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Rotating Product Introduction

演讲人

难加工材料切削专家
THE EXPERT OF DIFFICULT MACHINING

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01

Face Milling

难加工材料切削专家
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AFM45/75/88-SN12/19 series

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SN12 series Cutter features

Approaching angle (Kr) : 45°, 75°, 88°

Diameter (Dc) : Ø 2" - 12"

Max. cutting depth (apmax) :

Kr=45° apmax=0.26"

Kr=75° apmax=0.31"

Kr=88° apmax=0.39"

Pitch options: close and coarse pitch

➤ SN19 series Cutter features

Approaching angle (Kr) : 45°

Diameter (Dc) : Ø6" - 10"

Max cutting depth (apmax) : 0.433"

Pitch option: coarse pitch

Coupling type: Arbor

Milling cutters with diameter below Ø5" (included)
have internal coolant

Milling cutter surface Ni-plated



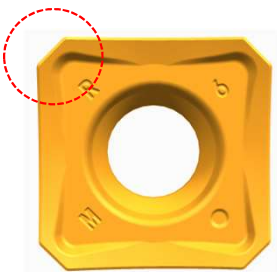
- **Milling cutter without N** (AFM88-080-Z07-A27R-SN12-C)
Screw: AST411-60W-M (M4) Wrench: ADT-T15
- **Milling cutter with N (upgraded)** (AFM88-080-Z07-A27R-SN12-**N**-C)
Screw: SP050120 (M5) Wrench: DT-TP20

AFM45/75/88-SN12/19 series

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Insert features:

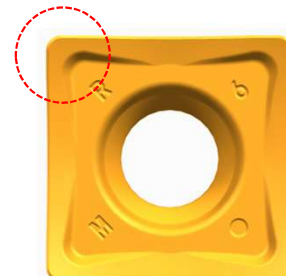
- Negative
- 8 cutting edges
- Round nose radius (0.8/1.2/2.0) , short wiper (ANN/ENN/ZNN) , long wiper (-W)
- M class inserts, G class inserts
- Geometries: MM3, MM4, MR6, RR2, FM2
- Grades:
AP301U/AP351U/AP351K/AC301K/AC301P/AW100K



ANN



ENN

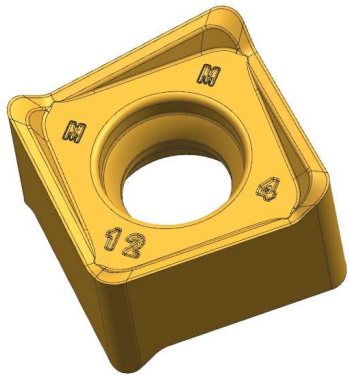


ZNN

AFM45/75/88-SN12/19 series

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Product Name	Dimension			Grade						
	l	s	r	AP301U	AP351U	AC301P	AP401U	AC301K	AP351K	AW100K
SNMX 120612R-MM4	0.5"	0.27"	0.05"	●	●	●		●	●	



Big rake angle decreases cutting force effectively.

AFM45/75/88-SN12/19 series

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SNHX12 long wiper inserts

Insert	Product Name	Dimensions			Grade						
		l	s	b	AP30IU	AP35IU	AC30IP	AP40IU	AC30IK	AP35IK	AW100K
	SNHX 1206ANN-W	0.5"	0.27"	0.26"	●				●		
	SNHX 1206ENN-W	0.5"	0.27"	0.05"	●				●		
	SNHX 1206ZNN-W	0.5"	0.27"	0.17"	●				●		



ANN-W



ENN-W



ZNN-W

AFM45/75/88-SN12/19 Geometries

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RR2 → Heavy Roughing Geometries

For stable machining condition; Mainly for cast iron and steel milling.



MR6 → Roughing Geometries

Suitable for unstable cutting conditions with cutting edge reliability; High feed rate.



MM4 → Universal Geometries

Suitable for machining most materials under medium cutting conditions.



MM3 → Sharp Geometries

Suitable for semi-finishing and finishing under good cutting conditions with low cutting force; Medium feed rate.



FM2 → Sharp Geometries For Aluminum

Low cutting force, sharp cutting edges.



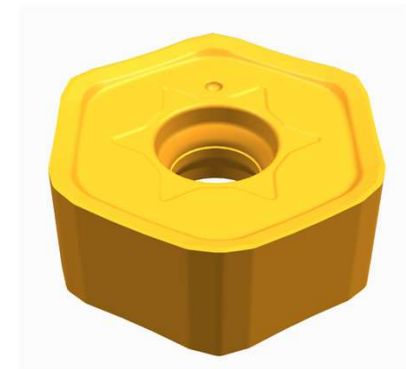
HN09 face milling insert



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Insert features:

- Max. cutting depth: $ap_{\max} = 0.19''$;
- Double-sided, 12 cutting edges, cost efficient;
- Wiper design for better surface quality;
- M class insert;
- Grades: AC151K, AC251P.



