

FS Geometry
ADVANCES 2015

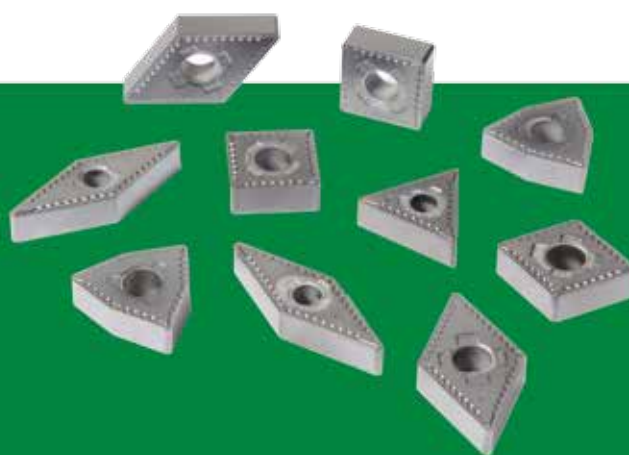


New WIDIA™ Victory™ Geometry and Grades for High-Temp Materials

The new -FS geometry is ideal for finishing applications in high-temperature alloys; INCONEL®, UDIMET®, and Rene® Ni-based; Haynes® Co-based; and Aermet® 100 Fe-based materials, as well as difficult-to-machine stainless (460SS, duplex, high-alloy stainless), CoCr, and stainless-based powdered metals.

This geometry has a ground, high-positive design and is best used in finishing cuts where size control, finish, and minimization of part deflection are considerations. The -FS geometry is available with high-performance Victory grades, which allow for improved performance and reduced cycle times.

*INCONEL® and UDIMET® are registered trademarks of Special Metals Corporation.
Rene® is a registered trademark of General Electric.
Haynes® is a registered trademark of Haynes International, Inc. Corporation.
Aermet® is a registered trademark of CRS Holdings Inc. Corporation.*



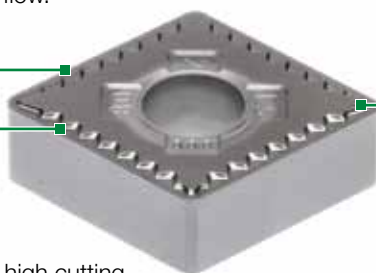
Victory™

The -FS geometry is designed to offer better tool life and superior surface finishes.

- All inserts are G tolerance inserts. This is a critical feature in some applications, especially the aerospace industry.
- Reduced cycle times — high speed and feed capability.
- Reduced cutting forces — improved dimensional control and reduced deflections.
- New chip forming elements — better chip control.
- Long tool life — new multilayer coating provides better wear resistance.
- Proven seating — smooth and secure seating surface.

High rake to allow smooth chip flow.

Proprietary nose geometry for better chip breaking under finishing parameters.



Precision ground provides high cutting edge quality to reduce depth-of-cut notching and provide consistency in component dimensions.

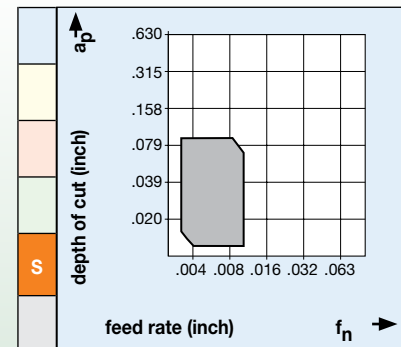
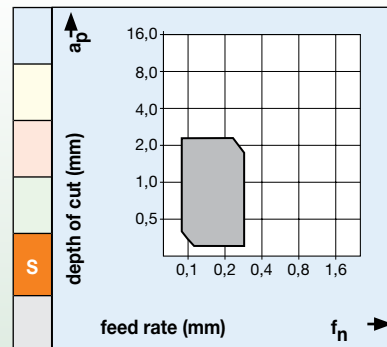
Grade	Cutting Conditions			Workpiece material
WS10PT				Ni/Co/Fe-Based Materials
WS25PT				Ni/Co/Fe-Based Materials
WU10HT				Titanium/Titanium Alloys

■ Carbide Inserts

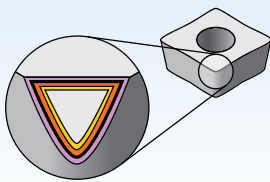
..-FS



For finishing applications. Ground periphery with positive cutting edge ideally suited for high-temp alloys. Micro-finished edge on the ground periphery adds just a slight hone for improved edge integrity and reliability.

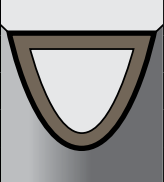
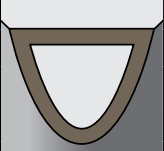
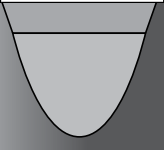


■ Grades and Grade Descriptions



Coatings provide high-speed capability and are engineered for finishing to heavy roughing.

