

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 offers 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

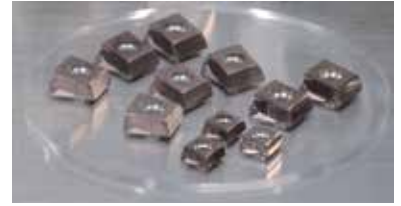
Special orders repeater and side cutter available.



# "Sumi Dual Mill" Series TSX Type

## ■ Insert Grade Selection

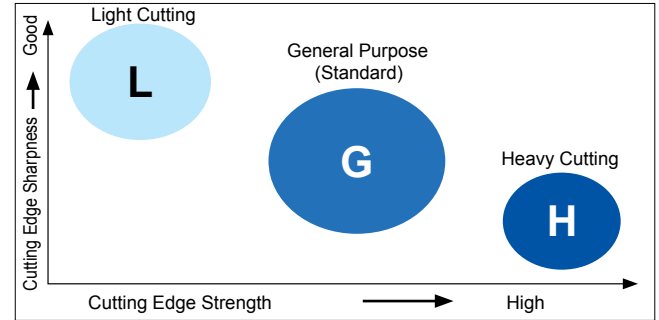
We have released ACP100 / ACP200 / ACP300 grades for steel machining, ACM200 / ACM300 grades for stainless steel machining and ACK200 / ACK300 grades for cast iron machining to cover a wide range of work materials.



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

▲ PVD
▼ CVD

## ■ Chipbreaker Selection



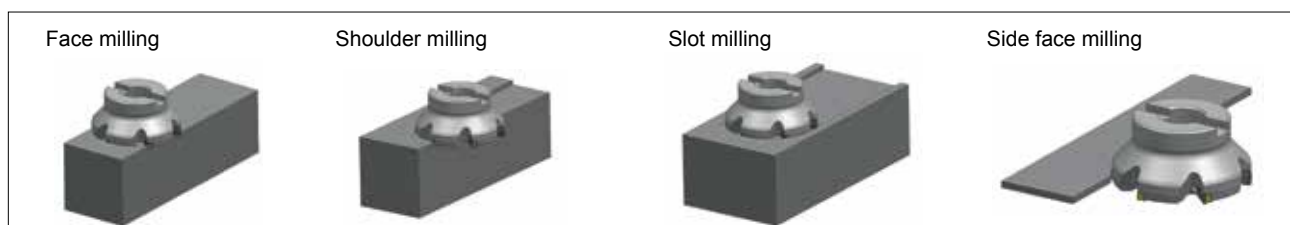
## ■ Inserts

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	<b>P M K S</b>		
	L type	G type	H type
Chipbreaker			
Feature	Low cutting force	General purpose	Strong edge
<b>LNEX08</b> Cutting edge geometry			—
<b>LNEX13</b> 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

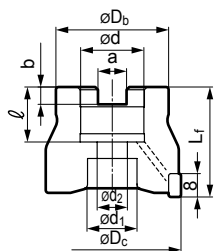
## ■ Suitable Applications



# "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)
		$\varnothing D_c$	$\varnothing D_b$	$L_f$	$\varnothing d$	$a$	$b$	$\ell$	$\varnothing d_1$	$\varnothing d_2$		
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.

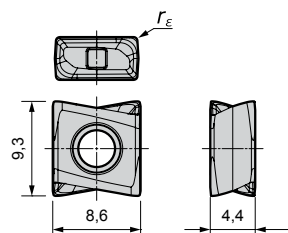
## ● Body - TSXF, Fine Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)
		$\varnothing D_c$	$\varnothing D_b$	$L_f$	$\varnothing d$	$a$	$b$	$\ell$	$\varnothing d_1$	$\varnothing d_2$		
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
									$r_\epsilon$
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 - <b>225</b> - 300	0,08 - <b>0,20</b> - 0,30	ACP100 ACP200 ACP300
		> 280HB	75 - <b>150</b> - 230	0,08 - <b>0,20</b> - 0,30	
	Alloy Steel	180~280HB	100 - <b>175</b> - 250	0,08 - <b>0,15</b> - 0,25	
M	Stainless Steel	220~280HB	90 - <b>135</b> - 180	0,08 - <b>0,15</b> - 0,25	ACM200 ACM300
		>280HB	75 - <b>125</b> - 170	0,08 - <b>0,15</b> - 0,25	
K	Cast Iron Ductile Cast Iron	250HB	100 - <b>175</b> - 250	0,08 - <b>0,20</b> - 0,30	ACK200 ACK300
S	Exotic Material	-	30 - <b>60</b> - 90	0,05 - <b>0,10</b> - 0,15	ACM200 ACM300

