

**Tungaloy**

Member IMC Group

Keeping the Customer First

Tungaloy Report No. 399-E

**TURNLINE** New PVD coated grade  
for stainless steel turning

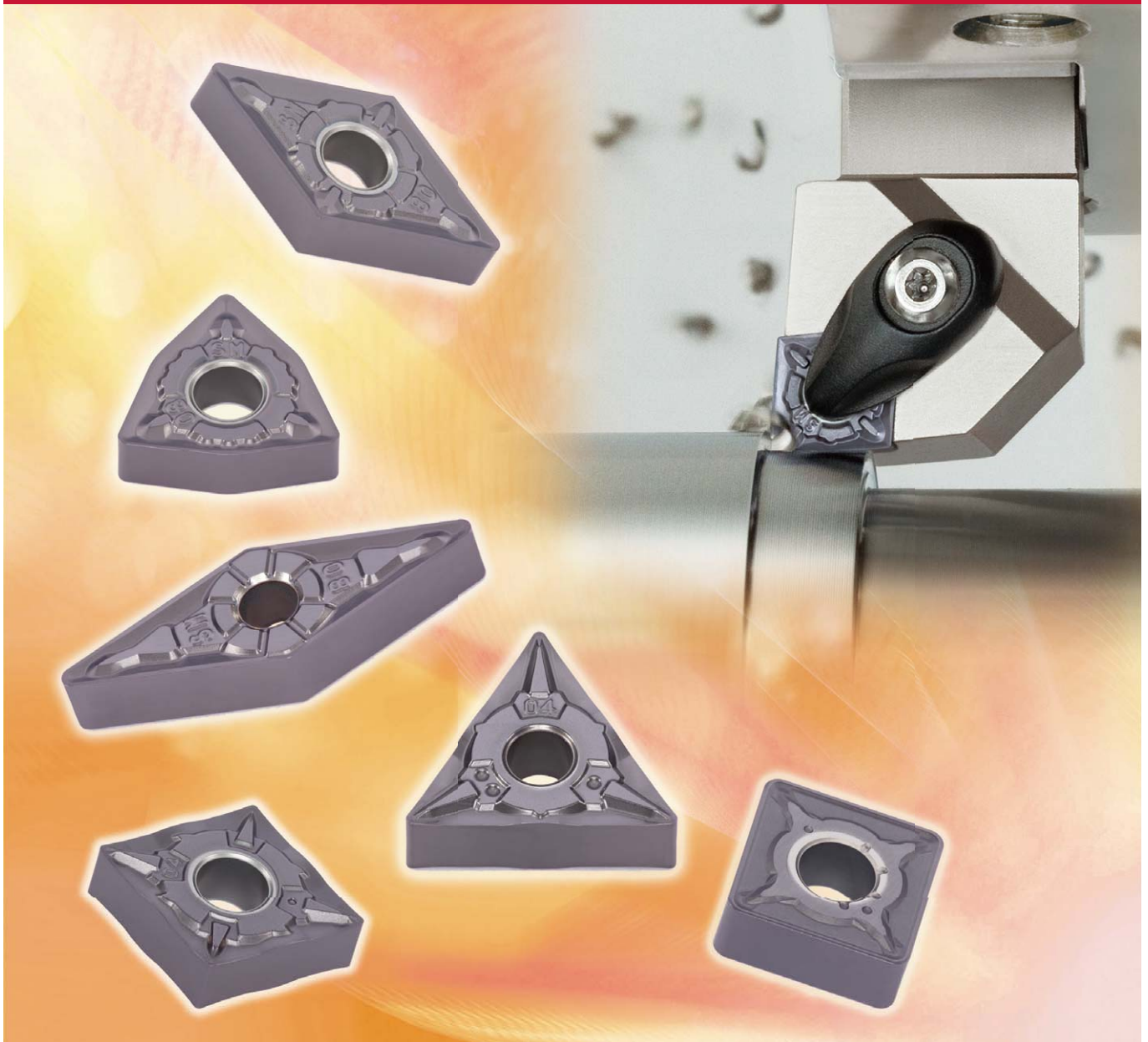
**NEW**

**AH600 SERIES**

**ISO TOOL™**

**PREMIUMTEC**  
TUNGALOY

Excellent tool life with new-generation PVD coating!



