

**Tungaloy**

Member IMC Group

Keeping the Customer First

Tungaloy Report No. 404-E

**TURNLINE** PVD coated grade for superalloy turning

**AH905**

Extended version

**PREMIUMTEC**  
TUNGALOY

Maximize productivity in superalloys machining!



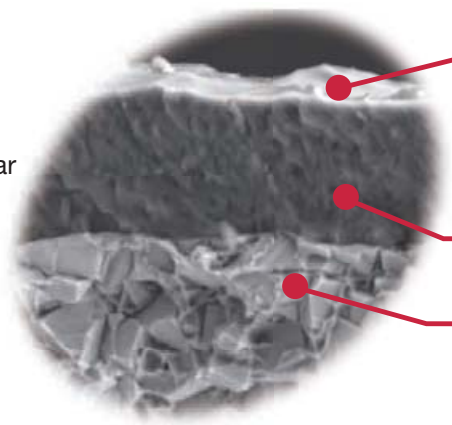
# Extended positive insert range to improve Superalloy machining capabilities!

## Features

**AH905 - The ideal grade for superalloy turning**

**Long tool life** Highest level of reliability!

Specified grade for Superalloy machining  
New (Al,Ti)N layer has very high oxidation resistance. This provides excellent wear resistance when cutting superalloys.




Special Surface Technology  
**PREMIUMTEC**  
TUNGALOY

Smooth insert surface prevents chip adhesion and improves chip flow.

New (Al,Ti)N coating

Fine grain cemented carbide  
Provides high impact resistance

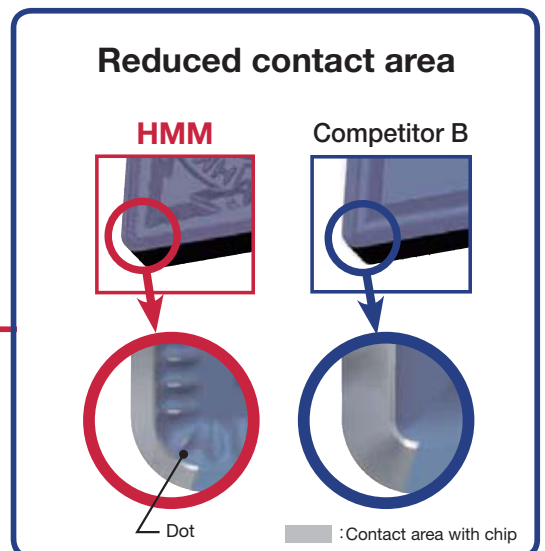
Application	Grade	Substrate			Coating layer		Features
	Application code	Specific gravity	Hardness (HRA)	T.R.S (GPa)	Main Composition	Thickness (µm)	
 Superalloys	<b>AH905</b>	15.0	93.0	2.9	(Al,Ti)N	1.5	For turning of superalloy New coating improves the adhesion and wear resistance.
	S01 - S15						

