

TurnLine

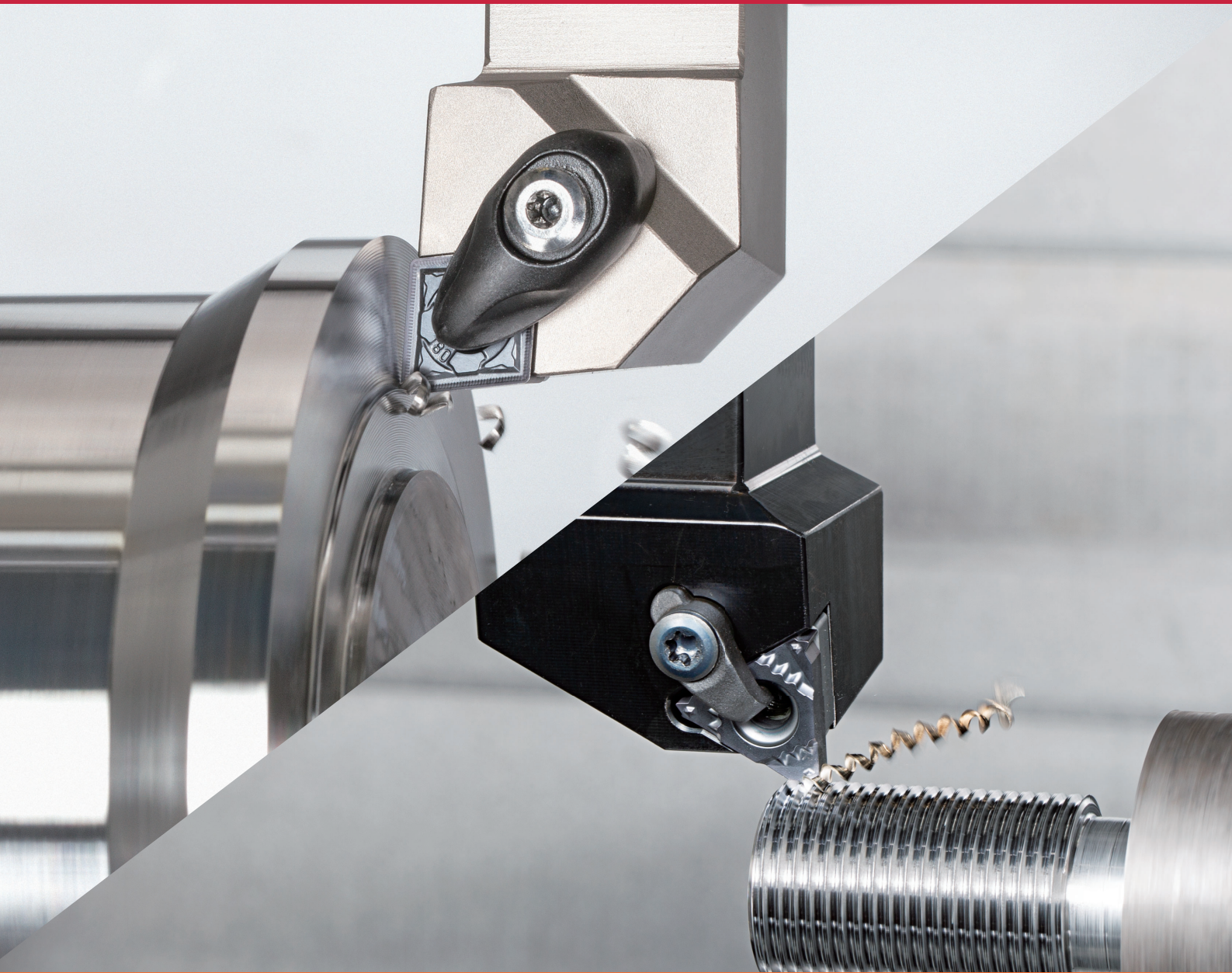


AH8000 SERIES

www.tungaloy.com/us

Tungaloy Report No. 437-US

Now in **threading inserts** to conquer ISO S materials



INDUSTRY 4.0
FEED the SPEED!

