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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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04

Shoulder Milling

难加工材料切削专家

THE EXPERT OF DIFFICULT MACHINING

ASM90-AO12 Series

NEW

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- New positive shoulder milling tool with two spiral cutting edges
- Light and fast cutting with reinforced cutting edge
- Insert grades are suitable for machining various materials, epecially heat-resistant alloy, Titanium alloy and stainless steel.

ASM90-AO12 insert features

NEW

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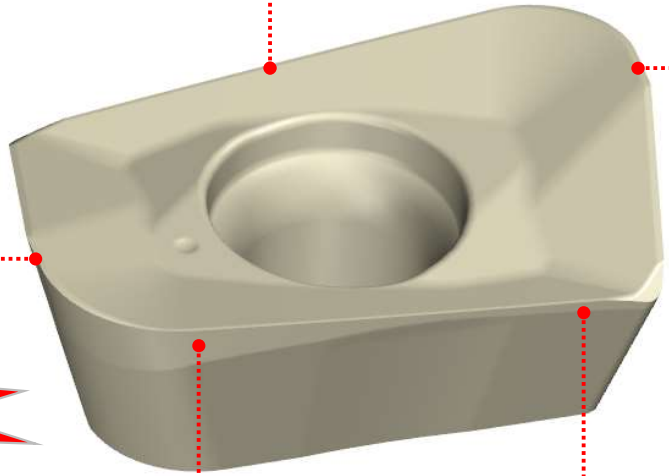
Strong geometry design
Tool performance improvement

Wiper edge
Great surface finish



Strong cutting edge
Longer tool life

Reduced cutting force

Cutter with inserts:
axial angle +8°
radial angle-5.5°

Spiral edge design
Light cutting

Variable angle
Strong cutting edge

ASM90-AO12 insert features

NEW

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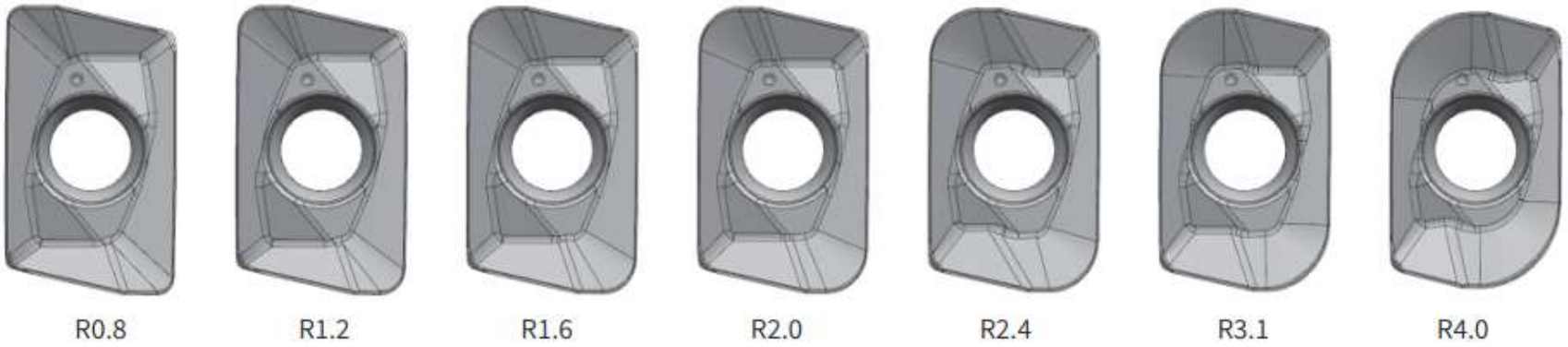

- Approach angle: 90° positive shoulder milling cutters
- Inserts with helical edge design for light cutting,
- Max. depth of cut: apmax=0.433 in
- Geometry: MM4
- Inserts with wiper design can get great surface finish
- Corner radius: R0.8/1.2/1.6/2.0/2.4/3.1/4.0.

ASM90-AO12 cutter features

NEW

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Four types of coupling can meet different needs

Screw head

Cylindrical shank

Weldon

Arbor

- Two pitch types: close and coarse pitch
- Screw head Diameter: φ0.79-1.38in
- Cylindrical shank Diameter: φ0.79-1.25in
- Weldon shank Diameter: φ0.79-1.5in
- Arbor diameter: φ1.5-3in

ASM90-AO12 grades and Geometries

NEW

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Chip breaker features

Geometry	Cutting edge shape	Application
MM4 General purpose		• Used for medium machining • First choice of general machining

Grade application

Grade	Coating	ISO material group					
		P	M	K	N	S	H
AP251U	PVD	●	◐				
AP351M	PVD	◐	●			◐	
AP403M	PVD	◐	●			◐	
AP251K	PVD			●			
AP403S	PVD		●			●	

●Marked: 1st choice ◐Marked: 2nd choice

AFM45-SE12 face milling

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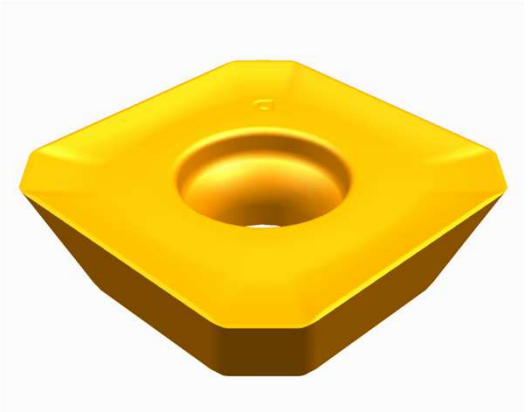
☐ Insert

- Clearance angle: 20°， and 29° for wiper inserts
- Max cutting depth： ap_{max}=0.24in
- Positive, 4 cutting edges, low cutting force and smooth cutting
- Wiper edge design for better surface finish
- Both pressed and ground insert options
- Geometries: MM3/MM4/MR6/FM2
- Grades： AP251U， AP351M， AP403M， AP403S， AC151K， AP251K， AP151H， AW100K， cermet



AFM45-SE12 face milling

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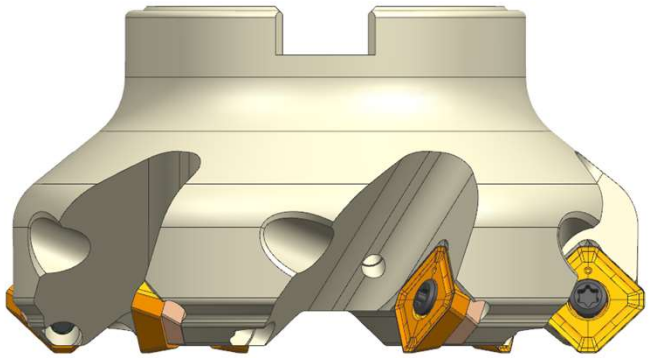
Cutter

- 45° approach angle
- With shim to protect the cutter, and better reliability
- Pitch options: close and coarse pitch
- Coupling:

  Cylindrical: Ø1.25-2.5in

  Waldon: Ø1.25-2.5in

  Arbor: Ø2-10in

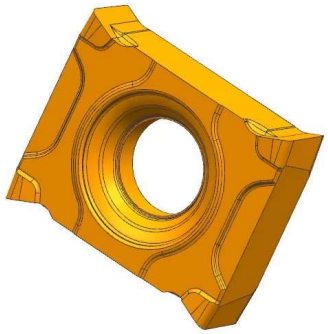


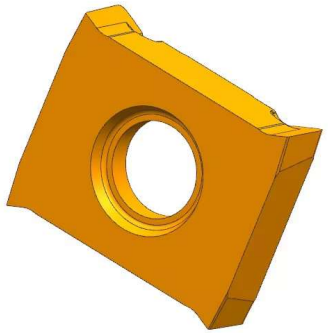
ADM04(08)-LX12 for narrow side & face milling cutter

