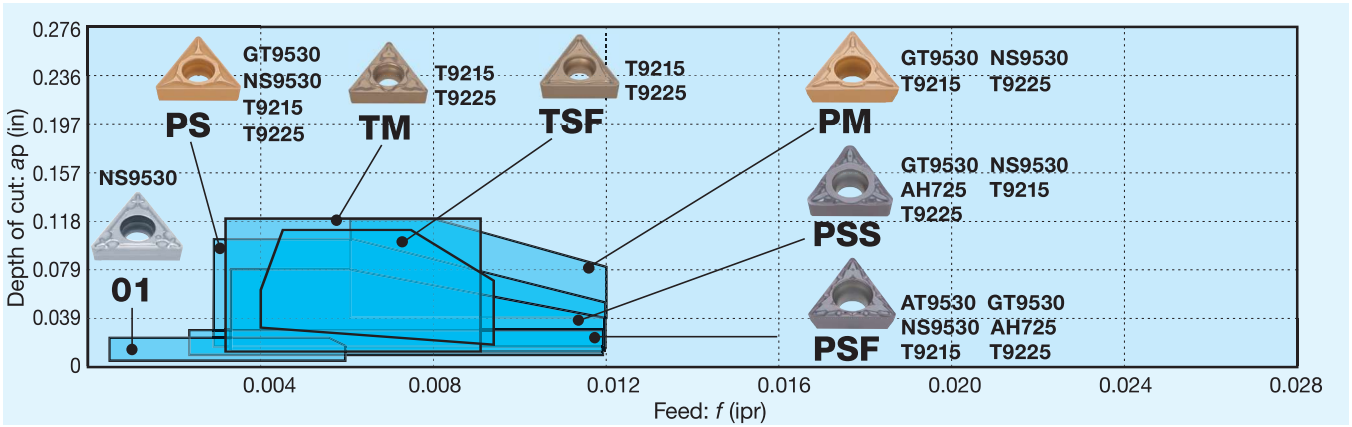
Chipbreaker Guide

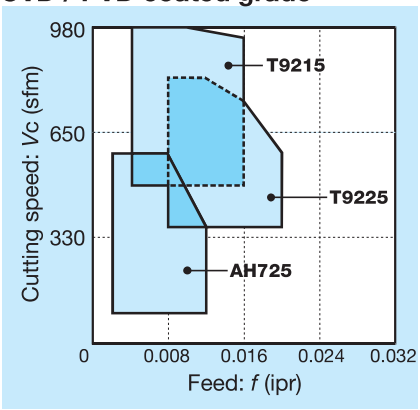
BASIC CHIPBREAKER: POSITIVE TYPE

P Steel

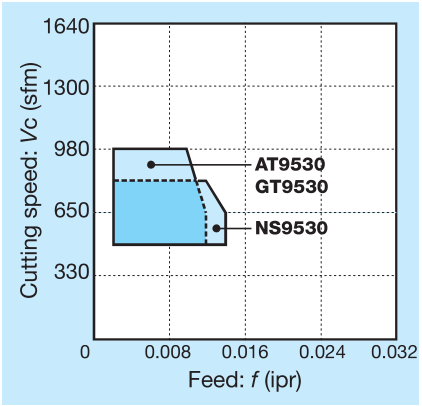
Chipbreaker System for Turning (Positive Type)

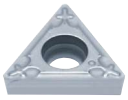
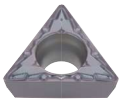
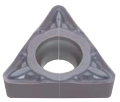


CVD / PVD coated grade



Coated cermet / Cermet



Chipbreaker	Shape	Feature
01		Excellent chip control in machining very small depth of cut thanks to the sharp cutting edge and protrusion.
PSF		Low cutting force and high wear resistance. First choice for finishing. Excellent chip control in finishing prevents chip entanglement in internal machining.
PSS		3D chipbreaker for finishing to medium cutting with excellent chip control and low cutting force.

Chipbreaker	Shape	Feature
PS		3D chipbreaker for finishing to medium cutting with excellent chip control and sharpness. M-class insert delivers cost reduction and highly efficient boring in a wide range of applications.
PM		First choice for medium cutting with excellent sharpness and good chip control. Delivers stable machining of stainless steel.

Chipbreaker	Shape	Feature
TSF		Optimal chipbreaker geometry ensures smooth chip control in a high feed range.
TM		Optimal cutting edge and chipbreaker geometry provides effective chip evacuation at greater depths of cut.

