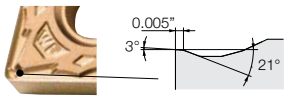
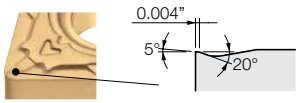
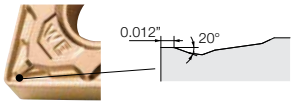
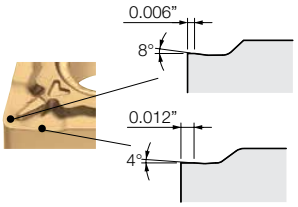
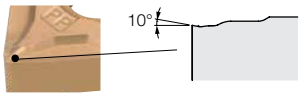
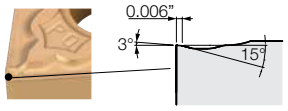
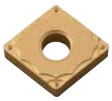
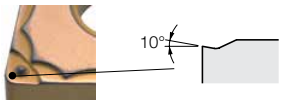
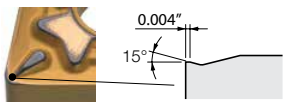
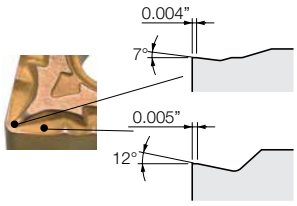
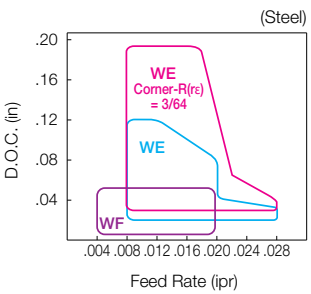
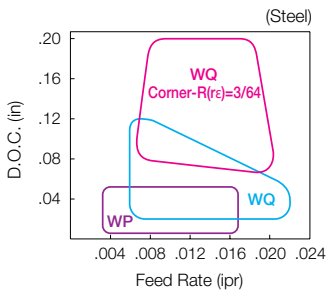
Steel

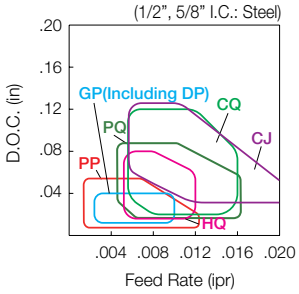
1 *Molded Chipbreaker*

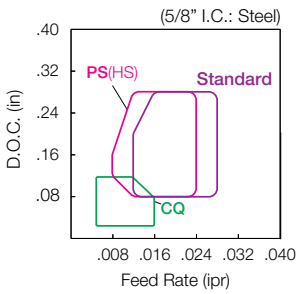
Finishing (Wiper Edge)	WF			Good chip control in finishing operations. Excellent surface finish by controlling adhesion. Less cutting force due to sharp cutting edge.
	WP			Double feed rate is available for finishing to light machining, while maintaining a smooth finish.
Finishing-Medium (Wiper Edge)	WE			Wide application range is available with improved chip control and high stability. Good surface finish at high feed rates.
	WQ			Double feed rate possible while maintaining a smooth finish. High efficiency and good chip control.
Finishing	PP			3-step dot structure realizes stable chip control at a wide range of feed rates. Less cutting force due to sharp cutting edge and smooth rake face.
Finishing-Medium	PQ			Stable chip control over a wide feed rate range. Well-balanced edge sharpness and toughness.
Finishing	GP			Finishing to light machining. Good chip control.
Finishing-Medium	HQ			Sharp cutting performance with 3-D rake angle and double projection design.
Finishing-Medium	CQ			Good chip control at various D.O.C. such as copying. Applicable for up-facing.

Applicable Chipbreaker Range (D.O.C. Refers to Radial Depth of Cut)



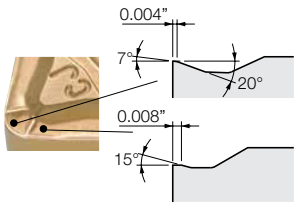
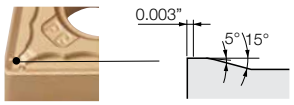
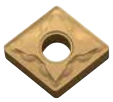
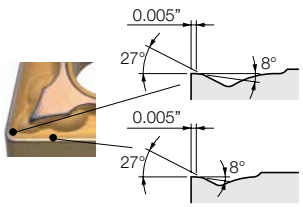
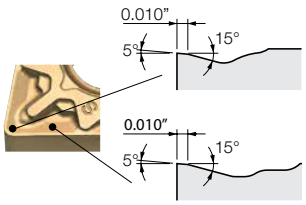
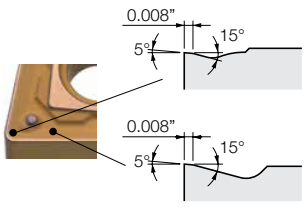
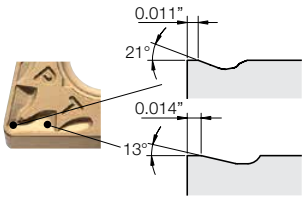
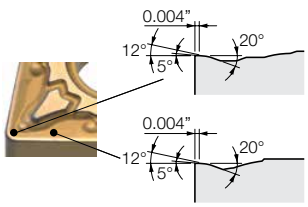
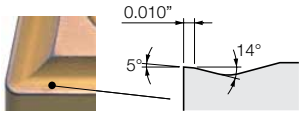