·ACHTECK·

☐ Insert

- Ground insert, double clearance angle design
- 4 cutting edges—2 right handed and 2 left handed
- Big screw hole for bigger screw with high clamping torque
- Countersink hole on the insert back side for longer screw clamping length
- Wiper design on the side edge for better surface finish
- General purpose geometry is suitable for most applications.
- Grades：AP351M，AP403M

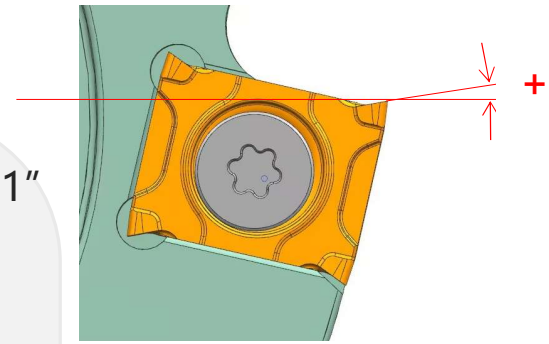




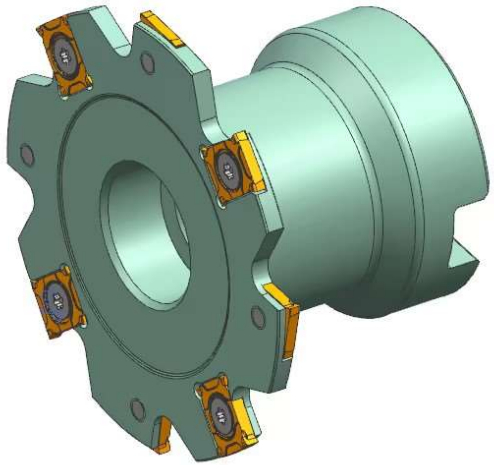
ADM04(08)-LX12 for narrow side & face milling cutter

·ACHTECK·

☐ Cutter



- Min. cutter thickness is 0.16”， Max. cutter thickness is 0.31”
- Insert pocket is reinforced for better cutter rigidity
- Positive radial angle for smooth cutting
- High strength pre-hardened cutter avoid cutter deformation
- Coupling types: screw head, arbor and cylindrical shank
- Suitable for most grooving and parting off applications



WNMU 08 insert features

NEW

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- Negative insert with 6 cutting edges, cost efficient.
- Corner radius: R0.8, 1.2, 1.6 for different applications.
- Different insert geometries, suitable for different applications.
- Coupling types: arbor, Cylindrical shank, and Weldon shank.
- Various pitches: coarse, close and extra-close pitch for wide applications.

WNMU 08 insert features

NEW

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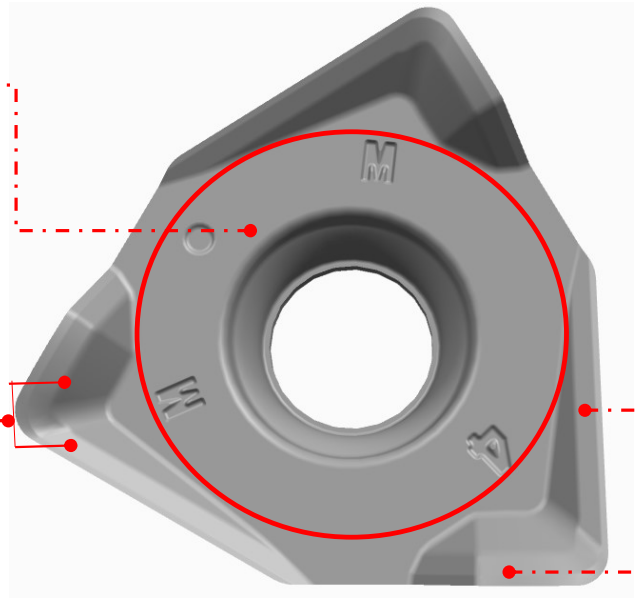
Large locating surface improves stability



Large rake angle reduces cutting force

Chip breaker with large rake angle
Smooth chip breaking

Wiper design improves surface finish

ASM90-WN08-N cutter features

NEW

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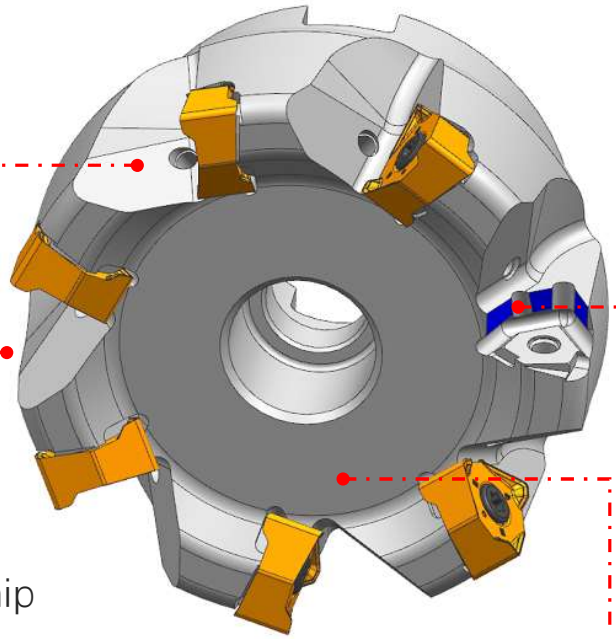
Precise internal cooling towards cutting edge for longer tool life.



High stability
3 locating surface clamping

3D chip pocket designfor smooth chip evacuation

Surface Ni-plated for better corrosion resistance and wear resistance

WNMU 08 insert features

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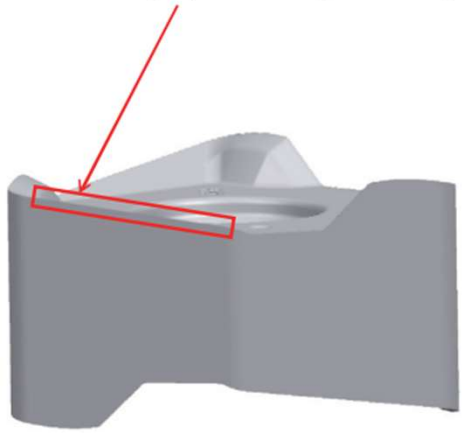
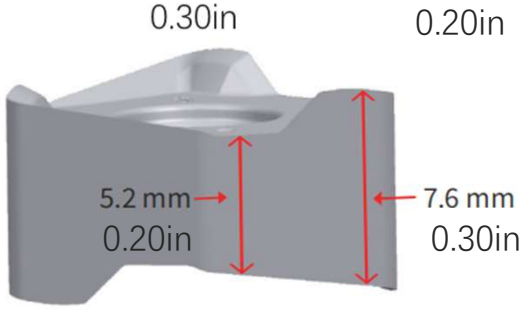
Positive axial angle provides light cutting and good chip evacuation.