STANDARD CUTTING CONDITIONS

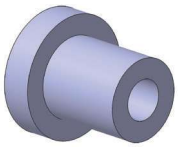
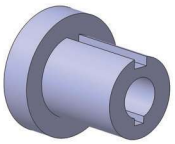
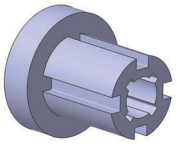
ISO	Operation	Work condition	Chip-breaker	Grade	Depth of cut *ap* (in)	Feed *f* (ipr)	Cutting speed: *Vc* (sfm) Low carbon steels, Alloy steels	Medium carbon steels, Alloy steels	High carbon steels, Alloy steels
P	Precision finishing	Continuous	01	NS9530	0.002 - 0.020	0.001 - 0.006	500 - 820	260 - 720	260 - 590
		Light interrupted	01	NS9530	0.002 - 0.020	0.001 - 0.006	500 - 820	260 - 720	260 - 590
	Finishing	Continuous	PSS	NS9530	0.004 - 0.020	0.002 - 0.012	500 - 820	260 - 720	260 - 590
		Light interrupted	PSS	NS9530	0.004 - 0.020	0.002 - 0.012	500 - 820	260 - 720	260 - 590
		Heavy interrupted	PSS	NS9530	0.004 - 0.020	0.002 - 0.012	500 - 820	260 - 720	260 - 590
	Finishing to light cutting	Continuous	PS	NS9530	0.012 - 0.079	0.003 - 0.012	500 - 820	260 - 720	260 - 590
		Light interrupted	PS	NS9530	0.012 - 0.079	0.003 - 0.012	500 - 820	260 - 720	260 - 590
		Heavy interrupted	PS	NS9530	0.012 - 0.079	0.003 - 0.012	500 - 820	260 - 720	260 - 590
	Finishing to Medium cutting	Continuous to Heavy interrupted	PS	T9215	0.020 - 0.098	0.003 - 0.012	400 - 1148	330 - 1148	260 - 820
			PS	T9225	0.020 - 0.098	0.003 - 0.012	330 - 660	260 - 980	260 - 820
	Medium cutting	Continuous to Heavy interrupted	PM	-	0.040 - 0.120	0.006 - 0.012	500 - 980	330 - 660	260 - 590
			PM	-	0.040 - 0.120	0.006 - 0.012	400 - 820	260 - 590	260 - 400

Low carbon steels, Alloy steels: 1018, 1020, etc. Medium carbon steels, Alloy steels: 1045, 4140, etc. Hi carbon steels, Alloy steels: 8620, etc.

Selection System

SELECTION SYSTEM: POSITIVE TYPE

P Steel

	Continuous	Light interrupted	Heavy interrupted
Precision finishing [a_p = ~ 0.020 in]	Basic: 01 NS9530 — B042, B047	Basic: 01 NS9530 — B042, B047 Fracture: PSF NS9530 — B042, B047, B051	
Finishing [a_p = 0.004 ~ 0.020 in]	Basic: PSS NS9530 — B042, B047, B051 Wear: PSS GT9530 — B042, B047, B051 Fracture: PS NS9530 — B042, B047, B051 Chip control: PSF NS9530 — B042, B047, B051	Basic: PSS NS9530 — B042, B047, B051 Wear: PSS GT9530 — B042, B047, B051 Fracture: PS NS9530 — B042, B047, B051 Chip control: PSF NS9530 — B042, B047, B051	Basic: PSS NS9530 — B042, B047, B051 Wear: PSS GT9530 — B042, B047, B051 Fracture: PS NS9530 — B042, B047, B051 Chip control: PSF NS9530 — B042, B047, B051
Finishing to medium cutting [a_p = 0.020 ~ 0.098 in]	Basic: PS T9215 — B042, B047, B051 Fracture: PS T9225 — B042, B047, B051 Wear: PS NS9530 — B042, B047, B051	Basic: PS T9215 — B042, B047, B051 Fracture: PS T9225 — B042, B047, B051 Wear: PS NS9530 — B042, B047, B051	Basic: PS T9215 — B042, B047, B051 Fracture: PM T9225 — B044, B048 Chip control: TSF T9215 — B042, B047
Medium cutting [a_p = 0.039 ~ 0.118 in]	Basic: PM T9215 — B044, B048 Wear: PM NS9530 — B044, B048	Basic: PM T9215 — B044, B048 Fracture: PM T9255 — B044, B048	Basic: PM T9215 — B044, B048 Chip control: TM T9215 — B043, B047

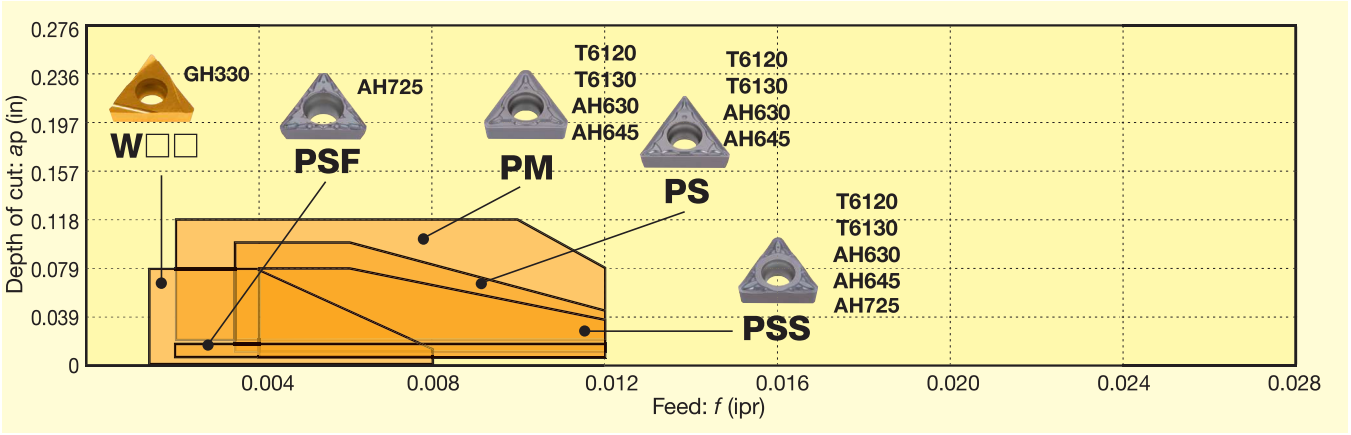
Please find the details on the pages: B***/7° relief angle, B***/11° relief angle, B***/5° relief angle.

