

Insert



Insert - Content structure

- Inserts are grouped in Positive type, Negative type, and CBN/PCD.
- The list is in alphabetical order.
- The order of the list: C (80°) → D (55°) → R (360°) → S (90°) → T (60°) → V (35°) → W (80°) → Y (25°) → Other shapes
- The order of inserts:
 - Negative type (each shape with hole → without hole)
 - Positive type (each shape with hole → without hole)
- The order of chipbreakers:
 - From precision finishing to heavy cutting, in the order of the values of cutting depth and feed rate.
- Insert without chipbreaker is on the last page of each shape.
- Introduces the proposed inserts according to the workpiece materials and the shape of workpiece materials.
- The standard cutting conditions for typical chipbreakers are at the bottom of the pages.
- ● in the catalog describes our standard items, and ▲ means the item to be discontinued in the future.

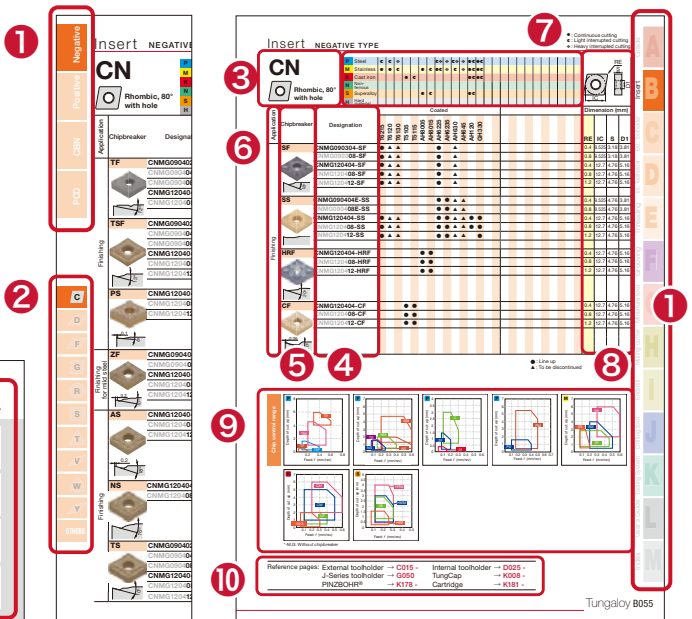
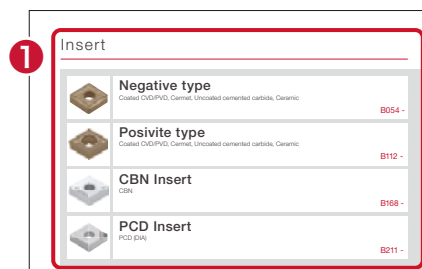
How to use the page

Method ①

Select an insert at the right end, and choose the information page by the insert type (①) and the outer shape of the insert (②) at the left end.

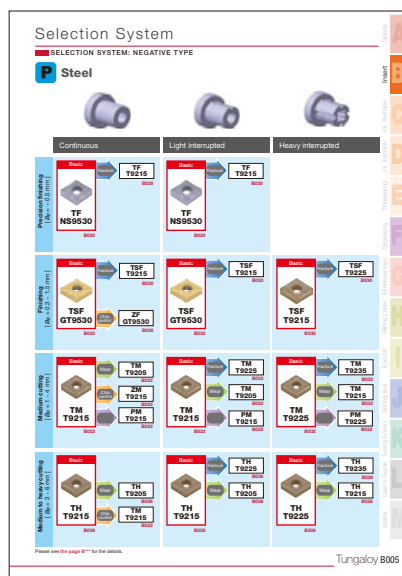
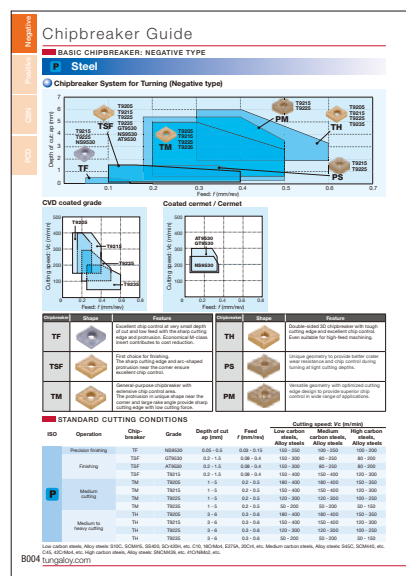
Method ②

Check the page of each insert type from the index on B003 (①), and choose the page of the setting information according to the outer shape of the insert (②).



