

High-Efficient and High Precision Tangential
Shoulder Milling Cutter

„Sumi Dual Mill“ **TSX** Series



"Sumi Dual Mill" Series

TSX Type



General Features

High-efficient and high precision tangential shoulder milling cutter with tangentially mounted carbide inserts.

Characteristics

- **Tough & Sharp cutting edge**
Tangentially mounted carbide insert design and optimized edge geometry realize extremely tough and sharp cutting action.
- **Very accurate and excellent surface finish**
Thanks to newly developed fine carbide press / sintering technology and very accurate grinding technics, periphery ground inserts generate very accurate and excellent surface finish.
- **Wide product range**
2 different insert size series, 3 chip breaker range and various carbide grade combination offer wide range of machining application.

Product Range

	Cat. No.	Series	Diameter Range / No of Teeth											Shape
			Ø16	Ø20	Ø25	Ø32	Ø40	Ø50	Ø63	Ø80	Ø100	Ø125	Ø160	
Shell Type	TSX 08000RS	Standard Pitch					4	5	6					
	TSXF 08000RS	Fine Pitch					6	8	10					
	TSX 13000RS	Standard Pitch					3	4	5	5	6	7	8	
	TSXM 13000RS	Medium Pitch					4	5	6	7	8	10	12	
Shank Type	TSX 08000E	Standard Pitch	2	2	3	3	4							
	TSXF 08000E	Fine Pitch		3	4	5	6							
	TSX 13000E	Standard Pitch			2	2	3	4						
	TSXM 13000E	Medium Pitch				3	4	5						

Special TSX Mills

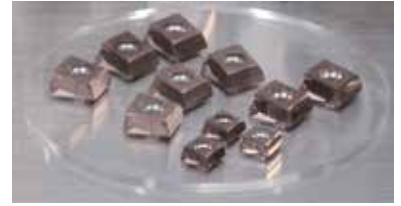
Special orders repeater and side cutter available.



"Sumi Dual Mill" Series TSX Type

■ Insert Grade Selection

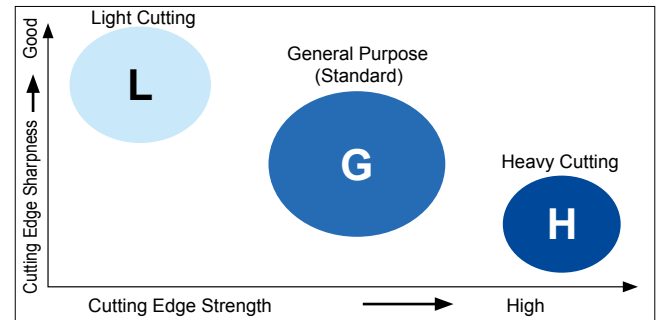
We have released ACP100 / ACP200 / ACP300 grades for steel machining, ACM200 / ACM300 grades for stainless steel machining and ACK200 / ACK300 grades for cast iron machining to cover a wide range of work materials.



ISO	Finishing to Light Cut	Medium Cut	Rough to Heavy Cut
P	ACP100	ACP200	ACP300
M	ACM200	ACM300	
K	ACK200	ACK300	
S		ACM200	ACM300

 PVD
  CVD

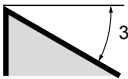
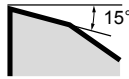
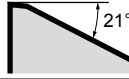
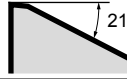
■ Chipbreaker Selection



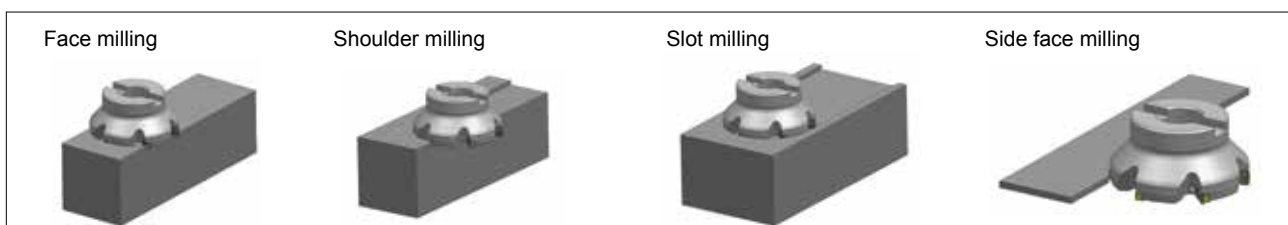
■ Inserts

Cat. No.	R0,4	R0,8	R1,2	R1,6	R2,4	R3,2
LNEX0804__PNER-L	●	●				
LNEX0804__PNER-G	●	●	●	●		
LNEX1306__PNER-L	●	●				
LNEX1306__PNER-G		●		●	●	●
LNEX1306__PNER-H	●	●		●	●	●