Chipbreaker Guide

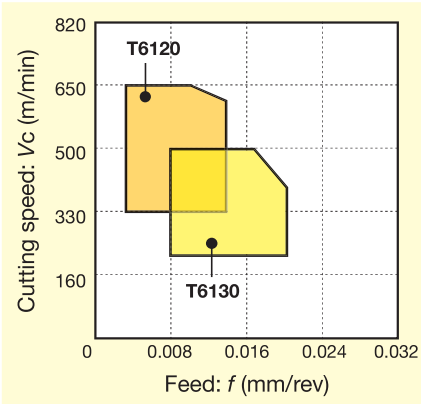
BASIC CHIPBREAKER: POSITIVE TYPE

M Stainless Steel

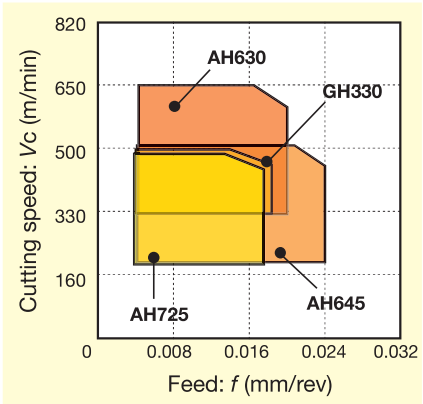
Chipbreaker System for Turning (Positive Type)

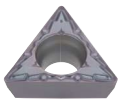


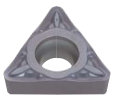
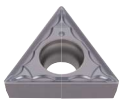
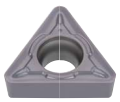
CVD coated grade



PVD coated grade



Chipbreaker	Shape	Feature
W□□		Designed to control the direction of chip flow in precision finishing. Smooth chip evacuation in boring.
PSF		Low cutting force and high wear resistance. First choice for finishing. Excellent chip control in finishing prevents chip entanglement in internal machining.

Chipbreaker	Shape	Feature
PSS		3D chipbreaker for finishing to medium cutting with excellent chip control and low cutting force.
PS		3D chipbreaker for finishing to medium cutting with excellent chip control and sharpness. M-class insert delivers cost reduction and highly efficient boring in a wide range of applications.
PM		First choice for medium cutting with excellent sharpness and good chip control. Delivers stable machining of stainless steel.

STANDARD CUTTING CONDITIONS

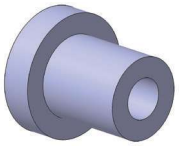
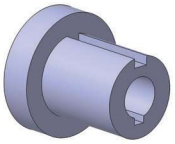
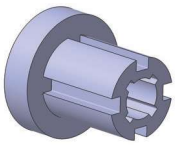
ISO	Operation	Work condition	Chipbreaker	Grade	Depth of cut *ap* (in)	Feed *f* (ipr)	Cutting speed *Vc* (sfm)
M	Precision finishing	Continuous	W□□	GH330	0.002 - 0.079	0.001 - 0.008	330 - 500
	Finishing	Continuous	PSF	AH725	0.004 - 0.020	0.002 - 0.012	160 - 500
		Light interrupted	PSF	AH725	0.004 - 0.020	0.002 - 0.012	160 - 500
		Heavy interrupted	PSF	AH725	0.004 - 0.020	0.002 - 0.012	160 - 400
	Finishing to light cutting	Continuous	PSS	AH630	0.012 - 0.079	0.003 - 0.012	300 - 620
		Light interrupted	PSS	AH630	0.012 - 0.079	0.003 - 0.012	300 - 620
		Heavy interrupted	PSS	AH630	0.012 - 0.079	0.003 - 0.012	300 - 620
	Finishing to medium cutting	Continuous	PS	T6130	0.020 - 0.098	0.003 - 0.012	330 - 660
		Light interrupted	PS	AH630	0.020 - 0.098	0.003 - 0.012	300 - 620
		Heavy interrupted	PS	AH630	0.020 - 0.098	0.003 - 0.012	300 - 620
	Medium cutting	Continuous	PM	T6130	0.040 - 0.120*	0.006 - 0.012	330 - 660
		Light interrupted	PM	AH630	0.040 - 0.120*	0.006 - 0.012	300 - 620
		Heavy interrupted	PM	AH630	0.040 - 0.120*	0.006 - 0.012	300 - 620

* For CCMT0602 and DCMT0702 type inserts, *ap* = 0.020 - 0.098, Stainless steels: 304SS, 316SS, etc.

Selection System

SELECTION SYSTEM: POSITIVE TYPE

M Stainless Steel

	Continuous	Light interrupted	Heavy interrupted
Precision finishing [a_p = ~ 0.020 in]	Basic: W□□ GH330 — B043, B048, B051	Basic: W□□ GH330 — B043, B048, B051	
Finishing [a_p = 0.012 ~ 0.060 in]	Basic: PSF AH725 — B042, B047, B051 Wear: PSS T6130 — B042, B047, B051	Basic: PSF AH725 — B042, B047, B051 Fracture: PSS AH630 — B042, B047, B051 Wear: PSS T6130 — B042, B047, B051	Basic: PSF AH725 — B042, B047, B051 Fracture: PSS AH630 — B042, B047, B051
Finishing to medium cutting [a_p = 0.020 ~ 0.098 in]	Basic: PSS AH630 — B042, B047, B051 Wear: PS T6130 — B042, B047, B051	Basic: PS AH630 — B042, B047, B051 Fracture: PM AH645 — B044, B048 Wear: PS T6130 — B042, B047, B051	Basic: PS AH630 — B042, B047, B051 Fracture: PM AH645 — B044, B048 Wear: PS T6130 — B042, B047, B051
Medium cutting [a_p = 0.039 ~ 0.118 in]	Basic: PM T6130 — B044, B048	Basic: PM AH630 — B044, B048 Fracture: PM AH645 — B044, B048 Wear: PM T6130 — B044, B048	Basic: PM AH630 — B044, B048 Fracture: PM AH645 — B044, B048