Success Story



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Workpiece: Engine block

Material: GG25

Insert: HNGX 0906ANN-MR6

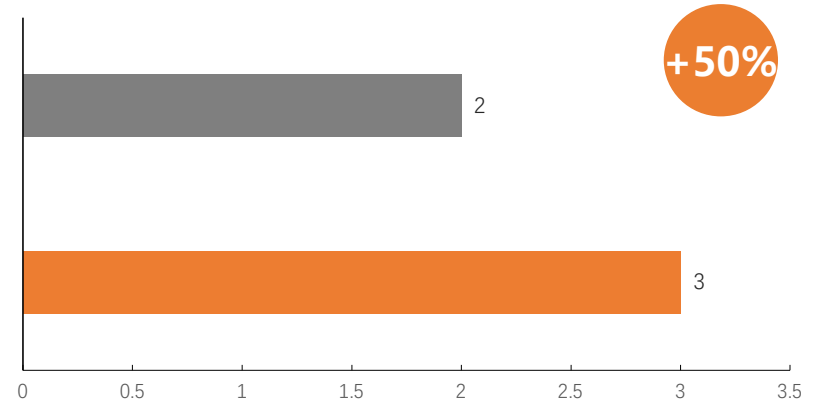
Grade: AC151K

Application: Rough milling



Parameters:	Competitor	Achteck
Vc [ft/min]	984	984
fz [in]	0.01	0.01
ap [in]	0.098	0.098
Coolant	Dry	Dry
Tool life (pcs)	2	3

Comparison: Tool Life (pieces)



AFM45-XN07/09 series

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Insert features:

- Double-sided, 14 cutting edges;
- Geometries: MM3, MM4, MR6;
- G class, M class;
- Round nose radius, short wiper, long wiper;
- XN07 and XN09 two insert sizes.

Cutter features:

- 45° approaching angle;
- Diameter (DC) : Ø1.5" -12" ;
- Coupling type: Screw head, Weldon, Arbor;
- Insert clamping: Screw
- Milling cutters with diameter below Ø5" (included) with internal coolant;
- Ni-plated cutter surface.



AFM45-XN07/09 series

• Precautions when using wiper insert

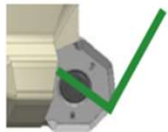


Fig.1(Right)



Fig.2(Wrong)

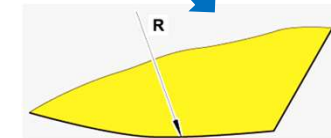
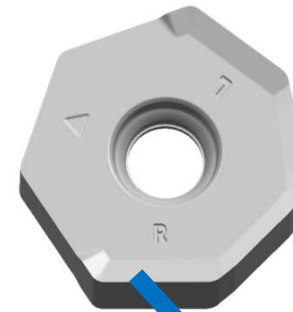
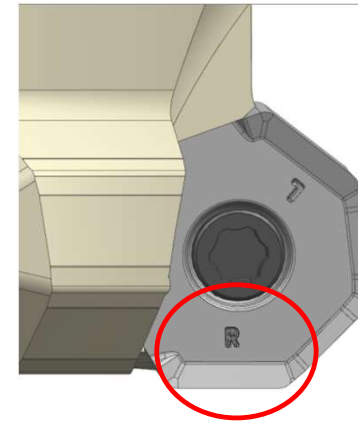


Fig.3(Wrong)



Fig.4(Wrong)

- Wiper inserts used with XN0705ANN or XN0906ANN ONLY;
- Two right-handed cutting edges and two left-handed cutting edges;
- Wiper insert edges are 0.001-0.002 in higher than main cutting insert edges;
- Surface finishing less than Ra1.6
- $f_n < 90\%$ of wiper edge length

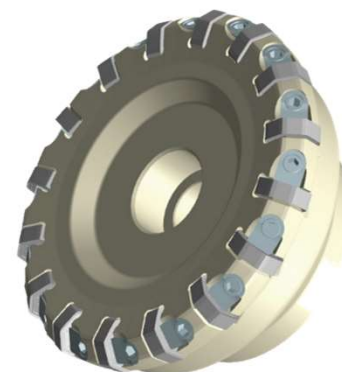


AFM45-XN07/09 series

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XN09-W 45° with wedge clamping

Heavy Roughing Geometries	D	d1	L	l1	apmax	Coolant	Z	Inserts
AFM45-080-Z09-A27R-XN09-W	80	27	50	-	6.0		9	XN..U 0906
AFM45-100-Z12-A32R-XN09-W	100	32	50	-	6.0		12	
AFM45-125-Z16-A40R-XN09-W	125	40	63	-	6.0		16	
AFM45-125-Z16-A40L-XN09-W	125	40	63	-	6.0		16	
AFM45-160-Z20-A40R-XN09-W	160	40	63	-	6.0		20	
AFM45-160-Z20-A40L-XN09-W	160	40	63	-	6.0		20	
AFM45-200-Z26-A60R-XN09-W	200	60	63	-	6.0		26	
AFM45-200-Z26-A60L-XN09-W	200	60	63	-	6.0		26	



Size (mm)	Accessories			
Diameters	Wedge	Screw	Wrench	Torque
φ80-200				7.0Nm
	AWG-8H	AWS830F	AWH4	

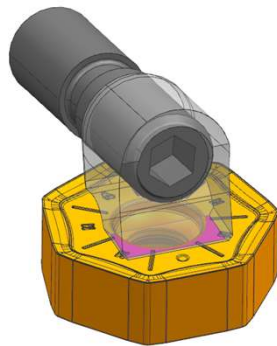
AFM45-XN07/09 series

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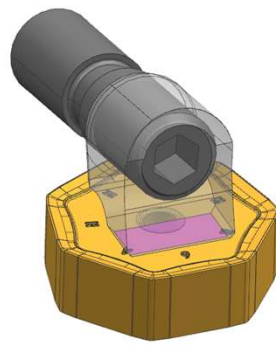
XNMF09 insert series (For cast iron machining)

