Tungaloy
Member IMC Group

Keeping the Customer First

Tungaloy Report No. 399-E

TURNLINE

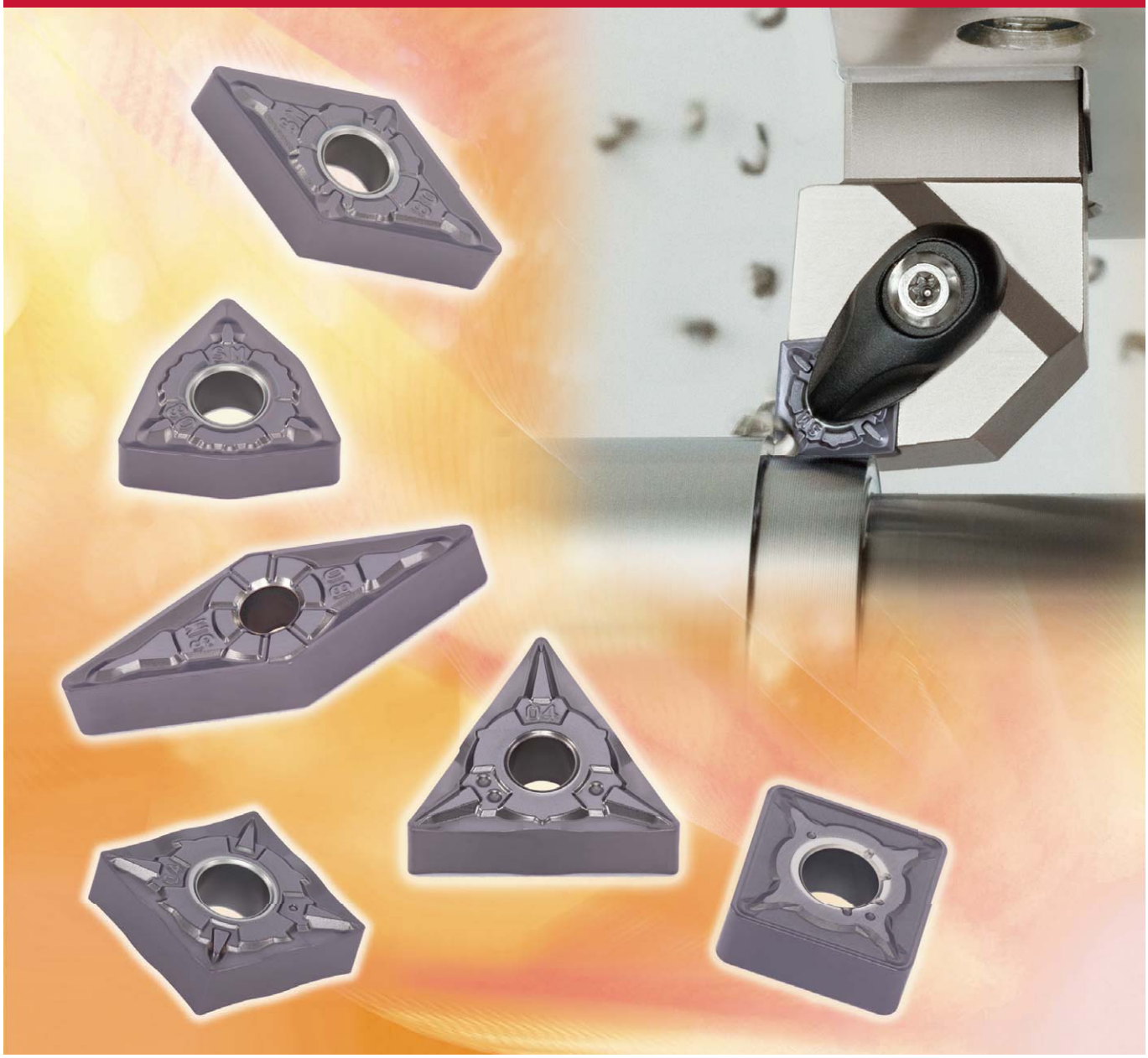
New PVD coated grade
for stainless steel turning

NEW

AH600 SERIES

PREMIUMTEC
TUNGALOY

Excellent tool life with new-generation PVD coating!