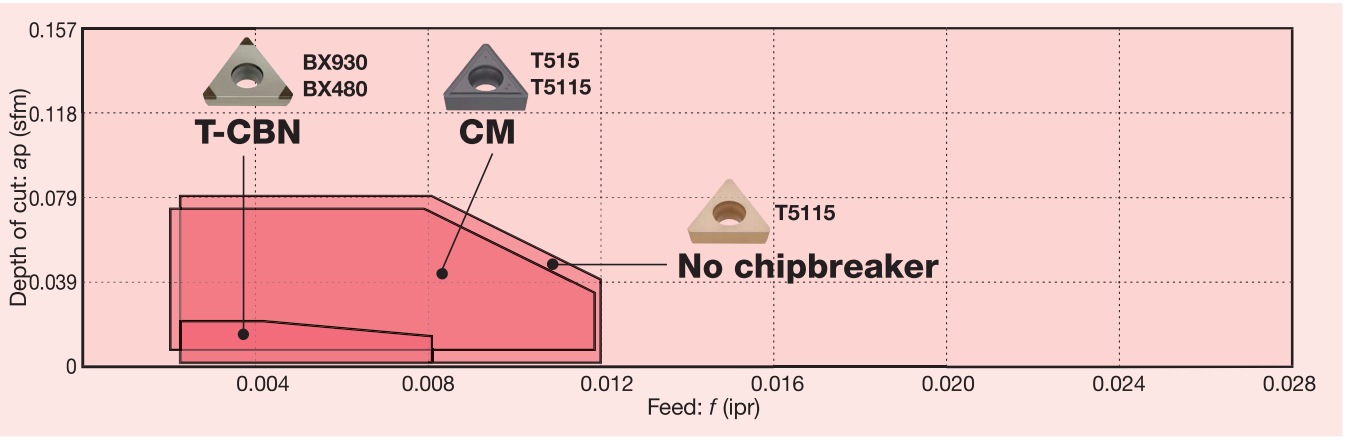
Please find the details on the pages: B***/7° relief angle, B***/11° relief angle, B***/5° relief angle.

Chipbreaker Guide

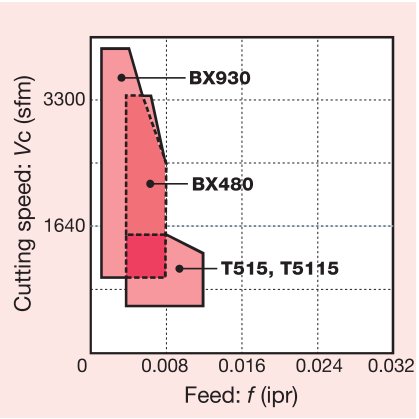
BASIC CHIPBREAKER: POSITIVE TYPE

K Cast Iron

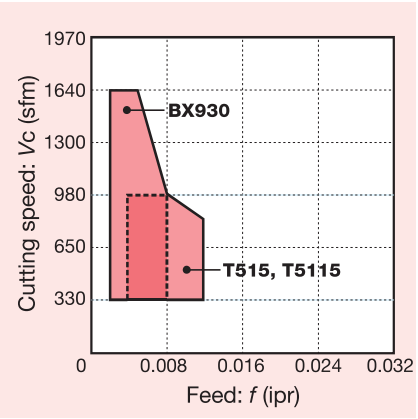
Chipbreaker System for Turning (Positive Type)

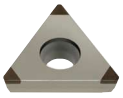
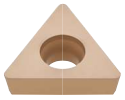


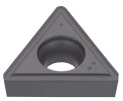
Grey cast iron



Ductile cast iron



Chipbreaker	Shape	Feature
No chip-breaker (T-CBN)		Excellent performance in high-speed finishing of cast iron with CBN sintered body on the cutting edge.
No chip-breaker		Suitable for a wide range of applications from finishing to roughing cast iron. Excellent performance with high cutting edge strength.

Chipbreaker	Shape	Feature
CM		Highly versatile all-round chipbreaker with low cutting force. Suitable for finishing to medium cutting.

STANDARD CUTTING CONDITIONS

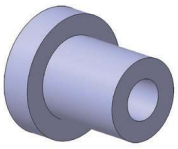
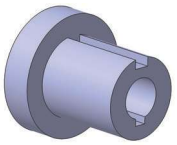
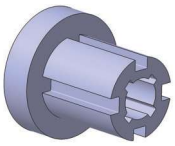
ISO	Operation	Work condition	Chip-breaker	Grade	Depth of cut *ap* (in)	Feed *f* (ipr)	Cutting speed: *Vc* (sfm)	
							Grey cast iron	Ductile cast iron
K	Precision finishing	Continuous	Without	BX930	0.002 - 0.020	0.002 - 0.008	980 - 3940	330 - 1640
		Light interrupted	Without	BX480	0.002 - 0.020	0.002 - 0.008	980 - 2630	330 - 980
		Light interrupted	Without	BX470	0.002 - 0.020	0.002 - 0.008	980 - 2630	330 - 980
	Finishing	Continuous	CM	T515	0.002 - 0.079	0.002 - 0.012	500 - 2300	500 - 980
		Heavy interrupted	CM	T515	0.002 - 0.079	0.002 - 0.012	330 - 660	330 - 660
	Medium cutting	Light interrupted	CM	T515	0.002 - 0.079	0.002 - 0.012	330 - 980	330 - 820

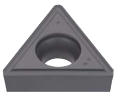
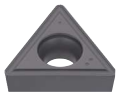
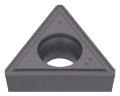
Grey cast irons: Class 25, etc. , Ductile cast irons: 65-45-12, etc.