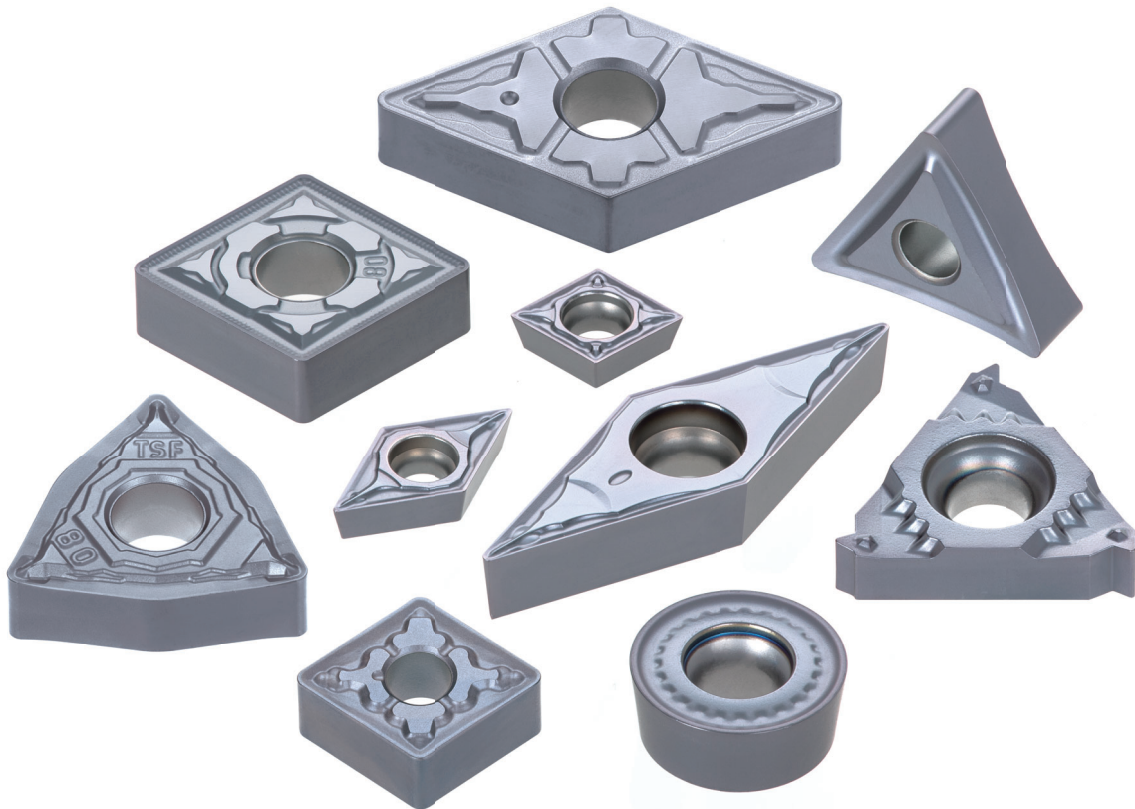


ACCELERATED MACHINING

TurnLine

AH8000 SERIES

TUNGALOY



Enables reliable threading of difficult materials

www.tungaloy.com/us

Incredible reliability in turning of heat-resistant alloys

PREMIUMTEC

TUNGALOY

Special surface technology

Nano-multi-layered AlTiN coating with high Al content

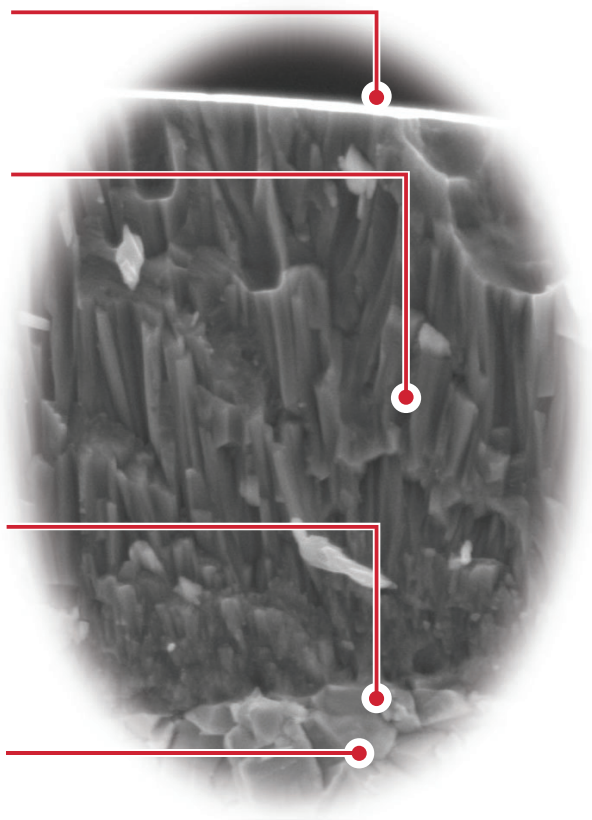
- Increases hardness by 20%
- Prevents micro cracks from developing

→ Long tool life & stable machining

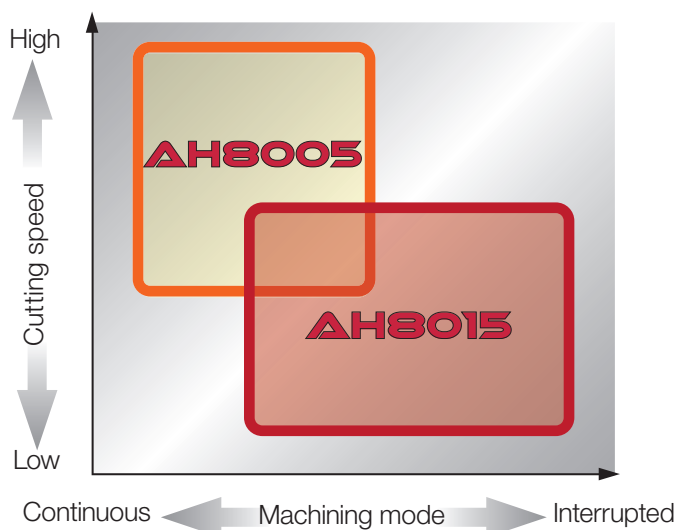
Improved adhesion strength

→ Prevents notch wear that tends to occur in machining heat-resistant alloys

Newly developed substrates



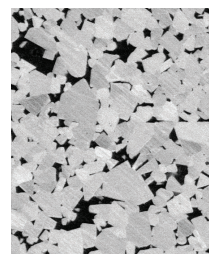
APPLICATION AREA



AH8015

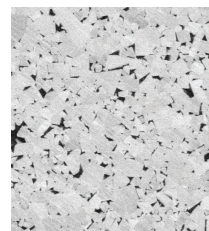
The 1st recommendation for heat-resistant alloys

Versatile grade with high wear and fracture resistance

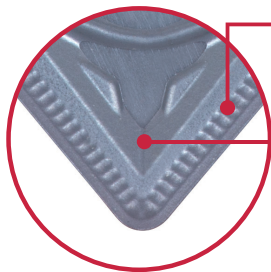


AH8005

Grade with high hardness and excellent wear resistance



CHIPBREAKERS

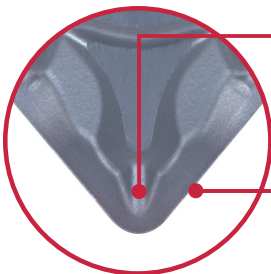
HRM For finishing to medium cutting**The 1st recommendation**