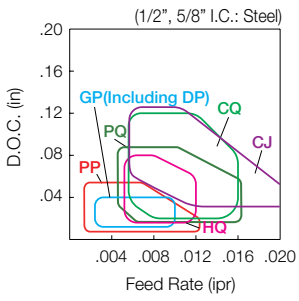


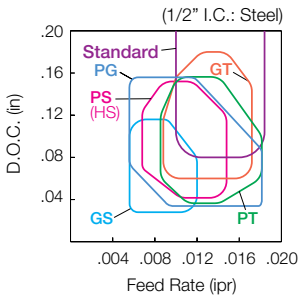
Steel

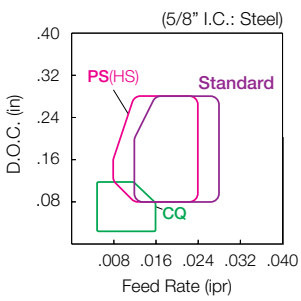
1 *Molded Chipbreaker*

Finishing-Medium (Up-Facing)	CJ			Ensures chips will curl even in small depth, high feed rate machining. Improves chip evacuation when copying and up-facing.
Medium-Roughing	PG			Stable machining with a balance of edge sharpness and strength. Prevents chip clogging at high feed rates. Good chip control at low feed rates. Stable machining with wide chip control range.
Medium-Roughing	GS			Strong edge chipbreaker. Stable for continuous machining and light interrupted machining.
Medium-Roughing	PS			General purpose chipbreaker. More stable due to large contact surface.
Medium-Roughing	HS			General purpose chipbreaker. Applicable for copying.
Medium-Roughing / High Feed Rate	PT			Low cutting force during high feed machining. Land support structure.
Medium-Roughing / High Feed Rate	GT			Strong edge chipbreaker. Wide land design and smooth chip control even at high feed rate machining.
Roughing	Standard			Low cutting force and suitable for large D.O.C. roughing.

Applicable Chipbreaker Range (D.O.C. Refers to Radial Depth of Cut)

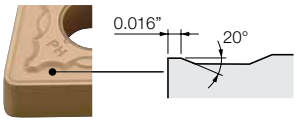
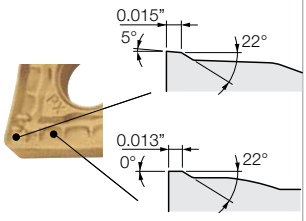




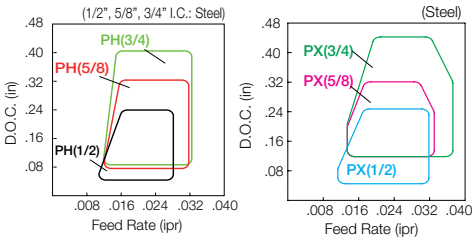


Steel

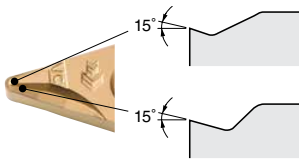
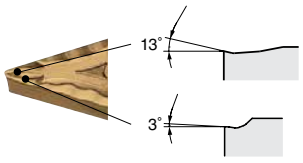
1 *Molded Chipbreaker*

Roughing	PH			For roughing of steel and cast iron. Suitable for heavy interrupted machining and for workpieces with scale due to strong cutting edge.
Single Sided Roughing (High Feed Rate)	PX			Roughing and high feed rate operation. Low cutting force chipbreaker.

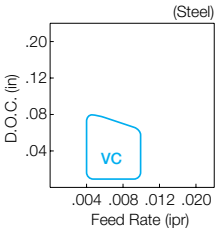
● **Applicable Chipbreaker Range** (D.O.C. Refers to Radial Depth of Cut)

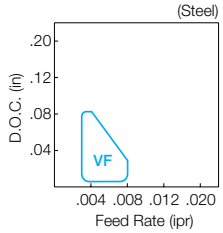


Steel (Copying / Undercutting, Varied D.O.C.)

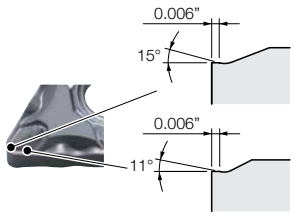
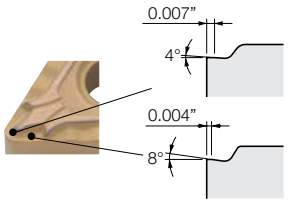
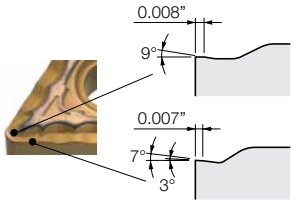
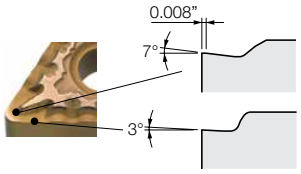
Finishing-Medium	VC			Handed chipbreaker for copying. Good chip control at varied D.O.C. because of the large space on the main cutting edge side.
Finishing-Medium	VF			Good chip control for varied D.O.C. such as copying and undercutting.