## HMM chipbreaker for superalloy turning

Uniquely designed chipbreaker with 3-dimensional shape

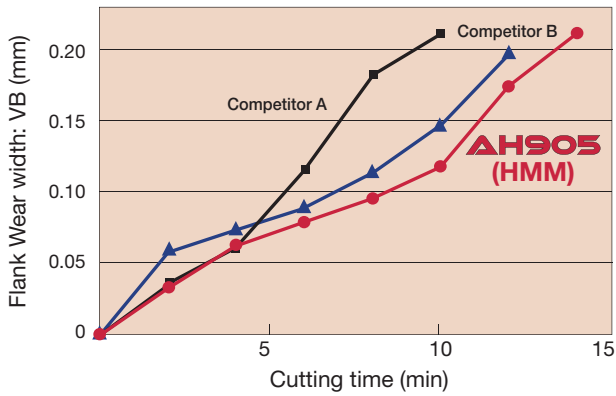


Reduced chip adhesion and improved chip control



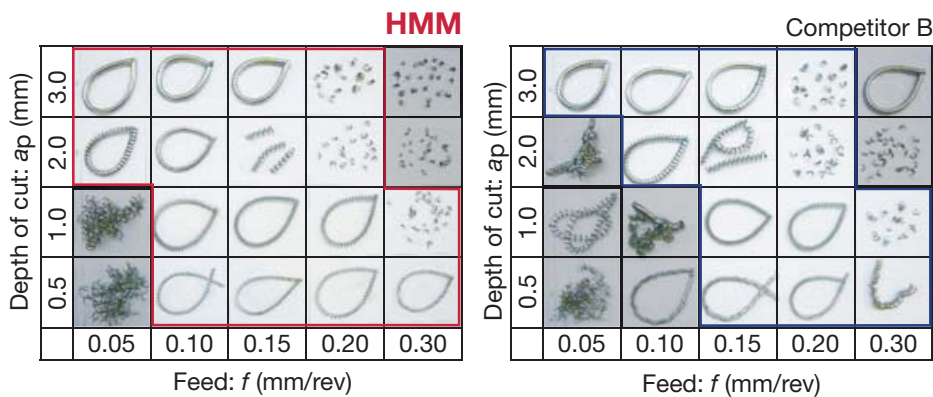
# Cutting performance

New grade provides remarkable tool life in superalloy cutting.



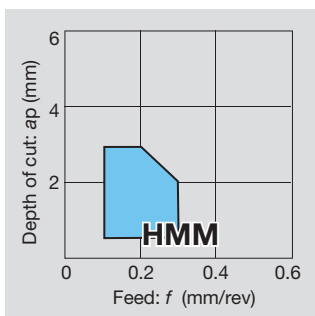
Work material : Inconel 718-T6 (40 ~ 44 HRC)  
 Insert : CNMG120408-\*\*  
 Toolholder : ACLNL2525M12-A  
 Cutting speed :  $V_c = 56$  m/min  
 Depth of cut :  $a_p = 0.7$  mm  
 Feed :  $f = 0.2$  mm/rev

HMM chipbreaker offers highly stable chip control.



Work material : Inconel 718-T6 (40 ~ 44 HRC)  
 Insert : CNMG120408-\*\*  
 Toolholder : ACLNL2525M12-A  
 Cutting Speed :  $V_c = 56$  m/min

# Chipbreaker (Negative type insert)



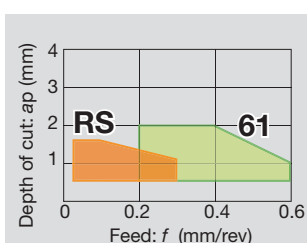
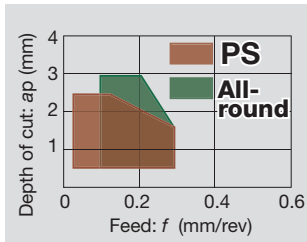
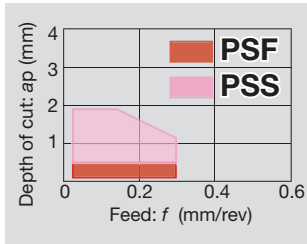
Application	Chip-breaker	Shape	Features
Medium cutting	HMM		Sharp cutting edge and unique dots on rake face significantly reduce the cutting forces and the contact area with the chips.

# Standard cutting conditions

Work material	Application	Chipbreaker	Grade	Cutting speed $V_c$ (m/min)	Depth of cut $a_p$ (mm)	Feed $f$ (mm/rev)
Ni-base alloys (Inconel 718 etc)	Medium cutting	HMM	AH905	50 (20-100)	1.5 (0.5 - 3.0)	0.2 (0.1 - 0.3)

**NEW**

## Chipbreakers (Positive type insert)



Application	Chip-breaker	Shape		Features
Finishing	<b>PSF</b>			Highly recommended chipbreaker for finishing with low cutting forces. This offers excellent chip control at small depths of cut.
Finishing to light cutting	<b>PSS</b>			Uniquely designed chipbreaker reduces the cutting forces and delivers exceptional chip control in a wide range of cutting conditions.
Finishing to medium cutting	<b>PS</b>			Versatile chipbreaker for medium cutting. Sharp cutting edge and special chipbreaker provides outstanding chip control.
Medium cutting	<b>All-round</b>			Suitable for a wide range of applications from continuous to interrupted cutting. This chipbreaker combines sharpness with high fracture resistance.
Finishing to light cutting	<b>RS</b>			Chipbreaker for round inserts. RS chipbreaker allows excellent chip control with large rake angle to curl chips smoothly.
Medium cutting	<b>61</b>			Chipbreaker for round insert. Suitable for medium cutting with small depth of cut and high feed.

