

**Screw-on type TAC Mills**

# **T/EAW13 & T/EPW13 types**

**Milling made "easy"**



## The exact simulation analysis in the design has low cutting forces, and light weight !

- Analysis of the load transmitting route

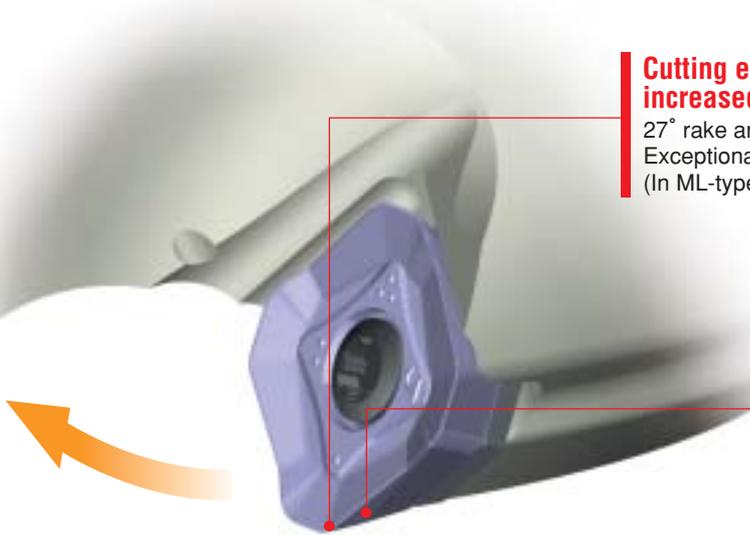


Lighter than competitor's cutters by 20 to 30 %.  
Lighter than existing TAC mills by 5 to 10 %.

## Low cutting forces and reliability for impact resistance

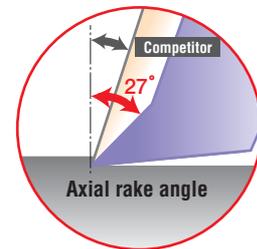
- Both the body and the insert are provided with a large rake angle.
- The insert provided with a double-relief angle.

Contribute to both the free cutting action and high toughness.



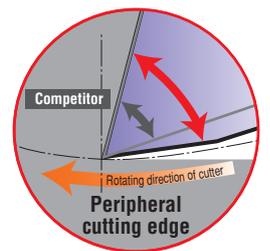
### Cutting edge inclination for increased free cutting action

27° rake angle !  
Exceptionally low cutting forces !  
(In ML-type chipbreaker)

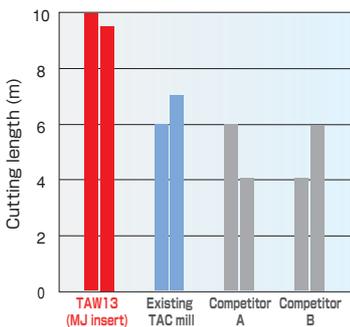


### Double-relief geometry for increase cutting-edge strength

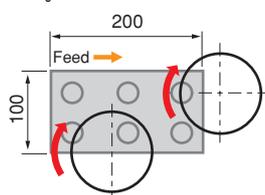
The peripheral cutting edges with two-step relief contribute to increased impact resistance.



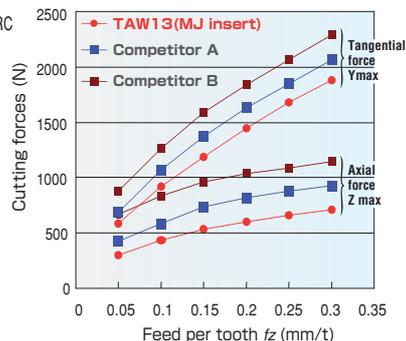
### Comparison of impact resistance



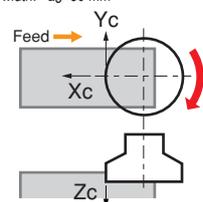
Work material: Carbon steel (JIS S50C), 30HRC  
Machine: BT50  
Cutting speed:  $V_c=150$  m/min  
Feed per tooth:  $f_z=0.3$  mm/t  
Depth of cut:  $a_p=2.0$  mm  
Cutting width:  $a_e=850$  mm



### Comparison of cutting forces



Work material: Carbon steel (JIS S55C), 210HB  
Machine: BT50  
Cutting speed:  $V_c=150$  m/min  
Feed per tooth:  $f_z=0.05\sim0.3$  mm/t  
Depth of cut:  $a_p=3.0$  mm  
Cutting width:  $a_e=80$  mm

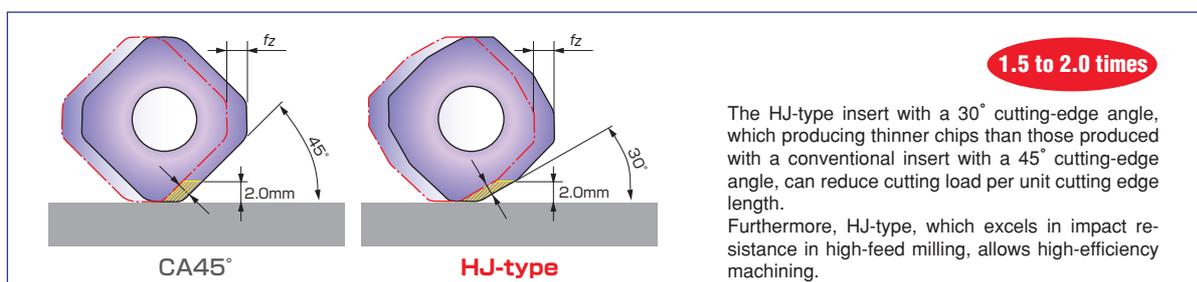


*realized high-rigidity,*



## High productivity

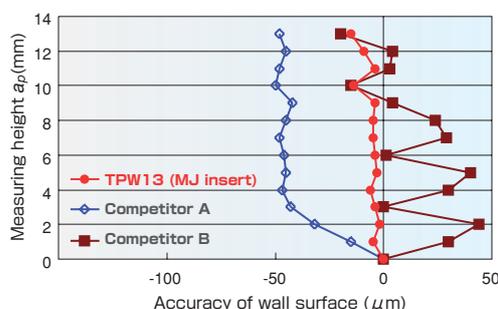
- Bodies are available in coarse, close, and extra-close (made to order) pitch design.
- For T/EAW13 type (45° corner angle), HJ-type inserts (dedicated for high-feed milling) are available. The HJ-type allows 1.5 to 2 times faster feeds than conventional inserts.