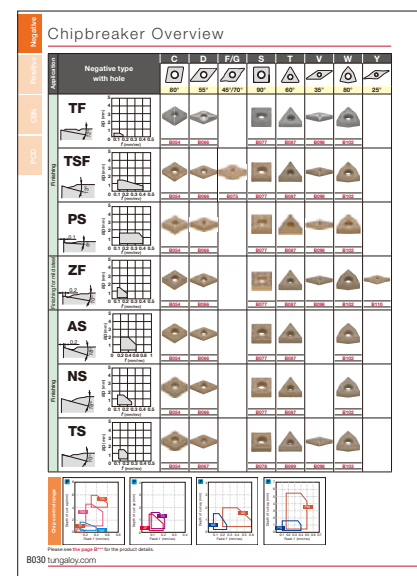
Method ③

Select an insert at the chipbreaker introduction and the selection guide on B004 - B029 and check the details on the product page.



Method ④

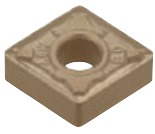
Select an insert from the list of chipbreaker shapes on B030-B053 and check the details on each page.



When ordering

- Please specify the designation, grade, and quantity.
e.g. **CNMG120408-TM T9215 ... 10 pieces** (10 inserts per package)
- *You will find a note if the number per package is not 10.

Insert



Negative type

Coated CVD/PVD, Cermet, Uncoated cemented carbide, Ceramic

B054 -



Positive type

Coated CVD/PVD, Cermet, Uncoated cemented carbide, Ceramic

B112 -



CBN Insert

CBN

B168 -



PCD Insert

PCD (DIA)