Unique protrusions on the rake face

Reduce the contact area of rake face and chips

Optimized rake face geometry and protrusion

Provide low cutting force and stable chip control

HRF For finishing

Special protrusion

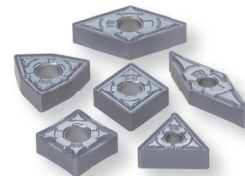
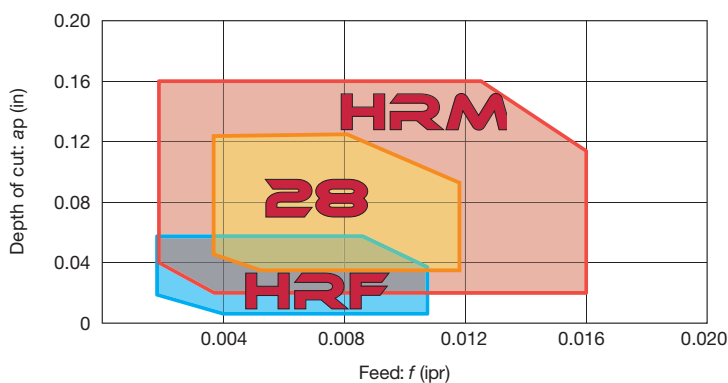
Provides excellent chip control in machining depth of cut less than the corner R

Large rake angle and inclination

Reduce cutting force

APPLICATION AREA AND CHIP CONTROL

Chipbreakers for negative inserts



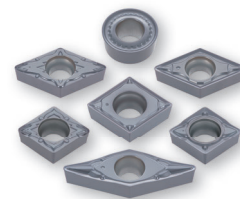
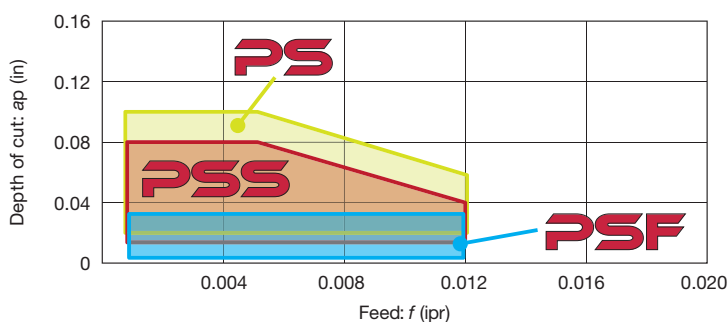
- The -HRF and -HRM styles are added as the first choice chipbreakers to the standard lineup, along with the free-cutting -28 chipbreaker to complement the negative insert range.

- Suited for medium to finish cutting range.

* For D.O.C > 0.157", use inserts in > 0.500" I.C.

Main chipbreakers for positive inserts

(CCMT, CPMT, DCMT, VBMT, VCMT)



- PSF, PSS, and PS chipbreakers cover finishing to medium cutting.

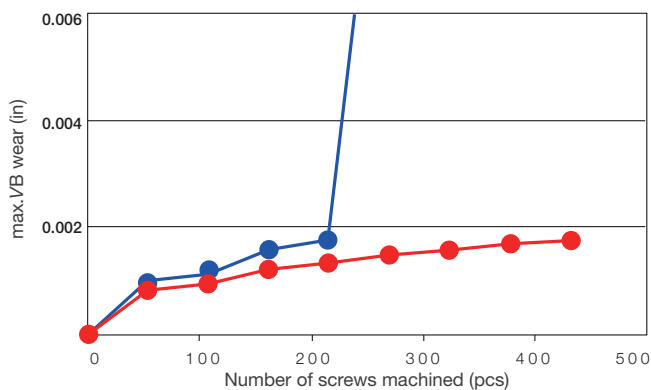
- Complementary chipbreaker: All-round type

CUTTING PERFORMANCE

New

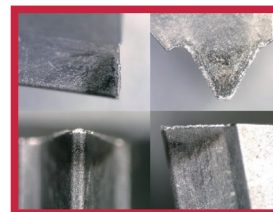
AH8015 / Threading

M



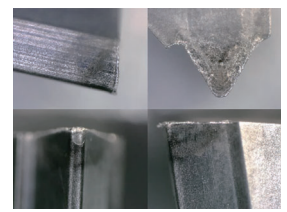
Insert : 16ER15ISO
 Workpiece material : SUS304
 Cutting speed : $V_c = 328$ sfm
 pitch : 0.059"
 Machining : External threading
 Infeed method : Radial infeed
 Coolant : Wet

After 432 thread



AH8015

After 216 thread



Conventional

ISO	Workpiece materials	Hardness	Cutting speed V_c (sfm)				
			AH725	AH8015	T313V	NS9530	TH10
P	Carbon steel	< 200 HB	260 - 590	260 - 590	328 - 656	490 - 656	-
		> 200 HB	197 - 525	197 - 525	328 - 490	328 - 558	-
M	Stainless steel	-	164 - 427	164 - 427	230 - 427	-	-
K	Cast iron	-	-	-	230 - 490	-	230 - 295
N	Aluminium	-	-	-	-	-	330 - 1640
S	Heat-resistance alloys	-	-	-	-	-	33 - 130
H	High hardened steel	50 - 60 HRC	-	-	-	-	33 - 98

CUTTING PERFORMANCE

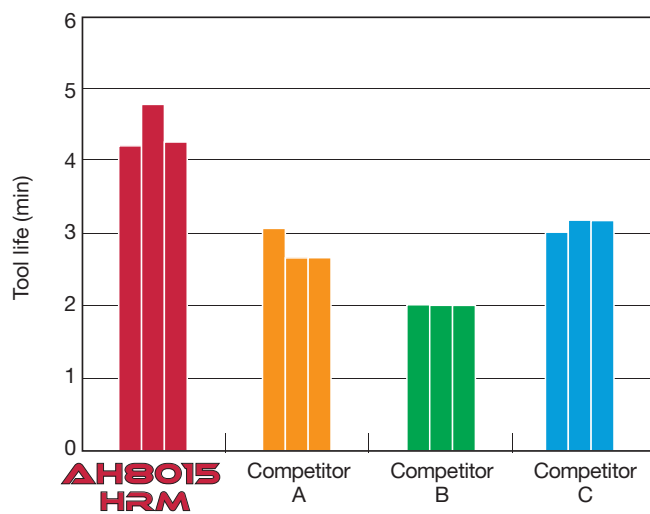
AH8015 / HRM

- General machining condition

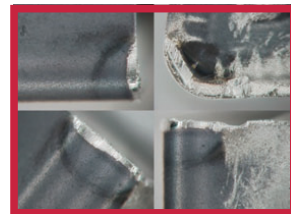
Insert : CNMG 432 **
 Cutting speed : $V_c = 197$ sfm
 Feed : $f = 0.008$ ipr
 Depth of cut : $a_p = 0.039$ "
 Machining : External turning
 Coolant : Wet

S

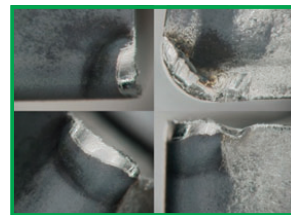
Inconel 718



After 4 min.