## Standard cutting conditions

Work material	Application	Chipbreaker	Grade	Cutting speed Vc (m/min)	Depth of cut ap (mm)	Feed f (mm/rev)
Ni-base alloys (Inconel 718 etc)	Finishing	<b>PSF</b>	<b>AH905</b>	50 (20-100)	0.3 (0.05 - 0.5)	0.16 (0.02 - 0.3)
	Finishing to light cutting	<b>PSS</b>			1.0 (0.5 - 2.0)	0.16 (0.02 - 0.3)
	Finishing to medium cutting	<b>PS</b>			1.0 (0.5 - 2.5)	0.16 (0.02 - 0.3)
	Medium cutting	<b>All-round</b>			1.5 (0.5 - 3.0)	0.19 (0.08 - 0.3)
	Finishing to light cutting	<b>RS</b>			1.0 (0.5 - 1.5)	0.15 (0.03 - 0.3)
	Medium cutting	<b>61</b>			1.0 (0.5 - 2.0)	0.4 (0.2 - 0.6)

## Inserts

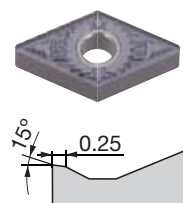
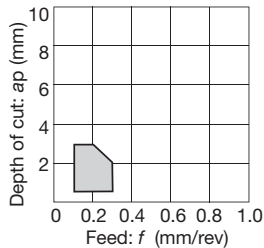
### Rhombic, 80° Negative type

Application	Chipbreaker	f - ap	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia ød	Thick- ness s	Hole dia ød1	Corner radius rE
				<b>AH905</b>				
Medium cutting	 			●	12.7	4.76	5.16	0.4
				●				0.8
				●				1.2
				●	15.875	6.35	6.35	0.8
				●				1.2
				●				1.6

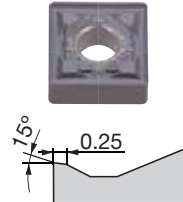
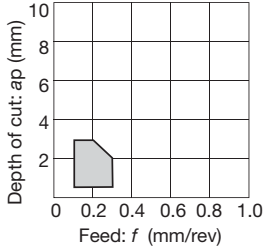
\*Note: Chipbreaker cross sections are of insert marked \*

● : Stocked items

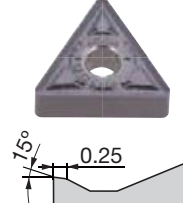
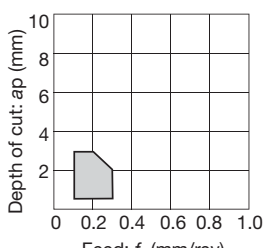
### Rhombic, 55° Negative type

Application	Chipbreaker	$f - ap$	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia $\varnothing d$	Thick- ness s	Hole dia $\varnothing d_1$	Corner radius $r\epsilon$
				AH905				
Medium cutting	<b>HMM</b> 			●	12.7	4.76	5.16	0.4
				*●				0.8
				●				1.2

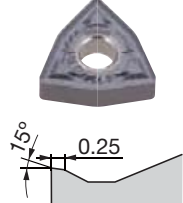
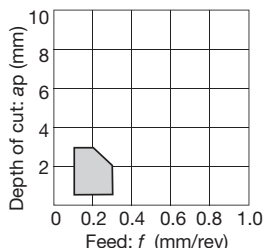
### Square, 90° Negative type

Application	Chipbreaker	$f - ap$	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia $\varnothing d$	Thick- ness s	Hole dia $\varnothing d_1$	Corner radius $r\epsilon$
				AH905				
Medium cutting	<b>HMM</b> 			●	12.7	4.76	5.16	0.8
				●				1.2

### Triangular, 60° Negative type

Application	Chipbreaker	$f - ap$	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia $\varnothing d$	Thick- ness s	Hole dia $\varnothing d_1$	Corner radius $r\epsilon$
				AH905				
Medium cutting	<b>HMM</b> 			●	9.525	4.76	3.81	0.4
				*●				0.8
				●				1.2

### Rhombic, 80° Negative type

Application	Chipbreaker	$f - ap$	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia $\varnothing d$	Thick- ness s	Hole dia $\varnothing d_1$	Corner radius $r\epsilon$
				AH905				
Medium cutting	<b>HMM</b> 			●	12.7	4.76	5.16	0.4
				*●				0.8
				●				1.2

