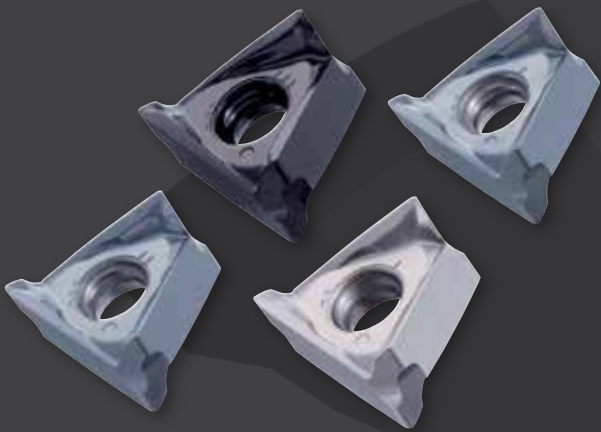




6-corner shoulder cutter series

# PSTW

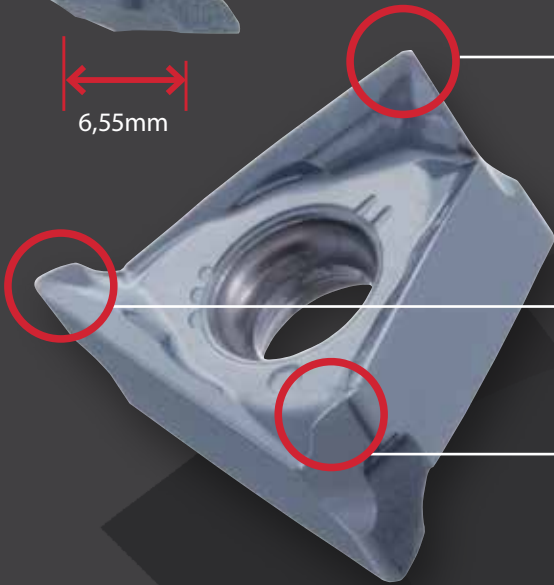
Volume 2



# KEY FEATURES: PHOENIX PSTW



6,55mm



● Positive rake angle geometry

● Economical 3 cutting edges per side (total of 6)

● Flat cutting edge for excellent surface finish



1

2

Chip pocket uniquely designed for heavy machining to enable maximum efficiency

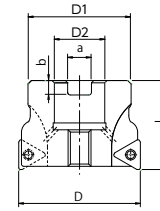
# PSTW BORE

Milling | Indexables

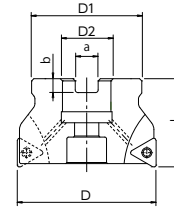


- 90° shoulder cutter
- Double sided 6 corners inserts
- Bore type
- 50 - 125 mm

Type 1






Type 2



EDP	Designation	Z	D	D1	D2	L	a	b	Type	Specification	Price
7803100	PSTW12R050M22-3	3	50	45	22	40	10,4	6,3	1	With coolant hole	
7803101	PSTW12R050M22-4	4	50	45	22	40	10,4	6,3	1	With coolant hole	
7803102	PSTW12R063M22-3	3	63	50	22	40	10,4	6,3	2	With coolant hole	
7803103	PSTW12R063M22-5	5	63	50	22	40	10,4	6,3	2	With coolant hole	
7803110	PSTW12R080M27-5	5	80	60	27	50	12,4	7	2	With coolant hole	
7803111	PSTW12R080M27-6	6	80	60	27	50	12,4	7	2	With coolant hole	
7803112	PSTW12R100M32-5	5	100	70	32	50	14,4	8	2	With coolant hole	
7803113	PSTW12R100M32-7	7	100	70	32	50	14,4	8	2	With coolant hole	
7803114	PSTW12R125M40-7	7	125	90	40	63	16,4	9	2	With coolant hole	
7803115	PSTW12R125M40-9	9	125	90	40	63	16,4	9	2	With coolant hole	

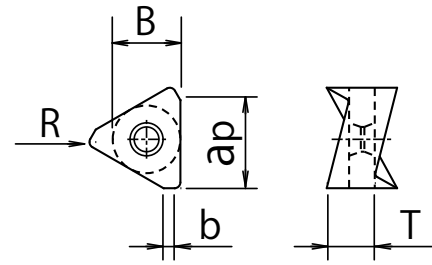
## Accessories & spare parts

Applicable cutter	 Clamping screw		 Power screw		 Wrench	
	Ø 50~125	7808129	FS40511 (Torx 15)			7808208
Ø 50			7808151	PS1031 (M10X31)		