**AH8015 / HRM**

After 2 min.



Competitor B

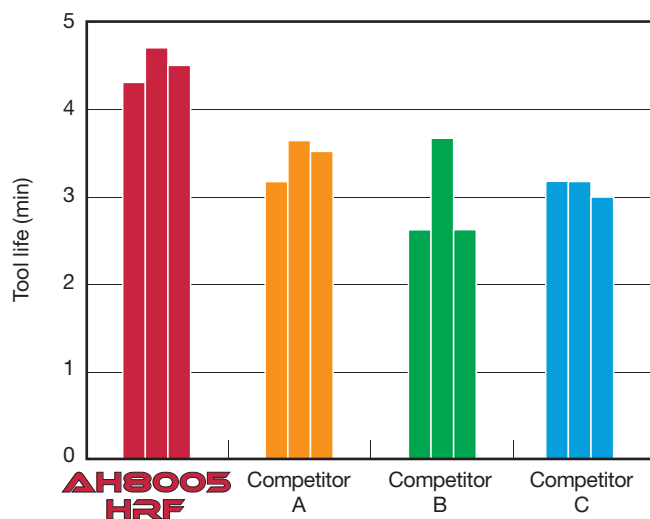
AH8005 / HRF

- High-speed cutting

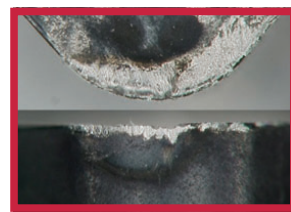
Insert : CNMG 432 **
 Cutting speed : $V_c = 328$ sfm
 Feed : $f = 0.006$ ipr
 Depth of cut : $a_p = 0.012$ "
 Machining : External turning
 Coolant : Wet

S

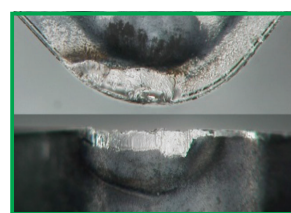
Inconel 718



After 2.7 min.

**AH8005 / HRF**

After 2.7 min.



Competitor B

GRADES

Application	Grade	Substrate			Coating layer	
	Application code	Specific gravity	Hardness (HRA)	T.R.S. (GPa)	Main composition	Thickness (μm)
	AH8005	15.0	93.0	2.2	(Al,Ti)N	3.5
	S01 - S10					
	AH8015	14.9	91.8	3.1	(Al,Ti)N	3.5
	S10 - S20					

STANDARD CUTTING CONDITIONS

Chipbreakers for negative inserts

Chipbreaker	Corner radius RE	Depth of cut ap (in)	Feed f (ipr)	Cutting speed: Vc (sfm)	
				AH8005	AH8015
HRF	0.016	0.008 - 0.059	0.002 - 0.009	130 - 330	66 - 260
	0.031	0.008 - 0.059	0.002 - 0.010	130 - 330	66 - 260
	0.047	0.008 - 0.059	0.003 - 0.011	130 - 330	66 - 260
HRM	0.016	0.020 - 0.157	0.002 - 0.012	130 - 330	66 - 260
	0.031	0.020 - 0.157	0.003 - 0.013	130 - 330	66 - 260
	0.047	0.020 - 0.157	0.004 - 0.014	130 - 330	66 - 260
	0.063	0.020 - 0.157	0.006 - 0.016	130 - 330	66 - 260
28	0.016	0.020 - 0.118	0.003 - 0.008	130 - 330	66 - 260
	0.031	0.020 - 0.118	0.004 - 0.012	130 - 330	66 - 260
	0.047	0.020 - 0.118	0.004 - 0.012	130 - 330	66 - 260

* Values for the inserts with 0.500" I.C. dia.

Chipbreakers for positive inserts

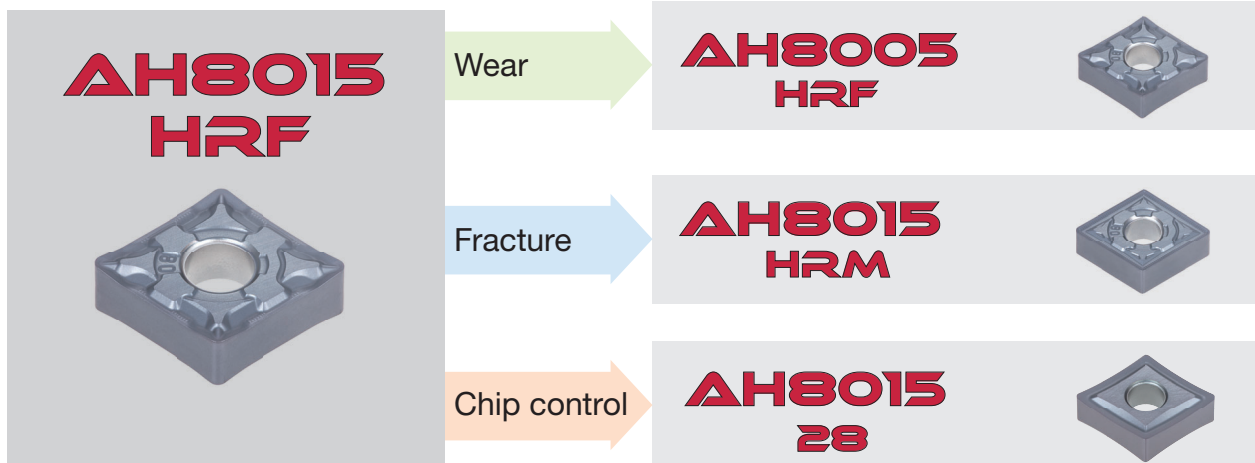
Chipbreaker	Corner radius RE	Depth of cut ap (in)	Feed f (ipr)	Cutting speed: Vc (sfm)	
				AH8005	AH8015
PSF	0.016	0.002 - 0.020	0.001 - 0.008	130 - 330	66 - 260
	0.031	0.002 - 0.020	0.001 - 0.012	130 - 330	66 - 260
PSS	0.016	0.012 - 0.079	0.001 - 0.008	130 - 330	66 - 260
	0.031	0.012 - 0.079	0.001 - 0.012	130 - 330	66 - 260
	0.047	0.012 - 0.079	0.002 - 0.012	130 - 330	66 - 260
PS	0.016	0.020 - 0.098	0.001 - 0.008	130 - 330	66 - 260
	0.031	0.020 - 0.098	0.001 - 0.012	130 - 330	66 - 260
	0.047	0.020 - 0.098	0.002 - 0.012	130 - 330	66 - 260
All-round	0.016	0.020 - 0.118	0.003 - 0.008	130 - 330	66 - 260
	0.031	0.020 - 0.118	0.003 - 0.012	130 - 330	66 - 260
	0.047	0.020 - 0.118	0.003 - 0.012	130 - 330	66 - 260
RS		0.020 - 0.059	0.001 - 0.012	130 - 330	66 - 260
61		0.020 - 0.079	0.008 - 0.024	130 - 330	66 - 260