## ■ Identification Details

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

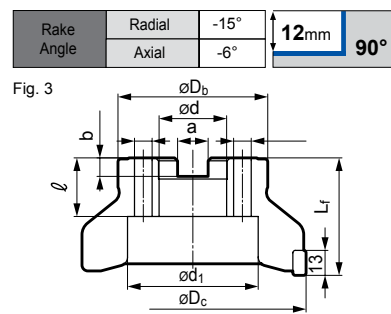
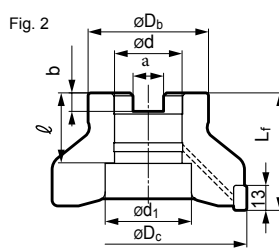
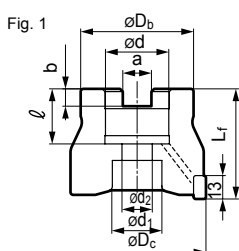
## ■ Spare Parts

Screw	Wrench
BFTX0306IP	TRDR08IP

● = Euro stock

# "Sumi Dual Mill" Series TSX(M) 13000 RS

## Body - Shell Type



## Body - TSX, Standard Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Figure
		$\varnothing D_c$	$\varnothing D_b$	$L_f$	$\varnothing d$	$a$	$b$	$\ell$	$\varnothing d_1$	$\varnothing d_2$			
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 ( $\varnothing 80$ : M12x30~35mm,  $\varnothing 100$ : M16x40~45mm) for securing  $\varnothing 80$  /  $\varnothing 100$  cutter on the arbor.

## Body - TSXM, Medium Pitch

Cat. No.	Stock	Dimensions (mm)									No. of Teeth	Weight (kg)	Figure
		$\varnothing D_c$	$\varnothing D_b$	$L_f$	$\varnothing d$	$a$	$b$	$\ell$	$\varnothing d_1$	$\varnothing d_2$			
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 ( $\varnothing 80$ : M12x30~35mm,  $\varnothing 100$ : M16x40~45mm) for securing  $\varnothing 80$  /  $\varnothing 100$  cutter on the arbor.

## Inserts

Application	Grade	Coated Carbide						Steel			
	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		
									$r_\epsilon$		
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
3,0	

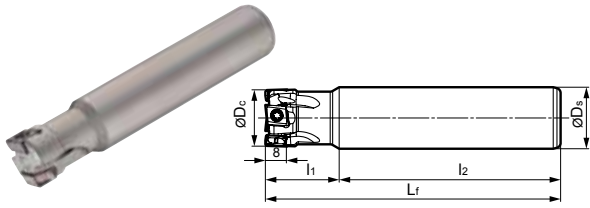
● = Euro stock

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

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

## Shank Type

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



## Body - TSX, Standard Pitch

Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		$\varnothing D_c$	$\varnothing D_s$	$l_1$	$l_2$	$L_f$		
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


















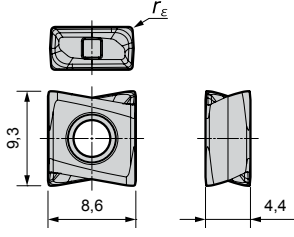
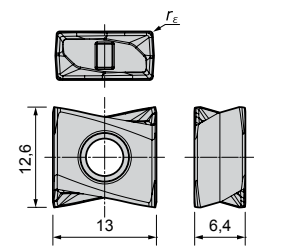
Cat. No.	Stock	Dimensions (mm)					No. of Teeth	Weight (kg)
		$\varnothing D_c$	$\varnothing D_s$	$l_1$	$l_2$	$L_f$		
TSXF 08020 E	●	20	20	30	80	110	3	0,22
08025 E	●	25	25	30	90	120	4	0,40
08032 E	●	32	32	30	90	120	5	0,67
08040 E	●	40	32	30	90	120	6	0,73

Inserts are not included.

## Spare Parts

Insert Screw	Insert Wrench	Applicable Cutters	
			
BFTX03061P	2,0	TRDR08IP	TSX08016E, TSX08020E, TSXF08020E
BFTX03081P			TSX08025E~40E, TSXF08025E~40E
BFTX035101P	3,0	TRDR15IP	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	LNEX 08000 type
TSX(F) 08000E	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	
TSX(M) 13000E	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



● = Euro stock

## ■ Toughness

TSX type has extremely stable cutting edge.