New Products:

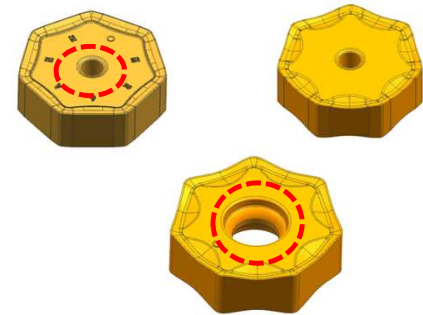
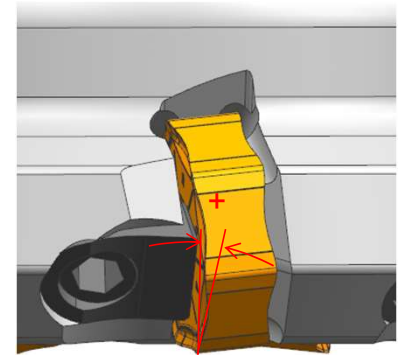
1. Upgraded XNMU09 insert into XNMF09 without screw hole
2. Wavy geometries added: MM3N, MM4N



Old (XNMU09)



New (XNMF09)



AFM40-ON05 series

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Insert features:

- Octagon, negative insert;
- Double-sided, 16 cutting edges, highly cost efficient;
- Geometries: MM3, MM4;
- G class, M class.

Cutter features:

- Approaching angle (Kr) : 40°
- Diameter (DC) : Ø2" -6" ;
- Coupling type: Arbor
- Milling cutters with diameter below Ø5" (included) have internal coolant;
- Milling cutter surface Ni-plated.



AFF45-ON05-C-S finishing milling cutter

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Special type	Standard type
AFM110-1000211	AFF45-080-Z06-A27R-ON05-C-S
AFM110-1000165	AFF45-100-Z07-A32R-ON05-C-S
AFM110-1000201	AFF45-125-Z09-A40R-ON05-C-S
AFM110-1000202	AFF45-160-Z12-A40R-ON05-C-S

- Diameter range: Ø3-6 inch
- Shim design applied to the whole series, blackened surface
 - S:** with shim **AFF:** finish milling
- **Inserts:** ONHU 050408-MM3
ONHU 050408-WC
- **Grades:** AP301U, AP501U, AP2921, AP2932
- Steel and stainless steel finish milling



AFM42-OD04/06 series

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Insert features:

- Positive rake angle, sharp cutting edge, smooth and light cutting;
- positive insert, eight cutting edges;
- Geometries: MM3, HR2, FM2;
- G class, M class;
- With OD04 and OD06 insert sizes.

Cutter features:

- Approach angle 42°;
- Diameter (DC) : Ø0.05-6 inch;
- Coupling type: Screw head, Weldon, Arbor;
- Milling cutters with diameter below Ø5" (included) have internal coolant design;
- Milling cutter surface Ni-plated.



AFM45/75/90-SD09/12 series

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Insert features:

- Positive, four cutting edges;
- Geometries: MM3, MM4, MR2, MR6, HR2;
- G class (M) , M class (H) ;
- SD09 and SD12 two insert sizes.

Cutter features:

- Approach angle (Kr) : 45°, 75° (phased out) , 90°
- Diameter range (DC) : Ø0.63-5 inch;
- Coupling type: Weldon, Arbor;
- The whole series milling cutters have internal coolant;
- Milling cutter surface Ni-plated.



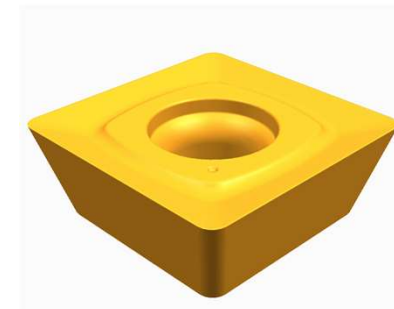
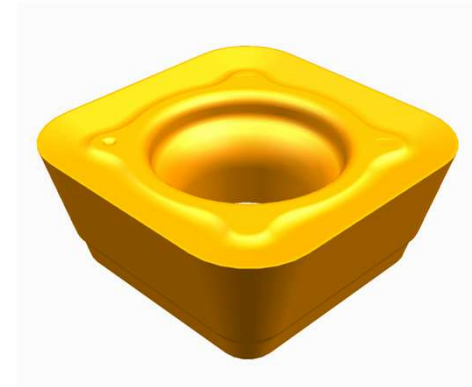
AFM89/AHM15/ACM45-SD09/12 series

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Insert series:

- Geometries: MM4 (universal) , MR2 (upgraded)
- Positive, single-sided 4 cutting edges, smooth and light cutting;
- M class insert, cost efficient;
- Insert sizes: 09 and 12
- Various radius choices: R0.8, R2.0, R2.5;
- Grades: AP251U, AP403M, AP351M, AP251K, AC151K, AP403S.