# PSTW INSERTS

Milling | Indexables



- 90° shoulder cutter
- Double sided 6 corners inserts

EDP	Designation	Z	B	T	R	b	ap max	Grade	P		M		K		N		S		H		Price	
									dry	⊖	dry	⊖	GG	GGG	dry	⊖	dry	⊖	dry	⊖		
7811087	TNHU120608ER-NM	6	10,8	6,55	0,8	1,25	12	CK010														
7827088	TNKH120608ER-GM	6	10,8	6,55	0,8	1,5	12	XC3020	⊖				⊖	⊖								
7828088	TNKH120608ER-GM	6	10,8	6,55	0,8	1,5	12	XP3025		⊖			⊖	⊖								
7825089	TNKH120608ER-GL	6	10,8	6,55	0,8	1,5	12	XC3030	⊖				⊖	⊖								
7825088	TNKH120608ER-GM	6	10,8	6,55	0,8	1,5	12	XC3030	⊖				⊖	⊖								
7814089	TNKH120608ER-GL	6	10,8	6,55	0,8	1,5	12	XP3035	⊖	⊖			⊖	⊖								
7814094	TNKH120612ER-GM	6	10,8	6,55	1,2	1,0	12	XP3035	⊖	⊖			⊖	⊖								
7814095	TNKH120616ER-GM	6	10,8	6,55	1,6	0,75	12	XP3035	⊖	⊖			⊖	⊖								
7814096	TNKH120620ER-GM	6	10,8	6,55	2,0	0,60	12	XP3035	⊖	⊖			⊖	⊖								
7814088	TNKH120608ER-GM	6	10,8	6,55	0,8	1,5	12	XP3035	⊖	⊖			⊖	⊖								
7813088	TNKH120608ER-GM	6	10,8	6,55	0,8	1,5	12	XP2040	⊖	⊖			⊖	⊖				⊖	⊖			
7813094	TNKH120612ER-GM	6	10,8	6,55	1,2	1,0	12	XP2040	⊖	⊖			⊖	⊖				⊖	⊖			
7813095	TNKH120616ER-GM	6	10,8	6,55	1,6	0,75	12	XP2040	⊖	⊖			⊖	⊖				⊖	⊖			
7813096	TNKH120620ER-GM	6	10,8	6,55	2,0	0,60	12	XP2040	⊖	⊖			⊖	⊖				⊖	⊖			
7813089	TNKH120608ER-GL	6	10,8	6,55	0,8	1,5	12	XP2040	⊖	⊖			⊖	⊖				⊖	⊖			
7812088	TNKH120608ER-GM	6	10,8	6,55	0,8	1,5	12	XC1015					⊖	⊖								
7812090	TNKH120608ER-GR	6	10,8	6,55	0,8	1,5	12	XC1015					⊖	⊖								
7821088	TNKH120608ER-GM	6	10,8	6,55	0,8	1,5	12	XP1020					⊖	⊖								
7821090	TNKH120608ER-GR	6	10,8	6,55	0,8	1,5	12	XP1020					⊖	⊖								
7816091	TNKH120608ER-SM	6	10,8	6,55	0,8	1,5	12	XC5040				⊖						⊖				