* Values for the inserts with 9.525 mm I.C. dia.

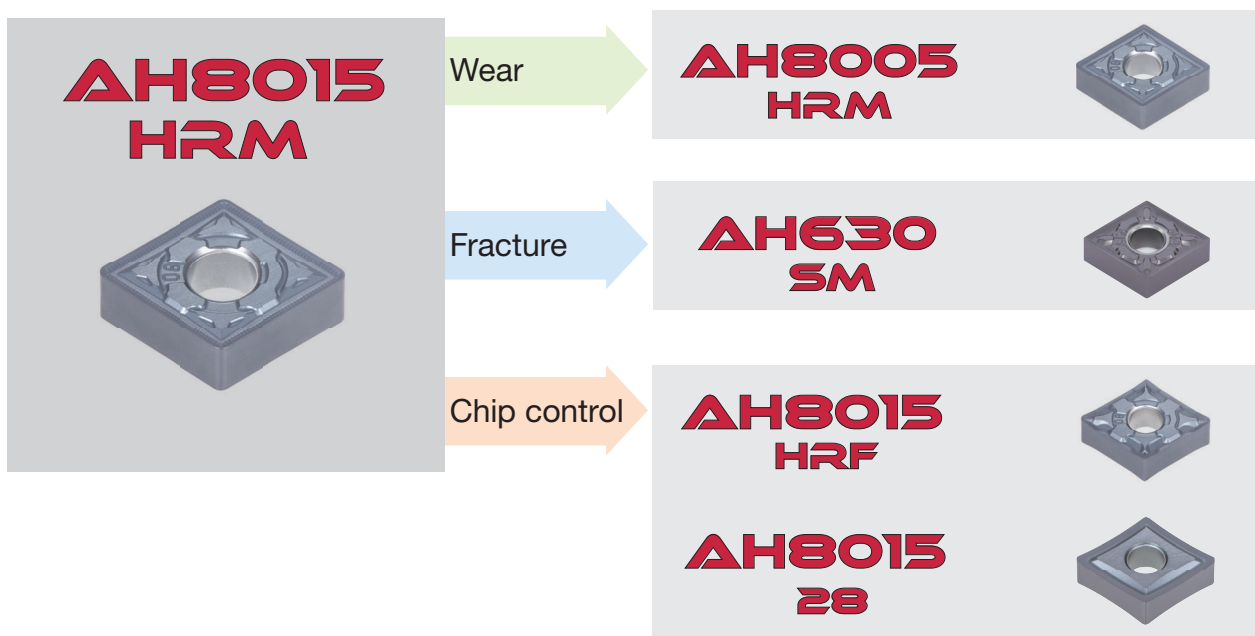
SELECTION GUIDE

Chipbreakers for negative inserts

- For finishing ($a_p = 0.008'' - 0.059''$)

The 1st recommendation

- For finishing to medium cutting ($a_p = 0.020'' - 0.157''$)

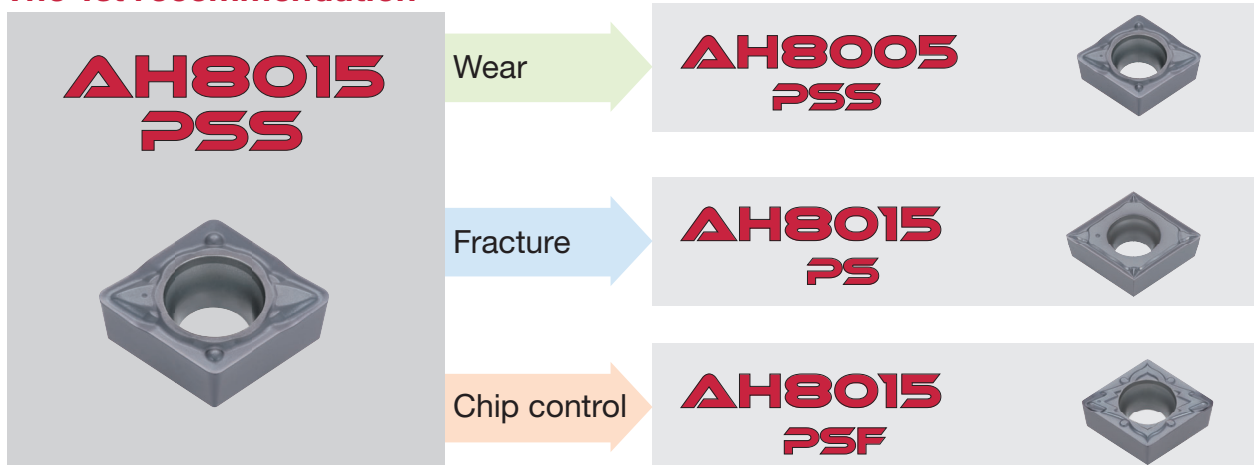
The 1st recommendation

Note: This is a general guide and may not be applicable under the specific conditions.