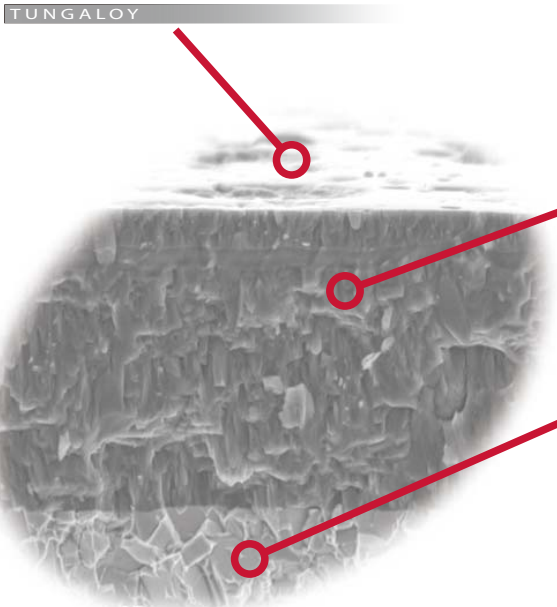
# Incredible reliability in stainless steel turning!

## Features

● Increased chipping resistance and smooth chip flow

Special Surface Technology

**PREMIUMTEC** improves insert surface!



● Advanced wear and fracture resistance

➔ New-generation PVD coating

● Extremely high reliability!

➔ New substrate with high adhesion strength of coating layer

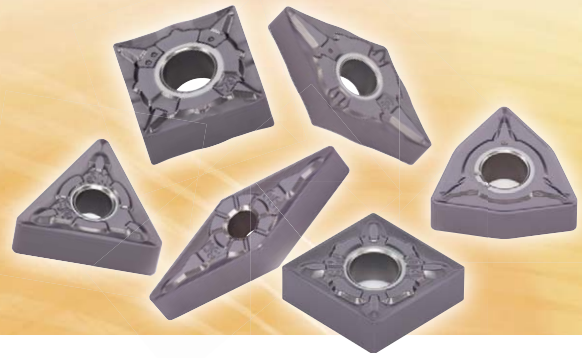
### AH630

- Unique substrate with high fracture resistance
- Versatile grade that has an excellent balance of fracture and wear resistance
- Suitable for stainless steel machining at low to medium cutting speeds

### AH645

- Extraordinary substrate with incredibly high toughness
- Provides outstanding reliability with high fracture resistance
- Ideal grade for heavy turning of stainless steel

Application	Grade		Substrate			Coating layer		Features
	ISO application code	PREMIUMTEC	Specific gravity	Hardness (HRA)	T.R.S. (GPa)	Main composition	Thickness (µm)	
M Stainless	AH630	PREMIUMTEC	14.4	91.5	3.0	(Ti,Al)N	5	<p><b>PVD coated grade for stainless steel turning</b></p> <p>AH600 series has a coating layer that provides a high balance of wear and fracture resistance. This series offers improved chip adhesion resistance with PremiumTec.</p> <p>AH630: Excellent wear and fracture resistance in low to medium speed machining.</p> <p>AH645: Remarkable fracture resistance in heavy interrupted machining when operating at low to medium cutting speeds.</p>
	M15 - M30							
	AH645	PREMIUMTEC	14.0	89.5	3.2		5	
	M30 - M40							



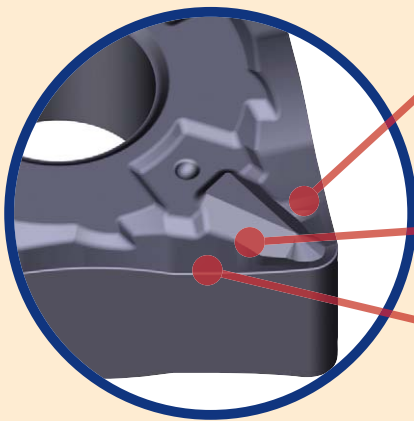
## Chipbreaker

**NEW**

For finishing operations

**SF** chipbreaker

- Excellent chip control when finishing
- Outstanding chip control when high feed turning at small depths of cut.
- Sharpness reduces cutting forces and burrs