AFM89/AHM15/ACM45-SD09/12 series

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Cutter features:

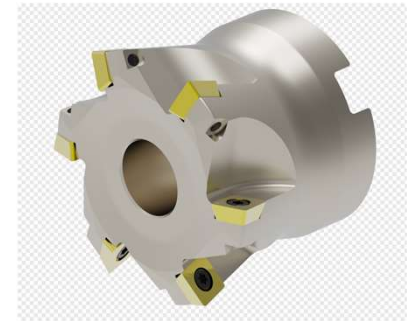


- Milling cutter types: AFM89 (Face milling) , AHM15 (High feed milling) , ACM45 (Chamfer)
- Coupling types: Arbor, Cylindrical, Weldon, Screw head;
- Approach angle (Kr) : Face milling 89.5°, High feed milling 15°, Chamfer 45°
- The whole series milling cutters have external coolant design, cost efficient
- The milling cutter surface Ni-plated, wear resistance, corrosion resistance and good-looking;
- Various products cover all kinds of applications.

Face milling cutter diameter: Ø1-5inch

High feed milling cutter diameter: Ø1-5 inch

Chamfer milling cutter diameter: Ø0.5-1.25inch



AFM89/AHM15/ACM45-SD09/12 series



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➤ Product Name

Old

SDMT 09T308EN-MM4

SDMT 120408EN-MM4

SDMT 09T320-MM4



New

SDMT 09T308N-MM4

SDMT 120408N-MM4

SDMT 09T320N-MM4

➤ Geometries

Old

MM3, MM4, MR2,

MR6, HR2



New

MM4, MR2

AFM89/AHM15/ACM45-SD09/12 series



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Old



New



Strengthened
toughness reduces
edge breakage

SD09: screw M4 → M3.5

SD12: screw M4.5 → M4

Upgraded design:

- Locking screw (Torx upgraded to Torxplus)
- Better Geometries design
- Stricter standards in production

AFF40-LN12/15 cast iron finish milling series

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Cutter features:

- 40° approach angle, matched with negative octagon G class inserts in 16 cutting edges, cost efficient;
- Wedge clamped main inserts, stable and convenient;
- Preloaded fine-tuning wiper clamping technology, small and convenient adjustment, the tolerance can be limited within $2\mu\text{m}$ ($7.874\text{e-}5''$);
- Blackened treatment for better cutter appearance and corrosion resistance;
- Standard diameter range: $\Phi 3$ - $\Phi 10$ inch, Special diameter range: $\Phi 12$ - $\Phi 20$ inch;
- Grade: AP151H, with high-hardness substrate and high wear-resistance coating.

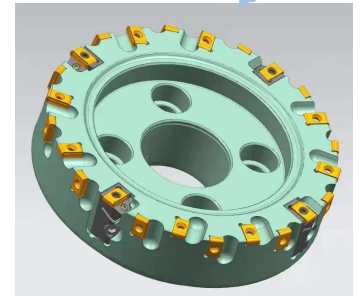
Application:

Suitable for all cast iron milling, such as gray cast iron, nodular cast iron and CGI;

Used for finish milling engine cylinder block and cylinder head, pump housing, valve housing, and so on.



Special design



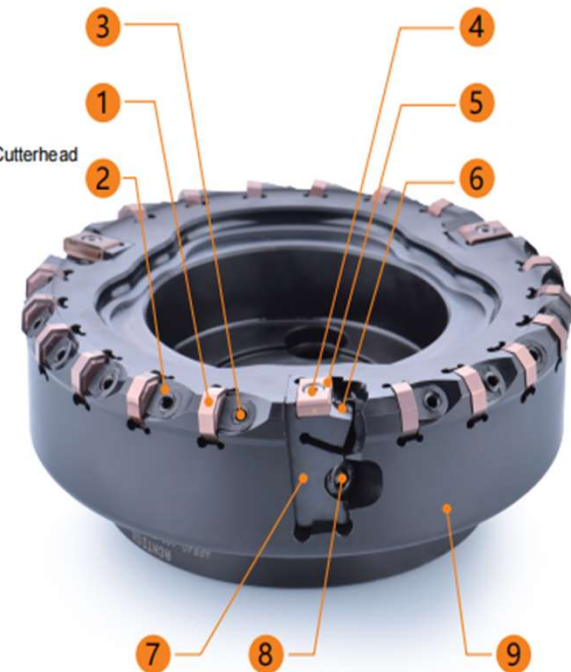
AFF40-LN12/15 cast iron finish milling series

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Cast iron finish milling cutter handling instructions:

1. Clean wiper cartridge (7), completely release adjusting screw (6);
2. Clean each insert pocket, cartridge pocket, clean inserts and cartridges;
3. Install roughing inserts (1), wiper cartridges (7) and use finger to push them to the locating surface and lock the screws;
4. Install wiper inserts (5);
5. Measure the axial run out of each roughing and wiper insert;
6. Adjusting wiper inserts height through adjusting screw (6);
7. Wiper inserts Max. run out should be higher than roughing inserts by 0.001- 0.002 inch.