Selection System

SELECTION SYSTEM: POSITIVE TYPE

K Cast Iron

	Continuous	Light interrupted	Heavy interrupted
Finishing to Medium cutting [a_p = 0.020 ~ 0.118 in.]	Basic  CM T515 B044, B048, B051 Wear → T-CBN BX930 B183 -	Basic  CM T515 B044, B048, B051	Basic  CM T515 B044, B048, B051

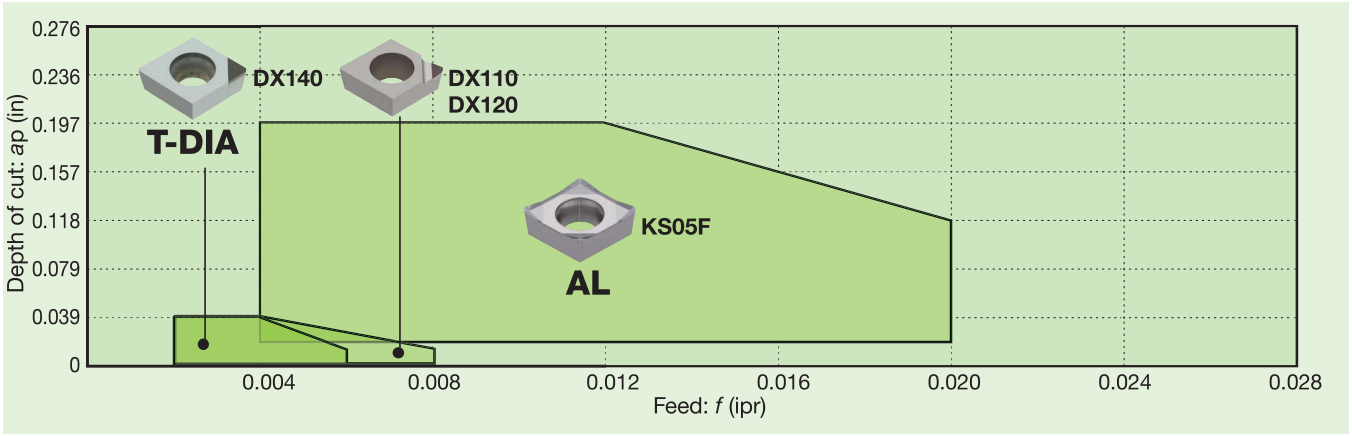
Please find the details on the pages: B***/7° relief angle, B***/11° relief angle, B***/5° relief angle.

Chipbreaker Guide

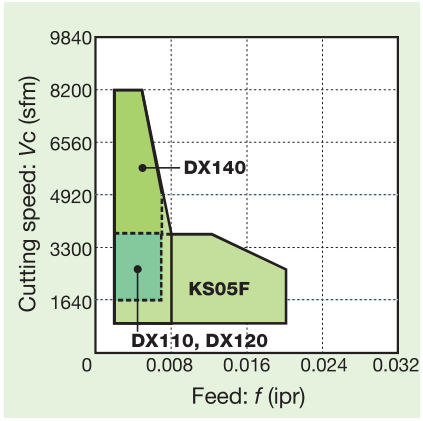
BASIC CHIPBREAKER: POSITIVE TYPE

N Non-ferrous Metal

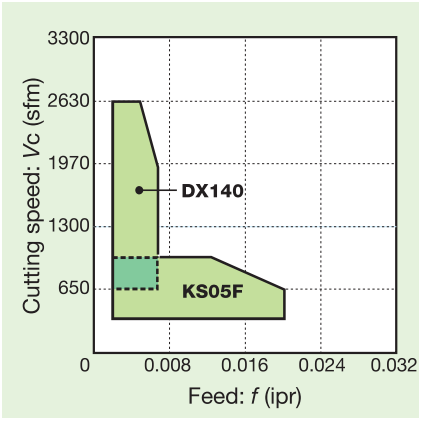
Chipbreaker System for Turning (Positive Type)



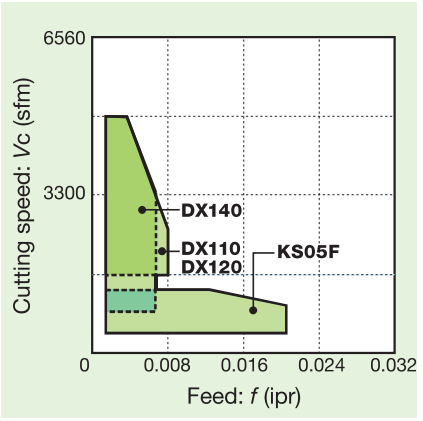
Aluminum alloy (Si < 12%)

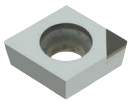
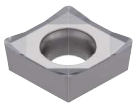


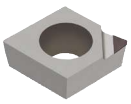
Aluminum alloy (Si ≥ 12%)



Copper alloy



Chipbreaker	Shape	Feature
No chip-breaker (T-DIA)		Excellent performance in high-speed finishing of non-ferrous metal with diamond sintered body on the cutting edge.
AL		Large rake angle and sharp cutting edge reduce cutting force. Lapped rake face prevents adhesion. Large inclination on the cutting edge (wavy cutting edge) for more stable chip control.