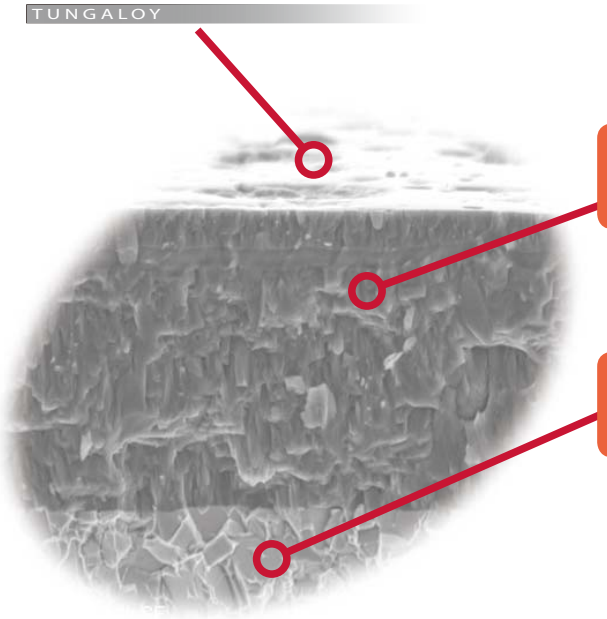
Incredible reliability in stainless steel turning!

Features

Increased chipping resistance and smooth chip flow

Special Surface Technology

PREMIUMTEC TUNGALOY improves insert surface!



Advanced wear and fracture resistance

➡ New-generation PVD coating

Extremely high reliability!

➡ New substrate with high adhesion strength of coating layer

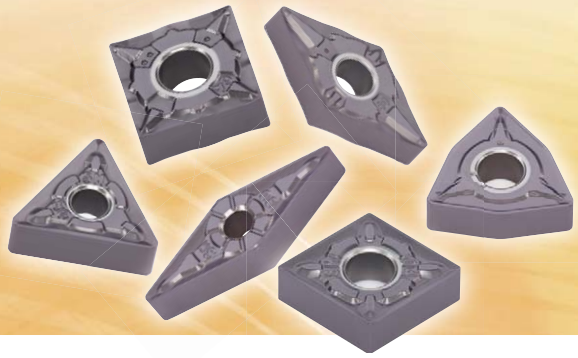
AH630

- 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

Appli-cation	Grade	Substrate			Coating layer		Features
	ISO application code	Specific gravity	Hardness (HRA)	T.R.S. (GPa)	Main composition	Thickness (μm)	
M Stainless	PREMIUMTEC AH630 M15 - M30	14.4	91.5	3.0	(Ti,Al)N	5	**PVD coated grade for stainless steel turning** **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**. **AH630:** Excellent wear and fracture resistance in low to medium speed machining. **AH645:** Remarkable fracture resistance in heavy interrupted machining when operating at low to medium cutting speeds.
	PREMIUMTEC AH645 M30 - M40	14.0	89.5	3.2		5	



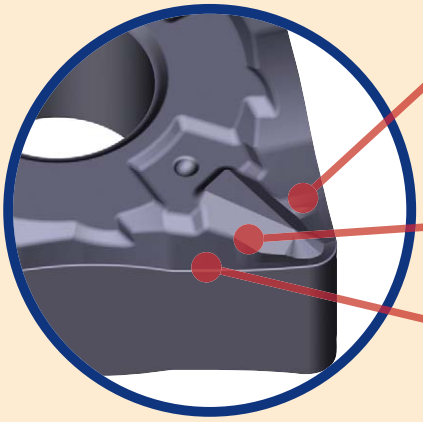
Chipbreaker

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

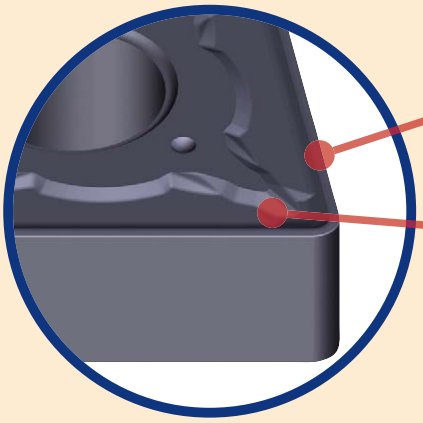
Excellent chip evacuation
➡ Large inclination