P	Steel
M	Stainless Steel
K	Cast Iron
N	Non-Ferrous
S	High-Temp Alloys
H	Hardened Materials

		wear resistance ← → toughness												
Coating		Grade Description												
Grade	WS10PT		An advanced multilayer PVD coating over a very deformation-resistant unalloyed carbide substrate. The new and improved coating improves edge stability with wide range speed and feed capabilities. WS10PT is ideal for finishing to general machining of most workpiece materials at a wide range of speed and feed capabilities. Excellent for machining most steels, stainless steels, cast irons, non-ferrous materials, and super alloys with improved edge toughness and higher cutting speed/feed capability.	P										
				M										
				K										
				N										
				S										
				H										
	WS25PT		An advanced PVD grade with hard AlTiN coating and fine-grain unalloyed substrate. The new and improved coating improves edge stability with wide range speed and feed capabilities. WS25PT is ideal for general machining of most steels, stainless steels, high-temp alloys, titanium, irons, and non-ferrous materials in a wide range of speeds and feeds with improved edge toughness for interrupted cut and high feed rates.	P										
				M										
				K										
				N										
				S										
	WU10HT		A hard, low-binder content, unalloyed WC/Co fine-grain grade. WU10HT offers exceptional edge wear and superior thermal deformation and depth-of-cut notch resistance. The grain structure is well controlled for minimal pits and flaws, which contributes to long, reliable service.	M										
				K										
				N										
S														

Negative Insert Geometry

-FS

cutting condition		
heavily interrupted cut		WS25PT
lightly interrupted cut		WS10PT
varying depth of cut, casting, or forging skin		WS10PT
smooth cut, pre-turned surface		WS10PT/WU10HT

Iron-Based, Heat-Resistant Alloys (135–320HB) (≤34 HRC)

speed — m/min (SFM)

Starting Conditions



material group	grade	15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	260 (850)	290 (950)	310 (1050)	380 (1250)	m/min	SFM
S1	WU10HT	◇												30	100
	WS10PT		◇											55	180
	WS25PT	◇												40	125

Cobalt-Based, Heat-Resistant Alloys (150–425HB) (≤45 HRC)

speed — m/min (SFM)

Starting Conditions



material group	grade	15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	260 (850)	290 (950)	310 (1050)	380 (1250)	m/min	SFM
S2	WU10HT	◇												35	110
	WS10PT		◇											60	195
	WS25PT	◇												30	100

Nickel-Based, Heat-Resistant Alloys (140–475HB) (≤48 HRC)

speed — m/min (SFM)

Starting Conditions



material group	grade	15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	260 (850)	290 (950)	310 (1050)	380 (1250)	m/min	SFM
S3	WU10HT	◇												40	125
	WS10PT		◇											70	225
	WS25PT	◇												40	125

Titanium and Titanium Alloys (110–450HB) (≤48 HRC)

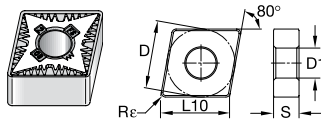
speed — m/min (SFM)

Starting Conditions



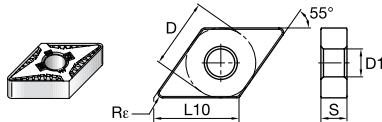
material group	grade	15 (50)	45 (150)	75 (250)	105 (350)	140 (450)	170 (550)	200 (650)	230 (750)	260 (850)	290 (950)	310 (1050)	380 (1250)	m/min	SFM
S4	WU10HT	◇												45	150

- Finishing geometry utilized when edge line sharpness is critical, such as high-temp and stainless applications.



■ CNGG-FS

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT
		mm	in	mm	in	mm	in	mm	in	mm	in											
CNGG120402FS	CNGG4305FS	12,70	1/2	12,90	.508	4,76	3/16	0,2	.008	5,16	.203	-	-	-	-	-	-	-	-	●	-	-
CNGG120401FS	CNGG430FS	12,70	1/2	12,90	.508	4,76	3/16	0,1	.004	5,16	.203	-	-	-	-	-	-	-	-	●	-	-
CNGG120404FS	CNGG431FS	12,70	1/2	12,90	.508	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	●	●	●
CNGG120408FS	CNGG432FS	12,70	1/2	12,90	.508	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	●	●	●
CNGG120412FS	CNGG433FS	12,70	1/2	12,90	.508	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	●	-	-