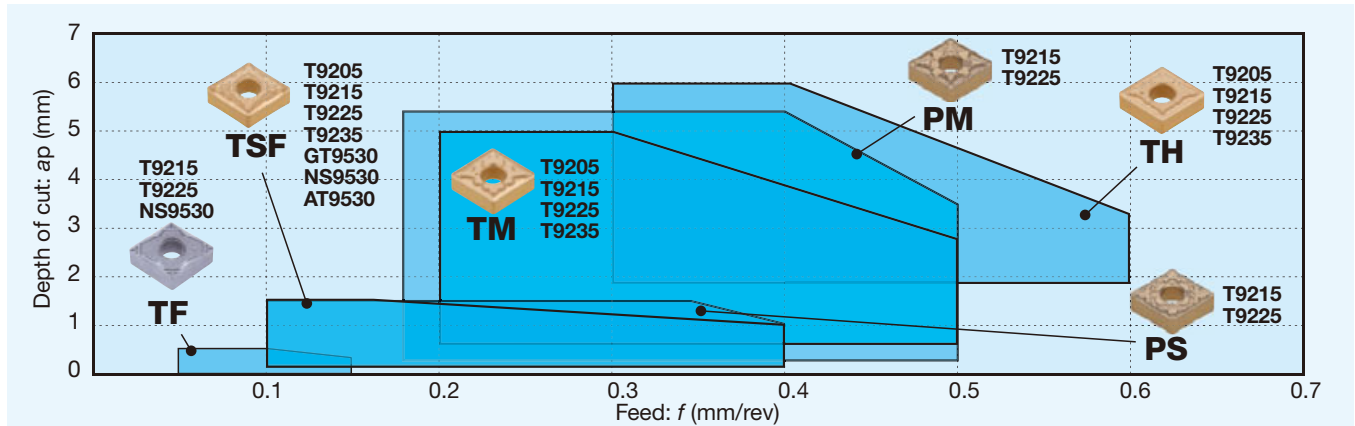
B211 -

Chipbreaker Guide

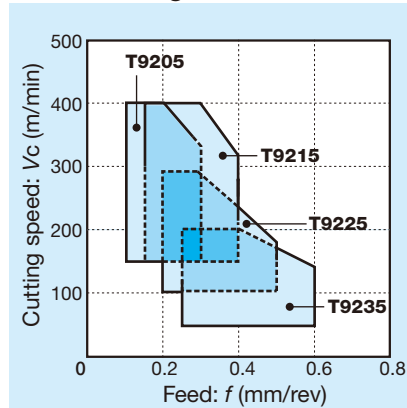
BASIC CHIPBREAKER: NEGATIVE TYPE

P Steel

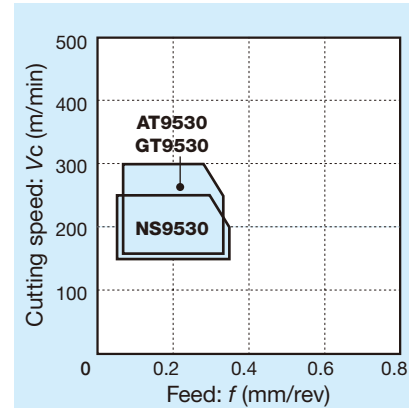
Chipbreaker System for Turning (Negative type)



CVD coated grade



Coated cermet / Cermet



Chipbreaker	Shape	Feature	Chipbreaker	Shape	Feature
TF		Excellent chip control at very small depth of cut and low feed with the sharp cutting edge and protrusion. Economical M-class insert contributes to cost reduction.	TH		Double-sided 3D chipbreaker with tough cutting edge and excellent chip control. Even suitable for high-feed machining.
TSF		First choice for finishing. The sharp cutting edge and arc-shaped protrusion near the corner ensure excellent chip control.	PS		Unique geometry to provide better crater wear resistance and chip control during turning at light cutting depths.
TM		General-purpose chipbreaker with extensive chip control area. The protrusion in unique shape near the corner and large rake angle provide sharp cutting edge with low cutting force.	PM		Versatile geometry with optimized cutting edge design to provide superior chip control in wide range of applications.

STANDARD CUTTING CONDITIONS

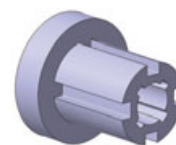
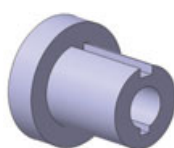
ISO	Operation	Chip-breaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed: V_c (m/min)		
						Low carbon steels, Alloy steels	Medium carbon steels, Alloy steels	High carbon steels, Alloy steels
P	Precision finishing	TF	NS9530	0.05 - 0.5	0.03 - 0.15	150 - 250	100 - 250	100 - 200
	Finishing	TSF	GT9530	0.2 - 1.5	0.08 - 0.4	150 - 300	80 - 250	80 - 200
		TSF	AT9530	0.2 - 1.5	0.08 - 0.4	150 - 300	80 - 250	80 - 200
		TSF	T9215	0.2 - 1.5	0.08 - 0.4	150 - 400	150 - 400	120 - 300
		TM	T9205	1 - 5	0.2 - 0.5	180 - 400	180 - 400	150 - 350
	Medium cutting	TM	T9215	1 - 5	0.2 - 0.5	150 - 400	150 - 400	120 - 300
		TM	T9225	1 - 5	0.2 - 0.5	120 - 300	120 - 300	100 - 250
		TM	T9235	1 - 5	0.2 - 0.5	50 - 200	50 - 200	50 - 150
		TH	T9205	3 - 6	0.3 - 0.6	180 - 400	180 - 400	150 - 350
	Medium to heavy cutting	TH	T9215	3 - 6	0.3 - 0.6	150 - 400	150 - 400	120 - 300
		TH	T9225	3 - 6	0.3 - 0.6	120 - 300	120 - 300	100 - 250
		TH	T9235	3 - 6	0.3 - 0.6	50 - 200	50 - 200	50 - 150

Low carbon steels, Alloy steels: S10C, SCM415, SS400, SCr420H, etc. C10, 18CrMo4, E275A, 20Cr4, etc. Medium carbon steels, Alloy steels: S45C, SCM440, etc. C45, 42CrMo4, etc. High carbon steels, Alloy steels: SNCM439, etc. 41CrNiMo2, etc.