Chipbreaker	Shape	Feature
With chip-breaker (T-DIA)		Wide chipbreaker for smooth chip evacuation. Large rake face reduces cutting force. DIA on the cutting edge delivers high-speed machining and long tool life.

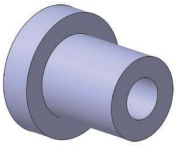
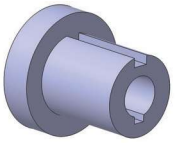
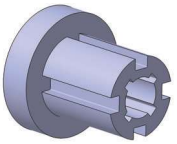
STANDARD CUTTING CONDITIONS

ISO	Operation	Work condition	Chip-breaker	Grade	Depth of cut ap (in)	Feed f (ipr)	Cutting speed: Vc (sfm) Aluminum alloy (Si < 12%)	Aluminum alloy (Si ≥ 12%)	Copper alloy
N	Precision finishing	Continuous	With	DX110	0.002 - 0.040	0.002 - 0.006	1640 - 8200	1310 - 2630	1640 - 4920
		Light interrupted	Without	DX140	0.002 - 0.040	0.002 - 0.008	980 - 8200	-	1640 - 4920
	Finishing	Continuous	Without	DX140	0.002 - 0.040	0.002 - 0.006	1640 - 8200	1310 - 2630	1640 - 4920
		Light interrupted	Without	DX140	0.002 - 0.040	0.002 - 0.006	980 - 5900	1310 - 1970	1310 - 3940
		Heavy interrupted	AL	KS05F	0.020 - 0.197	0.004 - 0.020	330 - 1970	330 - 660	-
	Medium cutting	Continuous	AL	KS05F	0.020 - 0.197	0.004 - 0.020	330 - 3940	330 - 980	330 - 980
		Light interrupted	AL	KS05F	0.020 - 0.197	0.004 - 0.020	330 - 2950	330 - 660	330 - 660
		Heavy interrupted	AL	KS05F	0.020 - 0.197	0.004 - 0.020	330 - 1970	330 - 660	-

Selection System

SELECTION SYSTEM: POSITIVE TYPE

N Non-ferrous Metal

	Continuous	Light interrupted	Heavy interrupted
Precision finishing [a_p = ~ 0.020 in]	Basic: With chipbreaker DX110 (B194, B196) → Wear → T-DIA DX140 (B195, B197, B198)	Basic: With chipbreaker DX110 (B194, B196) → Wear → T-DIA DX140 (B195, B197, B198)	
Finishing [a_p = 0.020 ~ 0.079 in]	Basic: T-DIA DX140 (B195, B197, B198) → Wear → T-DIA DX160 (B195, B197); Chip control → With chipbreaker T-DIA DX110 (B194, B196)	Basic: T-DIA DX140 (B195, B197, B198) → Fracture → AL KS05F (B044); Wear → T-DIA DX160 (B195, B197)	Basic: AL KS05F (B044)
Medium cutting [a_p = 0.039 ~ 0.197 in]	Basic: AL KS05F (B044) → Wear → With chipbreaker T-DIA DX120 (B194, B196)	Basic: AL KS05F (B044) → Wear → T-DIA DX140 (B195, B197, B198)	Basic: AL KS05F (B044)

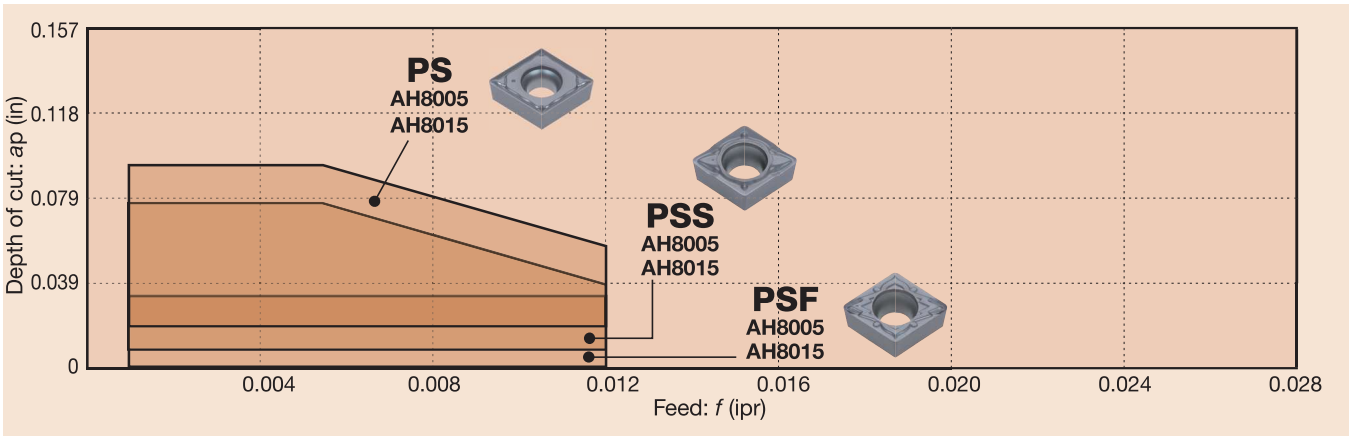
Please find the details on the pages: B***/7° relief angle, B***/11° relief angle, B***/5° relief angle.