The thickest: 7.6 mm; The thinnest: 5.2 mm



Strong insert design

WNMU08 compared to WNGU

NEW

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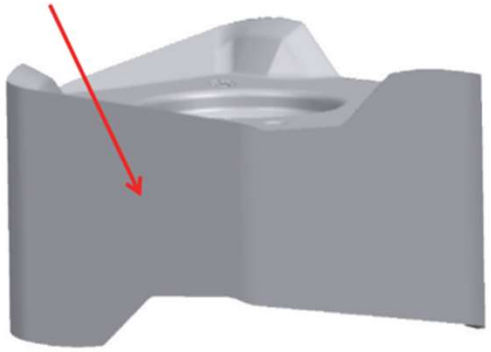
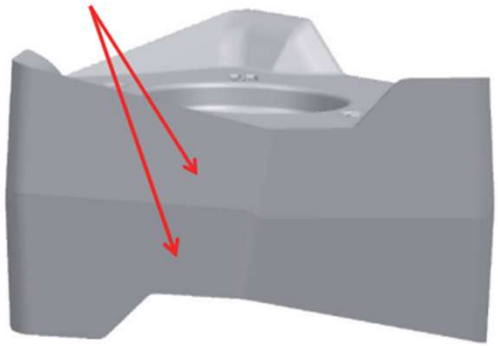
Single flank surface



New product: WNM(G)U 0806..insert

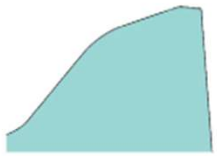
Double flank surface



Old product: WNGU 0806..insert

WNMU 08 geometry introduction

NEW

Chip breaker	Cutting edge shape	Application
MR2 Strong type		• Suitable for poor machining conditions • High cutting edge reliability • High feeding speed
MM4 General type		• Suitable for medium machining conditions • Good geometry choice for general machining
MM3 Easy cutting type		• Suitable for good machining conditon and finishing • Low cutting force(used in low power machine)

ASM90-WN08 cutter features

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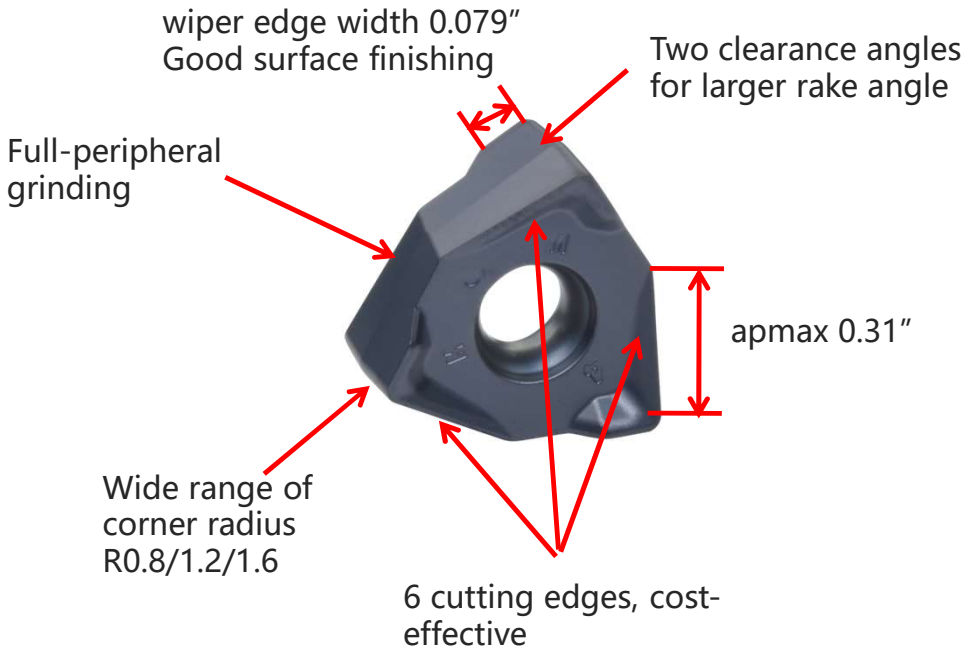
- Approach angle (Kr) : 90 °
- Tool Diameter (Dc) :
  WN08..: Ø1.25-10in
- Max. cutting depth (ap max.) :
  apmax=0.28
- Three pitches
  - Coarse pitch, slot milling, shoulder milling
  - Close pitch, shoulder milling
  - Extra close pitch, short chip material and small ap machining
- Coupling Type
  - Arbor
  - Cylindrical
  - Weldon
  - Screw head
- Internal coolant for cutter body up to Ø5” (incl.) diameter
- Insert Screws WN08..SP040090 (Torx Plus 15)
- Ni-plated cutter surface

ASM90-WN08 insert features

·ACHTECK·

- Negative inserts with 6 cutting edges
  - Cost efficient
  - Strong Geometries with thickness 0.31in;
- Four geometries with short wiper: FM2, MM3, MM4, MR2, wide range of applications. Great surface finish;
- Two types of long wiper inserts
  - For finish milling with high efficiency;
  - Suitable for workpieces with different rigidity;
- Insert corner radius
  - R0.8/1.2/1.6



ASM90-WN08 Geometries features

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Chip breaker Features

Chip breaker name	Edge Preparation	Feature
MR2 Stable type		• Suitable for unstable cutting conditions • Best cutting edge stability; • High feedrate.
MM4 General type		• First choice • Medium cutting conditions • General machining
MM3 Sharp type		• Fine cutting conditions and finish operation; • Low cutting force (used for small power machine)

ASM90-SO12 square shoulder milling cutter

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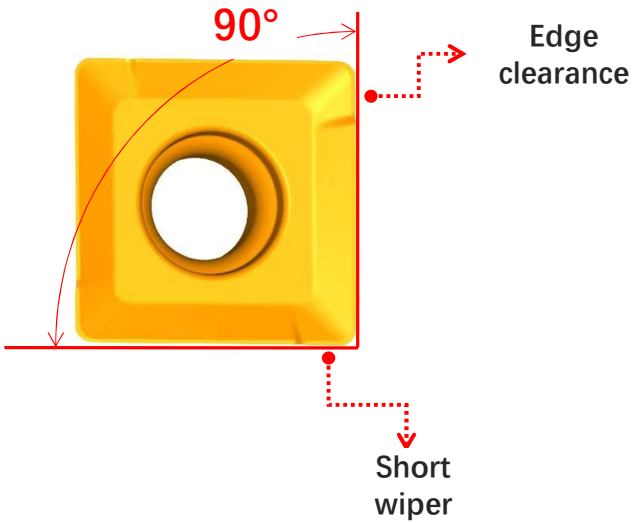
Insert

- Positive, 4 edges, low cutting force
- Double clearance angle design: 11° for the 1st clearance angle, 15° for the 2nd.
- Short wiper edge design for better surface quality
- Pressed insert for cost effective
- Geometry: MM4
- Grades: AP251U, AP351M, AP403M, AP403S, AC151K, AP251K



ASM90-SO12 square shoulder milling cutter

·ACHTECK·

☐ Cutter

- Accurate 90° approach angle
- Max cutting depth: ap_{max}=0.35”
- Coupling: cylindrical, Waldon and arbor
- Diameter range:
  Cylindrical: Ø1.25-2in
  Weldon: Ø1.25-1.5in
  Arbor: Ø2-10in
- Internal coolant for cutter body up to Ø5” (incl.) diameter
- Can be used in face milling, square shoulder milling, slot milling and plunge milling