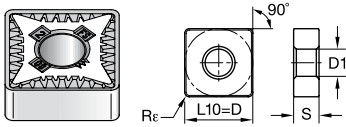
■ DNGG-FS

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT
		mm	in	mm	in	mm	in	mm	in	mm	in											
DNGG110402FS	DNGG3305FS	9,52	3/8	11,63	.458	4,76	3/16	0,2	.008	3,81	.150	-	-	-	-	-	-	-	-	●	●	●
DNGG110404FS	DNGG331FS	9,52	3/8	11,63	.458	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	-	-	-	●	-	●
DNGG110408FS	DNGG332FS	9,52	3/8	11,63	.458	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	-	●	-	●
DNGG150402FS	DNGG4305FS	12,70	1/2	15,50	.610	4,76	3/16	0,2	.008	5,16	.203	-	-	-	-	-	-	-	-	●	-	●
DNGG150401FS	DNGG430FS	12,70	1/2	15,50	.610	4,76	3/16	0,1	.004	5,16	.203	-	-	-	-	-	-	-	-	●	-	●
DNGG150404FS	DNGG431FS	12,70	1/2	15,50	.610	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	●	●	●
DNGG150408FS	DNGG432FS	12,70	1/2	15,50	.610	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	●	●	●
DNGG150412FS	DNGG433FS	12,70	1/2	15,50	.610	4,76	3/16	1,2	3/64	5,16	.203	-	-	-	-	-	-	-	-	●	-	●
DNGG150604FS	DNGG441FS	12,70	1/2	15,50	.610	6,35	1/2	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	●	●	●
DNGG150608FS	DNGG442FS	12,70	1/2	15,50	.610	6,35	1/4	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	●	●	●

● first choice
○ alternate choice

P	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
M	●	●	●	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
K	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○

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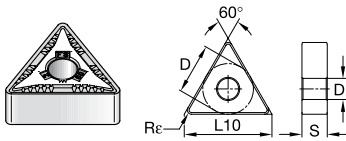


- first choice
- alternate choice

P	●	●	●	○	○	○	○	○	○	○	○
M	●	●	●	●	●	●	●	●	●	●	●
K	○	○	○	○	○	○	○	○	○	○	○
N	○	○	○	○	○	○	○	○	○	○	○
S	○	○	○	○	○	○	○	○	○	○	○
H	○	○	○	○	○	○	○	○	○	○	○

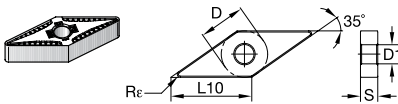
■ SNGG-FS

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT
		mm	in	mm	in	mm	in	mm	in	mm	in											
SNGG120408FS	SNGG432FS	12,70	1/2	12,70	.500	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	●	-	●



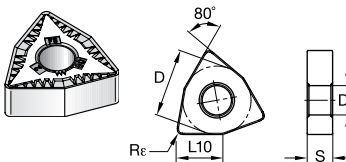
■ TNGG-FS

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT
		mm	in	mm	in	mm	in	mm	in	mm	in											
TNGG160404FS	TNGG331FS	9,53	3/8	16,50	.650	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	-	-	-	●	●	●
TNGG220408FS	TNGG432FS	12,70	1/2	22,00	.866	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	●	-	-



■ VNGG-FS

ISO catalog number	ANSI catalog number	D		L10		S		Rε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT
		mm	in	mm	in	mm	in	mm	in	mm	in											
VNGG160402FS	VNGG3305FS	9,53	3/8	16,61	.654	4,76	3/16	0,2	.008	3,81	.150	-	-	-	-	-	-	-	●	-	●	
VNGG160401FS	VNGG330FS	9,53	3/8	16,61	.654	4,76	3/16	0,1	.004	3,81	.150	-	-	-	-	-	-	-	●	-	●	
VNGG160404FS	VNGG331FS	9,53	3/8	16,61	.654	4,76	3/16	0,4	1/64	3,81	.150	-	-	-	-	-	-	-	●	●	●	
VNGG160408FS	VNGG332FS	9,53	3/8	16,61	.654	4,76	3/16	0,8	1/32	3,81	.150	-	-	-	-	-	-	-	●	●	●	



■ WNGG-FS

ISO catalog number	ANSI catalog number	D		L10		S		R _ε		D1		WP15CT	WP25CT	WP35CT	WM15CT	WM25CT	WM35CT	WK05CT	WK20CT	WS10PT	WS25PT	WU10HT
		mm	in	mm	in	mm	in	mm	in	mm	in											
WNGG080404FS	WNGG431FS	12,70	1/2	8,69	.342	4,76	3/16	0,4	1/64	5,16	.203	-	-	-	-	-	-	-	-	●	●	●
WNGG080408FS	WNGG432FS	12,70	1/2	8,69	.342	4,76	3/16	0,8	1/32	5,16	.203	-	-	-	-	-	-	-	-	●	●	●

FS Geometry

ADVANCES 2015

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