NEW

For medium to heavy cutting

SH chipbreaker

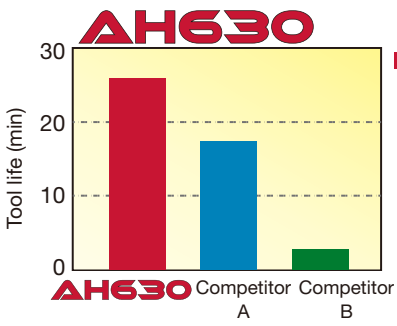
- Suitable for roughing operations and interrupted machining with tough cutting edges
- Applicable for a wide range of cutting conditions and ideal for machining with a fluctuating depth of cut
- Newly designed cutting edges increase the fracture resistance



Incredible fracture resistance
➡ Provided from advanced cutting edges

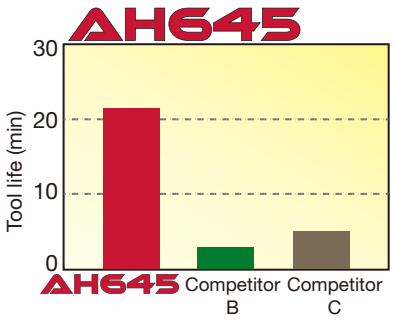
Low cutting forces and excellent chip control
➡ Credit to a unique chipbreaker geometry

Cutting performance



■ Continuous cutting
Work material:
SUS304 / X5CrNi18-9
Vc = 150 m/min
ap = 2 mm
f = 0.3 mm/rev

AH630 provides excellent wear resistance at medium cutting speeds.



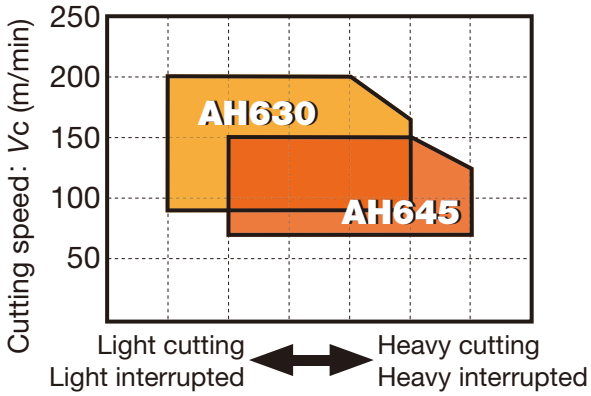
■ Interrupted cutting
Work material:
SUS304 / X5CrNi18-9
Vc = 120 m/min
ap = 1 mm
f = 0.25 mm/rev

AH645 offers exceptional fracture resistance at medium cutting speeds.