Chipbreakers for positive inserts

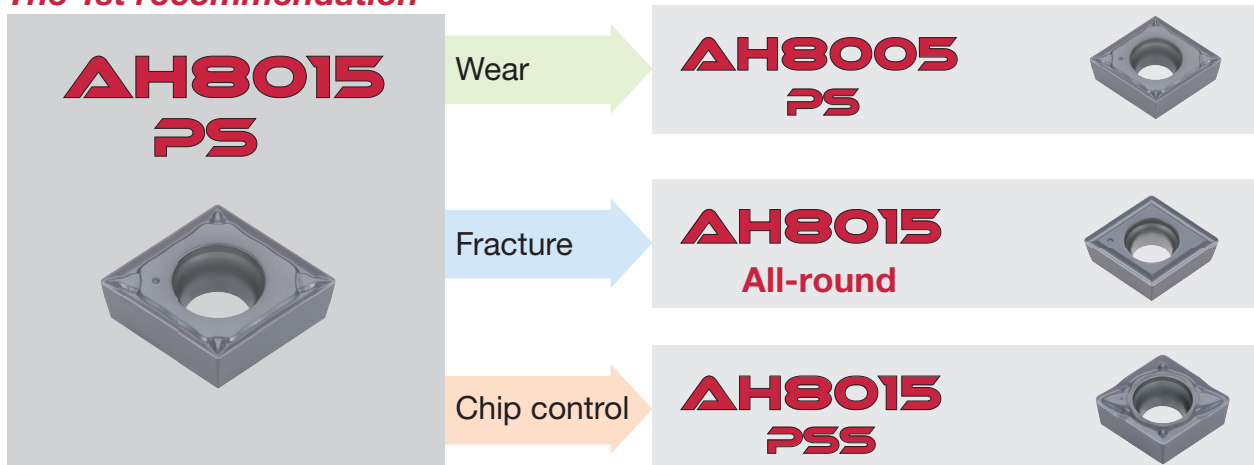
- For finishing ($a_p = 0.012'' - 0.079''$)

The 1st recommendation



- For finishing to medium cutting ($a_p = 0.020'' - 0.098''$)

The 1st recommendation



Note: This is a general guide and may not be applicable under the specific conditions.

100

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

NEGATIVE TYPE



**Rhombic, 80°
with hole**

[illegible][illegible]

● : Line-up

TurnLine - Inserts

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

NEGATIVE TYPE



**Rhombic, 80°
with hole**

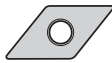
[illegible][illegible]

● : Line-up

100

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

NEGATIVE TYPE



**Rhombic, 55°
with hole**

[illegible][illegible]

● : Line-up

TurnLine - Inserts

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

NEGATIVE TYPE



**7 Rhombic, 55°
with hole**

[illegible][illegible]

● : Line-up

100

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Square, 90°
with hole**

[illegible][illegible]

● : Line-up

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible][illegible]

● : Line-up

100

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

**Rhombic, 35°
with hole**

[illegible][illegible]

● : Line-up

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Trigon, 80°
with hole**

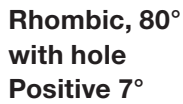
[illegible][illegible]

● : Line-up

100

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

POSITIVE TYPE

[illegible][illegible]

● : Line-up

TurnLine - Inserts

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting

POSITIVE TYPE



**Rhombic, 80°
with hole
Positive 11°**

[illegible][illegible]

● : Line-up

100

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Rhombic, 55°
with hole
Positive 7°**

[illegible][illegible]

● : Line-up

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Round,
with hole
Positive 7°**

[illegible][illegible]

● : Line-up

**Rhombic, 35°
with hole
Positive 5°**

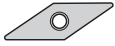
[illegible][illegible]

● : Line-up

100

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

POSITIVE TYPE



**Rhombic, 35°
with hole
Positive 7°**

[illegible][illegible]

● : Line-up

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

 Rhombic, 55°
with hole

[illegible][illegible]

● : Line up

100

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

POSITIVE TYPE



**Trigon, 80°
with hole**

[illegible][illegible]

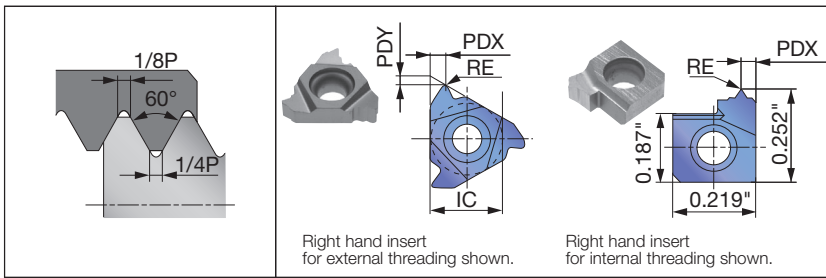
* Corner radius has minus tolerance

● : Line up

[illegible]

● : Line up

ISO metric



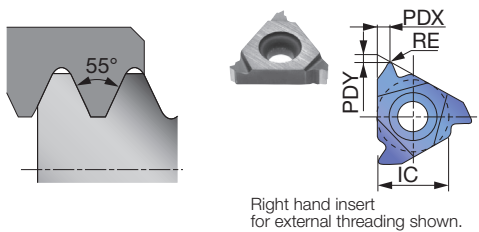
Full-profile inserts

Insert size	Pitch (mm)	TPI	Hand of cut	External insert (in)					
				Designation	Grades	IC	PDX	PDY	RE
					Coating				
					AH8015				
16	2	R		16ER20ISO	●	0.375	0.063	0.047	0.0098

Full-profile inserts with chipbreaker

Insert size	Pitch (mm)	TPI	Hand of cut	External insert (in)						Internal insert (in)					
				Designation	Grades	IC	PDX	PDY	RE	Designation	Grades	IC	PDX	PDY	RE
					Coating						Coating				
					AH8015						AH8015				
16	1	R		16ER10ISO-M		0.375	0.035	0.028	0.0051	16IR10ISO-M	●	0.375	0.035	0.028	0.0031
16	1.25	R		16ER125ISO-M	●	0.375	0.035	0.028	0.0063	16IR125ISO-M		0.375	0.035	0.028	0.0039
16	1.5	R		16ER15ISO-M	●	0.375	0.035	0.028	0.0075	16IR15ISO-M	●	0.375	0.035	0.028	0.0047