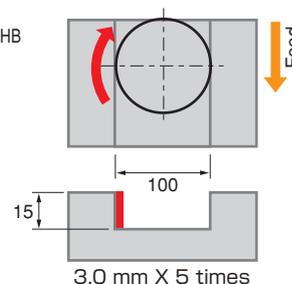
## High accuracy

- The body with highly improved axial and radial run-out can dramatically improve surface quality.
- T/EPW13 type with a 0° corner angle can dramatically reduce bumps formed in the boundary of cutting depths on the wall surface in multistep shouldering.

■ Accuracy of wall surface produced with 0° corner angle cutters.



Work material: Carbon steel (JIS S55C), 210HB  
 Machine: BT50  
 Cutting speed:  $V_c=100$  m/min  
 Feed per tooth:  $f_z=0.1$  mm/t  
 Depth of cut:  $a_p=3.0$  mm  
 Cutting width:  $a_e=100$  mm



## Highly functional body design

- Provided with air-holes applicable for through-the-spindle coolant system. Allows effective chip evacuation and coolant supply to the cutting point in machining aluminum alloy. (For the cutters of  $\leq \phi 125$  mm)
- Special surface treatment improves resistance to corrosion and rubbing.

## A full line of insert geometries covers a variety of machining

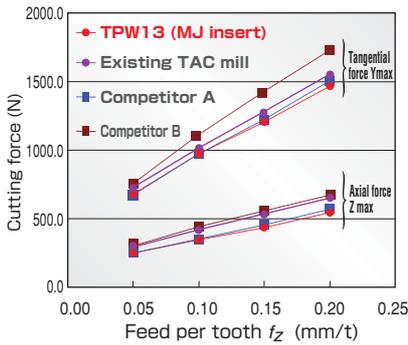
### MJ-type First choice for general purpose

General purpose chipbreaker applicable for a variety of materials and machining. Provided with both excellent impact resistance and low cutting forces.

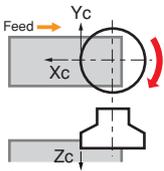


**P** Steels AH120 for general purpose, T3030 for high speed milling, and NS740 for high-quality surface. **M** Stainless steels AH140 **K** Cast Irons T1015

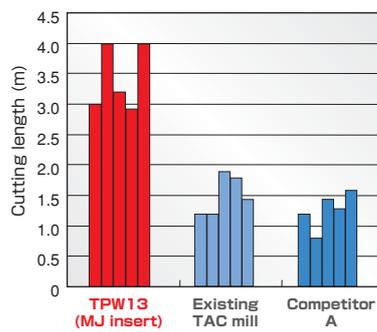
#### Cutting forces



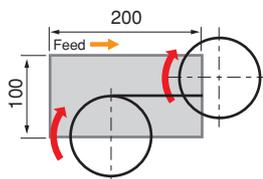
Work material: Carbon steel (JIS S55C)  
Machine: BT50  
Cutting speed:  $V_C=150$  m/min  
Feed per tooth:  $f_z=0.05\sim0.2$  mm/t  
Depth of cut:  $a_p=3.0$  mm  
Cutting width:  $a_e=80$  mm



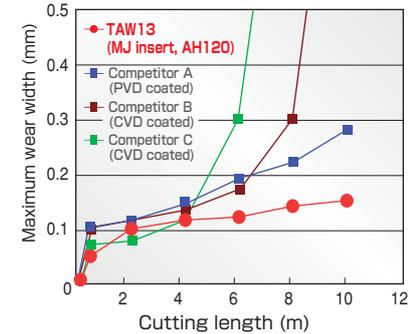
#### Impact resistance



Work material: Die steel (PX5)  
Machine: BT50  
Cutting speed:  $V_C=150$  m/min  
Feed per tooth:  $f_z=0.2$  mm/t  
Depth of cut:  $a_p=3.0$  mm  
Cutting width:  $a_e=50$  mm



#### Wear resistance



Work material: Chromium molybdenum steel equivalent to JIS SCM440, 30HRC  
Machine: BT40  
Cutting speed:  $V_C=150$  m/min  
Feed per tooth:  $f_z=0.25$  mm/t  
Depth of cut:  $a_p=2.0$  mm  
Cutting width:  $a_e=60$  mm  
Dry cutting, used with single tooth

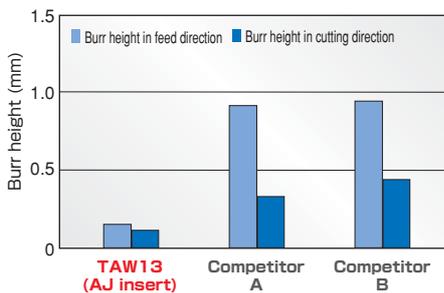
### AJ-type For machining aluminum alloys

Ground peripheral surfaces for accuracy. Large rake angle and mirror-like rake face. Excels in cutting edge sharpness and welding resistance and can suppress burr occurrence.