■ Chipbreaker Selection

Work Material	P M K S		
	L type	G type	H type
Chipbreaker			
Feature	Low cutting force	General purpose	Strong edge
LNEX08 Cutting edge geometry			—
LNEX13 Cutting edge geometry			
Application	Light cut, low rigidity milling and reduced burrs	Main breaker for general purpose applications	Roughing, heavy interrupted and hardness steel milling

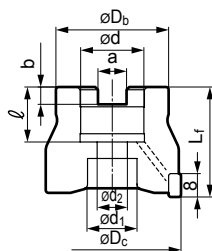
■ Suitable Applications



"Sumi Dual Mill" Series

TSX(F) 08000 RS

■ Body - Shell Type



Rake Angle	Radial	-20°	8mm	90°
	Axial	-6°		

● Body - TSX, Standard Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)
		ϕD_c	ϕD_b	L_f	ϕd	a	b	ℓ	ϕd_1	ϕd_2		
TSX 08040 RS	●	40	33	40	16	8,4	5,6	18	14	9	4	0,21
08050 RS	●	50	41	40	22	10,4	6,3	20	18	11	5	0,30
08063 RS	●	63	50	40	22	10,4	6,3	20	18	11	6	0,53

Inserts are not included.

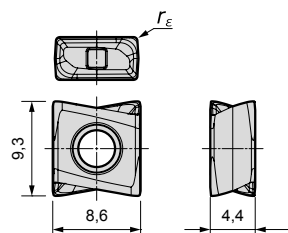
● Body - TSXF, Fine Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)
		ϕD_c	ϕD_b	L_f	ϕd	a	b	ℓ	ϕd_1	ϕd_2		
TSXF08040 RS	●	40	33	40	16	8,4	5,6	18	14	9	6	0,21
08050 RS	●	50	41	40	22	10,4	6,3	20	18	11	8	0,31
08063 RS	●	63	50	40	22	10,4	6,3	20	18	11	10	0,54

Inserts are not included.

■ Inserts

Grade		Coated Carbide						P	Steel
Application	High Speed / Light Cutting							M	Stainless Steel
	General Purpose Cutting							K	Cast Iron
	Rough Cutting							S	Exotic Alloy
Cat. No.		ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	Radius
									r_ϵ
LNEX 080404 PNER-L		●	●	●	●	●	●	●	0,4
080408 PNER-L		●	●	●	●	●	●	●	0,8
LNEX 080404 PNER-G		●	●	●	●	●	●	●	0,4
080408 PNER-G		●	●	●	●	●	●	●	0,8
080412 PNER-G		●	●	●	●	●	●	●	1,2
080416 PNER-G		●	●	●	●	●	●	●	1,6



■ Recommended Cutting Conditions

Min. - Optimum - Max.

ISO	Work-material	Hardness	Cutting Speed v_c (m/min)	Feed Rate f_t (mm/T)	Grade
P	Carbon Steel	180~280HB	150 - 225 - 300	0,08 - 0,20 - 0,30	ACP100 ACP200 ACP300
		> 280HB	75 - 150 - 230	0,08 - 0,20 - 0,30	
	Alloy Steel	180~280HB	100 - 175 - 250	0,08 - 0,15 - 0,25	
M	Stainless Steel	220~280HB	90 - 135 - 180	0,08 - 0,15 - 0,25	ACM200 ACM300
		>280HB	75 - 125 - 170	0,08 - 0,15 - 0,25	
K	Cast Iron Ductile Cast Iron	250HB	100 - 175 - 250	0,08 - 0,20 - 0,30	ACK200 ACK300
S	Exotic Material	-	30 - 60 - 90	0,05 - 0,10 - 0,15	ACM200 ACM300