Lab test

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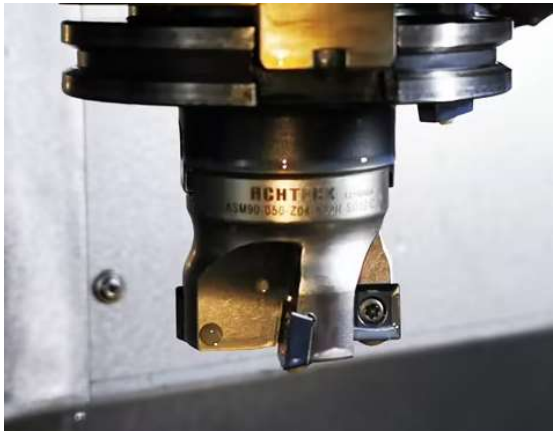
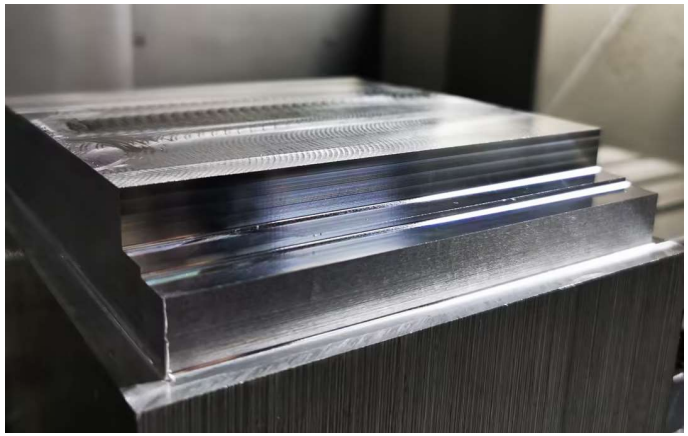
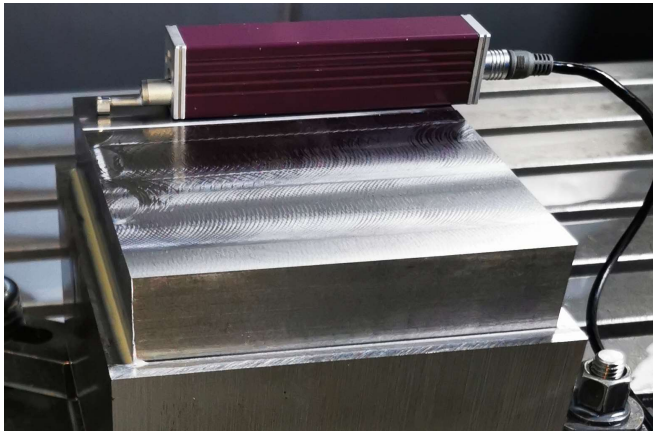
Test



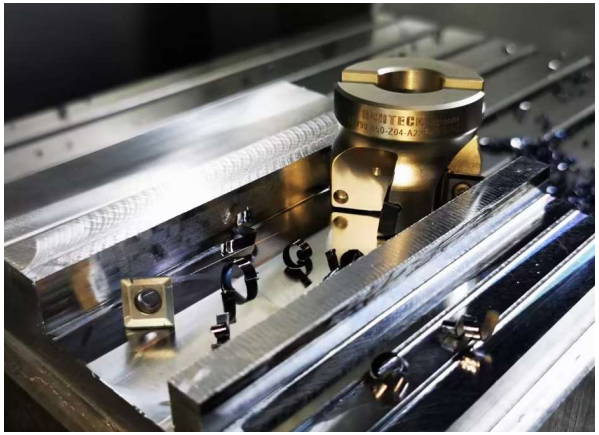
Side edge milling result



Face milling result



Slot milling result



Success story

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Workpiece: Structure part

Material: High strength steel

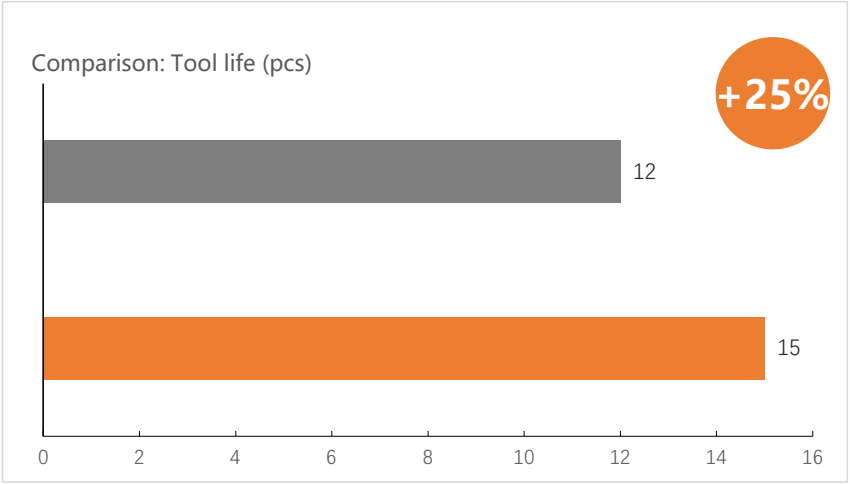
Cutter: ASM90-100-Z07-A32R-SO12-C

Insert: SOMT 120408PDER-MM4

Grade: AP351M

Application: Face milling

Cutting data:	Competitor	Achteck
Vc [m/min]	515	515
fz [in]	0.001	0.001
ap [in]	0.20	0.20
Coolant	Dry	Dry
Tool life (pcs)	12	15



ASM90-TD15 insert features

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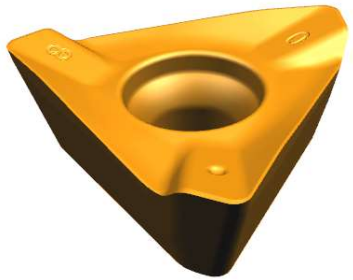
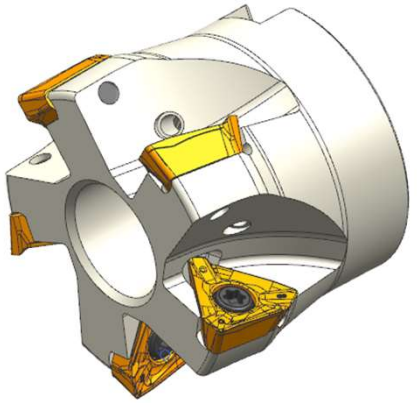
Insert Features:

- Positive milling insert
- Three cutting edges, cost efficient
- Positive rake angle and helix angle design, light cutting.
- Insert with short wiper edge
- Available with M and H class insert options





ASM90-TD15 insert features

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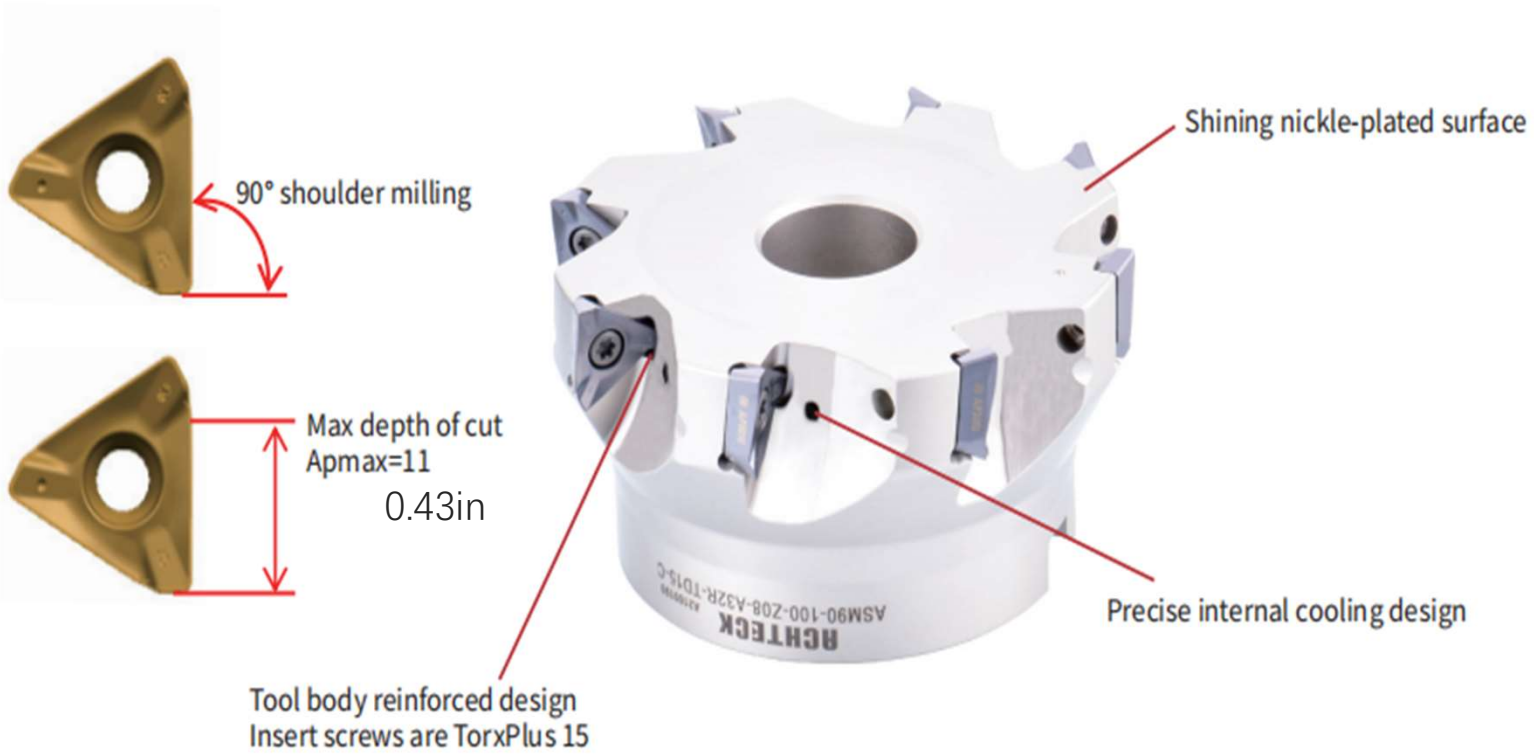
R0.8 R1.2 R1.6 R2.0 R2.4 R3.1 R4.0