Chipbreaker Guide

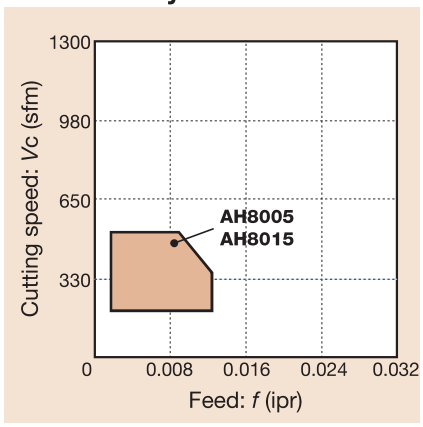
BASIC CHIPBREAKER: POSITIVE TYPE

S Superalloys and titanium

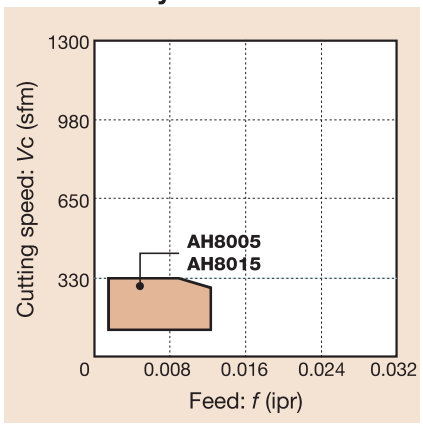
Chipbreaker System for Turning (Positive Type)

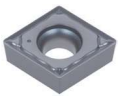


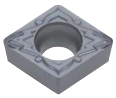
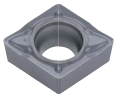
Titanium alloy



Ni-base alloy



Chipbreaker	Shape	Feature
PS		3D chipbreaker for finishing to medium cutting with excellent chip control and sharpness. M-class insert delivers cost reduction and highly efficient boring in a wide range of applications.

Chipbreaker	Shape	Feature
PSF		Low cutting force and high wear resistance. First choice for finishing. Excellent chip control in finishing prevents chip entanglement in internal machining.
PSS		3D chipbreaker for finishing to medium cutting with excellent chip control and low cutting force.

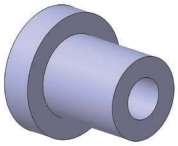
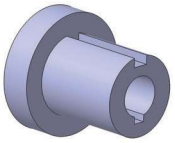
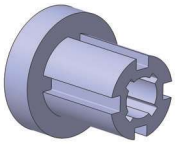
STANDARD CUTTING CONDITIONS

ISO	Operation	Work condition	Chip-breaker	Grade	Depth of cut *ap* (in)	Feed *f* (ipr)	Cutting speed: *Vc* (sfm)	
							Titanium alloy	Ni-base alloy
S	Finishing	Continuous	PSS	AH8015	0.012 - 0.079	0.001 - 0.012	66 - 500	66 - 330
		Light interrupted	PSS	AH8015	0.012 - 0.079	0.001 - 0.012	66 - 500	66 - 330
	Finishing to medium cutting	Continuous	PS	AH8015	0.020 - 0.098	0.001 - 0.012	66 - 500	66 - 330
		Light interrupted	PS	AH8015	0.020 - 0.098	0.001 - 0.012	66 - 500	66 - 330

Ni-base alloy: INCONEL718, etc.
Titanium alloy: Ti-6Al-4V, etc.

SELECTION SYSTEM: POSITIVE TYPE

S Superalloys and titanium

	Continuous	Light interrupted	Heavy interrupted
Finishing [a_p = 0.012 ~ 0.079 in]	Basic **PSS AH8015** B042, B047, B051 → Wear → **PSS AH8005** B044, B047, B051	Basic **PSS AH8015** B042, B047, B051 → Wear → **PSS AH8005** B042, B047, B051; Fracture → **PS AH8015** B042, B047, B051	
Finishing to medium cutting [a_p = 0.020 ~ 0.098 in]	Basic **PS AH8015** B042, B047, B051 → Wear → **PSS AH8005** B042, B047, B051	Basic **PS AH8015** B042, B047, B051 → Fracture → **All-round AH8015** B044, B049	Basic **PS AH8015** B042, B047, B051 → Fracture → **All-round AH8015** B044, B049

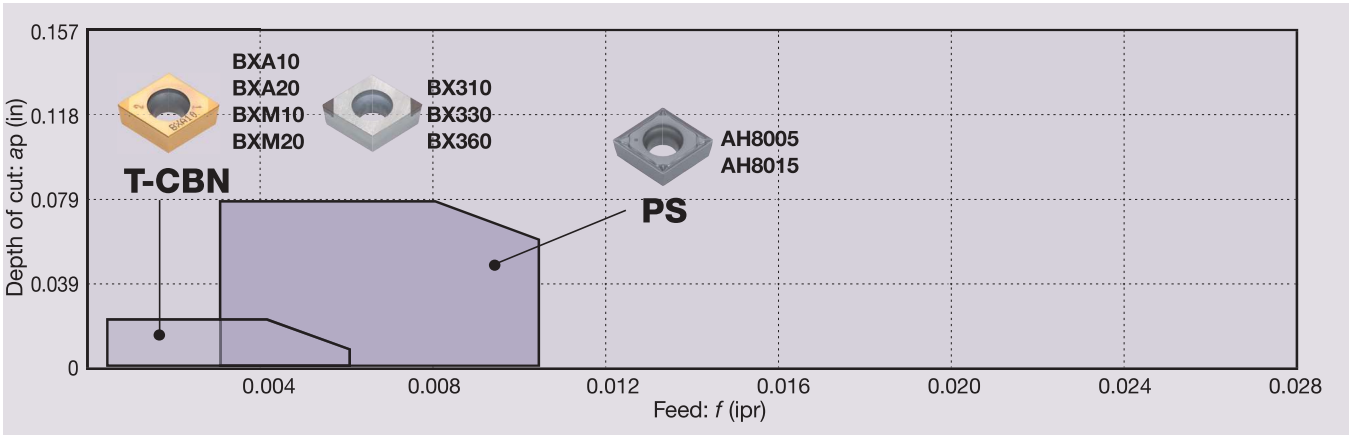
Please find the details on the pages: B***/7° relief angle, B***/11° relief angle, B***/5° relief angle.