■ Identification Details

TSX	F	08	050	R	S
Cutter Series	F: Fine Pitch	Insert Size	Cutter Diameter	Direction	Metric Type

■ Spare Parts

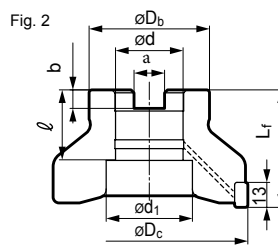
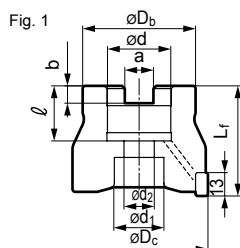
Screw	Wrench
BFTX0308IP	TRDR08IP

● = Euro stock

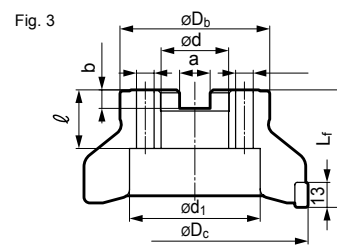
"Sumi Dual Mill" Series

TSX(M) 13000 RS

Body - Shell Type



Rake Angle	Radial	-15°	12mm	90°
	Axial	-6°		



Body - TSX, Standard Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Figure
		øD _c	øD _b	L _f	ød	a	b	ℓ	ød ₁	ød ₂			
TSX 13040 RS	●	40	33	40	16	8,4	5,6	18	14	9	3	0,20	1
13050 RS	●	50	41	40	22	10,4	6,3	20	18	11	4	0,30	1
13063 RS	●	63	50	40	22	10,4	6,3	20	18	11	5	0,50	1
13080 RS	●	80	55	50	27	12,4	7,0	22	20	14	5	0,92	1
13100 RS	●	100	70	50	32	14,4	8,0	32	46	-	6	1,35	2
13125 RS	●	125	80	63	40	16,4	9,0	29	52	29	7	2,55	1
13160 RS	●	160	130	63	40	16,4	9,0	29	90	-	8	4,97	3

Inserts are not included.

*Please use JIS B1176 hexagonal bolt ($\phi 80$: M12x30~35mm, $\phi 100$: M16x40~45mm) for securing $\phi 80$ / $\phi 100$ cutter on the arbor.

Body - TSXM, Medium Pitch

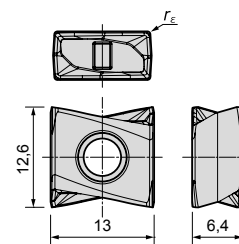
Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Figure
		øD _c	øD _b	L _f	ød	a	b	ℓ	ød ₁	ød ₂			
TSXM 13040 RS	●	40	33	40	16	8,4	5,6	18	14	9	4	0,19	1
13050 RS	●	50	41	40	22	10,4	6,3	20	18	11	5	0,28	1
13063 RS	●	63	50	40	22	10,4	6,3	20	18	11	6	0,50	1
13080 RS	●	80	55	50	27	12,4	7,0	22	20	14	7	0,92	1
13100 RS	●	100	70	50	32	14,4	8,0	32	46	-	8	1,36	2
13125 RS	●	125	80	63	40	16,4	9,0	29	52	29	10	2,57	1
13160 RS	●	160	130	63	40	16,4	9,0	29	90	-	12	5,02	3

Inserts are not included.

*Please use JIS B1176 hexagonal bolt ($\phi 80$: M12x30~35mm, $\phi 100$: M16x40~45mm) for securing $\phi 80$ / $\phi 100$ cutter on the arbor.

Inserts

Grade		Coated Carbide						Steel	
Application	High Speed / Light Cutting							Stainless Steel	
	General Purpose Cutting							Cast Iron	
	Rough Cutting							Exotic Alloy	
Cat. No.		ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	Radius
									r_ϵ
LNEX 130604 PNER-L		●	●	●	●	●	●	●	0,4
130608 PNER-L		●	●	●	●	●	●	●	0,8
LNEX 130604 PNER-G		●	●	●	●	●	●	●	0,4
130608 PNER-G		●	●	●	●	●	●	●	0,8
130616 PNER-G		●	●	●	●	●	●	●	1,6
130624 PNER-G		●	●	●	●	●	●	●	2,4
130632 PNER-G		●	●	●	●	●	●	●	3,2
LNEX 130608 PNER-H		●	●	●	●	●	●	●	0,8
130616 PNER-H		●	●	●	●	●	●	●	1,6
130624 PNER-H		●	●	●	●	●	●	●	2,4
130632 PNER-H		●	●	●	●	●	●	●	3,2