Insert Type

- Radius range: R0.8, R1.2, R1.6, R2.0, R2.4, R3.1, R4.0
- Geometry: MM4, MM3, FM2
- Grade: AP301U, AP351M, AP403M, AC301K, AP351K

ASM90-TD15 cutter features

·ACHTECK·



ASM90-TD15 cutter features

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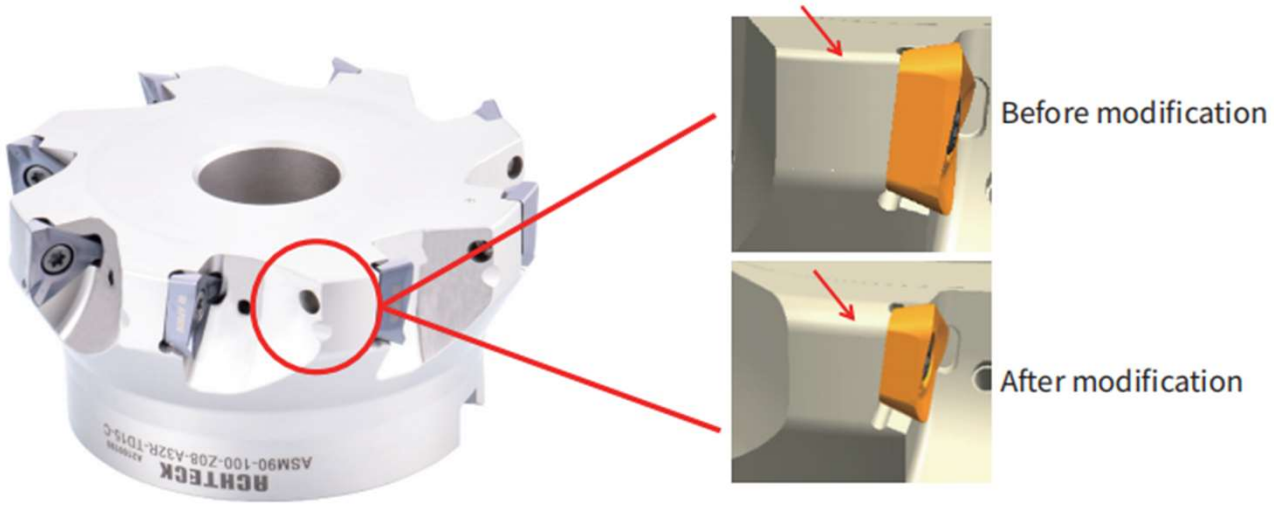
- Application range: Can be used for shoulder milling, face milling, slot milling, ramping, helical interpolate milling;
- Good Universality: Can be used for steel, cast iron, stainless steel roughing and semi-finishing milling;
- Two kinds of coupling:
  Cylindrical shank: ϕ32-40mm
  Shell mill(Arbor): ϕ40-200mm

ASM90-TD15 cutter features

ASM90-TD15 Cutter introduction

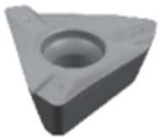
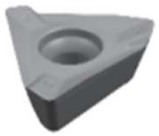
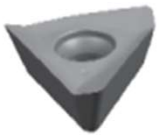
When big corner radius inserts are used, the tool body needs to be modified



TDMT 150531R-MM4	Modify the tool body corner radius to R2.0
TDMT 150540R-MM4	Modify the tool body corner radius to R4.0

ASM90-TD15 Geometry features

Geometry introduction

Insert	Geometry	Cutting edge	Application Range
	MM4		· For medium cutting conditions · 1st choice for general machining
	MM3		· For good cutting conditions, finishing · Low cutting force, can be used for low-power machines
	FM2		· Sharp geometry · Low cutting force · Used for aluminum machining

ASM90-AP10/17 Series

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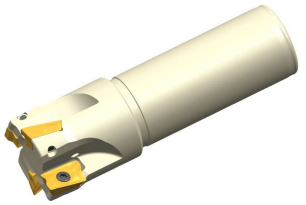
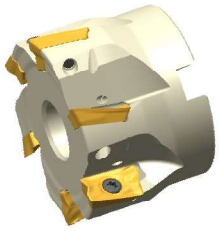
- ASM90-AP10 Tool Diameter: Ø0.63- Ø2.5in
- ASM90-AP17 Tool Diameter: Ø1- Ø4in
- ASM90-AP10 Max. depth of cut: 0.31in
- ASM90-AP17 Max. depth of cut: 0.63in
- Helical cutting edge design, sharp Geometries, light cutting, suitable for machining under weak rigidity and can achieve good surface finish on the side face.
- Coupling Types: Cylindrical shank, Screw head, Arbor
- APKT 10 series can be compatible with Iscar.
- APKT 17 series can be compatible with TaeguTec.





ASM90-AP10/17 Geometries and grades

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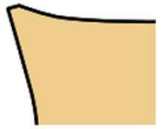
Geometry	Cutting edge types	Range of application
IT		Sharp type • Low cutting force with sharp Geometry • For medium and finishing machining conditions
DT		Universal use type Geometry • Strong cutting edge, good impact resistance • mainly used for medium and rough machining conditions

• Range of Grades application

Grades	Coating	Materials					
		P	M	K	S	N	H
AP401U	PVD	◐	●				
AP403S	PVD		◐		●		
AP351U	PVD	●	◐				
AP301U	PVD	●	◐				

● Marked : 1st Choice ◐ Marked : 2nd Choice ○ Marked : Supplementary application

ASM90-LN cutter features

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- Approach angle (Kr) : 90°
- Tool diameter (Dc) :
  LN09..: Ø0.79-3in
  LN13..: Ø1.5-6in
  LN16..: Ø2.5-6in
- Max. depth of cut (ap max.) :
  LN09..: 0.31in
  LN13..: 0.47in
  LN16..: 0.59in
- Coarse, standard and close pitch are available.
- Coupling types: Weldon shank, cylindrical shank and Arbor.
- Internal coolant for cutter body up to Ø5” (incl.) diameter
- Inserts screws: LN09.. (Torx Plus 09) , LN13.LN16. (Torx Plus 15 20)
- Nickel-plated surface