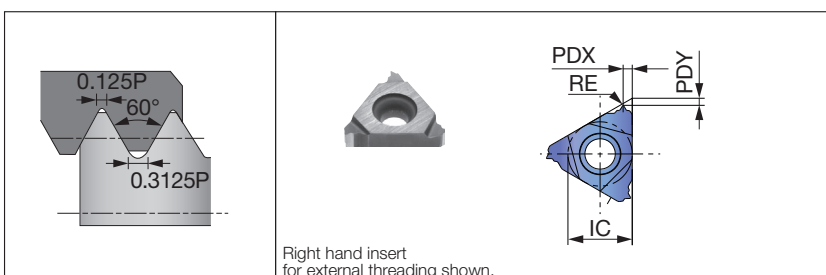
Whitworth



Full-profile inserts

Insert size	Pitch (Reference) (in)	TPI	Hand of cut	External insert (in)						Internal insert (in)					
				Designation	Grades	IC	PDX	PDY	RE	Designation	Grades	IC	PDX	PDY	RE
					Coating						Coating				
					AH8015						AH8015				
16	(0.071)	14	R	16ER14W-M		0.375	0.063	0.047	0.0091	16IR14W-M	●	0.375	0.063	0.047	0.0091

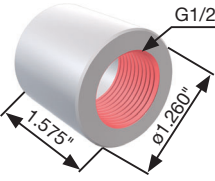
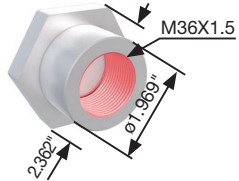
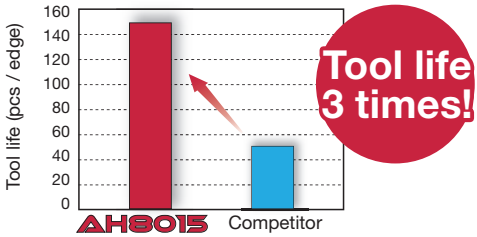
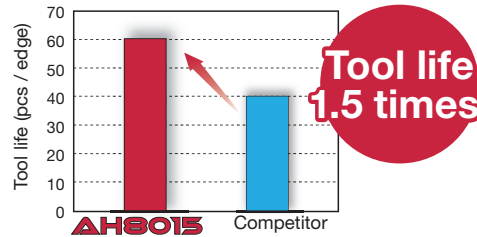
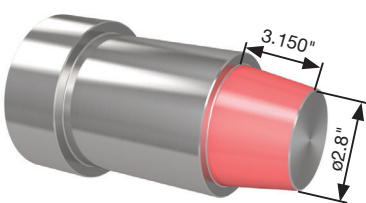
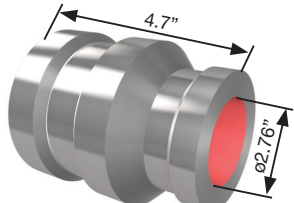
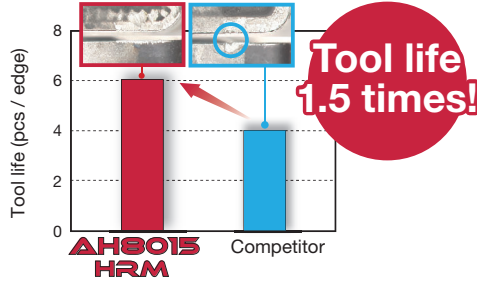
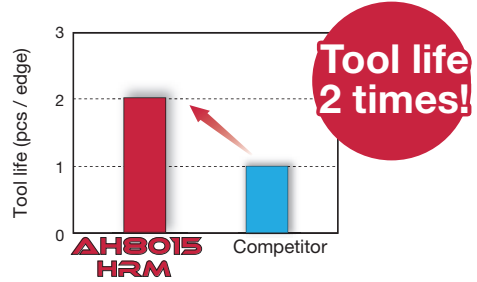
MJ

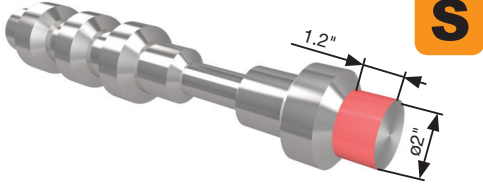
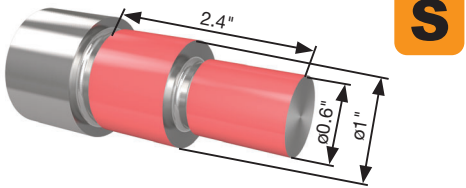
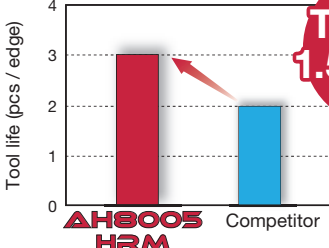
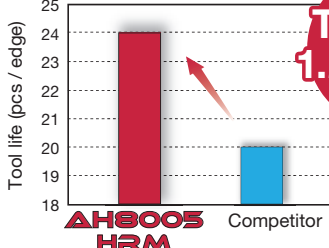
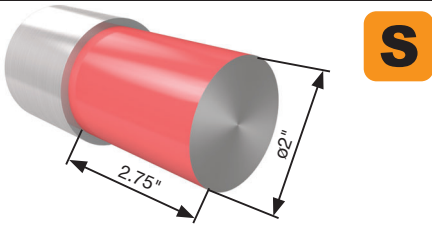
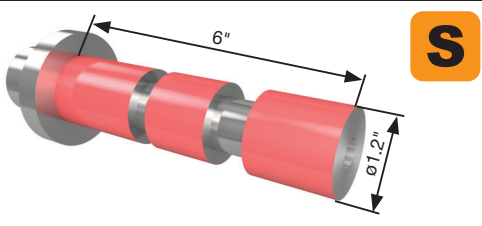
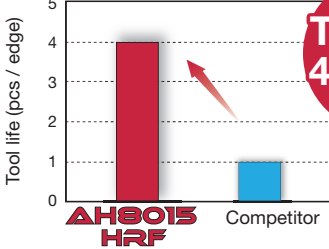
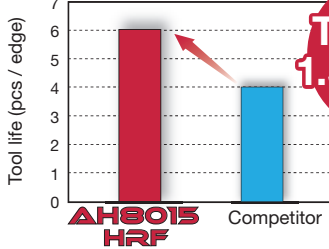