**Low cutting force**

➔ Large rake angle

**Reduces chip adhesion**

➔ Dimples around protrusion reduces contact with chips

**Excellent chip evacuation**

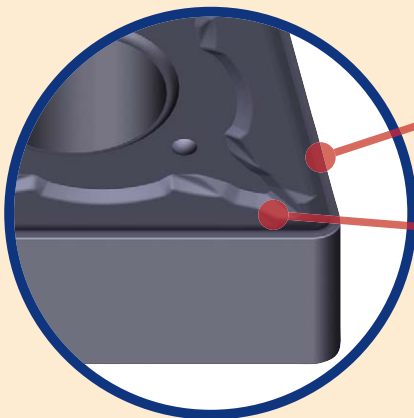
➔ Large inclination

**NEW**

For medium to heavy cutting

**SH** chipbreaker

- Suitable for roughing operations and interrupted machining with tough cutting edges
- Applicable for a wide range of cutting conditions and ideal for machining with a fluctuating depth of cut
- Newly designed cutting edges increase the fracture resistance



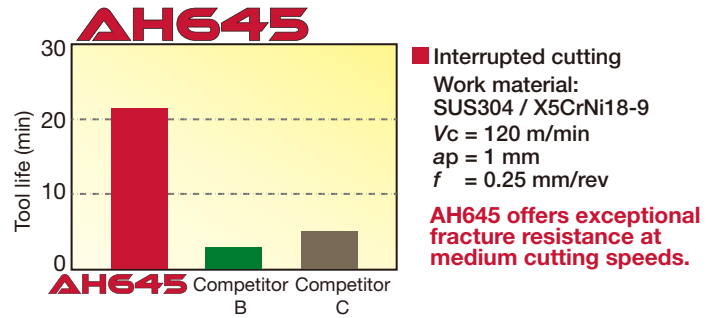
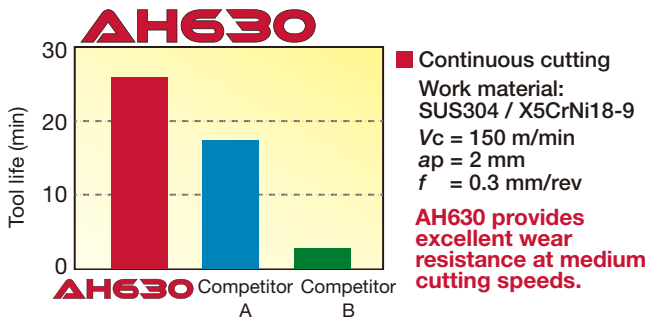
**Incredible fracture resistance**