\*Note: Chipbreaker cross sections are of insert marked \*

● : Stocked items

## Rhombic, 35° Negative type

Application	Chipbreaker	$f - ap$	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia	Thick-ness	Hole dia	Corner radius
				AH905	$\varnothing d$	s	$\varnothing d_1$	$r\epsilon$
Medium cutting	<b>HMM</b>			●	9.525	4.76	3.81	0.4
	*VNMG160408-HMM			●				0.8
	VNMG160412-HMM			●				1.2

## Rhombic, 80° Positive type 11°

Application	Chipbreaker	$f - ap$	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia	Thick-ness	Hole dia	Corner radius
				AH905	$\varnothing d$	s	$\varnothing d_1$	$r\epsilon$
Medium cutting	<b>All-round</b>		*CPMT120408	●	12.7	4.76	5.5	0.8

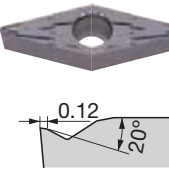
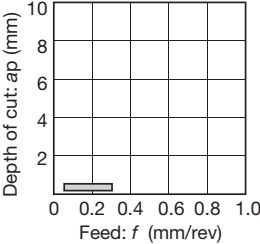
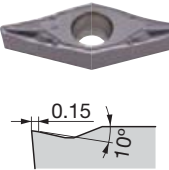
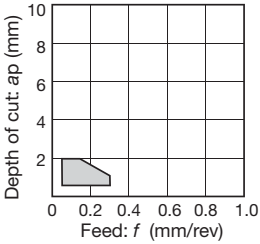
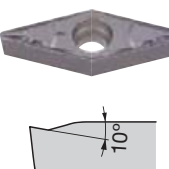
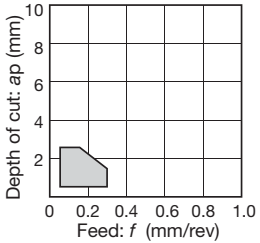
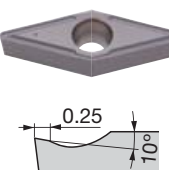
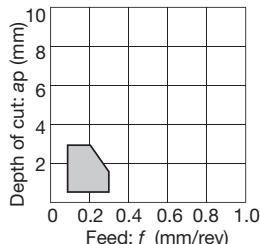
## Rhombic, 55° Positive type 7°

Application	Chipbreaker	$f - ap$	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia	Thick-ness	Hole dia	Corner radius
				AH905	$\varnothing d$	s	$\varnothing d_1$	$r\epsilon$
Finishing	<b>PSF</b>		DCMT11T304-PSF	●	9.525	3.97	4.4	0.4
	*DCMT11T308-PSF		●	0.8				
Finishing to light cutting	<b>PSS</b>		DCMT11T304-PSS	●	9.525	3.97	4.4	0.4
	*DCMT11T308-PSS		●	0.8				
	DCMT11T312-PSS		●	1.2				
Finishing to medium cutting	<b>PS</b>		DCMT11T304-PS	●	9.525	3.97	4.4	0.4
	*DCMT11T308-PS		●	0.8				
	DCMT11T312-PS		●	1.2				


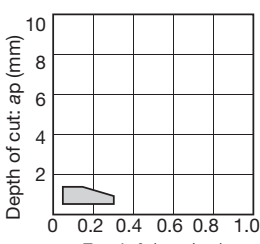

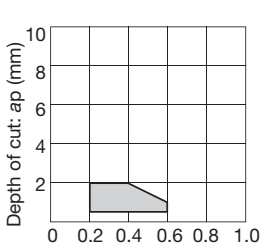
\*Note: Chipbreaker cross sections are of insert marked \*

● : Stocked items

## Rhombic, 35° Positive type 7°

Application	Chipbreaker	$f - a_p$	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia $\phi d$	Thick- ness $s$	Hole dia $\phi d_1$	Corner radius $r_\epsilon$
				AH905				
<b>NEW</b>	<b>PSF</b> 		VCMT160404-PSF *VCMT160408-PSF	●	9.525	4.76	4.4	0.4
				●				0.8
<b>NEW</b>	<b>PSS</b> 		VCMT160404-PSS *VCMT160408-PSS	●	9.525	4.76	4.4	0.4
				●				0.8
<b>NEW</b>	<b>PS</b> 		VCMT160404-PS *VCMT160408-PS	●	9.525	4.76	4.4	0.4
				●				0.8
<b>NEW</b>	<b>All-round</b> 		VCMT160404 *VCMT160408 VCMT160412	●	9.525	4.76	4.4	0.4
				●				0.8
				●				1.2