● **Applicable Chipbreaker Range** (D.O.C. Refers to Radial Depth of Cut)

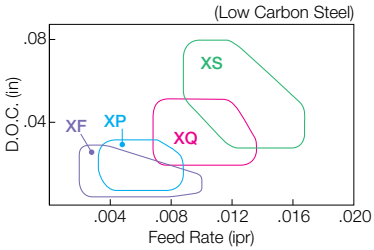




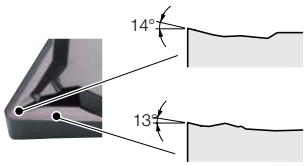
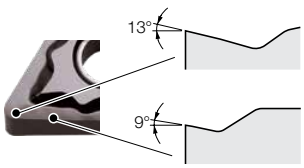
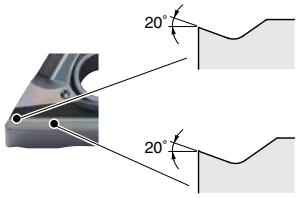
Steel (Copying / Undercutting, Varied D.O.C.)

Finishing	XF			Excellent chip control at high speed and small D.O.C. machining of low carbon steel.
Finishing	XP			Short chips when finishing due to sharp cutting and special design.
Medium	XQ			Consistent chip breaking at medium machining due to moderate rake face and special design.
Roughing	XS			Consistent chip breaking when roughing due to special rake angle design.

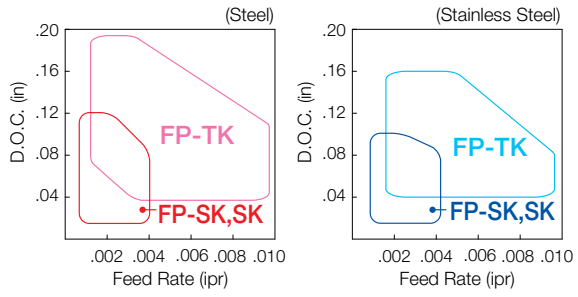
Applicable Chipbreaker Range (D.O.C. Refers to Radial Depth of Cut)

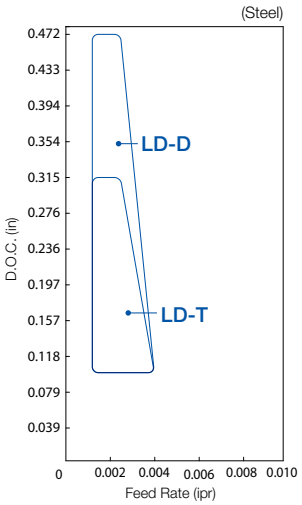


Steel / Stainless Steel (Small Parts Machining)

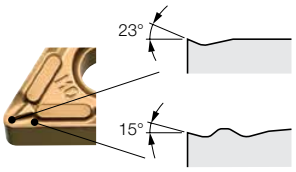
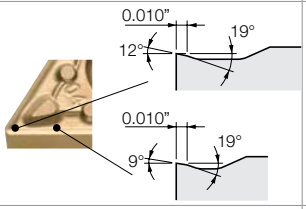
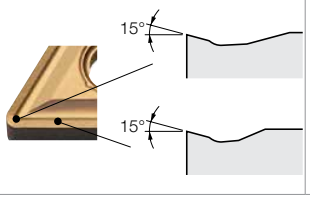
Finishing-Medium	SK	 FP-SK : Polished Sharp Edge -SK : Honed		For finishing to medium machining in automatic lathes. Sharp cutting performance equivalent to positive inserts. 2-step dot design provides reliable chip control at various D.O.C..
Medium-Roughing	FP-TK			For medium to high feed rate in automatic lathes (When machining workpieces of medium to large dia.) Superior cutting performance achieved by sharp edge and polished surface. Smooth chipbreaker geometry improves chip flow with less adhesion. Large curled chips.
Large D.O.C.	LD			Available for greater depths of cut than many conventional chipbreakers. Achieves high-precision machining in a single pass. Chipbreaker shape optimized for various depths of cut. Stable chip control in a wide range of machining applications.

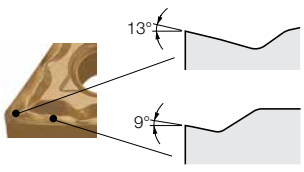
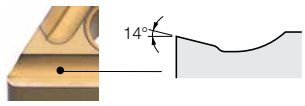
Applicable Chipbreaker Range
(D.O.C. Refers to Radial Depth of Cut)





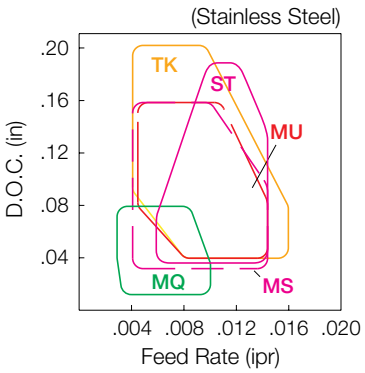
Stainless Steel / Heat-Resistant Alloy / Titanium Alloy

Finishing	MQ	 	Large rake angle and circular edge line. Low cutting force and good chip control.
Medium-Roughing	MS	 	Superior cutting edge sharpness and strength achieved by a positive land. Extra strength of cutting edge inhibits damage from wall shouldering.
Medium-Roughing	MU	 	Large rake angle reduces cutting force. Less burring achieved by diminishing damage from notching.

Medium-Roughing	TK	 	Smooth chipbreaker geometry improves chip flow with less adhesion. Large curled chips.
Medium-Roughing	ST	 	Lower cutting forces due to large rake angle. Less notching with special design.