## Cutting conditions

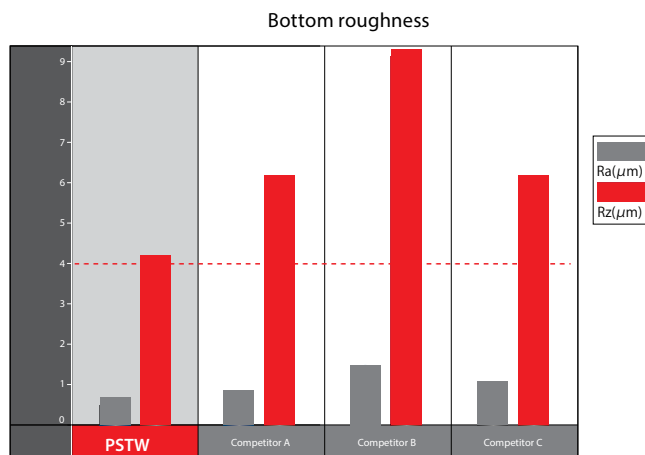
	Work Material	Tensile Strength / Hardness	Milling Speed Vc (m/min)	Feed per Tooth fz (mm/t)	Depth of Cut ap (mm)
P	Mild Steel-Carbon Steel (S5400-S10C)	~180HB	180 (100~250)	0,15 (0,05~0,25)	3
	Carbon Steel-Alloy Steel (S50C-SCM440)	~280HB	180 (100~250)	0,15 (0,05~0,25)	3
	Die Steel (SKD11-SKD61)	~280HB	150 (80~200)	0,12 (0,05~0,2)	3
M	Stainless Steel (Dry) (SUS304-SUS420)	~250HB	150 (80~200)	0,1 (0,05~0,18)	2
	Stainless Steel (Wet) (SUS304,SUS420)	~250HB	80 (60~120)	0,1 (0,05~0,18)	2
K	Cast Iron (FC250)	~350N/mm <sup>2</sup>	200 (100~350)	0,2 (0,1~0,3)	3
	Ductile Cast Iron (FCD400)	~800N/mm <sup>2</sup>	180 (100~270)	0,15 (0,05~0,25)	3
S	Superalloy (Wet) (Inconel®718)	-	35 (25~60)	0,08 (0,05~0,15)	1
	Titanium Alloy (Ti-Al-4V)	-	40 (30~120)	0,08 (0,05~0,15)	1,5
H	Pre-hardened Steel (NAK80)	40~43HRC	100 (50~150)	0,1 (0,08~0,2)	1,5
	Steel for Die Casting (DAC55-DH31)	43~48HRC	80 (40~120)	0,08 (0,06~0,15)	1
	Hardened Steel (SKD11)	50~55HRC	60 (40~90)	0,06 (0,05~0,1)	0,5

# PHOENIX PSTW

Milling | Indexables

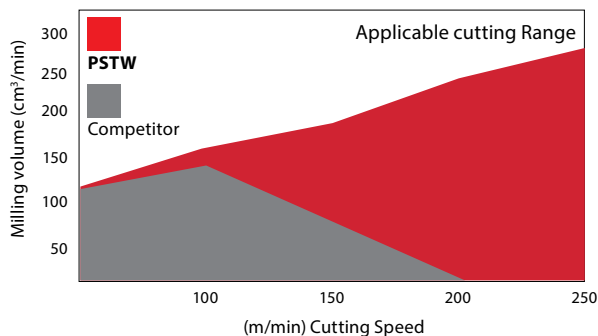
## Excellent surface roughness

Tool	PSTW12R050M22-4 (Ø 50 x 4 flutes)
Insert Grade	TNKG120608ER-GM (XP3035)
Work Material	S50C
Cutting Speed	200m/min (1,274min <sup>-1</sup> )
Feed	510mm/min (0.1mm/t)
Depth of cut	a <sub>p</sub> =0.2mm a <sub>e</sub> =32mm
Coolant	Air Blow
Machine	Horizontal Machining Center



## High efficiency even in long overhang length applications

Tool	PSTW12R050M22-4 (Ø 50 x 4 flutes)	(Ø 50 x 5 flutes) Competitor's Single Sided Insert Cutter
Insert grade	TNKG120608ER-GM (XP3035)	Coated Carbide Insert
Work Material	S50C	
Cutting Method	Slot Milling	
Depth of cut	a <sub>p</sub> =3mm a <sub>e</sub> =50mm	
Overhang length	190mm(3.8D)	
Coolant	Air Blow	
Machine	Horizontal Machining Center	



## Insert variation based on application

Chipbreaker	NM	GL	GM	GR	SM
	Aluminium Alloy & Non-Ferrous metal	Low-resistance machining	Multi-purpose machining & General steel milling	Intermittent machining & Cast iron machining	Superalloy & Difficult-to-machine material
Application					