ASM90-LN cutter features

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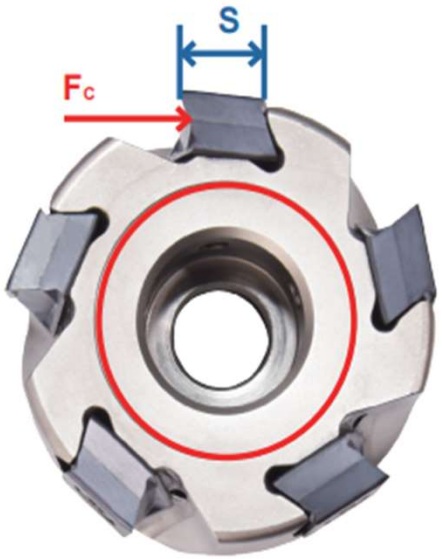
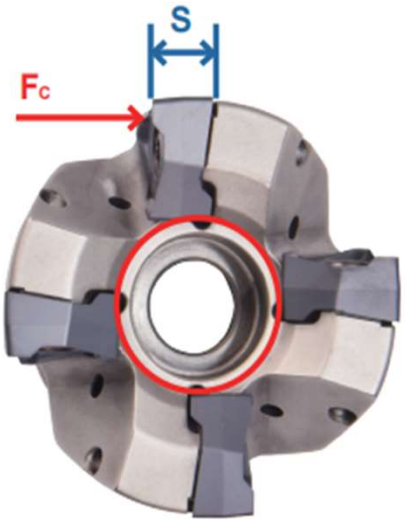
- Positive rake angle inserts
  - Light cutting
- 4 cutting edges
  - Cost-effective;
  - Strong cutting edge for reliable machining;
- Universal Geometry MR2 with short wiper edge
  - Wide range of applications
  - Good surface finish
- Two types of long wiper edge inserts
  - Finish milling for higher machining efficiency;
  - Suitable for workpieces with different rigidity;
- Insert corner radius
  - R0.8/1.2/1.6/2.0/2.4/3.1

ASM90-LN Advantages



Tangential inserts



Radial inserts

- Advantages for Tangential allocation cutters:
  - Tool body core area was greatly increased and the rigidity of the cutter body is strengthened;
  - large inser thickness on cuting force direction , can resist greater cutting force and achieve higher feed;

ASM90-LN Geometry features

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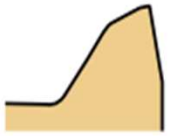
Geometry features

Geometry	Cutting edge shapes	Working conditions
MR2		• used stable cuting conditions • Suitable for medium, cuting and roughing operation

Geometry	Cutting edge shapes	Working conditions
MM3		• Easy-to-cut type • Used on weak cuting conditions Suitable for semi-finishing and medium roughing

Geometry	Cutting edge shapes	Working conditions
FM2		• Sharp type • Specially designed for aluminum materials machining • Low cutting force and sharp cutting edge

APE90-LN09/13 Denomination

A$_1$	PE$_2$	90$_3$	-	063$_4$	-	Z04$_5$	-	A$_6$	27$_7$	R$_8$	-	LN13$_9$	-	L56$_{10}$	-	F$_{11}$	-	C$_{12}$

1-Achteck

2-Machining type	
PE	Porcupine milling
SM	Square shoulder milling
PM	Profile milling
HM	High feed milling
DM	Side and face milling

3-Approch angle (Kr)	
Figure	Angle
90	90°
88	88°
60	60°
45	45°

4-Cutter dia.	
025	25mm
063	63mm
080	80mm
.	.
250	250mm

5-Number of teeth	
Z02	2 teeth
Z04	4 teeth
Z05	5 teeth
.	.
Z30	30 teeth

6-Connection	
A	Arbor
W	Weldon shank
C	Cylinder shank
N	Whistle noich shank
M	Screw modular

7-Connection size	
27	Connection diameter 27mm

8-Hand of tool	
R	Right
L	Left
N	Neutral

9-Insert	
LN13	LN13 series insert

10-Valid cutting edge length Max	
L30	30mm
L45	45mm
L56	56mm

11-Cutter type	
F	Full teeth
H	Half teeth

12-Other	
-C	With internal coolant
No mark	Without internal coolant

APE90-LN09/13 Porcupine Milling Cutter

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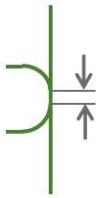
➢Tool diameter (Dc) :
LN..09..: Ø1- Ø2n
LN..13..: Ø1.5- Ø3in
➢Cutting depth (ap) :
LN..09..: 0.94-1.89in
LN..13..: 1.34-2.20in

➢Full-tooth design with precise internal coolant towards each insert cutting edge

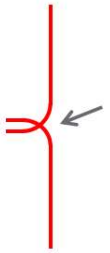
➢Insert mounting:
APE90-LN09..Cutter body:
•End edge mounted insert covers R0.4 or R0.8;
•Side edge mounted insert covers R0.4;
APE90-LN13..Cutter body:
•End edge mounted insert covers ≤R2.4;
•Side edge mounted insert covers R0.8;

➢Internal coolant applies to all cutters
➢Coupling Type: Screw head, Cylindrical shank, Arbor
➢Ni-plated cutter surface

Correct overlapping of corner radius



Wrong overlapping of corner radius



APE90-LN09/13 Applications

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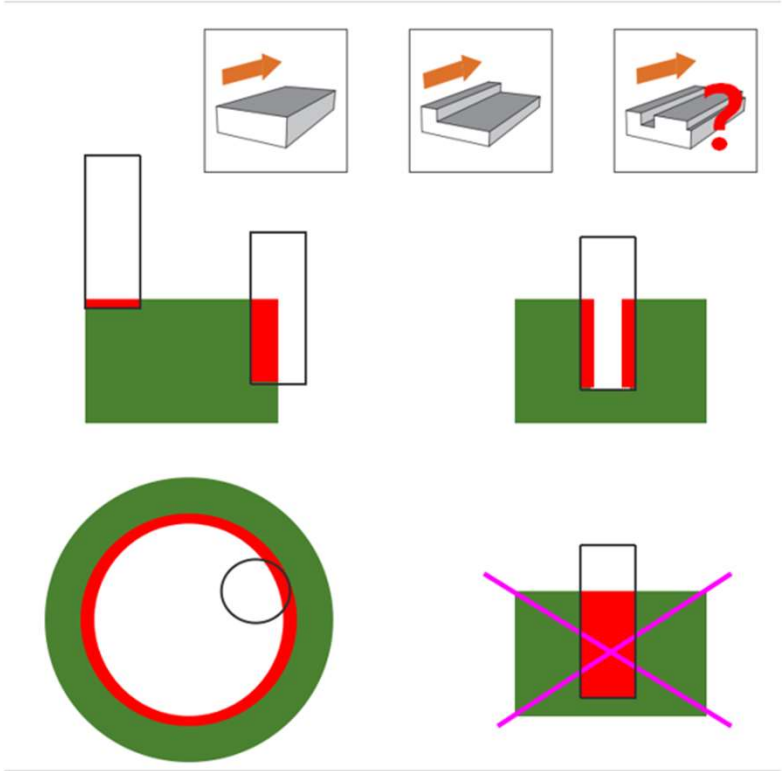
Side cutting edges for large cutting depth and small cutting width.

For large cutting width and small cutting depth on the end edges.

For slot milling and helical interpolation.

Not recoinended for long chip materials, full cutting width, large cutting depth and full slot milling.