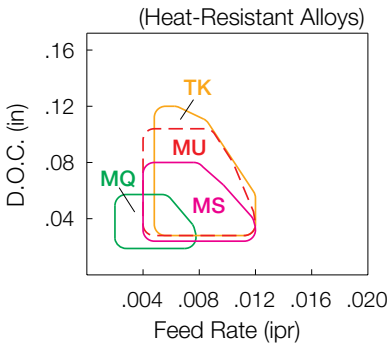
Stainless Steel

Applicable Chipbreaker Range
(D.O.C. Refers to Radial Depth of Cut)



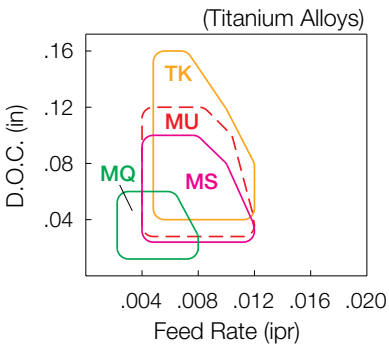
Heat-Resistant Alloy

Applicable Chipbreaker Range
(D.O.C. Refers to Radial Depth of Cut)

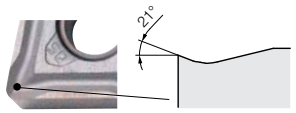
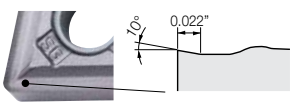
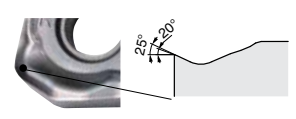


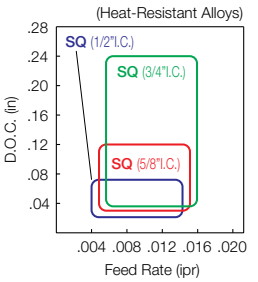
Titanium Alloy

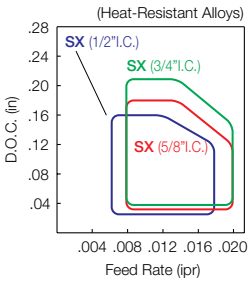
Applicable Chipbreaker Range
(D.O.C. Refers to Radial Depth of Cut)

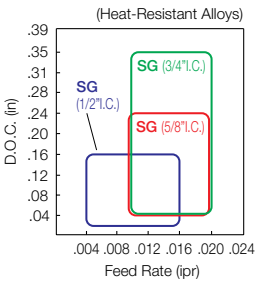


Heat-Resistant Alloy

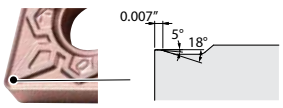
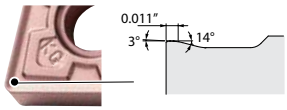
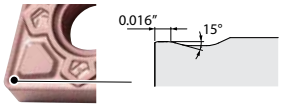
Finishing-Medium	SQ	 	Effective for burr suppression and reducing notching with positive cutting edge (inclined in (-) direction)
Roughing	SG	 	Stable chip control during heavy machining applications and high-strength land with low cutting force design.
Roughing (Single Sided)	SX	 	Slant cutting edge reduces cutting force. Less burring achieved by unique cutting edge design.





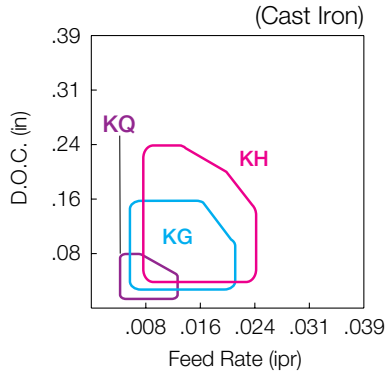


Cast Iron (K Series)

Sharp Cutting	KQ			Sharp cutting chipbreaker. Edge geometry is great when requiring sharpness such as machining thin-walled workpieces.
Medium	KG			Excellent balance of sharpness and strength. Excellent stability in continuous machining.
Medium-Roughing	KH			Good for heavily interrupted machining. Strong edge chipbreaker. Improved locating/seating in the toolholder pocket, with high reliability.

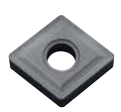
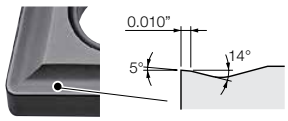
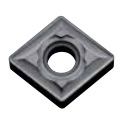
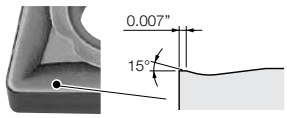
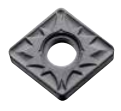
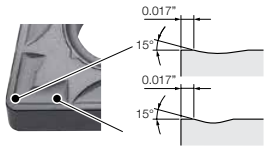
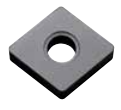
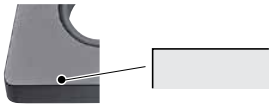
Applicable Chipbreaker Range

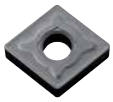
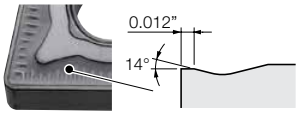
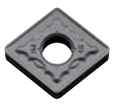
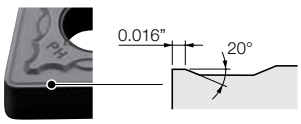
(D.O.C. Refers to Radial Depth of Cut)