1. Rough machining inserts(ON..05..)
2. Locking wedge
3. Double-headed wedge Locking bolts
4. Wiper inserts locking bolts
5. Wiper inserts (LN12/15)
6. Adjusting screw
7. wiper inserts Cutterhead
8. Locking bolt for wiper inserts Cutterhead
9. Cutter



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Profile Milling

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RD/RP round insert series

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RDHT/RDMT-MM3

Clearance angle

Screw hole

RD.. 0702MOE-MM3
RD.. 1003MOE-MM3
RD.. 12T3MOE-MM3
RD.. 1604MOE-MM3
RD.. 1606MOE-MM3

15
15
15
15
15

2.8
4.4
4.4
5.5
5.5



RDHW/RDMW/RPMW-HR2

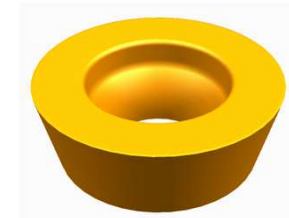
Clearance angle

Screw hole

RD.. 0702MOE-HR2
RD.. 1003MOE-HR2
RD.. 12T3MOE-HR2
RD.. 1604MOE-HR2
RD.. 1606MOE-HR2
RP.. 1003MOE-HR2
RP.. 10T3MOE-HR2

15
15
15
15
15
11
11

2.8
4.4
4.4
5.5
5.5
4.4
4.4



RD/RP round insert series

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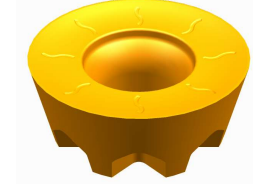
	Clearance Angle	Screw hole		
--	-----------------	------------	--	--

RPMT 1204MOE	11	4.4		
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	Clearance Angle	Screw hole		
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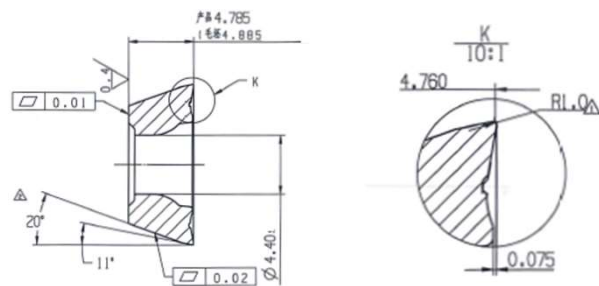
RPHT 1204M8E-MM3	11	4.4		
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RD/RP round insert series