Recommended Cutting Conditions



Identification Details

TSX	M	13	100	R	S
Cutter Series	M: Medium Pitch	Insert Size	Cutter Diameter	Direction	Metric Type

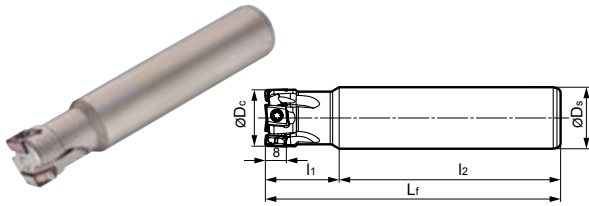
Spare Parts

Screw	Wrench
BFTX03510IP	TRDR15IP

"Sumi Dual Mill" Series TSX(F) 08000 E Type

Shank Type

Rake Angle	Radial	-20°
	Axial	-6°



Body - TSX, Standard Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		ØDc	ØDs	l1	l2	Lf		
TSX 08016 E	●	16	16	25	75	100	2	0,13
08020 E	●	20	20	30	80	110	2	0,22
08025 E	●	25	25	30	90	120	3	0,40
08032 E	●	32	32	30	90	120	3	0,67
08040 E	●	40	32	30	90	120	4	0,72

Inserts are not included.

Body - TSXF, Fine Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		ØDc	ØDs	l1	l2	Lf		
TSXF 08020 E	●	20	20	30	80	110	3	0,22
08025 E	●	25	25	30	90	120	4	0,40
08032 E	●	32	32	30	90	120	5	0,67
08040 E	●	40	32	30	90	120	6	0,73

Inserts are not included.

Spare Parts

Insert Screw	Insert Wrench	Applicable Cutters
BFTX0306IP	2,0	
BFTX0308IP	3,0	
BFTX03510IP	3,0	TSX08016E, TSX08020E, TSXF08020E TSX08025E~40E, TSXF08025E~40E TSX13000E, TSXM13000E

Inserts

Grade		Coated Carbide						P	Steel
Application	High Speed / Light Cutting								Stainless Steel
	General Purpose Cutting								Cast Iron
	Rough Cutting								Exotic Alloy
Applicable Cutters	Inserts Cat. No.	ACP100	ACP200	ACP300	ACK200	ACK300	ACM200	ACM300	Radius
TSX(F) 08000E	LNEX 080404 PNER-L	●	●	●	●	●	●	●	LNEX 08000 type
	080408 PNER-L	●	●	●	●	●	●	●	
	LNEX 080404 PNER-G	●	●	●	●	●	●	●	
	080408 PNER-G	●	●	●	●	●	●	●	
	080412 PNER-G	●	●	●	●	●	●	●	
	080416 PNER-G	●	●	●	●	●	●	●	
TSX(M) 13000E	LNEX 130604 PNER-L	●	●	●	●	●	●	●	LNEX 13000 type
	130608 PNER-L	●	●	●	●	●	●	●	
	LNEX 130604 PNER-G	●	●	●	●	●	●	●	
	130608 PNER-G	●	●	●	●	●	●	●	
	130616 PNER-G	●	●	●	●	●	●	●	
	130624 PNER-G	●	●	●	●	●	●	●	
	130632 PNER-G	●	●	●	●	●	●	●	
	LNEX 130608 PNER-H	●	●	●	●	●	●	●	
	130616 PNER-H	●	●	●	●	●	●	●	
	130624 PNER-H	●	●	●	●	●	●	●	
	130632 PNER-H	●	●	●	●	●	●	●	