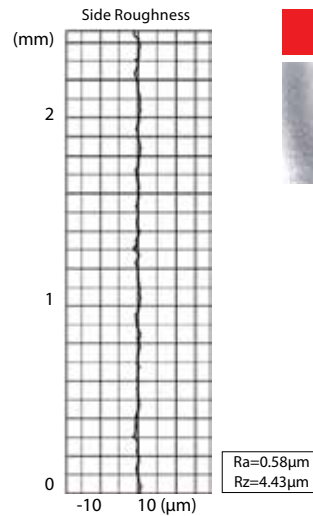
# PROCESSING DATA

Milling | Indexables

## High-precision machining of press mold slide surface

<b>Tool</b>	PSTW12R050M22-4 (Ø50 x 4 flutes)
<b>Insert Grade</b>	TNKU120608ER-GR (XP1020)
<b>Work Material</b>	FCD500
<b>Cutting Speed</b>	300m/min (1,910min <sup>-1</sup> )
<b>Feed</b>	1,700mm/min (0.2mm/t)
<b>Depth of Cut</b>	ap=0.5mm ae=0.3mm
<b>Overhang Length</b>	240mm
<b>Coolant</b>	Air Blow
<b>Machine</b>	Double Column Machining Center

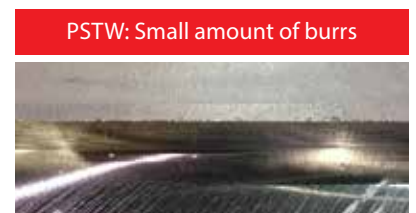
The PSTW was able to achieve excellent surface precision during side finishing, satisfying the required run-out accuracy of under 10µm.



## High efficiency machining of SUS304 (Stainless steel)

<b>Tool</b>	PSTW12R050M22-4 (Ø50 x 4 flutes)	Competitor's Single Sided Insert Cutter (Ø50 x 5 flutes)
<b>Insert Grade</b>	TNKU120608ER-GL (XP2040)	Coated Carbide Insert
<b>Work Material</b>	SUS304	
<b>Cutting Speed</b>	150m/min(955min <sup>-1</sup> )	
<b>Feed</b>	700mm/min(0.18mm/t)	700mm/min(0.15mm/t)
<b>Depth of Cut</b>	ap=5mm ae=35mm	ap=3mm ae=35mm
<b>Coolant</b>	Water Soluble	
<b>Machine</b>	Double Column Machining Center	

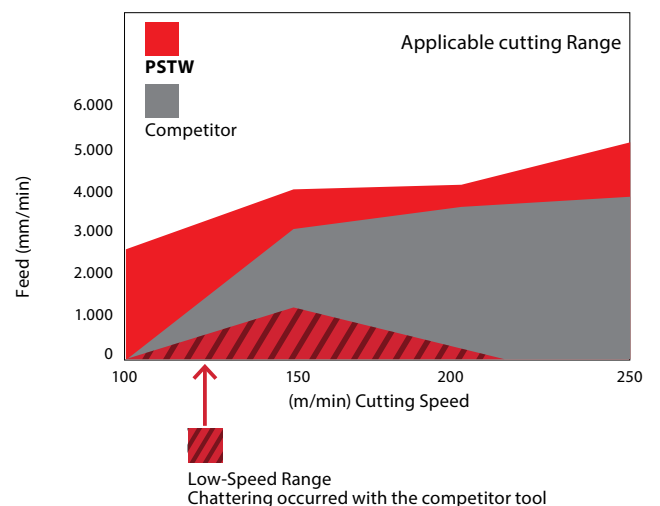
With the increase of depth of cut (ap), the competitor tool exhibited chattering and burrs, which hindered further efficiency improvement. Whereas the PSTW, even with one less corner, was able to increase machining efficiency by 67%, allowing high productivity.



## Highly efficient stable processing of long overhang length of 300 mm (5D)

<b>Tool</b>	PSTW12R063M22-5 (Ø63 x 5 flutes)	Competitor's Double Sided Insert Cutter (Ø63 x 4 flutes)
<b>Insert Grade</b>	TNKU120608ER-GM (XC3030)	Coated Carbide Insert
<b>Work Material</b>	FC250	
<b>Depth of Cut</b>	ap=2mm ae=44mm	
<b>Overhang Length</b>	300mm (5D)	
<b>Coolant</b>	Air Blow	
<b>Machine</b>	Horizontal Machining Center	

In this test, the PSTW achieved higher efficiency versus the competitor tool in the processing of long overhang length of L/D=5. Furthermore, due to the lack of sharpness in the cutting edge, the competitor tool had poor contact with the workpiece in the low-speed machining range, resulting in chattering (lined area on graph). With an ultra sharp cutting edge, the PSTW was able to achieve stable performance even in the low-speed cutting range.