➔ Provided from advanced cutting edges

**Low cutting forces and excellent chip control**

➔ Credit to a unique chipbreaker geometry

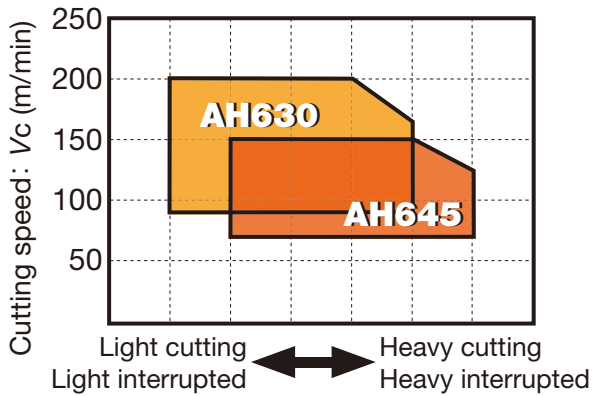
## Cutting performance



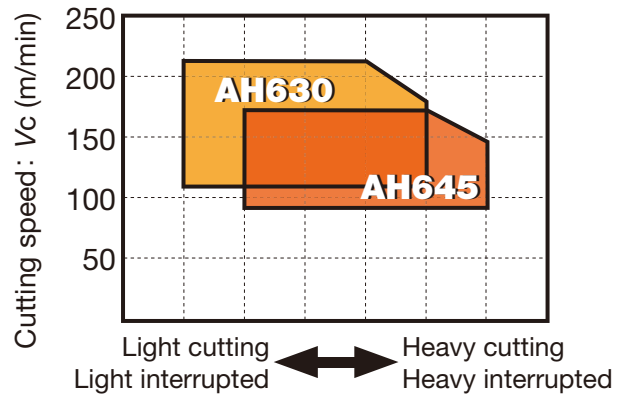
## Standard cutting conditions

### Standard cutting condition depending on work material

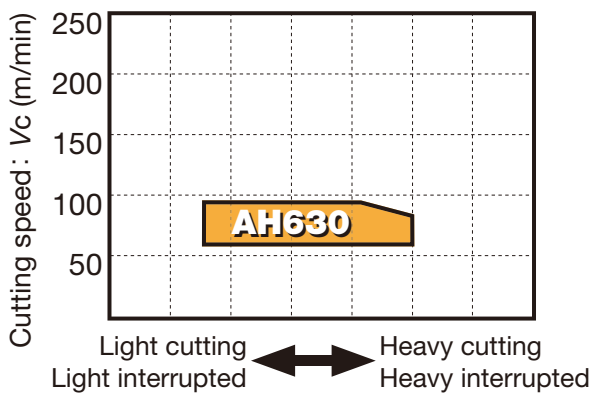
#### Austenitic stainless steel



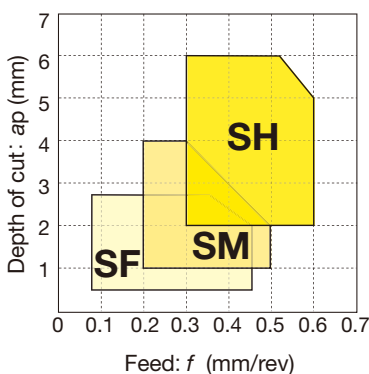
#### Ferritic / martensite stainless steel



#### Precipitation hardened stainless steel



### Standard cutting condition depending on chipbreakers



Operation	Chipbreaker	Grades	Depth of cut $a_p$ (mm)	Feed $f$ (mm/rev)
Finishing	SF	AH630	1.5 (0.5 ~ 2.5)	0.25 (0.08 ~ 0.45)
		AH645		
Medium cutting	SM	AH630	2.0 (1.0 ~ 4.0)	0.3 (0.2 ~ 0.5)
		AH645		
Medium to heavy cutting	SH	AH630	4.0 (2.0 ~ 6.0)	0.45 (0.3 ~ 0.6)
		AH645		

Note: Conditions in above table are for regular size inserts.

# Inserts Negative type

## Rhombic, 80°

Application	Chipbreaker	$f - a_p$	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 $r_E$
				AH630	AH645				
Finishing cutting	<b>SF</b>		CNMG090304-SF	●		9.525	3.18	3.81	0.4
	CNMG090308-SF		●		0.8				
	CNMG120404-SF		●		0.4				
	*CNMG120408-SF		●		12.7	4.76	5.16	0.8	
	CNMG120412-SF		●					1.2	
Medium cutting	<b>SM</b>		CNMG120404-SM	●	●	12.7	4.76	5.16	0.4
	*CNMG120408-SM		●	●	0.8				
	CNMG120412-SM		●	●	1.2				
Medium to heavy cutting	<b>SH</b>		CNMG120408-SH	●	●	12.7	4.76	5.16	0.8
	CNMG120412-SH		●	●	1.2				
	CNMG120416-SH		●	●	1.6				
	*CNMG160612-SH		●	●	15.875	6.35	6.35	1.2	
	CNMG160616-SH		●	●				1.6	
	CNMG190612-SH		●	●	19.05	6.35	7.93	1.2	
	CNMG190616-SH		●	●				1.6	

## Rhombic, 55°

Application	Chipbreaker	$f - a_p$	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 $r_E$
				AH630	AH645				
Finishing cutting	<b>SF</b>		DNMG150404-SF	●		12.7	4.76	5.16	0.4
	*DNMG150408-SF		●		0.8				
	DNMG150604-SF		●		12.7	6.35	5.16	0.4	
	DNMG150608-SF		●					0.8	
Medium cutting	<b>SM</b>		DNMG150404-SM	●	●	12.7	4.76	5.16	0.4
	*DNMG150408-SM		●	●	0.8				
	DNMG150412-SM		●	●	1.2				
	DNMG150604-SM		●	●	12.7	6.35	5.16	0.4	
	DNMG150608-SM		●	●				0.8	
	DNMG150612-SM		●	●				1.2	
Medium to heavy cutting	<b>SH</b>		DNMG150408-SH	●	●	12.7	4.76	5.16	0.8
	*DNMG150412-SH		●	●	1.2				
	DNMG150416-SH		●	●	1.6				
	DNMG150608-SH		●	●	12.7	6.35	5.16	0.8	
	DNMG150612-SH		●	●				1.2	