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RPMT 1204MOE-T1000



Clearance
Angle

11

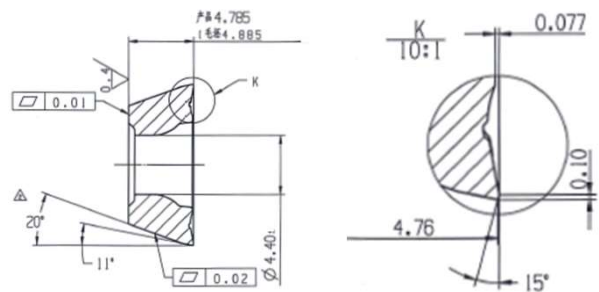
Screw hole

4.4

Anti-rotation design



RPMT 1204MOE-T1015



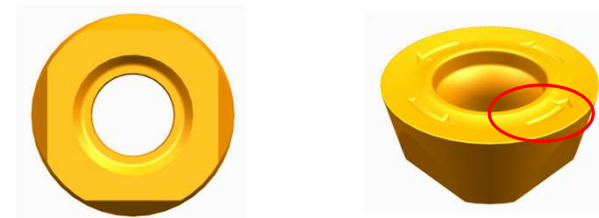
Clearance
Angle

11

Screw hole

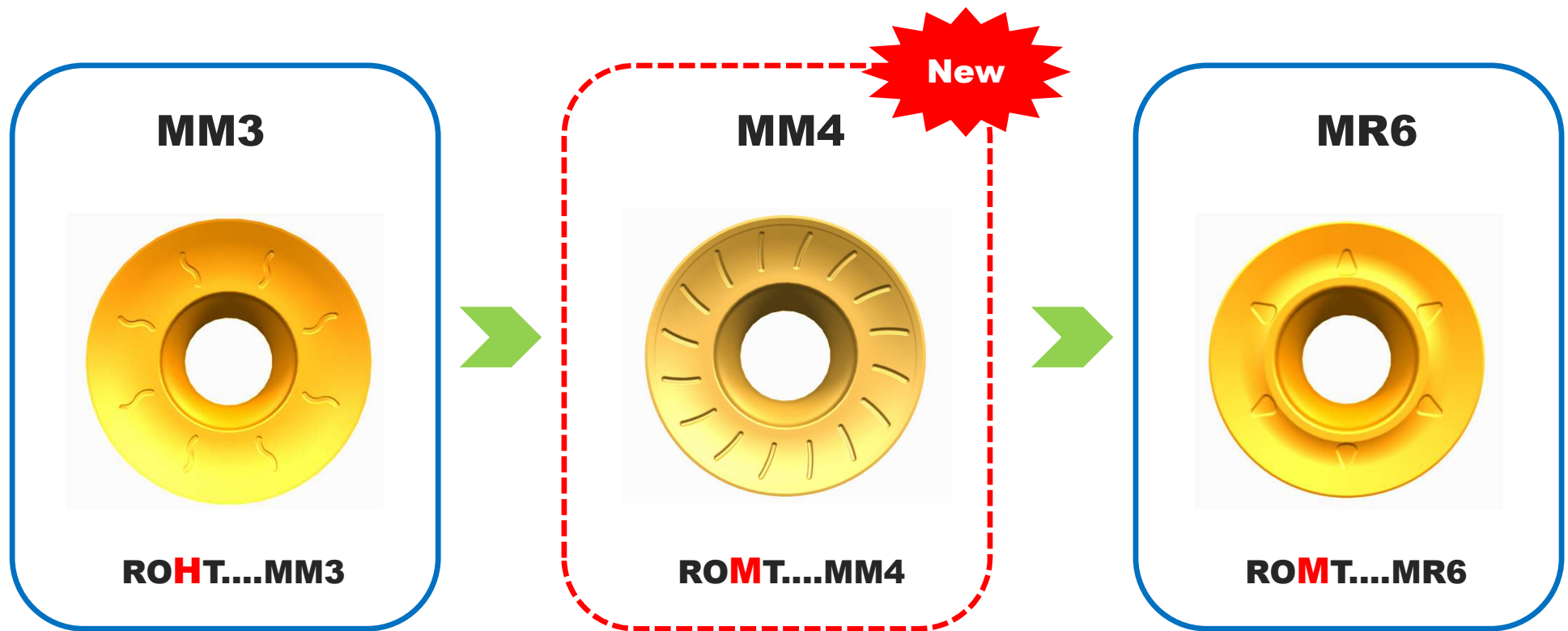
4.4

Anti-rotation design



APM00-RO08/10/12/16/20 round insert series

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APM00-RO08/10/12/16/20 round insert series

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ROHT-MM3	Clearance Angle	Screw hole
----------	-----------------	------------

ROHT 0803MOE-MM3	15	2.8
ROHT 10T3M8E-MM3	11	4.4
ROHT 1204M4E-MM3	11	4.4
ROHT 1204M6E-MM3	11	4.4
ROHT 1605M8E-MM3	11	5.5
ROHT 2006M8E-MM3	11	5.5



ROMT-MR6	Clearance Angle	Screw hole
----------	-----------------	------------

ROMT 10T3M4E-MR6	11	2.8
ROMT 1204M4E-MR6	11	4.4
ROMT 1605M4E-MR6	11	5.5
ROMT 2006M4E-MR6	11	5.5



APM00-RO08/10/12/16/20 round insert series

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APM00-RO08

Coupling type: Weldon shank (D16) Cylindrical shank (D25) Screw head (D20)

APM00-RO10

Coupling type: Cylindrical shank (D25-32) Screw head (D25-32) Arbor (D40-50)

APM00-RO12

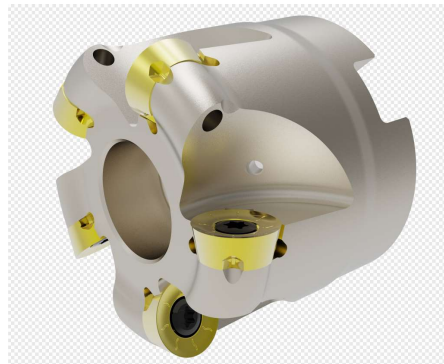
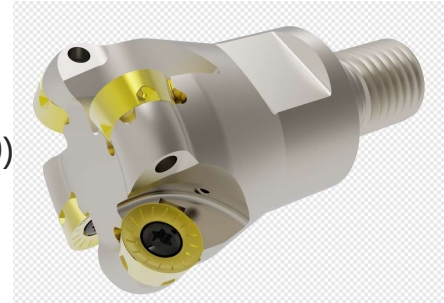
Coupling type: Cylindrical shank (D32) Screw head (D40) Arbor (D40-80)

APM00-RO16

Coupling type: Arbor (D63-100)

APM00-RO20

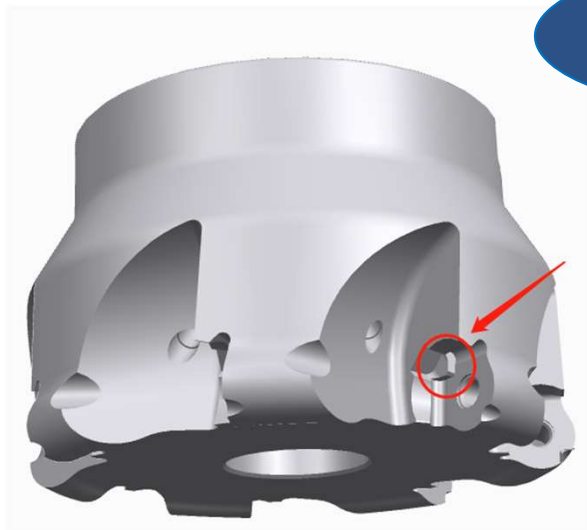
Coupling type: Arbor (D100-160)



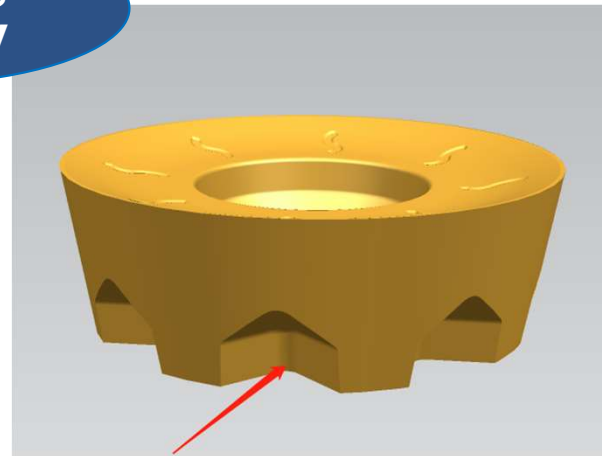
Anti-Rotation design

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- The Anti-Rotation design prevents the rotation of insert in the pocket, for reliability and precision during all kinds of applications.
- The same milling cutter can match with the insert in different index;
- The proper inserts can be chosen according to different cutting depth.

