

**MILLLINE** Round insert milling cutters

**FIXRMILL**



**TRP / ERP type**

**Incredible reliability when profile milling !**



# ***Ideal solution for three dime curved surfaces !***

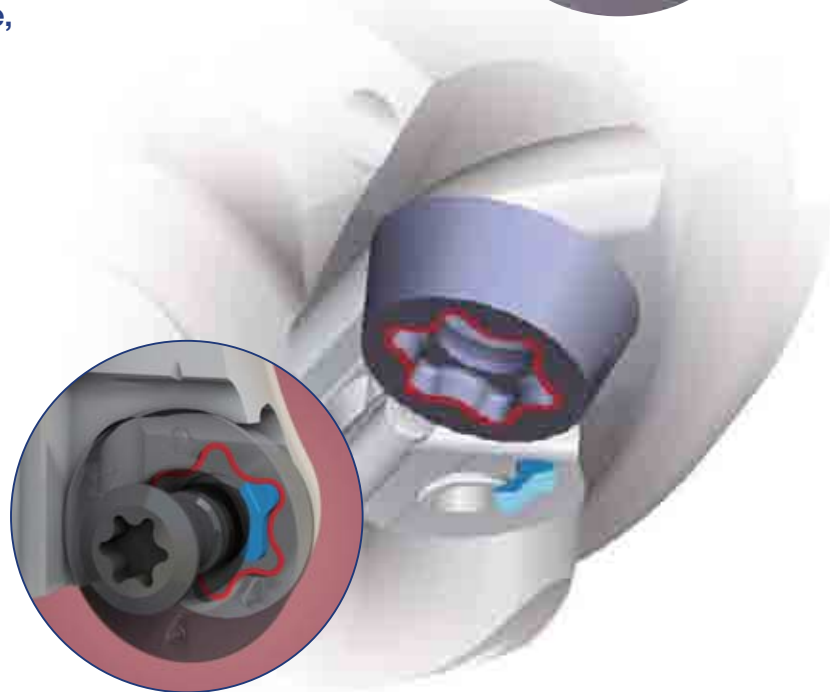
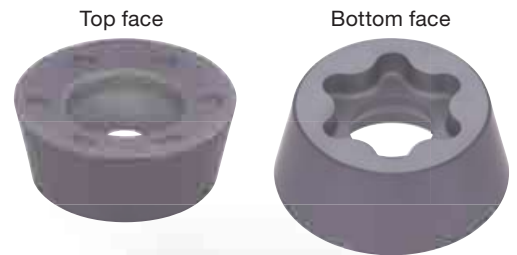
## **Innovative and safe anti-rotation system, featuring FIX insert location and higher clamping rigidity**

### **Anti-rotation system**

- The fitting of protrusion and cavity guarantees secure indexing, which prevents insert rotation.
- The unique insert fixation in the pocket allows up to 6 indexes.
- Two types of chipbreakers are available, MJ: general purpose machining ML: low cutting force machining

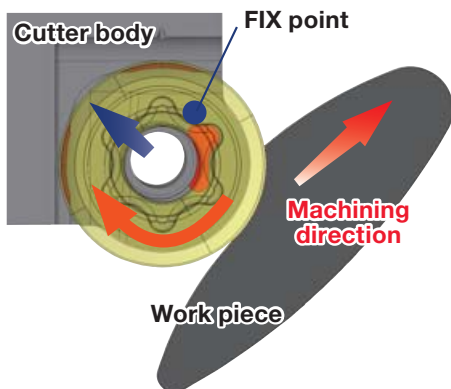
### **Simple, but rigid insert clamping system**

- The FIX point of the protrusion and insert cavity ensures the cutting forces to push the insert to the pocket, offering rigid clamping.



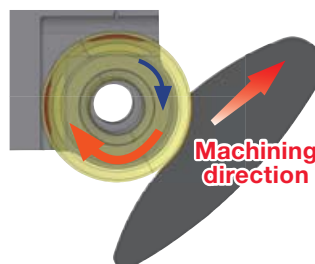
## **FIXRMILL**

**The cutting force pushes the insert into the insert seat, providing high clamping forces.**



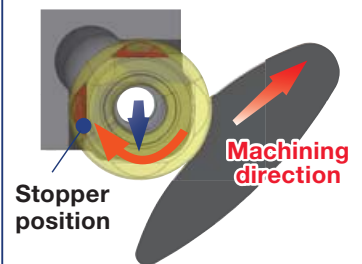
### **Screw-on clamping (Without anti-rotating system)**

Insert may rotate when machining.