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

● : Stocked items

### Square, 90°

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 $\phi d1$	Corner radius $r_E$	
				AH630	AH645					
Finishing cutting	<b>SF</b>		<b>SNMG120404-SF</b>	●		12.7	4.76	5.16	0.4	
			<b>*SNMG120408-SF</b>	●					0.8	
Medium cutting	<b>SM</b>		<b>*SNMG120408-SM</b>	●	●	12.7	4.76	5.16	0.8	
			<b>SNMG120412-SM</b>	●	●				1.2	
Medium to heavy cutting	<b>SH</b>		<b>SNMG120408-SH</b>	●	●	12.7	4.76	5.16	0.8	
			<b>SNMG120412-SH</b>	●	●				1.2	
				<b>*SNMG150612-SH</b>	●	●	15.875	6.35	6.35	1.2
			<b>SNMG150616-SH</b>	●	●	1.6				
			<b>SNMG190612-SH</b>	●	●	19.05	6.35	7.93	1.2	
			<b>SNMG190616-SH</b>	●	●				1.6	

### Triangular, 60°

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 $\phi d1$	Corner radius $r_E$
				AH630	AH645				
Finishing cutting	<b>SF</b>		<b>TNMG160404-SF</b>	●		9.525	4.76	3.81	0.4
			<b>*TNMG160408-SF</b>	●					0.8
	<b>TNMG160412-SF</b>		●		1.2				
Medium cutting	<b>SM</b>		<b>TNMG160404-SM</b>	●	●	9.525	4.76	3.81	0.4
			<b>*TNMG160408-SM</b>	●	●				0.8
			<b>TNMG160412-SM</b>	●	●				1.2
				<b>TNMG220408-SM</b>	●	●	12.7	5.16	0.8
			<b>TNMG220412-SM</b>	●	●	1.2			

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

● : Stocked items

Rhombic, 35°

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 $r_\epsilon$
				AH630	AH645				
Finishing cutting	<b>SF</b>		VNMG160404-SF	●		9.525	4.76	3.81	0.4
			*VNMG160408-SF	●					0.8
Medium cutting	<b>SM</b>		VNMG160404-SM	●	●	9.525	4.76	3.81	0.4
			*VNMG160408-SM	●	●				0.8
			VNMG160412-SM	●	●				1.2

Trigon, 80°

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 $r_\epsilon$
				AH630	AH645				
Finishing cutting	<b>SF</b>		WNMG060404-SF	●		9.525	4.76	3.81	0.4
			WNMG060408-SF	●					0.8
			WNMG080404-SF	●		12.7	4.76	5.16	0.4
			*WNMG080408-SF	●					0.8
Medium cutting	<b>SM</b>		WNMG080404-SM	●	●	12.7	4.76	5.16	0.4
			*WNMG080408-SM	●	●				0.8
			WNMG080412-SM	●	●				1.2
Medium to heavy cutting	<b>SH</b>		WNMG080408-SH	●	●	12.7	4.76	5.16	0.8
			*WNMG080412-SH	●	●				1.2

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

● : Stocked items

# Practical examples

Workpiece type		Shaft	Nozzle
Insert		CNMG120408-SM	CNMG120404-SM
Grade		AH630	AH645
Work material		SUS304 / X5CrNi18-9	SUS304 / X5CrNi18-9
Cutting conditions	Cutting speed: $V_c$ (m/min)	80 ~ 120	100
	Feed: $f$ (mm/rev)	0.2 ~ 0.25	0.15
	Depth of cut: $a_p$ (mm)	2	1
	Machining	External turning (continuous cutting)	External turning (continuous and interrupted cutting)
Coolant		Wet	Wet
Results		<p><b>AH630 demonstrates stable wear and no sudden insert chipping due to the well-balanced grade of wear and fracture resistance.</b></p>	<p><b>High toughness levels of AH645 significantly reduces sudden fracture. This creates stable and prolonged tool life.</b></p>



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