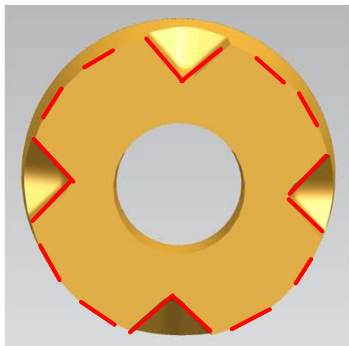


**Precision,
Reliability**

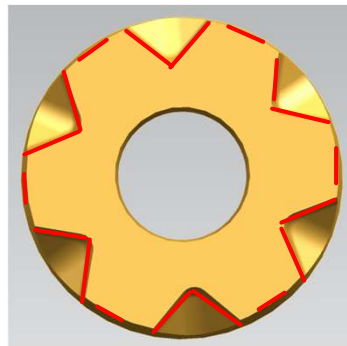


Transform times

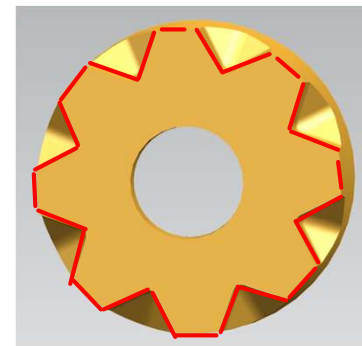
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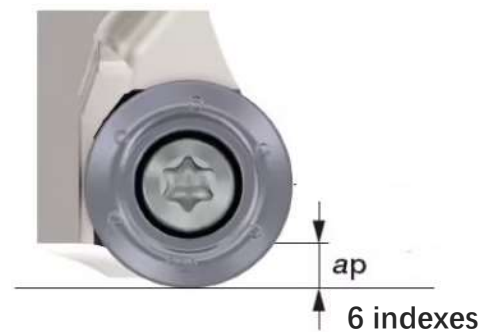
RO...M4E..
4 times



RO...M6E..
6 times



RO...M8E..
8 times



Max. cutting depth

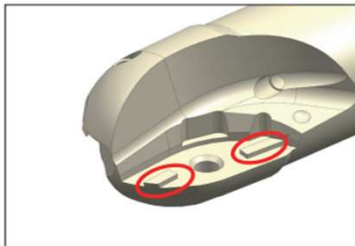
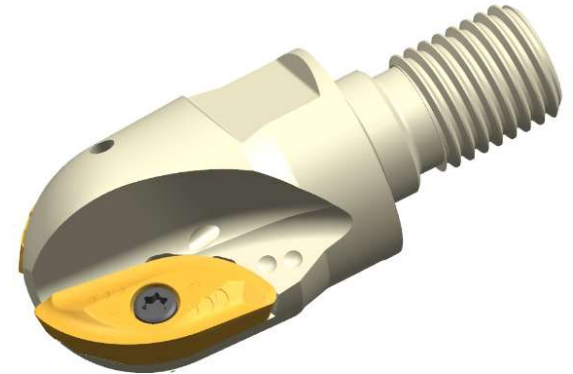
APM00-RP080/100

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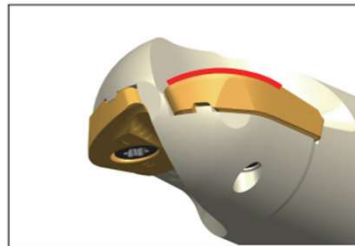
- APM00-RPM series for profiling milling in Aerospace applications
- Roughing and semi-finishing of blades, disks, deep cavity milling of mold bodies.
- Outstanding performance especially in Ni-based alloys, titanium alloys and stainless steel milling.

Product features:

- Tool diameters: $\varnothing 0.63$ - $\varnothing 0.79$ inch;
- Coupling Types: Modular screw head and cylindrical shank;
- RPM insert sizes: 08/10;
- Grades: AP403S and AP351M.



Anti rotation retaining boss

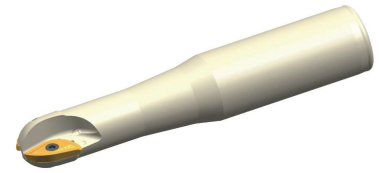
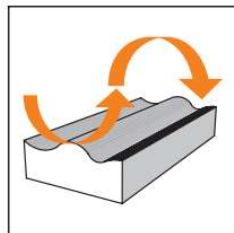
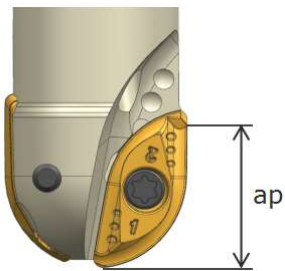