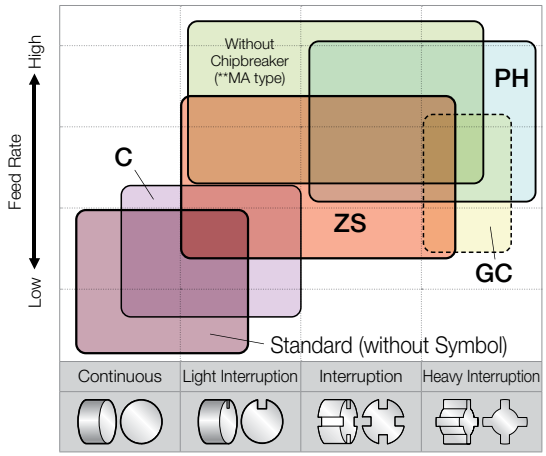


Cast Iron

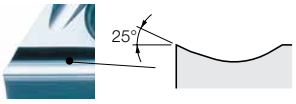
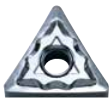
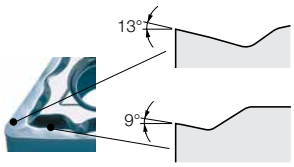
Sharp Cutting Oriented ↑ / Stability Oriented ↓

Standard				Standard chipbreaker for continuous to light interrupted machining of cast iron. (Low cutting force)
C				High feed rate chipbreaker for continuous to light interrupted machining of cast iron.
ZS				Standard chipbreaker for light interrupted to interrupted machining of cast iron. (High stability)
Without Chipbreaker				High feed rate chipbreaker for light interrupted machining of cast iron.

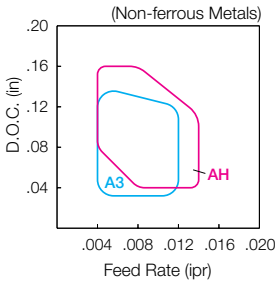
Stability Oriented	GC			Chipbreaker for heavy interrupted machining of cast iron. (Tough edge chipbreaker)
	PH			Chipbreaker for roughing of cast iron and steel. Suitable for heavy interrupted machining and for workpieces with scale due to strong cutting edge.

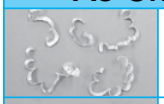
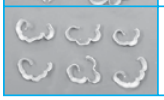


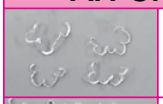
Non-ferrous Metals

Finishing-Medium	A3			Large rake angle and smooth surface. Good chip control and less adhesion.
Medium-Roughing	AH		 G Class: Sharp Edge Prep. M Class: Honed Edge Prep.	Polished chipbreaker. Smooth chip control and less adhesion.

● **Applicable Chipbreaker Range** (D.O.C. Refers to Radial Depth of Cut)

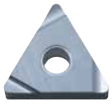
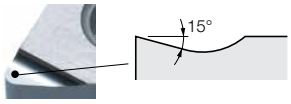
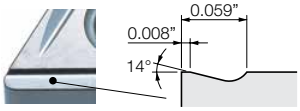


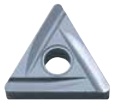
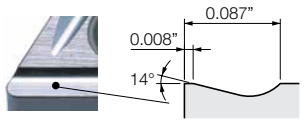
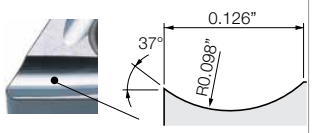
A3 Chipbreaker	
	D.O.C.= 0.08” f= 0.008 ipr
	D.O.C.=0.08” f= 0.012 ipr

AH Chipbreaker	
	D.O.C.= 0.08” f= 0.008 ipr
	D.O.C.= 0.08” f= 0.012 ipr

Steel

2 *Ground Chipbreaker*

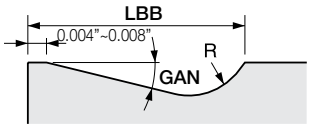
Sharp Cutting	S			Sharp edge and less cutting force. Good chip control and smooth chip evacuation.
Medium	B			Suitable for general purpose machining at feed rate from 0.006 to 0.010ipr.

Sharp Cutting	C			Suitable for general purpose machining at feed rate from 0.008 to 0.014ipr.
Medium	25R			Applicable to sticky material such as low carbon steel. Large rake angle also suitable for stainless steel.

Effectiveness of Ground Chipbreaker

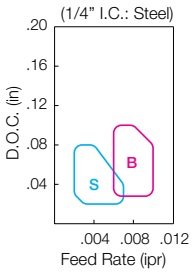
(1) Lower cutting force and sharper cutting edge
(2) Improved adhesion resistance
(3) Improved dimensional accuracy and surface finish
(4) Controlled chip flow

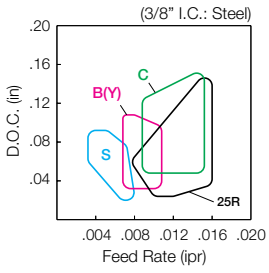
Specification of B, C, D and Parallel Ground Chipbreaker