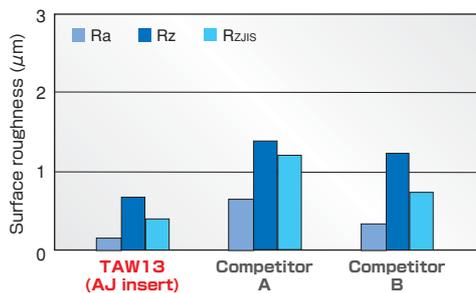


**N** Non ferrous metals KS05F

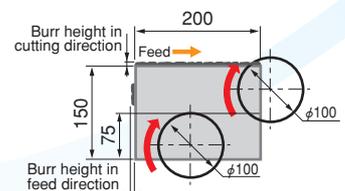
#### Burr height



#### Surface roughness

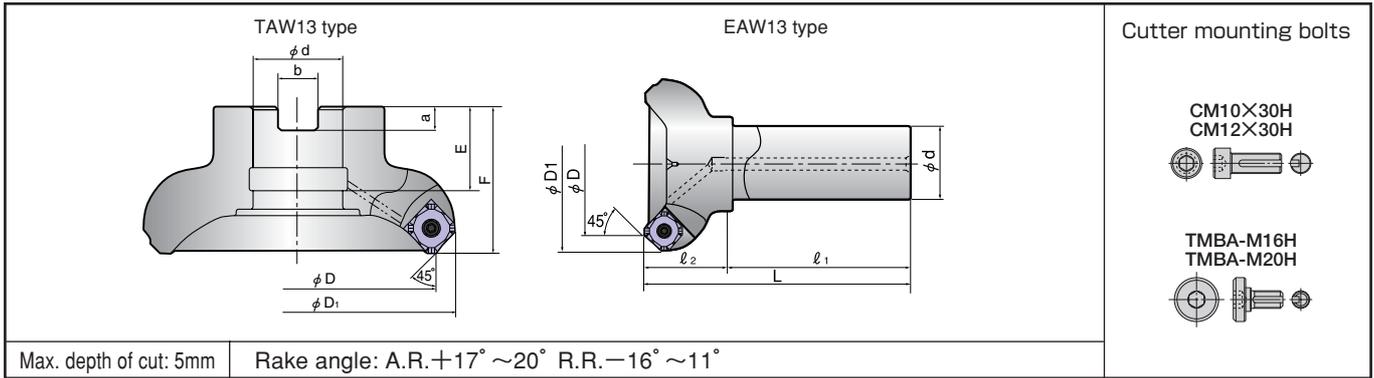


Work material: Aluminum alloy (JIS A5052)  
Machine: BT40  
Cutting speed:  $V_C=600$  m/min  
Feed per tooth:  $f_z=0.15$  mm/t  
Depth of cut:  $a_p=1.0$  mm  
Cutting width:  $a_e=75$  mm





## T/EAW13-type



Max. depth of cut: 5mm      Rake angle: A.R. +17° ~ 20° R.R. -16° ~ 11°

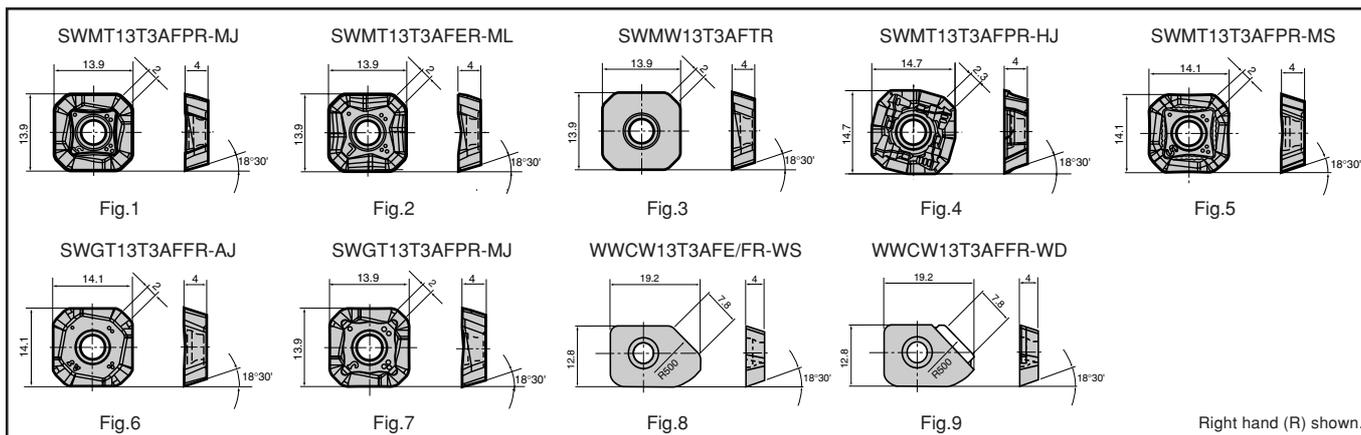
### TAW13 (Arbor type)

Cat. No.	Stock	No. of inserts	Dimensions (mm)								Weight (kg)	Air hole	Shim screw	Shim	Clamping screw	Wrench	Cutter mounting bolts
			φ D	φ D1	φ d	E	F	a	b								
Coarse pitch type	TAW13R050M22.0-03	●	3	50	63	22	20	40	6	10	0.4	With	DTS5-3.5SS	FSSA1102	CSPB-3.5	P-3.5 IP-15D	CM10X30H CM12X30H TMBA-M16H TMBA-M20H
	TAW13R063M22.0-04	●	4	63	76	22	20	40	6	10	0.5	With					
	TAW13R080M25.4-04	●	4	80	94	25.4	26	50	6	9.5	1	With					
	TAW13R100M31.7-05	●	5	100	114	31.75	32	50	8	12.7	1.5	With					
	TAW13R125M38.1-06	●	6	125	139	38.1	38	63	10	15.9	2.8	With					
	TAW13R160M50.8-07	●	7	160	174	50.8	40	63	11	19	4.4	Without					
	TAW13R200M47.6-08	●	8	200	213	47.625	38	63	14	25.4	8	Without					
	TAW13R250M47.6-10	●	10	250	263	47.625	38	63	14	25.4	13.5	Without					
TAW13R315M47.6-14	●	14	315	328	47.625	38	63	14	25.4	22.5	Without						
Close pitch type	TAW13R050M22.0-04	●	4	50	63	22	20	40	6	10	0.4	With	DTS5-3.5SS	FSSA1102	CSPB-3.5	P-3.5 IP-15D	CM10X30H CM12X30H TMBA-M16H TMBA-M20H
	TAW13R063M22.0-05	●	5	63	76	22	20	40	6	10	0.6	With					
	TAW13R080M25.4-06	●	6	80	94	25.4	26	50	6	9.5	1	With					
	TAW13R100M31.7-07	●	7	100	114	31.75	32	50	8	12.7	1.5	With					
	TAW13R125M38.1-08	●	8	125	139	38.1	38	63	10	15.9	2.7	With					
	TAW13R160M50.8-10	●	10	160	174	50.8	40	63	11	19	4.4	Without					
	TAW13R200M47.6-12	●	12	200	213	47.625	38	63	14	25.4	7.8	Without					
	TAW13R250M47.6-14	●	14	250	263	47.625	38	63	14	25.4	13.3	Without					
TAW13R315M47.6-18	●	18	315	328	47.625	38	63	14	25.4	22.2	Without						
Extra close pitch type	TAW13R050M22.0-05	●	5	50	63	22	20	40	6	10	0.4	With	DTS5-3.5SS	FSSA1102	CSPB-3.5	P-3.5 IP-15D	CM10X30H CM12X30H TMBA-M16H TMBA-M20H
	TAW13R063M22.0-06	●	6	63	76	22	20	40	6	10	0.6	With					
	TAW13R080M25.4-08	●	8	80	94	25.4	26	50	6	9.5	1	With					
	TAW13R100M31.7-10	●	10	100	114	31.75	32	50	8	12.7	1.5	With					
	TAW13R125M38.1-12	●	12	125	139	38.1	38	63	10	15.9	3	With					
	TAW13R160M50.8-16	●	16	160	174	50.8	40	63	11	19	4.4	Without					
	TAW13R200M47.6-20	●	20	200	213	47.625	38	63	14	25.4	8	Without					
	TAW13R250M47.6-24	●	24	250	263	47.625	38	63	14	25.4	13.5	Without					
TAW13R315M47.6-28	●	28	315	328	47.625	38	63	14	25.4	22.6	Without						