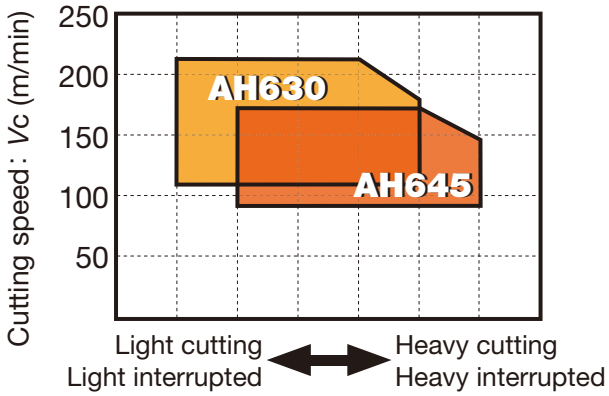
Standard cutting conditions

Standard cutting condition depending on work material

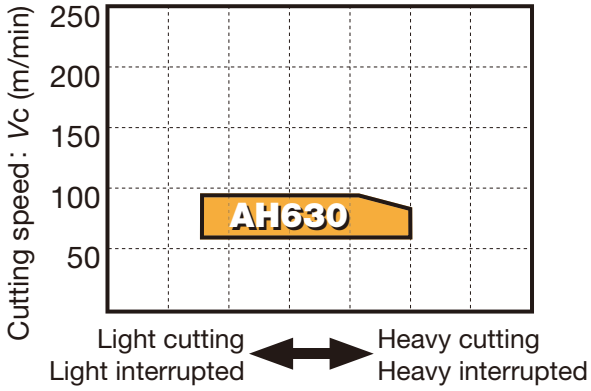
Austenitic stainless steel



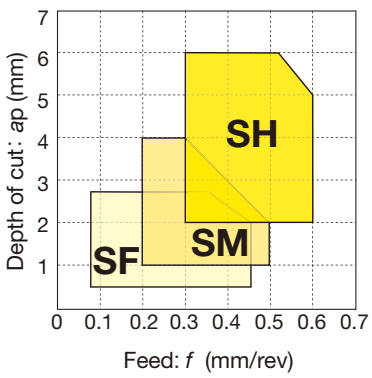
Ferritic / martensite stainless steel



Precipitation hardened stainless steel



Standard cutting condition depending on chipbreakers

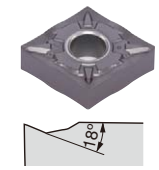
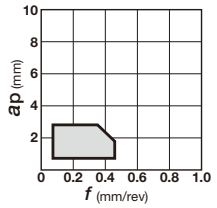
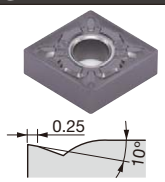
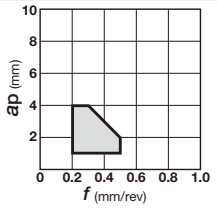
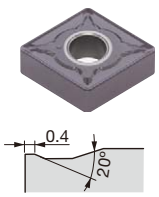
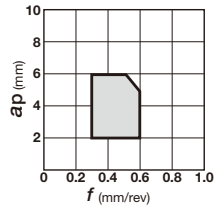


Operation	Chipbreaker	Grades	Depth of cut *ap* (mm)	Feed *f* (mm/rev)
Finishing	SF	AH630 AH645	1.5 (0.5 ~ 2.5)	0.25 (0.08 ~ 0.45)
Medium cutting	SM	AH630 AH645	2.0 (1.0 ~ 4.0)	0.3 (0.2 ~ 0.5)
Medium to heavy cutting	SH	AH630 AH645	4.0 (2.0 ~ 6.0)	0.45 (0.3 ~ 0.6)

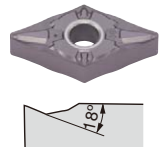
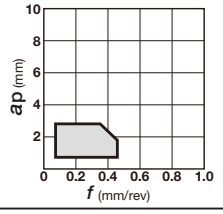
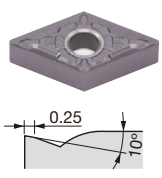
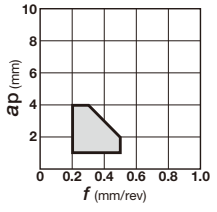
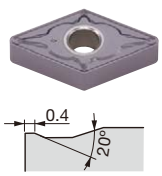
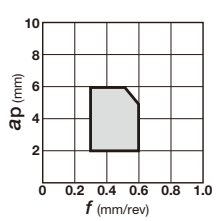
Note: Conditions in above table are for regular size inserts.

Inserts Negative type

Rhombic, 80°

Application	Chipbreaker Appearance (Cross section)	f - ap	Cat. No.	Stocked grades Coated AH630	Stocked grades Coated AH645	Dimensions (mm) I.C.dia ød	Thickness s	Hole dia ød1	Corner radius rε
Finishing cutting	SF 		CNMG090304-SF	●		9.525	3.18	3.81	0.4
			CNMG090308-SF	●					0.8
			CNMG120404-SF	●		12.7	4.76	5.16	0.4
			*CNMG120408-SF	●					0.8
			CNMG120412-SF	●					1.2
Medium cutting	SM 		CNMG120404-SM	●	●	12.7	4.76	5.16	0.4
			*CNMG120408-SM	●	●				0.8
			CNMG120412-SM	●	●				1.2
Medium to heavy cutting	SH 		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°