Selection System

SELECTION SYSTEM: NEGATIVE TYPE

P Steel



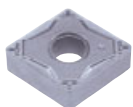
Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p \approx 0.5 \text{ mm}$]

Basic



**TF
NS9530**

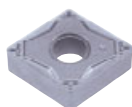
B030

Fracture

**TF
T9215**

B030

Basic



**TF
NS9530**

B030

Fracture

**TF
T9215**

B030

Finishing
[$a_p = 0.3 \sim 1.5 \text{ mm}$]

Basic



**TSF
GT9530**

B030

Fracture

**TSF
T9215**

B030

Chip control

**ZF
GT9530**

B030

Basic



**TSF
GT9530**

B030

Fracture

**TSF
T9215**

B030

Basic



**TSF
T9215**

B030

Fracture

**TSF
T9225**

B030

Medium cutting
[$a_p = 1 \sim 4 \text{ mm}$]

Basic



**TM
T9215**

B032

Wear

**TM
T9205**

B032

Chip control

**ZM
T9215**

B032

Crater wear

**PM
T9215**

B032

Basic



**TM
T9215**

B032

Fracture

**TM
T9225**

B032

Wear

**TM
T9205**

B032

Crater wear

**PM
T9215**

B032

Basic



**TM
T9225**

B032

Fracture

**TM
T9235**

B032

Wear

**TM
T9215**

B032

Crater wear

**PM
T9225**

B032

Medium to heavy cutting
[$a_p = 3 \sim 6 \text{ mm}$]

Basic



**TH
T9215**

B036

Wear

**TH
T9205**

B036

Chip control

**TM
T9215**

B032

Basic



**TH
T9215**

B036

Fracture

**TH
T9225**

B036

Wear

**TH
T9205**

B036

Basic



**TH
T9225**

B036

Fracture

**TH
T9235**

B036

Wear

**TH
T9215**

B036

Please see the page B*** for the details.

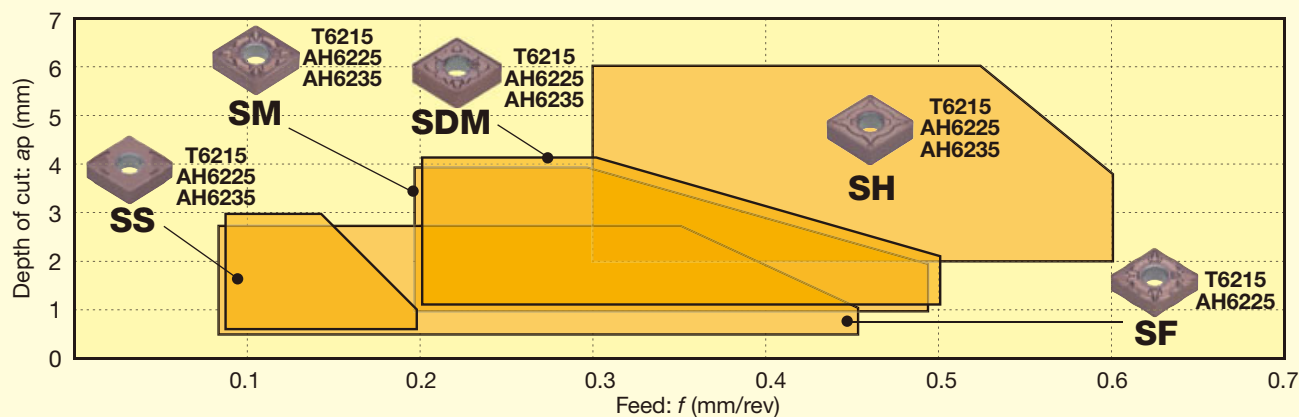


Chipbreaker Guide

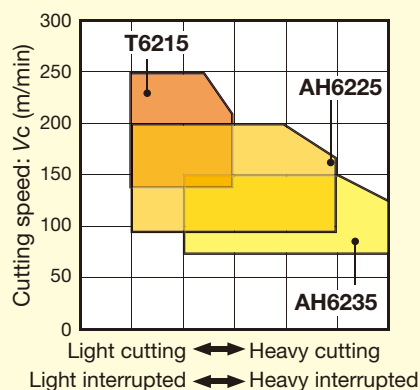
BASIC CHIPBREAKER: NEGATIVE TYPE

M Stainless Steel

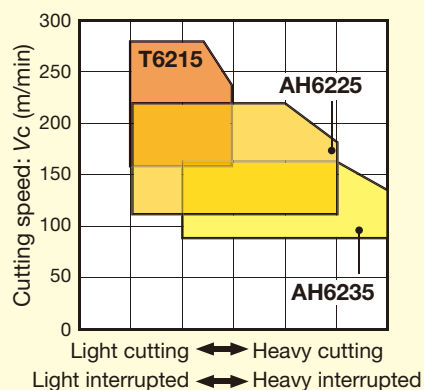
Chipbreaker System for Turning (Negative type)