### EAW13 (Shank type)

Cat. No.	Stock	No. of inserts	Dimensions (mm)						Weight (kg)	Air hole	Shim screw	Shim	Clamping screw	Wrench	
			φ D	φ D1	φ d	R1	R2	L							
Coarse pitch type	EAW13R025M25.0-02	●	2	25	39	25	80	35	115	0.4	With	DTS5-3.5SS	FSSA1102	CSPB-3.5	IP-15D
	EAW13R032M32.0-02	●	2	32	46	32	80	35	115	0.7	With				
	EAW13R040M32.0-03	●	3	40	54	32	80	35	115	0.8	With				
	EAW13R050M32.0-03	●	3	50	63	32	80	40	120	1	With				
	EAW13R063M32.0-04	●	4	63	76	32	80	40	120	1.1	With				
	EAW13R080M32.0-04	●	4	80	94	32	80	40	120	1.5	With				
Close pitch type	EAW13R050M32.0-04	●	4	50	63	32	80	40	120	0.9	With	DTS5-3.5SS	FSSA1102	CSPB-3.5	P-3.5 IP-15D
	EAW13R063M32.0-05	●	5	63	76	32	80	40	120	1.1	With				
	EAW13R080M32.0-06	●	6	80	94	32	80	40	120	1.4	With				

Inserts



Type	Insert Cat. No.	Accuracy	Honing	Grade						Insert shape		
				Coated				Cermet	Uncoated		T-DIA	
				AH120	AH140	T3030	T1015					GH110
Regular	SWMT13T3AFPR-MJ	M	With	●	●	●	●		●			Fig.1
	SWMT13T3AFER-ML	M	With	●								Fig.2
	SWMW13T3AFTR	M	With	●		●	●		●			Fig.3
	SWMT13T3AFPR-HJ	M	With	●	●	●	●					Fig.4
	SWMT13T3AFPR-MS	M	With		●							Fig.5
Wiper	SWGT13T3AFFR-AJ	G	Without							●		Fig.6
	SWGT13T3AFPR-MJ	G	With	●					●			Fig.7
	WWCW13T3AFE/FR-WS	C	With					●	●			Fig.8
	WWCW13T3AFFR-WD	C	Without							●		Fig.9

Standard cutting conditions

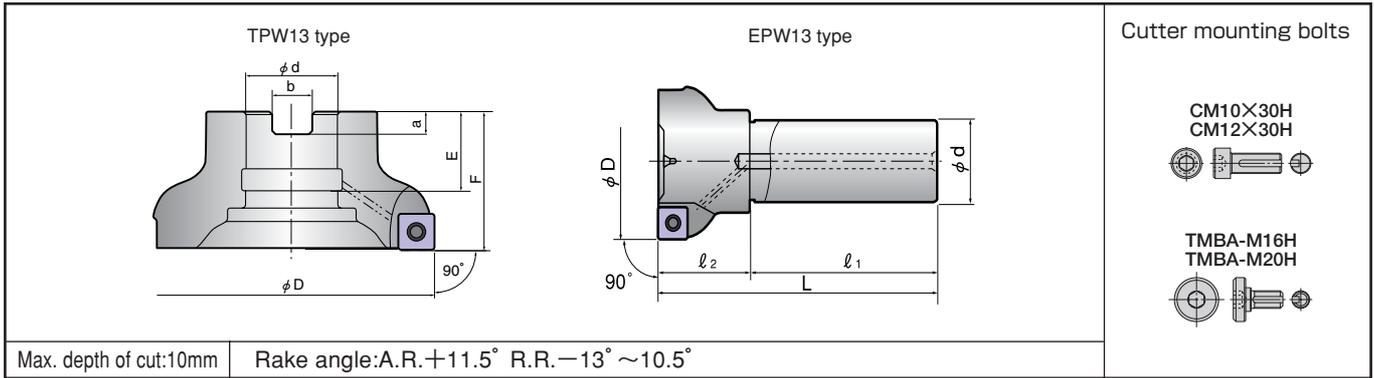
Work material	Recommended insert grade	Cutting speed $V_c$ (m/min)	Roughing (Depth of cut $\geq 1.0$ mm)					
			Feed per tooth $f_z$ (mm/t)					
			MJ	ML	HJ	MS	Flat top	AJ
Mild steels Low carbon steels (< 180HB)	AH120 (First choice)	100~180~270	0.05~0.3	0.05~0.25	0.2~0.6	—	0.05~0.3	—
	T3030 (Priority on wear resistance)	150~220~300	0.05~0.3	—	0.2~0.6	—	0.05~0.3	—
	AH140 (Priority on impact resistance)	80~130~180	0.05~0.3	—	—	0.1~0.25	—	—
	NS740 (Priority on surface finish)	100~200~300	0.05~0.23	—	—	—	0.05~0.23	—
Carbon steels Alloy steels (< 300HB)	AH120 (First choice)	100~150~230	0.05~0.25	0.05~0.2	0.2~0.5	—	0.05~0.25	—
	T3030 (Priority on wear resistance)	150~200~280	0.05~0.25	—	0.2~0.5	—	0.05~0.25	—
	AH140 (Priority on impact resistance)	80~120~150	0.05~0.25	—	0.2~0.5	—	—	—
	NS740 (Priority on surface finish)	100~150~230	0.05~0.2	—	—	—	0.05~0.2	—
Die steels (< 30HRC)	AH120 (First choice)	100~140~180	0.05~0.2	0.05~0.2	0.2~0.4	—	0.05~0.2	—
	T3030 (Priority on wear resistance)	100~140~180	0.05~0.2	—	0.2~0.4	—	0.05~0.2	—
Stainless steels (< 250HB)	AH140 (First choice)	80~150~200	0.1~0.25	—	0.2~0.5	0.1~0.2	—	—
	AH120 (Priority on wear resistance)	150~200~250	0.1~0.25	0.1~0.2	0.2~0.5	—	0.1~0.25	—
Gray cast irons Ductile cast irons	T1015 (First choice)	100~180~250	0.05~0.25	—	0.2~0.6	—	0.05~0.25	—
	AH120 (Priority on impact resistance)	100~180~250	0.05~0.25	0.05~0.2	0.2~0.6	—	0.05~0.25	—
Aluminum alloys (Si < 12%)	KS05F (First choice)	300~500~1000	—	—	—	—	—	0.05~0.2
Aluminum alloys (Si > 13%)	KS05F (First choice)	80~200~300	—	—	—	—	—	0.05~0.2
Copper alloys	KS05F (First choice)	200~350~500	—	—	—	—	—	0.05~0.2