ASM90-LNET12 Butterfly milling insert

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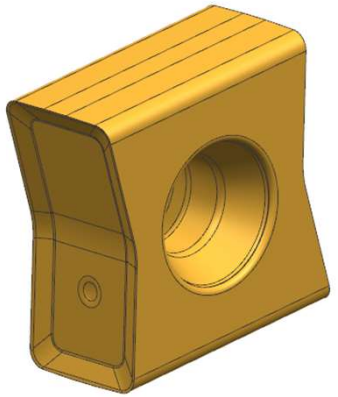
Insert features:

- Negative vertical insert
- 8 cutting edges including left-handed and right-handed cutting edges
- Cutting edge with short wiper design
- E class ground insert
- MM4 Geometry
- Grades: AP251U, AP403M, AP251K, AC151K

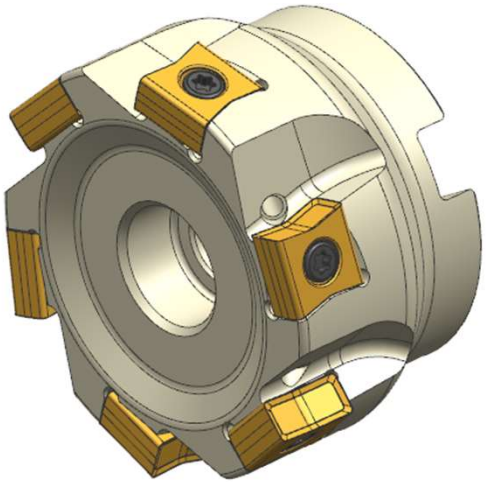


ASM90-LNET12 Butterfly millling cutter

·ACHTECK·

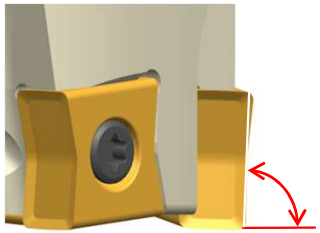
Cutter features:

- Tool diameter range (Dc): Ø2.5- Ø10in (left-handed and right-handed milling cutter)
- Close pitch and coarse pitch
- 8 cutting edges including left-handed and right-handed cutting edges
- Suitable for cast iron, steel and stainless-steel medium roughing, semi-finishing and finish milling
- Coupling type: Arbor
- Right-handed milling cutters are kept in stock, left-handed milling cutter will be produced according to orders

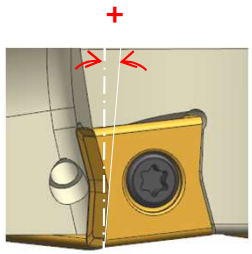


ASM90-LNET12 Butterfly milling cutter

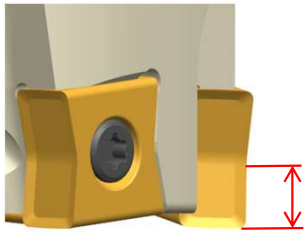
·ACHTECK·



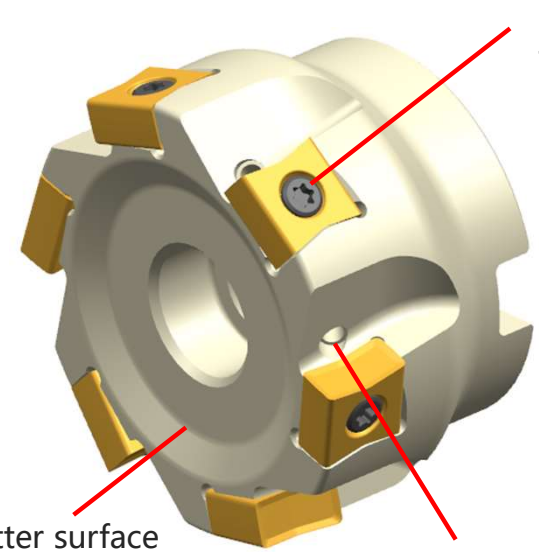
Approach angle: 89°



Positive rake angle milling



Max. DOC (apmax) : 0.20in



AC251P - high speed steel milling grade

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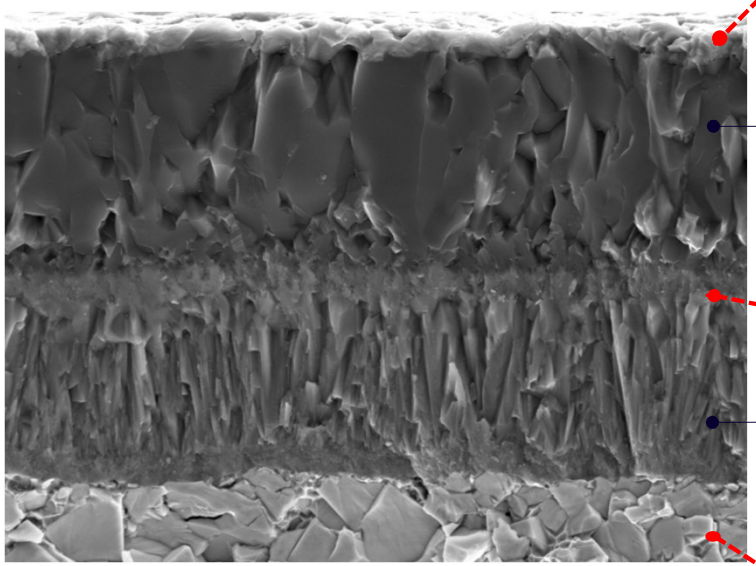
CVD coating

Bi-colored insert: black rake surface and gold relief surface



Special treatment after coating for smooth coating surface

Dramatically reduced built-up edge and edge breakage

α-Al_2O_3

Gradient transition layer enhanced coating adhesion

Improved coating adhesion for less coating peeling

M-TiCN

New substrate

Balanced wear resistance and toughness for better tool life

Success story

·ACHTECK·

Workpiece: Welded structure part

Material: St60-2

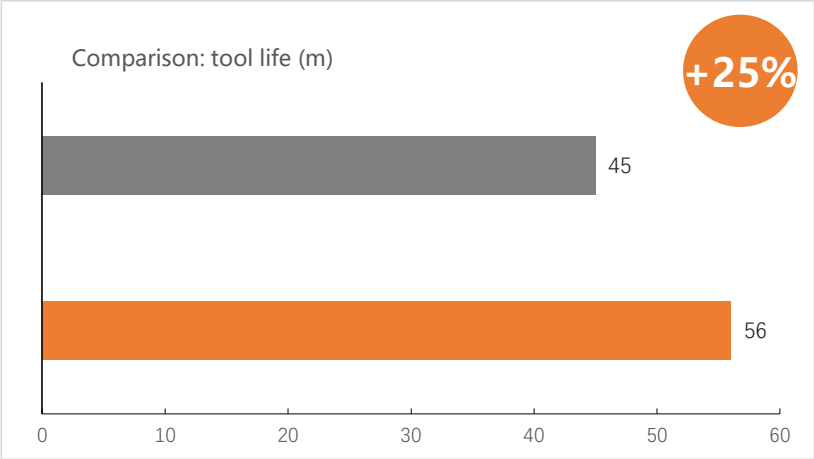
Cutter: ASM90-063-Z06-A22R-LN13-C

Insert: LNHU 130608ER-MR2

Grade: AC251P

Application: rough milling

Cutting data:	AC301P	AC251P
Vc [ft/min]	984	984
fz [in]	0.01	0.01
ap [in]	0.10	0.10
Coolant	Emulsion	Emulsion
Tool life (ft)	148	148