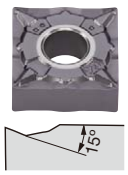
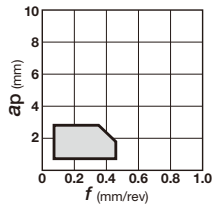
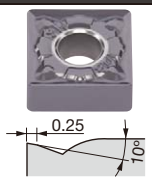
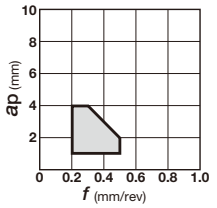
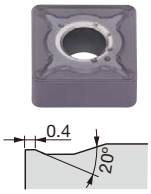
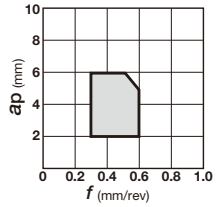
Application	Chipbreaker Appearance (Cross section)	f - ap	Cat. No.	Stocked grades Coated AH630	Stocked grades Coated AH645	Dimensions (mm) I.C.dia ød	Thickness s	Hole dia ød1	Corner radius rε
Finishing cutting	SF 		DNMG150404-SF	●		12.7	4.76	5.16	0.4
			*DNMG150408-SF	●					0.8
			DNMG150604-SF	●		12.7	6.35	5.16	0.4
			DNMG150608-SF	●					0.8
Medium cutting	SM 		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	SH 		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 *

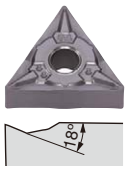
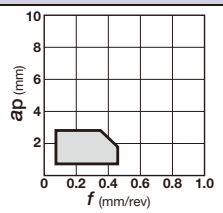
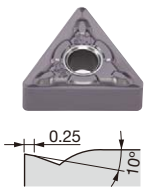
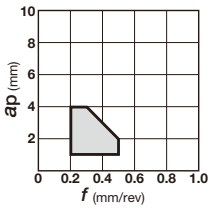
● : Stocked items

Negative type

Square, 90°

Application	Chipbreaker Appearance (Cross section)	f - ap	Cat. No.	Stocked grades Coated AH630	Stocked grades Coated AH645	Dimensions (mm) I.C.dia ød	Thickness s	Hole dia ød1	Corner radius rε
Finishing cutting	**SF** 		SNMG120404-SF	●		12.7	4.76	5.16	0.4
			*SNMG120408-SF	●					0.8
Medium cutting	**SM** 		*SNMG120408-SM	●	●	12.7	4.76	5.16	0.8
			SNMG120412-SM	●	●				1.2
Medium to heavy cutting	**SH** 		SNMG120408-SH	●	●	12.7	4.76	5.16	0.8
			SNMG120412-SH	●	●				1.2
			*SNMG150612-SH	●	●	15.875	6.35	6.35	1.2
			SNMG150616-SH	●	●				1.6
			SNMG190612-SH	●	●	19.05	6.35	7.93	1.2
			SNMG190616-SH	●	●				1.6

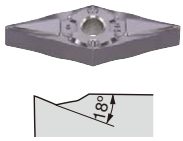
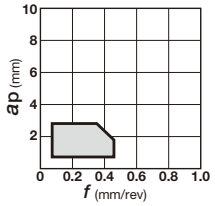
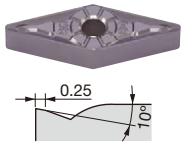
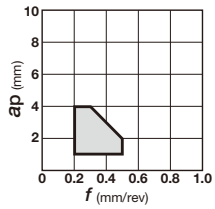
Triangular, 60°

Application	Chipbreaker Appearance (Cross section)	f - ap	Cat. No.	Stocked grades Coated AH630	Stocked grades Coated AH645	Dimensions (mm) I.C.dia ød	Thickness s	Hole dia ød1	Corner radius rε
Finishing cutting	**SF** 		TNMG160404-SF	●		9.525	4.76	3.81	0.4
			*TNMG160408-SF	●					0.8
			TNMG160412-SF	●					1.2
Medium cutting	**SM** 		TNMG160404-SM	●	●	9.525	4.76	3.81	0.4
			*TNMG160408-SM	●	●				0.8
			TNMG160412-SM	●	●				1.2
			TNMG220408-SM	●	●	12.7		5.16	0.8
			TNMG220412-SM	●	●				1.2