Work material	Recommended insert grade	Cutting speed $V_c$ (m/min)	Light cutting to finishing (Depth of cut $\leq 1.0$ mm)					
			Feed per tooth $f_z$ (mm/t)					
			MJ	ML	HJ	MS	Flat top	AJ
Mild steels Low carbon steels (< 180HB)	AH120 (First choice)	100~180~270	0.05~0.25	0.05~0.2	0.2~0.6	—	0.05~0.25	—
	T3030 (Priority on wear resistance)	150~220~300	0.05~0.25	—	0.2~0.6	—	0.05~0.25	—
	AH140 (Priority on impact resistance)	80~130~180	0.05~0.25	—	—	0.1~0.2	—	—
	NS740 (Priority on surface finish)	100~200~300	0.05~0.2	—	—	—	0.05~0.2	—
Carbon steels Alloy steels (< 300HB)	AH120 (First choice)	100~150~230	0.05~0.2	0.05~0.15	0.2~0.5	—	0.05~0.2	—
	T3030 (Priority on wear resistance)	150~200~280	0.05~0.2	—	0.2~0.5	—	0.05~0.2	—
	AH140 (Priority on impact resistance)	80~120~150	0.05~0.2	—	0.2~0.5	—	—	—
	NS740 (Priority on surface finish)	100~150~230	0.05~0.18	—	—	—	0.05~0.18	—
Die steels (< 30HRC)	AH120 (First choice)	100~140~180	0.05~0.18	0.05~0.12	0.2~0.4	—	0.05~0.18	—
	T3030 (Priority on wear resistance)	100~140~180	0.05~0.18	—	0.2~0.4	—	0.05~0.18	—
Stainless steels (< 250HB)	AH140 (First choice)	80~150~200	0.1~0.2	—	0.2~0.5	0.1~0.18	—	—
	AH120 (Priority on wear resistance)	150~200~250	0.1~0.2	0.1~0.18	0.2~0.5	—	0.1~0.2	—
Gray cast irons Ductile cast irons	T1015 (First choice)	100~180~250	0.1~0.2	—	0.2~0.6	—	0.1~0.2	—
	AH120 (Priority on impact resistance)	100~180~250	0.1~0.2	0.05~0.18	0.2~0.6	—	0.1~0.2	—
Aluminum alloys (Si < 12%)	KS05F (First choice)	300~500~1000	—	—	—	—	—	0.05~0.2
Aluminum alloys (Si > 13%)	KS05F (First choice)	80~200~300	—	—	—	—	—	0.05~0.2
Copper alloys	KS05F (First choice)	200~350~500	—	—	—	—	—	0.05~0.2

Notes:

- When machining at large depth of cut or large cutting width,  $V_c$  and  $f_z$  should be set to the lower side.
- As a rule, dry machining (including air blow) is recommended. But, for excessive chip welding, such as when machining stainless steels, use a water soluble cutting fluid. In this case, use AH140 and set the cutting speed to  $V_c \leq 100$  m/min.
- When machining mild steel, carbon steel, or alloy steel in wet conditions, T3030 is recommended. In this case,  $V_c$  and  $f_z$  should be set lower.
- TAW13 type can not be used for ramping, plunging and drilling.

## T/EPW13-type



Max. depth of cut:10mm Rake angle:A.R.+11.5° R.R.-13°~10.5°

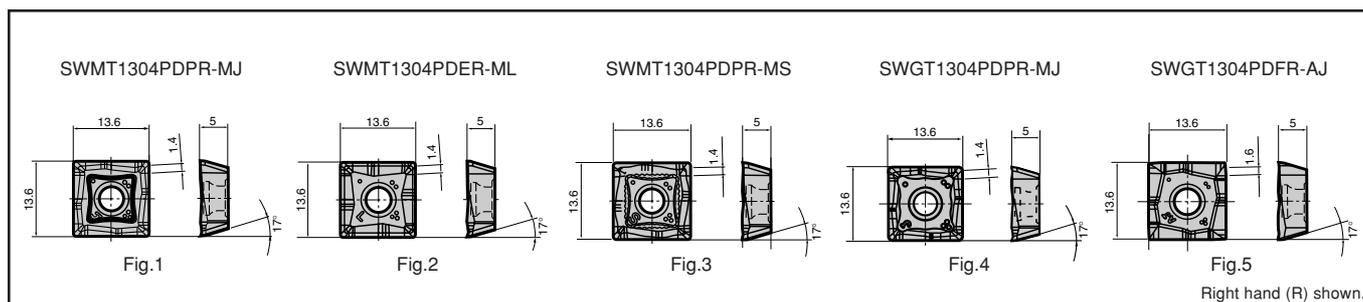
### TPW13 (Arbor type)