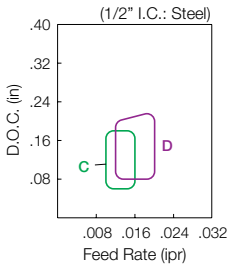


Insert Type	I.C. Size	Chipbreaker Name	LBB (in)	GAN	R (in)
CNGG	3/8, 1/2	Without Indication (Similar to C)	0.087	14°	0.040
WNGG	3/8	Without Indication (Similar to C)	0.087	14°	0.040
TNGG	1/4, 3/8	B	0.060	14°	0.020
	3/8, 1/2	C	0.087	14°	0.040
DNGG	3/8, 1/2	Without Indication (Similar to C)	0.100	14°	0.080
VNGG	3/8	Without Indication (Similar to B)	0.060	14°	0.020
SNGG	3/8, 1/2	B	0.060	14°	0.020
	1/2	C	0.087	14°	0.040

Applicable Chipbreaker Range (D.O.C. Refers to Radial Depth of Cut)

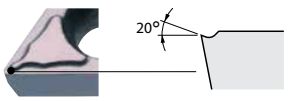
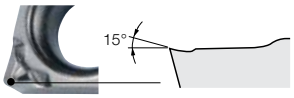
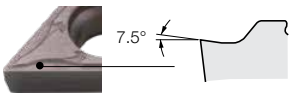
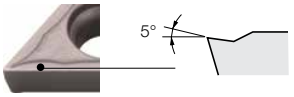
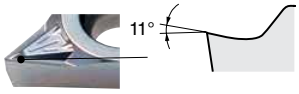
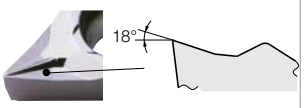
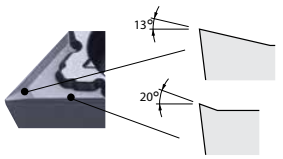
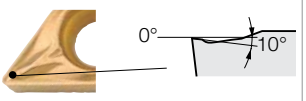


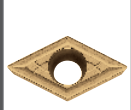
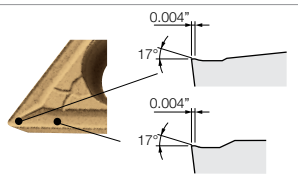
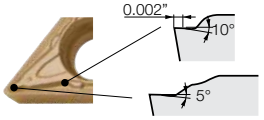
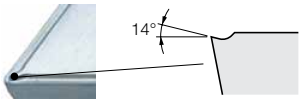
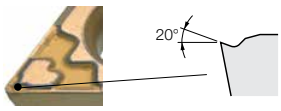
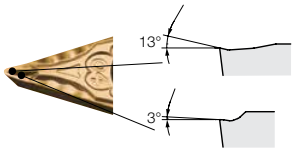
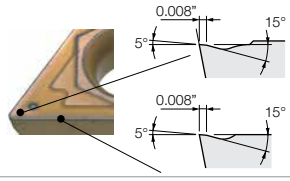
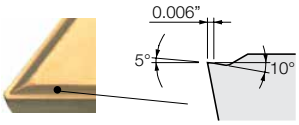
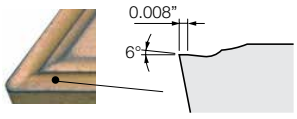