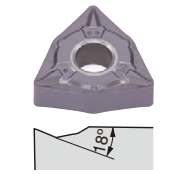
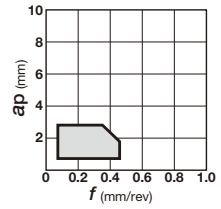
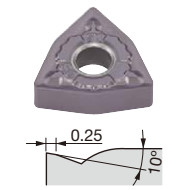
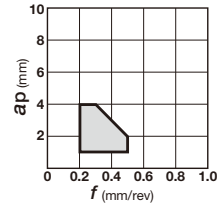
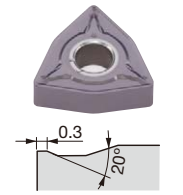
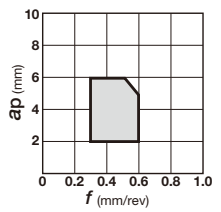
*Note: Chipbreaker cross sections are of insert marked *

● : Stocked items

Rhombic, 35°

Application	Chipbreaker Appearance (Cross section)	f - ap	Cat. No.	Stocked grades Coated AH630	Stocked grades Coated AH645	Dimensions (mm) I.C.dia ød	Thickness s	Hole dia ød1	Corner radius rε
Finishing cutting	SF 		VNMG160404-SF	●		9.525	4.76	3.81	0.4
			*VNMG160408-SF	●					0.8
Medium cutting	SM 		VNMG160404-SM	●	●	9.525	4.76	3.81	0.4
			*VNMG160408-SM	●	●				0.8
			VNMG160412-SM	●	●				1.2

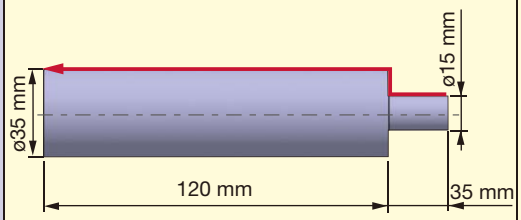
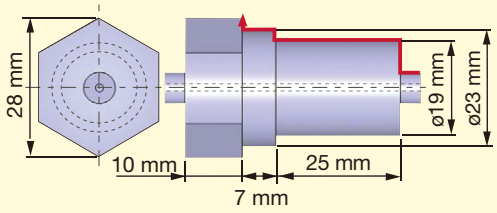
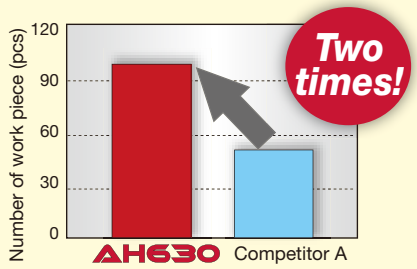
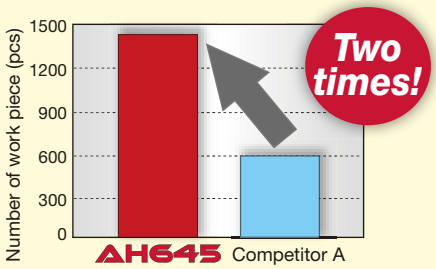
Trigon, 80°

Application	Chipbreaker Appearance (Cross section)	f - ap	Cat. No.	Stocked grades Coated AH630	Stocked grades Coated AH645	Dimensions (mm) I.C.dia ød	Thickness s	Hole dia ød1	Corner radius rε
Finishing cutting	SF 		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	SM 		WNMG080404-SM	●	●	12.7	4.76	5.16	0.4
			*WNMG080408-SM	●	●				0.8
			WNMG080412-SM	●	●				1.2
Medium to heavy cutting	SH 		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: *Vc* (m/min)	80 ~ 120	100
	Feed: *f* (mm/rev)	0.2 ~ 0.25	0.15
	Depth of cut: *ap* (mm)	2	1
	Machining	External turning (continuous cutting)	External turning (continuous and interrupted cutting)
	Coolant	Wet	Wet
Results		 AH630 demonstrates stable wear and no sudden insert chipping due to the well-balanced grade of wear and fracture resistance.	 High toughness levels of AH645 significantly reduces sudden fracture. This creates stable and prolonged tool life.

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