Cat. No.	Stock	No. of inserts	Dimensions (mm)						Weight (kg)	Air hole	Shim screw	Shim	Clamping screw	Wrench	Cutter mounting bolts
			$\phi D$	$\phi d$	E	F	a	b							
TPW13R050M22.0-03	●	3	50	22	20	40	6	10	0.3	With	DTS5-3.5SS	FSSP1102	CSPB-3.5	P-3.5 IP-15D	CM10X30H
TPW13R063M22.0-04	●	4	63	22	20	40	6	10	0.5	With					CM12X30H
TPW13R080M25.4-04	●	4	80	25.4	26	50	6	9.5	0.8	With					TMBA-M16H
TPW13R100M31.7-05	●	5	100	31.75	38	50	8	12.7	1.2	With					TMBA-M20H
TPW13R125M38.1-06	●	6	125	38.1	38	63	10	15.9	2.4	With					-
TPW13R160M50.8-08	●	8	160	50.8	38	63	11	19	4	Without					-
TPW13R200M47.6-10	●	10	200	47.625	38	63	14	25.4	7.4	Without					-
TPW13R250M47.6-12	●	12	250	47.625	38	63	14	25.4	12.6	Without					-
TPW13R050M22.0-04	●	4	50	22	20	40	6	10	0.3	With	DTS5-3.5SS	FSSP1102	CSPB-3.5	P-3.5 IP-15D	CM10X30H
TPW13R063M22.0-05	●	5	63	22	20	40	6	10	0.4	With					CM12X30H
TPW13R080M25.4-06	●	6	80	25.4	26	50	6	9.5	0.8	With					TMBA-M16H
TPW13R100M31.7-07	●	7	100	31.75	38	50	8	12.7	1.2	With					TMBA-M20H
TPW13R125M38.1-08	●	8	125	38.1	38	63	10	15.9	2.4	With					-
TPW13R160M50.8-12	●	12	160	50.8	38	63	11	19	4	Without					-
TPW13R200M47.6-16	●	16	200	47.625	38	63	14	25.4	7.4	Without					-
TPW13R250M47.6-18	●	18	250	47.625	38	63	14	25.4	12.7	Without					-
TPW13R050M22.0-05	●	5	50	22	20	40	6	10	0.3	With	DTS5-3.5SS	FSSP1102	CSPB-3.5	P-3.5 IP-15D	CM10X30H
TPW13R063M22.0-06	●	6	63	22	20	40	6	10	0.4	With					CM12X30H
TPW13R080M25.4-08	●	8	80	25.4	26	50	6	9.5	0.8	With					TMBA-M16H
TPW13R100M31.7-10	●	10	100	31.75	38	50	8	12.7	1.2	With					TMBA-M20H
TPW13R125M38.1-12	●	12	125	38.1	38	63	10	15.9	2.5	With					-
TPW13R160M50.8-15	●	15	160	50.8	38	63	11	19	4	Without					-

### EPW13 (Shank type)

Cat. No.	Stock	No. of inserts	Dimensions (mm)					Weight (kg)	Air hole	Shim screw	Shim	Clamping screw	Wrench
			$\phi D$	$\phi d$	$l_1$	$l_2$	L						
EPW13R025M25.0-01	●	1	25	25	80	35	115	0.4	With	DTS5-3.5SS	FSSP1102	CSPB-3.5	IP-15D
EPW13R032M32.0-02	●	2	32	32	80	35	115	0.6	With				
EPW13R040M32.0-03	●	3	40	32	80	35	115	0.7	With				
EPW13R050M32.0-03	●	3	50	32	80	40	120	0.9	With				P-3.5 IP-15D
EPW13R063M32.0-04	●	4	63	32	80	40	120	1	With				
EPW13R080M32.0-04	●	4	80	32	80	40	120	1.3	With				
EPW13R050M32.0-04	●	4	50	32	80	40	120	0.9	With	DTS5-3.5SS	FSSP1102	CSPB-3.5	P-3.5 IP-15D
EPW13R063M32.0-05	●	5	63	32	80	40	120	1	With				
EPW13R080M32.0-06	●	6	80	32	80	40	120	0.8	With				

**Inserts**



Insert Cat. No.	Accuracy	Honing	Grade						Insert shape
			Coated				Cermet	Uncoated	
			AH120	AH140	T3030	T1015	NS740	KS05F	
<b>SWMT1304PDPR-MJ</b>	M	With	●	●	●	●	●		Fig.1
<b>SWMT1304PDER-ML</b>	M	With	●						Fig.2
<b>SWMT1304PDPR-MS</b>	M	With		●					Fig.3
<b>SWGT1304PDPR-MJ</b>	G	With	●				●		Fig.4
<b>SWGT1304PDFR-AJ</b>	G	Without						●	Fig.5

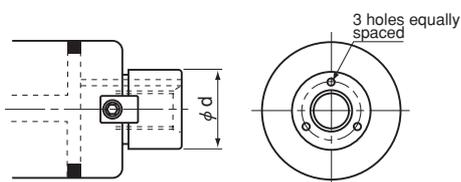
**Standard cutting conditions**

Work material	Recommended insert grade	Cutting speed $V_c$ (m/min)	Roughing (Depth of cut $\geq 1.0$ mm)				Light cutting to finishing (Depth of cut $\leq 1.0$ mm)			
			Feed per tooth $f_z$ (mm/t)				Feed per tooth $f_z$ (mm/t)			
			MJ	ML	MS	AJ	MJ	ML	MS	AJ
Mild steels	AH120 (First choice)	100~270	0.05~0.25	0.05~0.2	—	—	0.05~0.2	0.05~0.18	—	—
	T3030 (Priority on wear resistance)	150~300	0.05~0.25	—	—	—	0.05~0.2	—	—	—
	AH140 (Priority on impact resistance)	80~180	0.05~0.25	—	0.05~0.2	—	0.05~0.2	—	0.05~0.18	—
Low carbon steels (< 180HB)	NS740 (Priority on surface finish)	100~300	0.05~0.15	—	—	—	0.05~0.12	—	—	—
	AH120 (First choice)	100~230	0.05~0.2	0.05~0.15	—	—	0.05~0.18	0.05~0.12	—	—
	T3030 (Priority on wear resistance)	150~280	0.05~0.2	—	—	—	0.05~0.18	—	—	—
Carbon steels	AH140 (Priority on impact resistance)	80~150	0.05~0.2	—	—	—	0.05~0.18	—	—	—
	NS740 (Priority on surface finish)	100~230	0.05~0.15	—	—	—	0.05~0.12	—	—	—
	AH120 (First choice)	100~180	0.05~0.15	0.05~0.12	—	—	0.05~0.12	0.05~0.1	—	—
Alloy steels (< 300HB)	T3030 (Priority on wear resistance)	100~180	0.05~0.15	—	—	—	0.05~0.12	—	—	—
	AH140 (Priority on impact resistance)	80~200	0.05~0.2	—	0.05~0.18	—	0.05~0.18	—	0.05~0.15	—
	NS740 (Priority on surface finish)	150~250	0.05~0.2	0.05~0.15	—	—	0.05~0.18	0.05~0.12	—	—
Die steels (< 30HRC)	AH120 (First choice)	100~250	0.05~0.2	—	—	—	0.05~0.18	—	—	—
	AH120 (Priority on wear resistance)	100~250	0.05~0.2	0.05~0.15	—	—	0.05~0.18	0.05~0.12	—	—
	T1015 (First choice)	100~250	0.05~0.2	—	—	—	0.05~0.18	—	—	—
Stainless steels (< 250HB)	AH120 (First choice)	100~250	0.05~0.2	—	—	—	0.05~0.18	—	—	—
	AH120 (Priority on wear resistance)	100~250	0.05~0.2	0.05~0.15	—	—	0.05~0.18	0.05~0.12	—	—
	T1015 (First choice)	100~250	0.05~0.2	—	—	—	0.05~0.18	—	—	—
Gray cast irons Ductile cast irons	AH120 (First choice)	100~250	0.05~0.2	—	—	—	0.05~0.18	—	—	—
	AH120 (Priority on impact resistance)	100~250	0.05~0.2	0.05~0.15	—	—	0.05~0.18	0.05~0.12	—	—
	T1015 (First choice)	100~250	0.05~0.2	—	—	—	0.05~0.18	—	—	—
Aluminum alloys (Si < 12 %)	KS05F (First choice)	300~1000	—	—	—	0.05~0.2	—	—	—	0.05~0.2
	KS05F (First choice)	80~300	—	—	—	0.05~0.2	—	—	—	0.05~0.2
	KS05F (First choice)	200~500	—	—	—	0.05~0.2	—	—	—	0.05~0.2