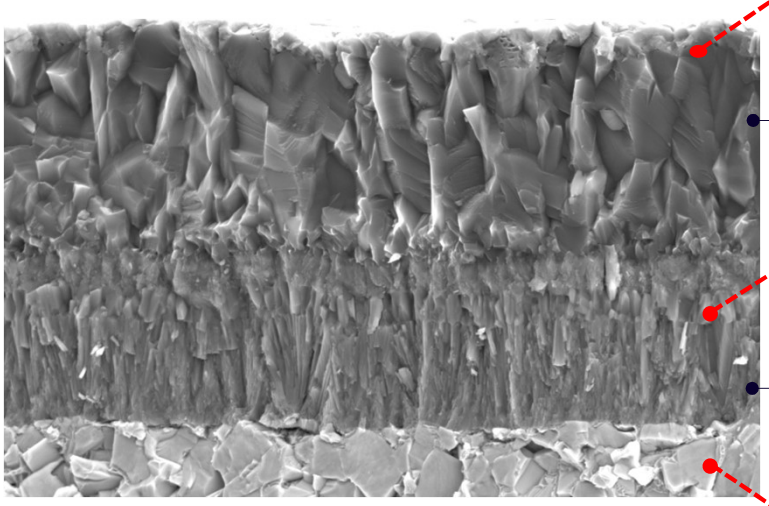


AC151K – high speed cast iron milling grade

·ACHTECK·

CVD coating

Bi-colored insert: black rake surface and gold relief surface



Special surface treatment after coating

Effectively reduced tensile residual stress in the coating

α-Al_2O_3

Nano structured coating for better wear resistance

Fine and uniform crystal for better wear resistance

M-TiCN

Better wear resistant substrate

Higher hot hardness and better wear resistance

Success story

·ACHTECK·

Workpiece: exhaust manifold

Material: GGG50

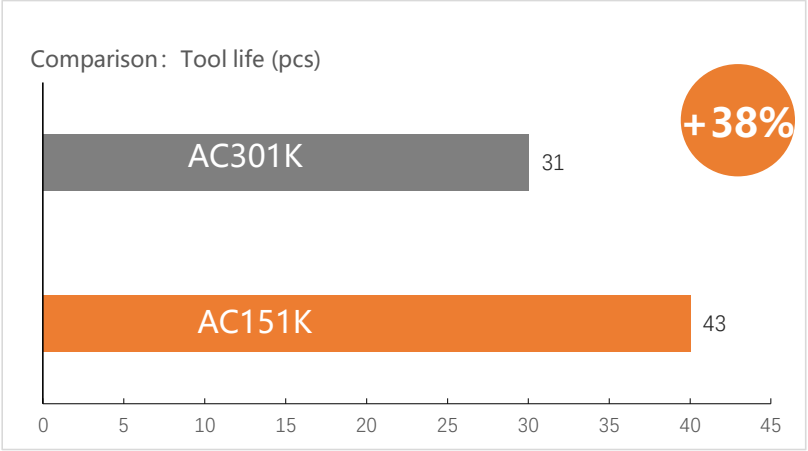
Cutter: AFM45-125-Z08-A40R-XN07-C

Insert: XNMU 070508-MM4

Grade: AC151K

Application: rough face milling

Cutting data:	AC301K	AC151K
Vc [ft/min]	918	918
fz [in]	0.01	0.01
ap [in]	0.10	0.10
Coolant	Emulsion	Emulsion
Tool life (pcs)	31	43



Special Tools

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Application:
Engineering machinery part, finish bore with long overall length. The customer uses the tool with 12.60in length, 1.97in diameter, with low RPM and feed rate at n=300, F=0.79 to do this application with very low productivity.

Improvement solution:
Machine tool: Double spindle boring/milling machine tool
Material: St60-2
Tool: DFB-041-074-BBT50-L280
RPM: n=950 rev/min, F=5.67 in/min
Finish boring cutting depth: 0.01in
Internal coolant
Insert: TCMT 110204E-PB1 AC250P

Result:
1. Tool life is 5 pcs and surface finish is Ra2.4
2. Machining time has reduced from 450 seconds to 62 seconds

Special tool

·ACHTECK·

Workpiece: **Injection molding machine part**
Workpiece: **GG25**
Application: **Finish boring**

Machine Tool: **Mazak horizontal machining center**
Coupling: **BT50**

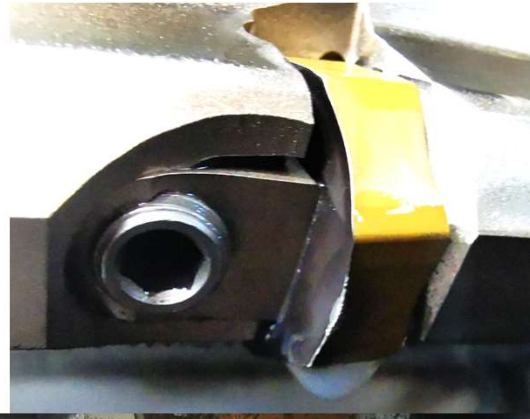
Cutting data:

	Achteck TCMT 110204E-KC2 AC202K	Current tool Without anti-vibration
v_c [m/min] :	515	154
n [rev/min] :	1000	300
Z [Teeth] :	1	1
f_n [in/rev] :	0.004	0.008
OAL [in] :	18.70(including inference length)	18.70(including inference length)
ap [in] :	0.008	0.008

Special tool

·ACHTECK·

Milling top surface of engine block



Cutter: Special (D500, Z48)
Coupling: Arbor 60 (standard coupling)
Insert: LNKX15061.5X45PN-N IC910

Cutting data:
- **Vc = 590 ft/min**
- **n = 115 rpm**
- **F = 21.65 in/min**
- **fz = 0.004 in**

Tool life: 160 pcs

Achteck

Cutter: Special (D500, Z32)
Coupling: Arbor 60 (standard coupling)
Insert: XNMF 0906ANN MR6 AP251K

Cutting data:
- **Vc = 590 ft/min**
- **n = 115 rpm**
- **F = 21.65 in/min**
- **fz = 0.006 in**

Tool life: 160 pcs

Special tool

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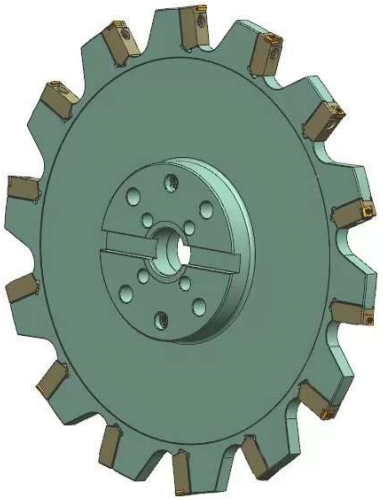
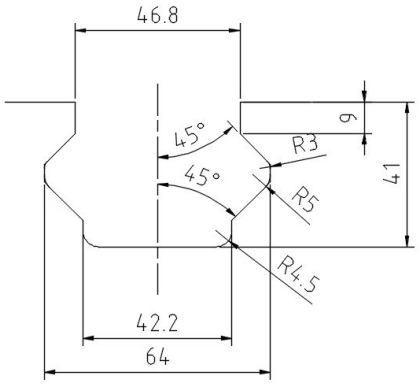
Oil & gas industry, compressor cylinder block machining

Special：
AFM120-1001672 Φ24.80”, Z=8x2



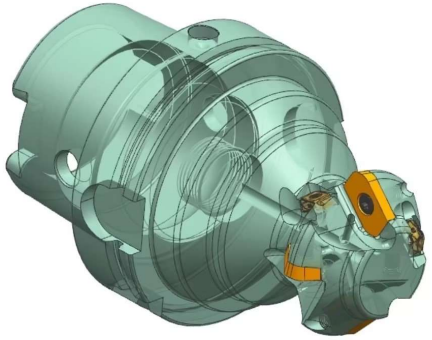
Special tool

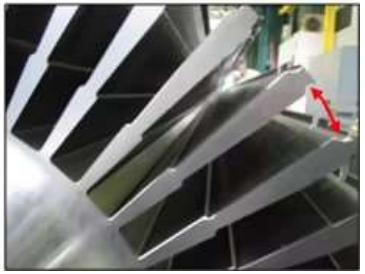
·ACHTECK·



Power generator shaft dovetail slot milling, special tool:

APM110-1004514 (with internal coolant)
APM110-1004515 (with internal coolant)





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THANKS