Spiral cutting edge design ensures smooth machining

APM00-RP080/100

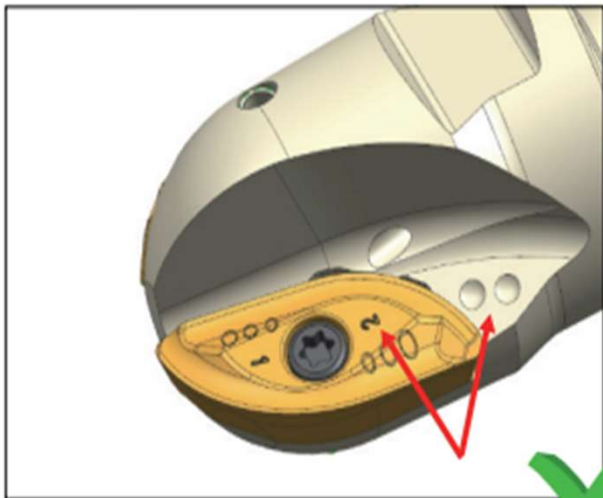
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- Tool diameter (Dc) : Ø0.63, Ø0.79 inch
- Max. cutting depth (apmax) : 0.55 in, 0.63 in
- Positive insert, 2 indexes per insert
- Coupling type: Screw head, cylindrical shank
- Internal coolant
- Insert screws: TorxPlus 08, 09
- Nickel-plated surface

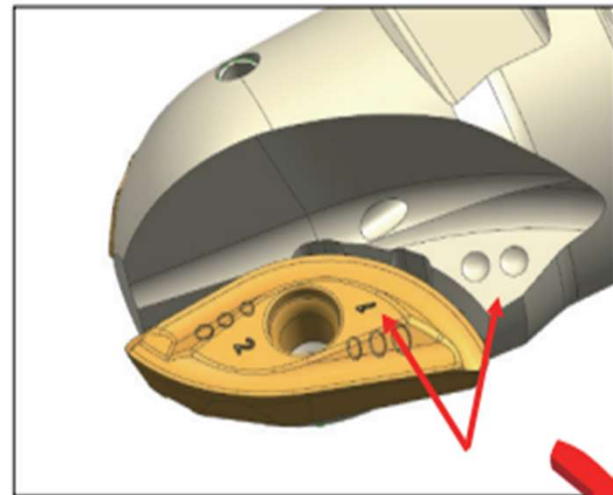


- **Attentions and precautions during inserts-installation**

Inserts can not be mounted with the cutter if inserts No. marks mismatches with cutter BOSS No. signs

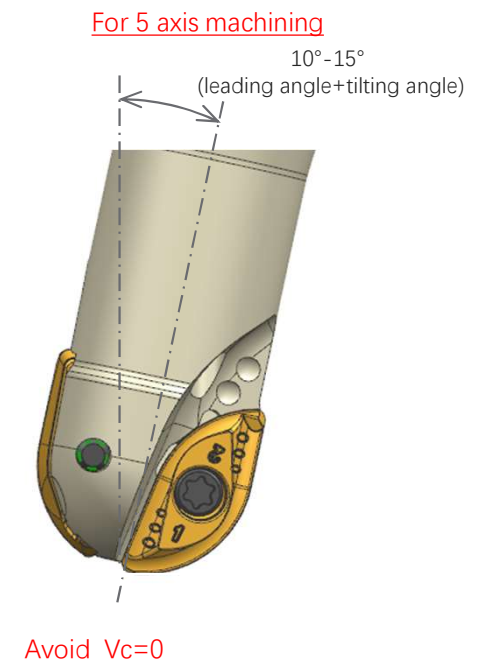
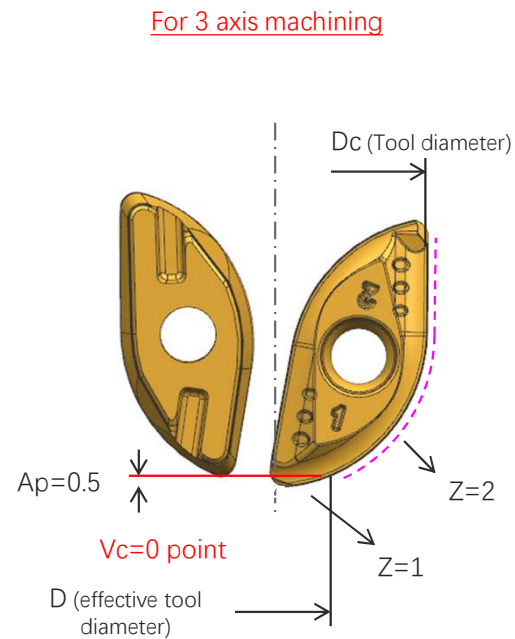


Matching marks



Dismatching marks

- Applications:
 - For profile milling mold, turbine blades, impeller
 - For roughing and semi-finishing
 - For 3 axis machining, $V_c=0$ at center point, effective cutting diameter should be considered for cutting data calculation.
 - For 5 axis, use leading angle and tilting angle can avoid $V_c=0$ point, better for tool life.



APM00-RP080/100

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• Geometry Features

Geometry	Edge Preparation	Feature
MM4		• Widely used in medium machining working conditions; • 1st option for General machining;
MM3		• Used under weak machining conditions and finishing machining; • Low cutting force (low power machine)

• Grade application

Grade	Coating	Material					
		P	M	K	S	N	H
AP401U	PVD	●	●				
AP403S 	PVD		●		●		
AP351M 	PVD		●		●		

● 1st Choice ● 2nd Choice ○ Supplementary application

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THANKS