Notes:

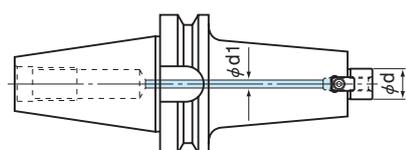
- When machining at large depth of cut or large cutting width,  $V_c$  and  $f_z$  should be set to the lower side.
- As a rule, dry machining (including air blow) is recommended. But, for excessive chip welding, such as when machining stainless steels, use a water soluble cutting fluid. In this case, use AH140 and set the cutting speed to  $V_c \leq 100$  m/min.
- When machining mild steel, carbon steel, or alloy steel in wet conditions, T3030 is recommended. In this case,  $V_c$  and  $f_z$  should be set lower.
- TPW13 type can not be used for ramping, plunging and drilling.

**Face mill arbors with center-through coolant hole**



Cutter diameter $\phi D$ (mm)	50/63	80	100	125	160
Nominal diameter $\phi d$ (mm)	22	25.4	31.75	38.1	50.8
Arbor type	FMH22	FMH25.4	FMH31.75	FMH38.1	FMH50.8

**Notes on arbors when using TAW13 or TPW13 type with center-through air.**



Nominal diameter $\phi d$ (mm)	16	22	25.4	31.75	38.1	50.8
Applicable arbor types	SMA SM1	FMC SM1	FMA FMC	FMA SMB	FMA	FMA
Through hole diameter $\phi d1$ (mm)	4~6	5~8	6~9	10~13	10~15	10~15

When using TAW13 or TPW13 type with center-through air (coolant or mist), the arbor to be used must be provided for center-through air supplying.

**Cautionary notes in use**

- In slotting or pocketing, when chips are likely to remain in the cutting zone, internal air supplying or air blow is recommended to prevent chip recutting.
- Use of inserts other than specified can result in incomplete cutting and cause damage to the cutter body. Therefore, specified inserts in our catalogs must be used.
- Before changing or indexing the inserts, remove chips or other foreign matter remained on the inserts and in the insert pocket of the cutter body by using an air blast or a wiping cloth.
- The inserts should be clamped by using the wrench supplied with the TAC Mill.
- After a long period of use, the clamping screws whose socket is deformed or damaged and the wrench whose tip is damaged or deformed must be replaced with specified new one respectively a little early.

## Machining examples

Cutter body: **TAW13R080M25.4-06 (φ 80, 6-teeth)**

Inserts: **SWMT13T3AFPR-MJ (AH120)**

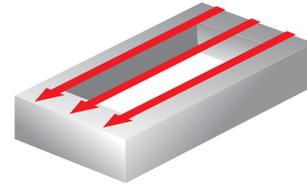
Work material: Chromium molybdenum steel (JIS SCM415)    Cutting speed:  $V_C=180$  m/min    Depth of cut:  $a_p=2.0$  mm  
Machine: Vertical machining center (BT50)    Feed per tooth:  $f_z=0.15$  mm/t

Existing tool

Cutter body: Competitor B (φ 80, 4-teeth)

Inserts: CVD coated

Work material: Carbon steel (JIS S55C)    Cutting speed:  $V_C=180$  m/min    Depth of cut:  $a_p=1.5$  mm  
Machine: Vertical machining center (BT50)    Feed per tooth:  $f_z=0.15$  mm/t



**Results** In the existing tooling, the tool life was unstable because of chatter build-up resulting from less rigid workpiece and low clamping rigidity. TAW13 (MJ), which features low cutting forces, could eliminate chatter and allowed smooth machining.



1.3 times the machining efficiency

1.8 times the tool life

Cutter body: **TAW13R100M31.7-07 (φ 100, 7-teeth)**

Inserts: **SWMT13T3AFPR-HJ (T3030)**

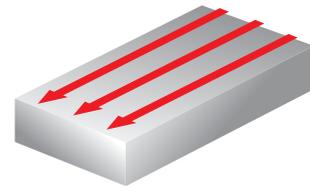
Work material: Carbon steel (JIS S55C)    Cutting speed:  $V_C=240$  m/min    Depth of cut:  $a_p=2$  mm  
Machine: Vertical machining center (BT50)    Feed per tooth:  $f_z=0.6$  mm/t    : Water soluble cutting fluid  
Feed:  $V_f=3,200$  mm/min

Existing tool

Cutter body: Competitor D

Inserts: PVD coated

Work material: Carbon steel (JIS S55C)    Cutting speed:  $V_C=220$  m/min    Depth of cut:  $a_p=2$  mm  
Machine: Vertical machining center (BT50)    Feed per tooth:  $f_z=0.25$  mm/t    : Water soluble cutting fluid  
Feed:  $V_f=1,200$  mm/min



**Results** By using the combination of TAW13 and HJ-inserts, the feed could be consistently up to 2.7 times that of the existing tool. Furthermore, in spite of increased conditions, the cutting noise level was lower. Allowed about 2.7 times the machining efficiency.