### **Screw-on clamping + insert with flat contact face**

Cutting force rotates the insert and reduces the contact area, making insert unstable



# nsional cutting of



## Grades

### AH725

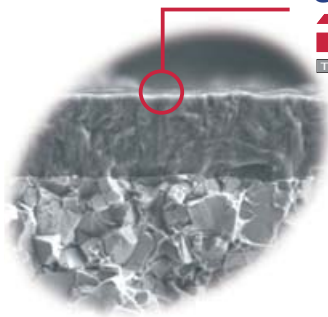


Steel Cast Iron

#### For general purpose milling

- Provides high reliability in steel and cast iron machining
- Highly versatile grade with excellent wear and chipping resistance

Special Surface Technology  
**PREMIUMTEC**  
TUNGALOY



### AH130



Stainless

#### For general stainless steel milling

- Drastically reduces crater and notch wear
- Provides exceptionally reliable milling



**NEW**

### AH4035



Stainless

#### Ideal grade for high chromium content stainless steels

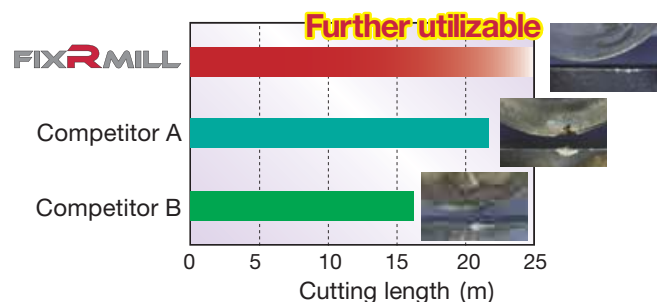
- Newly developed grade with exceptional balance of wear and chipping resistance.
- Drastically reduces flank wear and chipping, when machining stainless steels.

Special Surface Technology  
**PREMIUMTEC**  
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#### Comparison of tool life

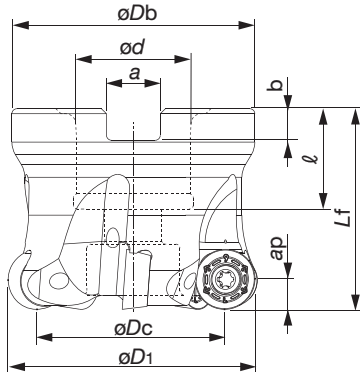
**Longer tool life than competitor products**



Cutter : TRP12R050M22.0E05 (z = 5)  
 Insert : RPMT1204EN-ML  
 Grade : AH4035  
 Work material : SUS420J1 / X20Cr13  
 Cutting speed :  $V_c = 300$  m/min  
 Feed per tooth:  $f_z = 0.5$  mm/t  
 Depth of cut :  $a_p = 2.0$  mm  
 Width of cut :  $a_e = 32.5$  mm  
 Machine : Horizontal M/C, BT40

## Cutter

TRP12, TRP16 type  
Bore type



E/TRP12: Max.  $ap = 6.0$  mm  
E/TRP16: Max.  $ap = 8.0$  mm

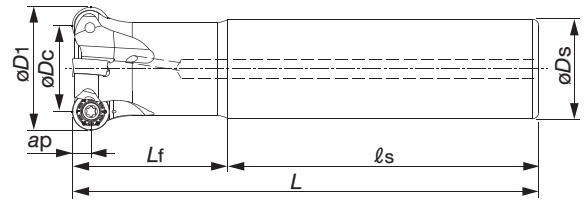
Bore type

Cat. No.	Stock	No. of inserts	Dimensions (mm)								Weight (kg)	Air hole	Center bolt	Inserts
			$\phi Dc$	$\phi D1$	$\phi Db$	$\phi d$	$\ell$	$L_f$	$b$	$a$				
TRP12R050M22.0E05	●	5	38	50	47	22	20	40	6.3	10.4	0.3	with	CM10 30H	RPMT1204EN-M*
TRP12R063M22.0E06	●	6	51	63	59	22	20	40	6.3	10.4	0.6			RPMT1606EN-M*
TRP16R063M22.0E05	●	5	47	63	59	22	20	40	6.3	10.4	0.6			RPMT1606EN-M*