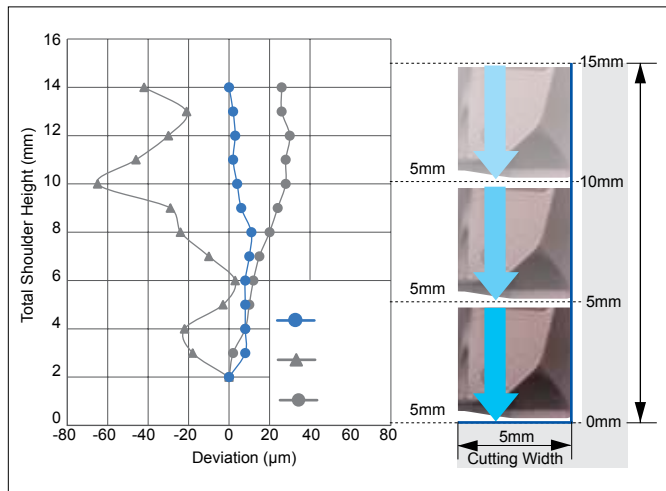
Cutting Length	4 passes	8 passes	12 passes
TSX	Available		
Competitor A	Breakage		
Competitor B	Breakage		

Machine:	M/C BT-50, vertical	Work Material:	C50
Tool:	TSX13100RS	Insert:	LNEX130608PNER-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

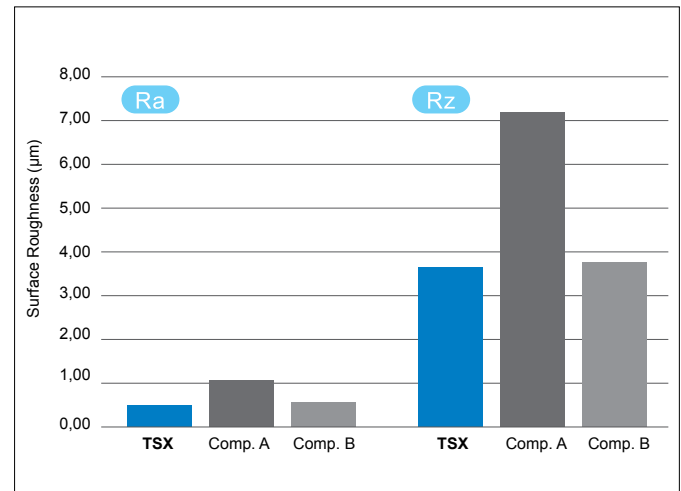
TSX type shows excellent squareness due to ground insert and optimized design.



Machine:	M/C BT-50, vertical	Work Material:	Carbon Steel
Tool:	TSX13100RS	Insert:	LNEX130608PNER-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:	LNEX130608PNER-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  Machine Parts	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.	

Workpiece		Sumitomo	Competitor
Material: 42CrMo4  Machine Parts	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.	

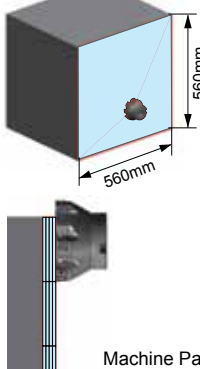
# "Sumi Dual Mill" Series TSX Type

## Application Examples

Workpiece		Sumitomo	Competitor
 <p>Ring</p>	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
	Result	Achieving 3,3 x longer tool life.	

Workpiece		Sumitomo	Competitor
 <p>Shift Forge</p>	Material: GGG (32HRC)		
	Tool	TSXM 13040RS	-
	Grade	ACK300	-
	Chipbreaker	G	-
	Tool Diameter	40	38
	No. of Teeth	4	6
	$v_c$ (m/min)	300	300
	$f_z$ (mm/t)	0,10	0,07
	$a_p$ (mm)	max. 8,0	max. 8,0
	$a_e$ (mm)	25	25
	Coolant	Wet	Wet
	Accuracy	1000pcs	800pcs
	Result	Achieving 25% longer tool life. Less attached insert & twice corner.	

Workpiece		Sumitomo	Competitor
 <p>Housing</p>	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
	Result	Achieving 30% longer tool life.	

Workpiece		Sumitomo	Competitor
 <p>Machine Parts</p>	Material: GGG-40,3		
	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.	



(Germany)  
SUMITOMO ELECTRIC Hartmetall GmbH  
Konrad-Zuse-Straße 9, 47877 Willich

Tel. +49(0)2154 4992-0, Fax +49(0)2154 4992-161  
Info@SumitomoTool.com  
www.SumitomoTool.com



(UK and Ireland)  
SUMITOMO ELECTRIC Hardmetal Ltd.  
Summerleys Road, Princes Risborough  
Buckinghamshire HP27 9PW, UK

Tel. +44(0)1844 342081, Fax: +44(0)1844 342415  
SalesUK@sumitomotool.com  
www.Sumitomotool.com