2.7 times the machining efficiency

Cutter body: **TAW13R080M25.4-06 (φ 80, 6-teeth)**

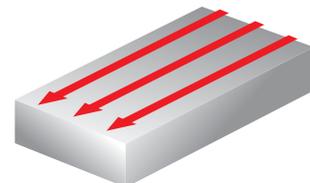
Inserts: **SWMT13T3AFPR-MJ (AH120)**

Work material: Mild steel (JIS SS400)    Cutting speed:  $V_C=230$  m/min    Depth of cut:  $a_p=2\sim3$  mm  
Machine: Vertical machining center (BT50)    Feed per tooth:  $f_z=0.33$  mm/t    :  $a_e=60$  mm  
Feed:  $V_f=1,800$  mm/min    : Dry cutting

Existing tool Cutter body: Competitor C (φ 100, 7-teeth)

Inserts: PVD coated

Work material: Mild steel (JIS SS400)    Cutting speed:  $V_C=180$  m/min    Depth of cut:  $a_p=2\sim3$  mm  
Machine: Vertical machining center (BT50)    Feed per tooth:  $f_z=0.2$  mm/t    :  $a_e=60$  mm  
Feed:  $V_f=800$  mm/min    : Dry cutting



**Results** The feed rate of the existing tool could not be increased because of excessive vibration during machining. The TAW13, because of the low cutting forces and less vibration, could increase the feed and allowed about 2.3 times the machining efficiency.

2.3 times the machining efficiency

Cutter body: TPW13R080M25.4-04 ( $\phi 80$ , 4-teeth)

Inserts: SWMT1304PDPR-MS (AH140)

Existing tool

Cutter body: Conventional cutter

Inserts: PVD coated

Work material: Stainless steel (JIS SUS304)

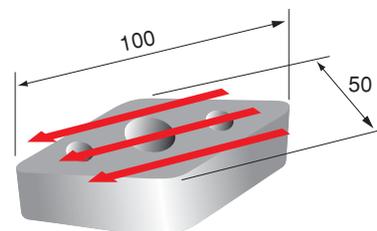
Machine: Vertical machining center (BT40)

Cutting speed:  $V_C=120$  m/min

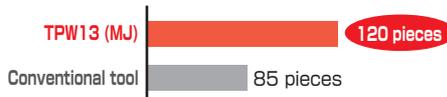
Feed per tooth:  $f_z=0.18$  mm/t

Depth of cut:  $a_p=1.2$  mm

: Water soluble cutting fluid



**Results** Tool life was 1.4 times longer than that of the conventional tool. Cutting noise level was lower than that of the conventional tool. Surface finish was also improved.



1.4 times the tool life

Cutter body: TPW13R080M25.4-06 ( $\phi 80$ , 6-teeth)

Inserts: SWMT1304PDPR-MJ (AH140)

Work material: Stainless steel (JIS SUS316)

Machine: Vertical machining center

Cutting speed:  $V_C=100$  m/min

Feed per tooth:  $f_z=0.1$  mm/t

Depth of cut:  $a_p=2.8$  mm  $\times$  5 passes

Cutting width:  $a_e=80$  mm

: Water soluble cutting fluid

Existing tool

Cutter body: Conventional cutter ( $\phi 80$ , 6-teeth)

Inserts: PVD coated

Work material: Stainless steel (JIS SUS316)

Machine: Vertical machining center

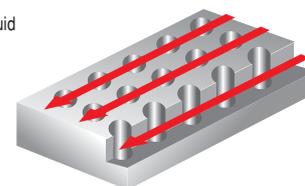
Cutting speed:  $V_C=100$  m/min

Feed per tooth:  $f_z=0.08$  mm/t

Depth of cut:  $a_p=2$  mm  $\times$  7 passes

Cutting width:  $a_e=80$  mm

: Water soluble cutting fluid



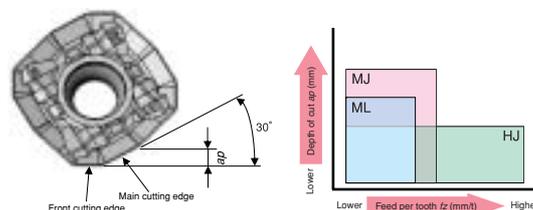
**Results** The conventional cutter could machine maximum 4 pieces. But the tool life was unstable due to unpredictable tool breakage. TPW13 could consistently machine 4 pieces or more. Furthermore, it showed less chatter vibration than the conventional cutter and could increase the depth of cut and feed.

1.5 times the machining efficiency

### Cautionary points in use for HJ inserts

HJ-type inserts provide a unique tool geometry to cope with higher feeds than MJ inserts. When using HJ inserts, care should be taken to the following points.

- Use the inserts within the maximum allowable depth of cut,  $a_p=2$  mm.
- Do not use the inserts together with other types (such as MJ, MS, etc.) in the same body.
- The peripheral shape of HJ-type insert differs from those of other types (MJ, MS, etc.). But, it can be commonly used in the same insert pocket.



### Cautionary points in use for wiper insert

● When requiring good surface finish, use of a wiper insert (WWCW13T3AF\_R-W\_) is recommended. In general, installing of one wiper insert allows superior surface finish.

● When using the wiper insert, install the insert as shown in Fig.1. If the insert is installed as shown in Fig.2, the breakage of the insert is inevitable and normal surface finish can not be obtained.

● The wiper insert has one wiping corner.

● The peripheral cutting edge of the wiper insert is retracted from the edge of the normal inserts. Therefore, the feed per tooth ( $f_z$  mm/t) of the normal insert following the wiper insert is two times that of other normal inserts.

● When using the wiper insert, the depth of cut ( $a_p$ ) less than 1 mm is recommended.

Fig.1

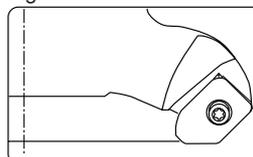
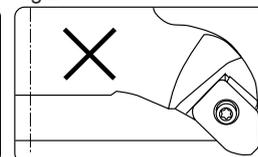


Fig.2





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