Shank type

Cat. No.	Stock	No. of inserts	Dimensions (mm)						Weight (kg)	Air hole	Inserts
			$\phi Dc$	$\phi D1$	$\phi Ds$	$\ell_s$	$L_f$	$L$			
ERP12R032M32.0-03	●	3	20	32	32	100	50	150	0.8	with	RPMT1204EN-M*
ERP12R040M32.0-04	●	4	28	40	32	100	50	150	0.9		RPMT1606EN-M*
ERP16R040M32.0-02	●	2	24	40	32	100	50	150	0.9		RPMT1606EN-M*

ERP12, ERP16 type  
Shank type



### Replacement parts

Description	Parts Cat. No.			
	TRP12...	ERP12...	TRP16...	ERP16...
Applicable cutter	TRP12...	ERP12...	TRP16...	ERP16...
Clamping screw	CSTR-4L100		CSPB-5	
Wrench	Bit	BT15S	-	BLD IP20/S7
	Grip	H-TBS	-	H-TBS
Mono block type substitution wrench	-	T-15DB	-	IP-20D

## Insert

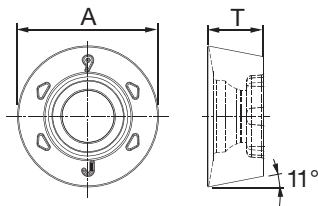


Fig. 1 MJ

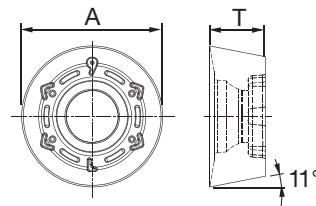
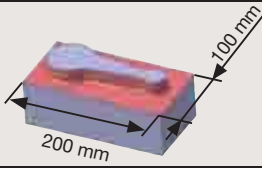
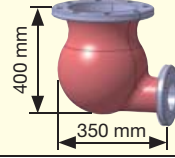
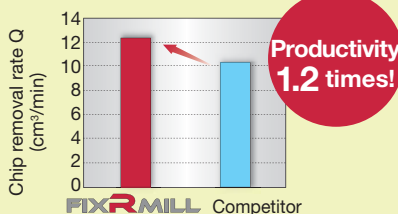
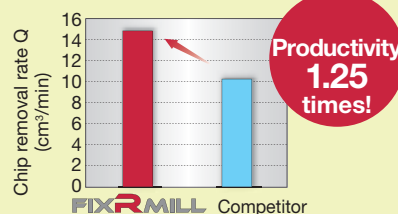


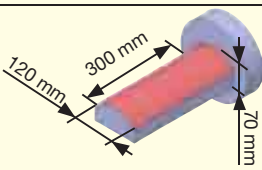
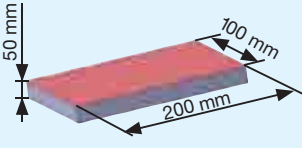
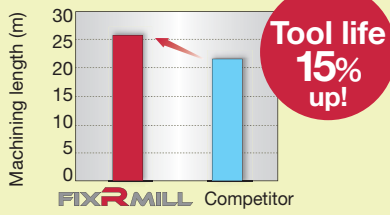
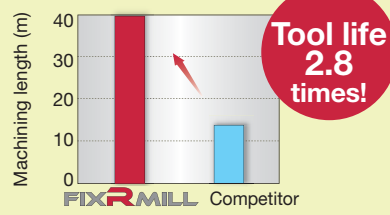
Fig. 2 ML

Cat. No.	Accuracy	Honing	Grades <b>PREMIUMTEC</b>			Dimensions (mm)		Shape	Cutters
			AH725	AH4035	AH130	A	T		
RPMT1204EN-MJ	M	with	●	●	●	12	4.76	Fig.1	E/TRP12R
RPMT1204EN-ML			●	●	●	12	4.76	Fig.2	
RPMT1606EN-MJ			●	●	●	16	6.35	Fig.1	E/TRP16R
RPMT1606EN-ML			●	●	●	16	6.35	Fig.2	