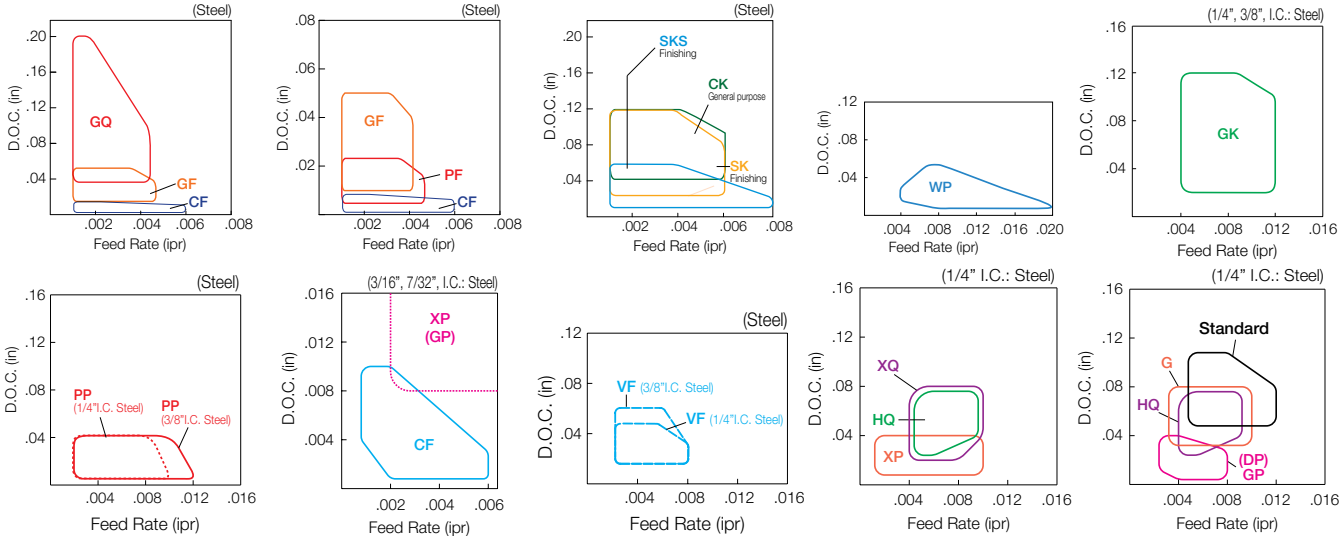
Steel

1 *Molded Chipbreaker*

Minute D.O.C.	CF			Available for minute D.O.C. (0.0008" - 0.008") finishing.
Finishing	PF			Finishing chipbreaker for boring with D.O.C. of (0.006"~0.024")
Finishing	GF			Dot located close to ridge line of cutting edge on corner. Breaks chips into small pieces at low D.O.C.
Finishing-Medium	GQ			Enables cutting over a wide range of conditions by using the optimum chipbreaker width according to the cutting depth.
Finishing	SKS			Finishing chipbreaker with a D.O.C. of 0.2mm-1.5mm. Stable chip control with rake face, bottom face, and chipbreaker face design.
Finishing	SK			Sharp cutting performance due to Large rake angle. Large dot to the corner edge improved chip control in a wide feed rate range.
Finishing	CK			Good cutting performance. Applicable without hand for two direction cutting on automatic lathe.
Finishing	WP			Dual-dot structure with one dot offering stabilized chip control at low feed rates, while a second dot controls chips at higher feed rates.

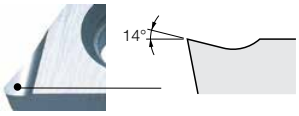
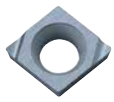
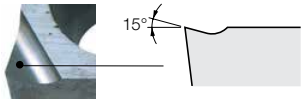
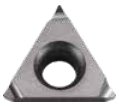
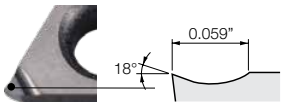
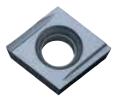
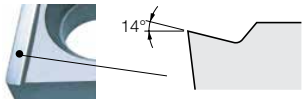
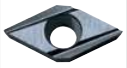
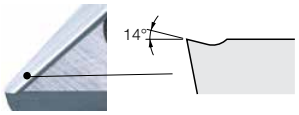
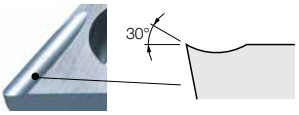
Finishing-Medium	GK			Good chip evacuation at wide range by breaker dot and wide chip pocket.
Finishing	PP			3-step Smart Dot structure is applicable to a wide range of feed rates in steel finishing. Smooth taper cutting edge reduces cutting forces.
Finishing	DP			Consistent chip breaking performance for finishing.
Finishing	GP			Good chip control at finishing. Applicable to sticky material like low carbon steel, pipe material.
Finishing	VF			Good chip control for varied D.O.C. such as copying and undercutting.
Finishing-Medium	HQ			General purpose chipbreaker for medium machining.
Medium	G			Chipbreaker for short chips at medium machining.
Medium	Standard			Strong edge chipbreaker for medium machining range.

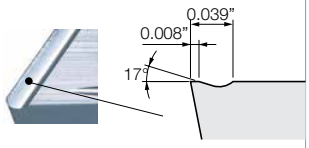
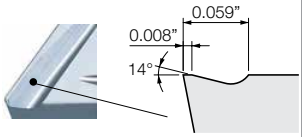
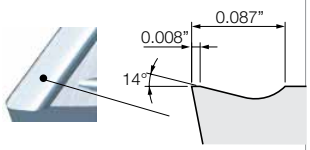
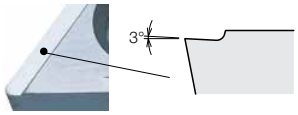
Applicable Chipbreaker Range (D.O.C. Refers to Radial Depth of Cut)



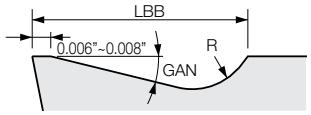
Steel

2 *Ground Chipbreaker*

Finishing	(Without Indication)			Good chip control during finishing to light machining with low cutting forces.
Finishing	F			Good chip control during finishing to light machining with low cutting forces.
Finishing	P			Chipbreaker smoothly breaks chips and directs them towards the outside of the workpiece when boring. Sharp cutting performance and good surface finish.
Finishing-Medium	Y			Sharp cutting performance and good surface finish.
Low Feed	J			Slant chipbreaker width provides chip control at various D.O.C..
Low Feed	U			Good chip control at low feed rates and varied D.O.C. with low cutting force. Suitable for automatic lathes.

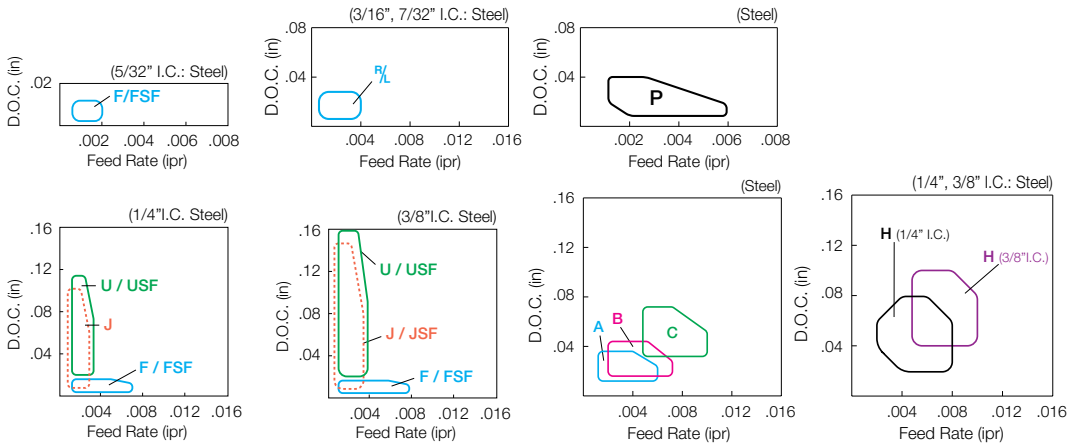
Finishing	A			Large rake angle and low cutting force. Narrow chipbreaker width and consistent chip control.
Finishing-Medium	B			General purpose chipbreaker for medium machining. Good balance between chip control and sharp cutting.
Medium	C			Applicable to high load machining. Good chip flow and less resistance.
Finishing-Medium	H			Sharp cutting performance and small curled chips.