Milling | Indexables

Processing Data

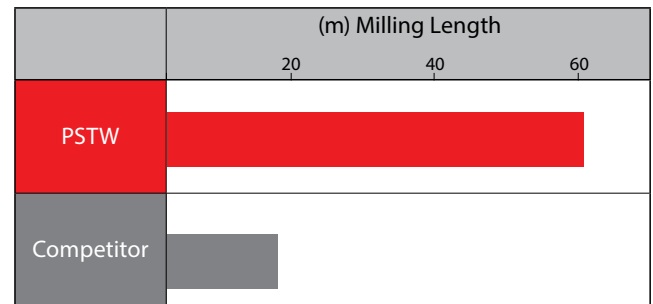
# PROCESSING DATA

Milling | Indexables

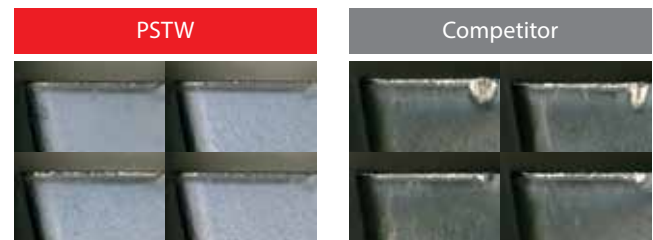
## Rough milling of construction machinery control valve

Tool	<b>PSTW12R063M22-5</b> (Ø63 x 5 flutes)	Competitor's Double Sided Insert Cutter (Ø63x 5 flutes)
Insert Grade	TNKU120608ER-GR (XP1020)	Coated Carbide Insert
Work Material	FCD500	
Cutting Speed	180m/min(910min <sup>-1</sup> )	
Feed	1,000mm/min(0.22mm/t)	
Depth of Cut	ap=3mm ae=45mm	
Coolant	Air Blow	
Machine	Horizontal Machining Center	

The PSTW demonstrated much greater wear resistance versus the competitor tool. In particular, it was able to effectively suppress wear progress of the cutting edge and achieved 3.5 times the durability versus the competitor.



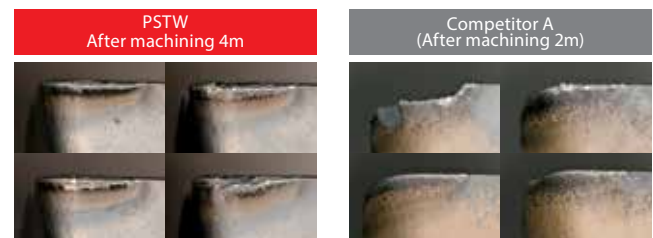
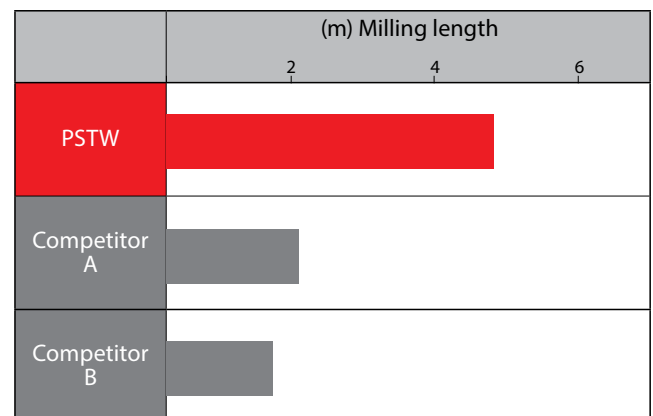
After machining 17m



## Long tool life in Ti-6Al-4V

Tool	<b>PSTW12R050M22-4</b> (Ø50 x 4 flutes)	Competitor's Double Sided Insert Cutter A,B (Ø50x 4 flutes)
Insert Grade	TNKU120608ER-SM (XC5040)	Coated Carbide Insert
Work Material	Ti-6Al-4V	
Cutting Speed	40m/min(255min <sup>-1</sup> )	
Feed	82mm/min(0.08mm/t)	
Depth of Cut	ap=1.5mm ae=20mm	
Coolant	Air Blow	
Machine	Horizontal Machining Center	

The PSTW (XC5040) was able to suppress wear resistance to prolong durability whereas the competitor equivalent product (double sided triangle insert) exhibited early wear and chipping.





shaping your dreams

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