● : Stocked items

# Practical examples

Workpiece type		Die	Machine part
Cutter		ERP12R032M32.0-03	TRP12R050M22.0E05
Insert		RPMT1204EN-ML	RPMT1204EN-ML
Grade		AH725	AH130
Work material		SKD61 / X40CrMoV5-1	Corrosion-resistant stainless steel
			
Cutting conditions	Cutting speed: $V_c$ (m/min)	130	200
	Feed per tooth: $f_z$ (mm/t)	0.4	0.3
	Depth of cut: $a_p$ (mm)	1.0	1.0
	Width of cut: $a_e$ (mm)	26.0	< 50
	Method of machining	Profile milling	Profile milling on curved surface
	Coolant	Air blast	Wet
	Machine	Vertical M/C, BT40	5 axis M/C, BT50
Results		 <p>Due to the high rigidity, 1.2 times higher productivity can be achieved without any chipping or vibration.</p>	 <p>Due to the high toughness and rigidity, higher cutting speed and feed is possible. This improves productivity by 25%.</p>

Work piece type		Machine part	Machine part
Cutter		TRP12R050M22.0E05	TRP12R050M22.0E05
Insert		RPMT1204EN-MJ	RPMT1204EN-MJ
Grade		AH4035	AH725
Work material		SUS420J1 / X20Cr13	S55C / C55
			
Cutting conditions	Cutting speed: $V_c$ (m/min)	300	160
	Feed per tooth: $f_z$ (mm/t)	0.5	0.5
	Depth of cut: $a_p$ (mm)	2.0	2.0
	Width of cut: $a_e$ (mm)	< 50	30.0
	Method of machining	Profile milling on curved surface	Face milling
	Coolant	Air blast	Air blast
	Machine	5 axis M/C, BT50	Vertical M/C, BT50
Results		 <p>High wear resistance provides 1.15 times longer tool life.</p>	 <p>After 40 m of cutting, damage to the FixRMill is minimal and inserts can be utilized further. Competitor product has chipping after 14 m machining and has reached failure point.</p>

## Standard cutting condition

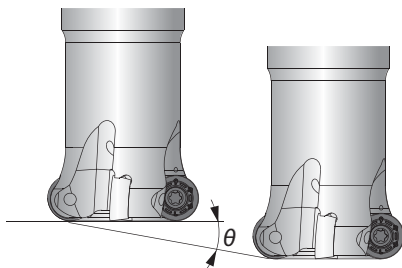
Work material	Brinell hardness	Priority	Grade	Chip breaker	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
Carbon steels (S45C / C45, S55C / C55 etc.)	< 300 HB	First choice	<b>AH725</b>	<b>MJ</b>	120 - 250	0.3 - 0.7
		for impact resistance	<b>AH130</b>	<b>MJ</b>	120 - 250	0.3 - 0.7
Alloy steels (SCM440 / 42CrMo4, SCr415 / 17Cr3 etc.)	150 - 300 HB	First choice	<b>AH725</b>	<b>MJ</b>	100 - 250	0.2 - 0.6
		for impact resistance	<b>AH130</b>	<b>MJ</b>	100 - 250	0.2 - 0.6
Tool steels (SKD11 / X153CrMoV12 etc.)	< 300 HB	-	<b>AH725</b>	<b>ML</b>	80 - 180	0.2 - 0.4
Stainless steels (SUS304 / X5CrNi18-9, SUS316 / X5CrNiMo17-12-3 etc.)	< 200 HB	First choice	<b>AH130</b>	<b>ML</b>	100 - 250	0.2 - 0.6
		for impact resistance	<b>AH130</b>	<b>MJ</b>	100 - 250	0.2 - 0.6
Stainless steels (SUS430 / X6Cr17 etc.)	< 200 HB	First choice	<b>AH4035</b>	<b>ML</b>	100 - 300	0.2 - 0.6
		for impact resistance	<b>AH4035</b>	<b>MJ</b>	100 - 300	0.2 - 0.6
Grey cast irons (FC250 / GG25, FC300 / GG30 etc.)	150 - 250 HB	-	<b>AH725</b>	<b>ML</b>	120 - 250	0.3 - 0.7
Ductile cast irons (FCD400 / GGG40 etc.)	150 - 250 HB	-	<b>AH725</b>	<b>ML</b>	100 - 200	0.3 - 0.7
Hardened steels (SKD61 / X40CrMoV5-1 etc.)	40 - 50 HRC	-	<b>AH725</b>	<b>MJ</b>	60 - 140	0.1 - 0.3
Hardened steels (SKD11 / X153CrMoV12 etc.)	50 - 60 HRC	-	<b>AH725</b>	<b>MJ</b>	20 - 60	0.05 - 0.2

- Use air blast to remove chips from the work area in slot milling or pocketing operation.
- When machining at high cutting speeds of more than Vc = 1000 m/min, the dynamic balance of the tools must be adjusted.