● Specification of A, B, C and parallel ground chipbreaker



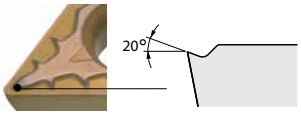
Insert Type	Size	Chipbreaker Name	LBB (in)	GAN	R (in)
TPGR	1/4	A	0.040	17°	0.020
	1/4, 3/8	B	0.060	14°	0.020
	3/8	C	0.087	14°	0.040
SPGR	3/8	Without Indication (Similar to B)	0.060	14°	0.020
	1/2	Without Indication (Similar to C)	0.087	14°	0.040

● Applicable Chipbreaker Range (D.O.C. Refers to Radial Depth of Cut)



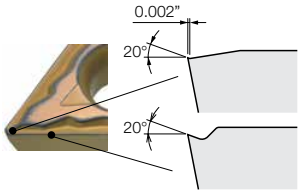
Low Carbon Steel (Pipe / Rolled Plate / Rolled Steel)

Finishing — **XP**



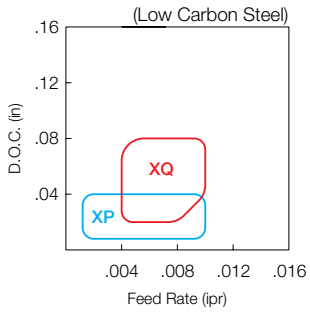
Wide chip control range and sharp cutting performance. Suitable for low carbon steel and sticky material.

Finishing-Medium — **XQ**

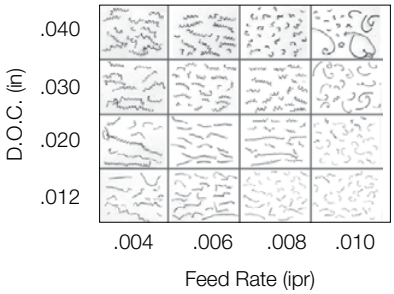


Wide chip control range and sharp cutting performance. Suitable for low carbon steel and sticky material.

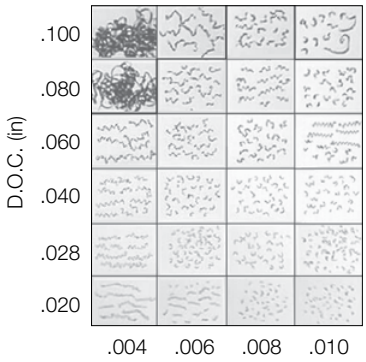
● **Applicable Chipbreaker Range** (D.O.C. Refers to Radial Depth of Cut)



XP Chipbreaker

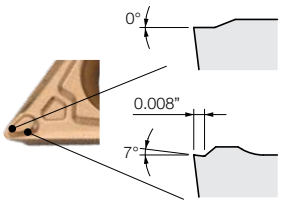


XQ Chipbreaker



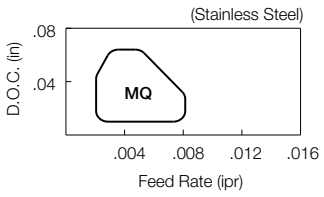
Stainless Steel

Finishing — **MQ**



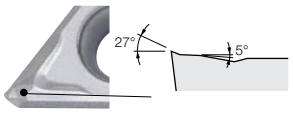
Good chip evacuation when boring. Small curled chips. Prevents chip entanglement with toolholder and stabilizes surface roughness.

● **Applicable Chipbreaker Range** (D.O.C. Refers to Radial Depth of Cut)



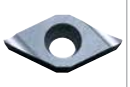
Non-ferrous Metals

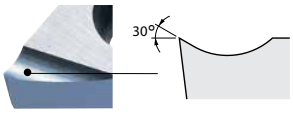
Finishing — **AP**



Stable chip evacuation and good surface finish when boring stainless steel with small curled chips evacuated towards the outside of the workpiece.

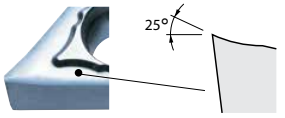
Finishing-Medium — **A3**





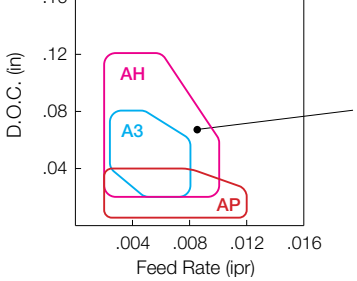
Large rake angle, smooth chip flow and less adhesion. Sharp edge and good surface finish.

Finishing-Medium — **AH**



Positive chip groove and good chip control with low cutting forces. Polished surface reduces adhesion.

● **Applicable Chipbreaker Range** (D.O.C. Refers to Radial Depth of Cut)



AH Chipbreaker