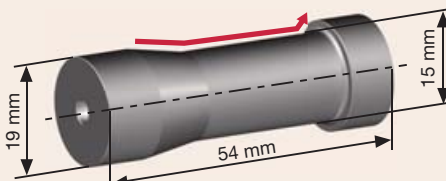
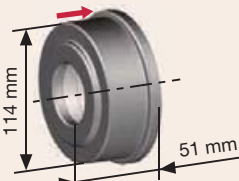

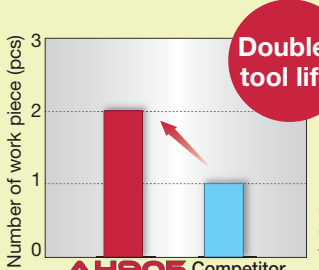
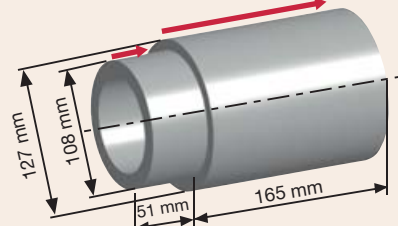
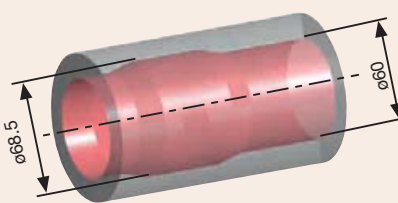
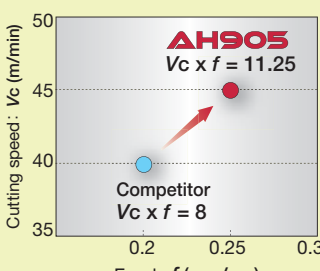
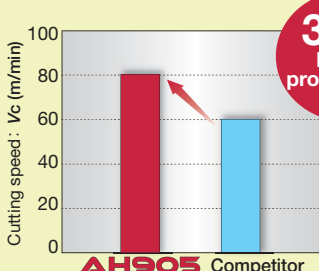
## Round with hole, Positive type 7°

Application	Chipbreaker	$f - a_p$	Cat. No.	Stocked grades	Dimensions (mm)			
	Appearance (Cross section)			Coated	I.C.dia $\phi d$	Thick- ness $s$	Hole dia $\phi d_1$	Corner radius $r_\epsilon$
				AH905				
<b>NEW</b>	<b>RS</b> 		RCMT10T3M0-RS *RCMT1204M0-RS	●	10	3.97	4.4	-
				●				12
<b>NEW</b>	<b>61</b> 		RCMM1003M0-61 *RCMM1204M0-61	●	10	3.18	3.6	-
				●				12

\*Note: Chipbreaker cross sections are of insert marked \*

● : Stocked items

# Practical examples

Workpiece type		Nozzle	Engine component
Insert		DNMG150408-HMM AH905	CNMG120408-HMM AH905
Work material		Hastelloy X 	Inconel 718 
Cutting conditions	Cutting speed: $V_c$ (m/min)	100	45
	Feed: $f$ (mm/rev)	0.13	0.25
	Depth of cut: $a_p$ (mm)	2.0	1.0
	Coolant	Wet	Wet
Results		 <p><b>Doubled tool life!</b> Machining is very stable and the longer tool life can be provided due to high wear resistance.</p>	 <p><b>Doubled tool life!</b> Even with 50% higher feed, there is no chipping on the cutting edge credit to the excellent toughness.</p>
Workpiece type		Belt	Aerospace component
Insert		CNMG120408-HMM AH905	DCMT11T308-PSF AH905
Work material		Inconel 718 	High strength steel alloy 
Cutting conditions	Cutting speed: $V_c$ (m/min)	45	80
	Feed: $f$ (mm/rev)	0.25	0.1~0.15
	Depth of cut: $a_p$ (mm)	2.5	1.5~2.0
	Coolant	Wet	Wet
Results		 <p><b>140% productivity!</b> Both cutting speed and feed can be increased to drastically improve productivity.</p>	 <p><b>30% higher productivity!</b> Even at higher cutting speeds, the edge wear is minimal with remarkable wear resistance.</p>



# Tungaloy Corporation

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