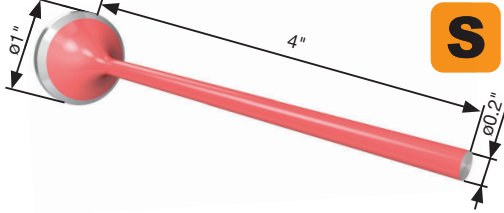
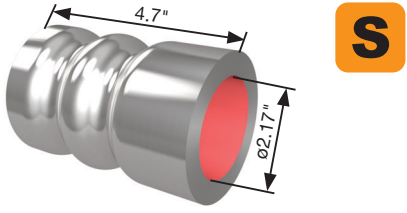
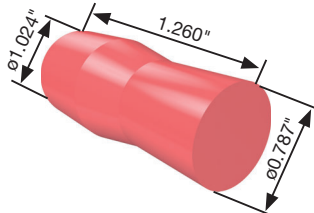
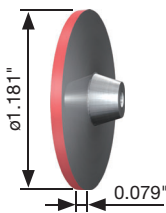
Insert size	Pitch (Reference) (in)	TPI	Hand of cut	External insert (in)					
				Designation	Grades	IC	PDX	PDY	RE
					Coating				
					AH8015				
11	0.039	R		11IR10MJ	●	0.250	0.035	0.028	0.020

● : Line up

PRACTICAL EXAMPLES

Workpiece type		Pipe	End cover
Insert		16IR14W-M	16IR15ISO-M
Grade		AH8015	AH8015
Workpiece material		SUS304, X5CrNi18-9	SCM440, 42CrMo4
			
Cutting conditions	Thread	G1/2 (14TPI)	M36X1.5
	Thread depth : (in)	0.630	0.748
	Cutting speed : Vc (sfm)	262	361
	Pass number (pass)	8	6
	Infeed method	Radial infeed	Radial infeed
		Wet	Wet
Results		 AH8015 high wear resistance and high chipping resistance extends tool life by 3 times.	 AH8015 high wear resistance extends tool life by 1.5 times also for alloy steel.
Workpiece type		Valve parts	Aircraft parts
Insert		CNMG 432 HRM	CNMG 432 HRM
Grade		AH8015	AH8015
Workpiece material		Inconel 625	Inconel 718
			
Cutting conditions	Cutting speed: Vc (sfm)	100	130
	Feed : f (ipr)	0.008	0.009
	Depth of cut : ap (in)	0.059	0.078
	Coolant	Wet	Wet
Results		 AH8015 with HRM chipbreaker greatly reduces notch wear and extends tool life by 1.5 times.	 AH8015 wear and fracture resistance doubles tool life.

Workpiece type		Shaft parts	Valve parts
Insert		CNMG 432 HRM	CNMG 432 HRM
Grade		AH8005	AH8005
Workpiece material		Inconel 718	Inconel 718
			
Cutting conditions	Cutting speed: V_c (sfm)	160	260
	Feed : f (ipr)	0.011	0.008
	Depth of cut : a_p (in)	0.138	0.039 - 0.059
	Coolant	Wet	Wet
Results		 AH8005 HRM Competitor AH8005 with high wear resistance extends tool life by 1.5 times.	 AH8005 HRM Competitor Due to outstanding wear resistance, AH8005 extends tool life by 1.2 times.
Workpiece type		Tube parts	Aircraft parts
Insert		CNMG 432 HRF	CNMG 433 HRF
Grade		AH8015	AH8015
Workpiece material		Hastelloy 276	Inconel 909
			
Cutting conditions	Cutting speed: V_c (sfm)	260	180
	Feed : f (ipr)	0.004	0.012
	Depth of cut : a_p (in)	0.059" x 8 pass	0.020
	Coolant	Wet	Wet
Results		 AH8015 HRF Competitor AH8015 has good balance between wear and fracture resistance, increasing tool life by 4 times.	 AH8015 HRF Competitor AH8015 provides better surface finish and extends tool life by 1.5 times.

Workpiece type		Valve parts	Aircraft parts
Insert		CNMG 432 HRF	CNMG 432 HRF
Grade		AH8005	AH8005
Workpiece material		Inconel 718	Inconel 718
Cutting conditions	Cutting speed: V_c (sfm)	330	230
	Feed : f (ipr)	0.004 - 0.006	0.007
	Depth of cut : a_p (in)	0.012	0.020
	Coolant	Wet	Wet
	Results	 Tool life 1.5 times! AH8005 HRF AH8005 delivers outstanding wear resistance, increasing tool life by 1.5 times.	 Tool life 1.3 times! AH8005 HRF AH8005 with excellent wear resistance, provides good surface quality and extends tool life by 1.3 times.
Workpiece type		Seal pin	Turbine parts
Insert		VCMT432-PS	CCMT09T304-PSF
Grade		AH8005	AH8005
Workpiece material		Inconel 718	Inconel 718
Cutting conditions	Cutting speed: V_c (sfm)	150	330
	Feed : f (ipr)	0.008	0.005
	Depth of cut : a_p (in)	0.020	0.003
	Machining	External turning and facing	External turning
	Coolant	Wet	Wet
Results	Results	 Tool life 2 times! AH8005 PS AH8005 with PS chipbreaker improves productivity by 1.3 times due to increased feed rate and speed, doubling tool life.	 Tool life 1.5 times! AH8005 PSF AH8005 with PSF chipbreaker provides excellent chip control and wear resistance, extending tool life by 1.5 times.

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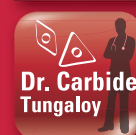


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