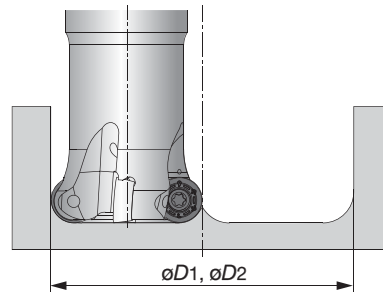
- Cutting conditions are limited by machine power, workpiece rigidity and spindle output. When the cutting width or depth is large, set Vc and fz to the lower recommended values and check the machine power and vibration.

## Application

### ■ Ramping



### ■ Helical contouring



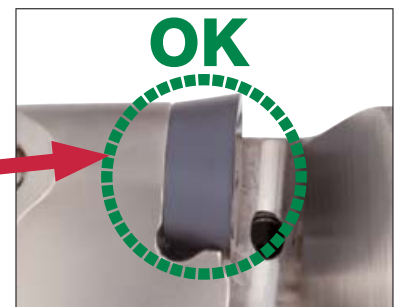
Cat. No.	Tool dia. øDc (mm)	Max. ramping angle θ	Min. machinable hole dia. øD1 (mm)	Max. machinable hole dia. øD2 (mm)
<b>ERP12R032M32.0-03</b>	32	8°	55	64
<b>ERP12R040M32.0-04</b>	40	6°	71	80
<b>ERP16R040M32.0-02</b>	40	7°	71	80
<b>TRP12R050M22.0E05</b>	50	3.5°	91	100
<b>TRP12R063M22.0E06</b>	63	2.5°	117	126
<b>TRP16R063M22.0E05</b>	63	3°	117	126

- When helical contouring, face milling on the bottom is required because uncut portions will remain around the center of the cavity.

Tool dia.: $\phi D_c$ (mm), Number of revolutions: $n$ ( $\text{min}^{-1}$ ), Feed speed: $V_f$ (mm/min), Depth of cut: $a_p = 2.0$ mm									
$\phi 32$		$\phi 40$			$\phi 50$		$\phi 63$		
$n$	$V_f$	$n$	$V_f$		$n$	$V_f$	$n$	$V_f$	
			ERP12	ERP16				TRP12	TRP16
1790	2690	1430	2860	1430	1150	2880	910	2730	2280
Vc = 180 m/min, fz = 0.5 mm/t									
1790	2690	1430	2860	1430	1150	2880	910	2730	2280
Vc = 180 m/min, fz = 0.5 mm/t									
1690	2030	1350	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, fz = 0.4 mm/t									
1690	2030	1350	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, fz = 0.4 mm/t									
1290	1160	1030	1240	620	830	1250	660	1190	990
Vc = 130 m/min, fz = 0.3 mm/t									
1690	2030	1350	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, fz = 0.4 mm/t									
1690	2030	1350	2160	1080	1080	2160	860	2060	1720
Vc = 170 m/min, fz = 0.4 mm/t									
1990	2390	1590	2540	1270	1270	2540	1010	2420	2020
Vc = 200 m/min, fz = 0.4 mm/t									
1990	2390	1590	2540	1270	1270	2540	1010	2420	2020
Vc = 200 m/min, fz = 0.4 mm/t									
1790	2690	1430	2860	1430	1150	2880	910	2730	2280
Vc = 180 m/min, fz = 0.5 mm/t									
1490	2240	1190	2380	1190	950	2380	760	2280	1900
Vc = 150 m/min, fz = 0.5 mm/t									
990	590	800	640	320	640	640	510	610	510
Vc = 100 m/min, fz = 0.2 mm/t									
400	140	320	150	75	250	150	200	140	120
Vc = 40 m/min, fz = 0.12 mm/t									

## ■ Notification point when clamping

· When installing the insert, please carefully locate the insert in the seat and fasten the screw.





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