Recommended Cutting Conditions

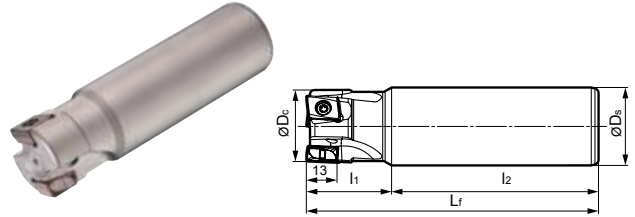


● = Euro stock

"Sumi Dual Mill" Series TSX(M) 13000 E Type

Shank Type

Rake Angle	Radial	-15°
	Axial	-6°



Body - TSX, Standard Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		ØDc	ØDs	l1	l2	Lf		
TSX 13025 E	●	25	25	35	85	120	2	0,38
13032 E	●	32	32	35	85	120	2	0,66
13040 E	●	40	32	30	90	120	3	0,71
13050 E	●	50	32	30	90	120	4	0,81

Inserts are not included.

Body - TSXM, Medium Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		ØDc	ØDs	l1	l2	Lf		
TSXM 13032 E	●	32	32	35	85	120	3	0,65
13040 E	●	40	32	30	90	120	4	0,71
13050 E	●	50	32	30	90	120	5	0,80

Inserts are not included.

Identification Details

TSX	F	08	032	E
Cutter Series	F: Fine Pitch M: Medium Pitch	Insert Size	Cutter Diameter	Endmill Type

"Sumi Dual Mill" Series TSX Type

■ Toughness

TSX type has extremely stable cutting edge.

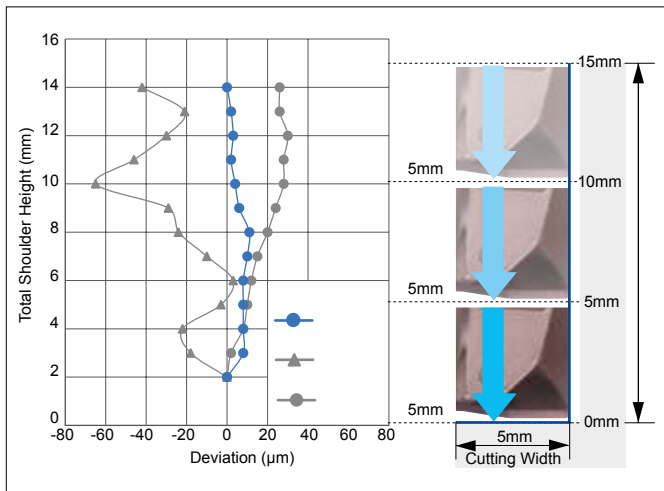
Cutting Length	4 passes	8 passes	12 passes
TSX	Available		
Competitor A	Breakage		
Competitor B	Breakage		

Machine: M/C BT-50, vertical Work Material: C50
 Tool: TSX13100RS Insert: LNX130608PNER-G (ACP200)
 Cutting Conditions:
 $v_c = 150\text{m/min}$, $f_z = 0,6\text{mm/t}$, $a_p = 3\text{mm}$, $a_e = 40\text{mm}$, dry



■ Squareness of Machined Shoulder

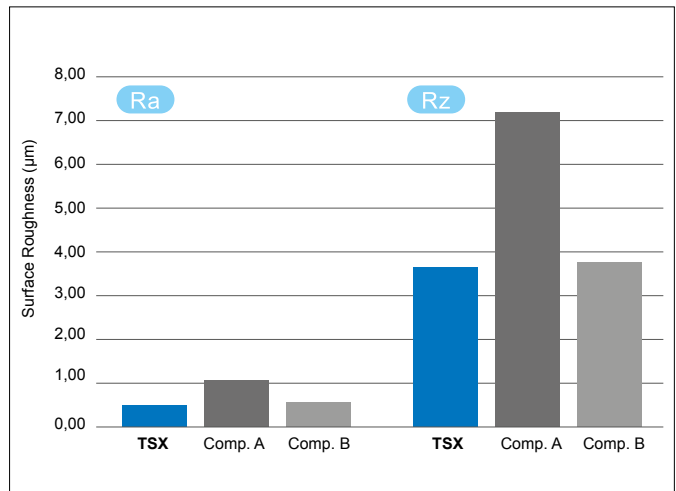
TSX type shows excellent squareness due to ground insert and optimized design.