Chipbreaker Guide

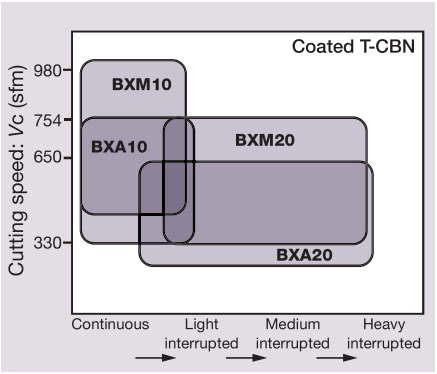
BASIC CHIPBREAKER: POSITIVE TYPE

H Hard Materials

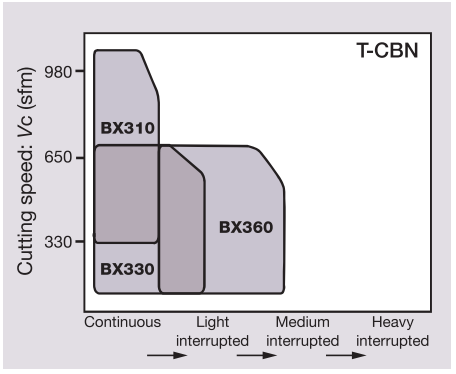
Chipbreaker System for Turning (Positive Type)



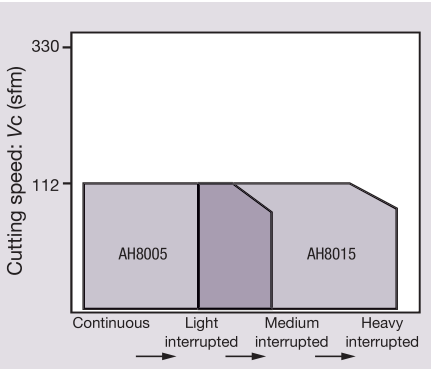
Coated T-CBN

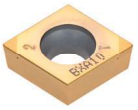


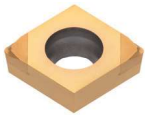
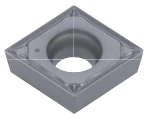
T-CBN



PVD coating



Chipbreaker	Shape	Feature
No chip-breaker (T-CBN)		Excellent performance in high-speed finishing of hard material with CBN sintered body on the cutting edge.

Chipbreaker	Shape	Feature
HP (T-CBN)		Excellent chip control in precision finishing.
PS		Excellent chip control in hardened steel medium finishing.

STANDARD CUTTING CONDITIONS

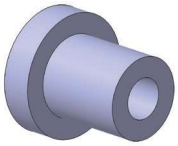
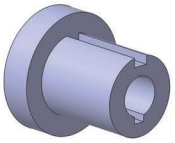
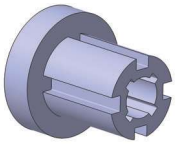
ISO	Operation	Work condition	Chipbreaker	Grade	Depth of cut *ap* (in)	Feed *f* (ipr)	Cutting speed *Vc* (sfm)
H	Precision finishing	Continuous	HP	BXA10 BXA20 BXM10	0.002 - 0.080	0.001 - 0.006	500 - 1150
		Light interrupted	Without	BXA20 BXM20	0.002 - 0.080	0.001 - 0.006	230 - 720
	Finishing	Continuous to heavy interrupted	Without	BXA10 BXA20 BXM10	0.003 - 0.020	0.002 - 0.012	230 - 720
	Medium cutting	Continuous to medium interrupted	PS	AH8005 AH8015	0.002 - 0.080	0.002 - 0.010	33 - 164

Hardened steels, Pre-hardened steels: D2, H13, etc.

Selection System

SELECTION SYSTEM: POSITIVE TYPE

H Hard Materials

	Continuous	Light interrupted	Heavy interrupted
Precision finishing [a_p = ~ 0.012 in]	Basic **T-CBN HP BXA10** B173, B176, B182	Basic **T-CBN BXA10** B173, B176, B182 Fracture **T-CBN BXA20** B172 - B184 B188 - B189 B191 - B192	
Finishing [a_p = ~ 0.020 in]	Basic **T-CBN BXA10** B173, B176, B182	Basic **T-CBN BXA10** B173, B176, B182 Fracture **T-CBN BXM20** B182 - B192	Basic **T-CBN BXA20** B173, B176, B182 Fracture **T-CBN BXA20-H** B172 - B184 B188 - B189 B191 - B192
Medium cutting [a_p = ~ 0.020 in]	Basic **PS AH8005** B112, B118, B153 Fracture **PS AH8015** B112, B118, B153	Basic **PS AH8015** B112, B118, B153 Fracture **All-round AH8015** B120	Basic **PS AH8015** B112, B118, B153 Fracture **All-round AH8015** B120

Please find the details on the pages: B***/7° relief angle, B***/11° relief angle, B***/5° relief angle.