Machine: M/C BT-50, vertical Work Material: Carbon Steel
 Tool: TSX13100RS Insert: LNX130608PNER-G (ACP200)
 Cutting Conditions:
 $v_c = 200\text{m/min}$, $f_z = 0,2\text{mm/t}$, $a_p = 5\text{mm} \times 3\text{passes}$, $a_e = 5\text{mm}$, dry

■ Surface Finish

TSX type shows excellent surface roughness.



Machine: M/C BT-50, vertical Work Material: C50
 Tool: TSX13100RS Insert: LNX130608PNER-G (ACP200)
 Cutting Conditions:
 $v_c = 200\text{m/min}$, $f_z = 0,2\text{mm/t}$, $a_p = 3\text{mm}$, $a_e = 60\text{mm}$, dry

■ Application Examples

Workpiece		Sumitomo	Competitor
Material: 42CrMo4 	Tool	TSXM 13050RS	-
	Grade	ACK300	-
	Chipbreaker	G	-
	Tool Diameter	50	50
	No. of Teeth	5	6
	v_c (m/min)	122	122
	f_z (mm/t)	0,25	0,18
	a_p (mm)	8,6	8,6
	a_e (mm)	6,35	6,35
	Coolant	Air	Air
	Accuracy	25μm	76μm
	Result	TSX shows better wall accuracy.	
	Machine Parts		

Workpiece		Sumitomo	Competitor
Material: 42CrMo4 	Tool	TSXF 08020E	-
	Grade	ACP200	-
	Chipbreaker	G	-
	Tool Diameter	20	20
	No. of Teeth	3	3
	v_c (m/min)	270	270
	f_z (mm/t)	0,05	0,05
	a_p (mm)	8,0	8,0
	a_e (mm)	0,64	0,64
	Coolant	Wet	Wet
	Accuracy	220pcs	135pcs
	Result	TSX shows better wall accuracy. Cutting time is shortened.	
	Machine Parts		

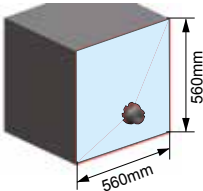
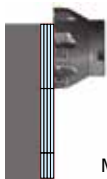
"Sumi Dual Mill" Series TSX Type

Application Examples

Workpiece		Sumitomo	Competitor
 Material: 25CrMo4	Tool	TSXM 13080RS	-
	Grade	ACP200	-
	Chipbreaker	H	-
	Tool Diameter	80	80
	No. of Teeth	7	6
	v_c (m/min)	180	180
	f_z (mm/t)	0,19	0,22
	a_p (mm)	3,8	3,8
	a_e (mm)	50,0	50,0
	Coolant	Air	Air
	Accuracy	100pcs	30pcs
	Ring	Result	Achieving 3,3 x longer tool life.

Workpiece		Sumitomo	Competitor
 Shift Forge	Material: GGG (32HRC)	Tool	TSXM 13040RS
		Grade	ACK300
		Chipbreaker	G
		Tool Diameter	40
		No. of Teeth	4
		v_c (m/min)	300
		f_z (mm/t)	0,10
		a_p (mm)	max. 8,0
		a_e (mm)	25
		Coolant	Wet
		Accuracy	1000pcs
		Result	Achieving 25% longer tool life. Less attached insert & twice corner

Workpiece		Sumitomo	Competitor
 Material: GGG	Tool	TSXM 13050RS	-
	Grade	ACK300	-
	Chipbreaker	G	-
	Tool Diameter	50	50
	No. of Teeth	5	5
	v_c (m/min)	240	240
	f_z (mm/t)	0,13	0,13
	a_p (mm)	1,0	1,0
	a_e (mm)	28,0	28,0
	Coolant	Dry	Dry
	Accuracy	236pcs	180pcs
	Housing	Result	Achieving 30% longer tool life.

Workpiece		Sumitomo	Competitor
Material: GGG-40,3   Machine Parts	Tool	TSXM 13100RS	-
	Grade	ACP200	-
	Chipbreaker	G	-
	Tool Diameter	100	125
	No. of Teeth	8	8
	v_c (m/min)	150	150
	f_z (mm/t)	0,26	0,08
	a_p (mm)	4,0 x 4passes	2,5 x 7passes
	a_e (mm)	80,0	80,0
	Coolant	Wet	Wet
	Accuracy	1pc	1pc
	Result	Achieving 3x high efficiency.	



CARBIDE - CBN - DIAMOND

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