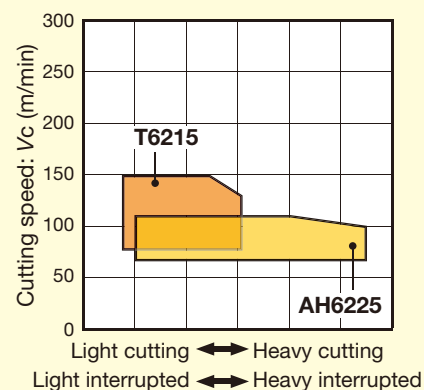
Austenitic stainless steel



Ferritic / martensite stainless steel



Precipitation hardened stainless steel



Chipbreaker	Shape	Feature
SF		Excellent chip control with small depth of cut at high feed. Suitable for finishing stainless steel.
SH		Suitable for medium to heavy cutting. High fracture resistance with specially reinforced cutting edge. Ideal for machining that requires cutting edge strength, such as roughing and interrupted cutting.

Chipbreaker	Shape	Feature
SM		General-purpose chipbreaker with sharpness and good chip control. First choice for stainless steel.
SDM		Light cutting geometry for notch wear and crater wear resistance.

STANDARD CUTTING CONDITIONS

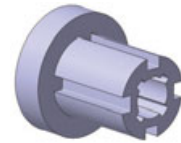
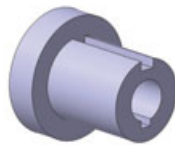
ISO	Operation	Chipbreaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed: V_c (m/min)		
						Austenitic stainless steel	Ferritic / martensite stainless steel	Precipitation hardened stainless steel
M	Finishing	SF	T6215	0.5 - 2.5	0.08 - 0.45	140 - 240	160 - 280	80 - 150
			AH6225	0.5 - 2.5	0.08 - 0.45	90 - 200	110 - 240	60 - 110
			AH6235	0.5 - 2.5	0.08 - 0.45	50 - 150	70 - 170	-
	Medium cutting	SM	T6215	1 - 4	0.2 - 0.5	140 - 240	160 - 280	80 - 150
			AH6225	1 - 4	0.2 - 0.5	90 - 200	110 - 240	60 - 110
			AH6235	1 - 4	0.2 - 0.5	50 - 150	70 - 170	-
		SDM	T6215	1 - 4	0.2 - 0.5	140 - 240	160 - 280	80 - 150
			AH6225	1 - 4	0.2 - 0.5	90 - 200	110 - 240	60 - 110
			AH6235	1 - 4	0.2 - 0.5	50 - 150	70 - 170	-
	Heavy cutting	SH	T6215	2 - 6	0.3 - 0.6	140 - 240	160 - 280	80 - 150
			AH6225	2 - 6	0.3 - 0.6	90 - 200	110 - 240	60 - 110
			AH6235	2 - 6	0.3 - 0.6	50 - 150	70 - 170	-

Stainless steels: SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.

Selection System

SELECTION SYSTEM: NEGATIVE TYPE

M Stainless Steel



Continuous

Light interrupted

Heavy interrupted

Finishing [$a_p = 0.5 \sim 1.5 \text{ mm}$]	Continuous	Light interrupted	Heavy interrupted
	Basic SF T6215 Fracture → SF AH6225 B031 Chip control → SS AH6215 B031 Crater wear → SDM T6215 B033 B031	Basic SF AH6225 Fracture → SF AH6235 B031 Wear → SF T6215 B031 Chip control → SS AH6225 B031 Crater wear → SDM AH6225 B033 B031	Basic SF AH6225 Fracture → SM AH6225 B031 Wear → SF T6215 B031 B031
	Basic SM AH6225 Wear → SM T6215 B033 Chip control → SS AH6225 B031 Crater wear → SDM AH6225 B033 B033	Basic SM AH6225 Fracture → SM AH6235 B033 Wear → SM T6215 B033 Chip control → SS AH6225 B031 Crater wear → SDM AH6225 B033 B033	Basic SM AH6235 Fracture → SH AH6235 B036 Wear → SM AH6225 B033 B033
Medium cutting [$a_p = 1 \sim 4 \text{ mm}$]	Basic SH AH6225 Fracture → SH AH6235 B036 Wear → SH T6215 B036 Chip control → SM AH6225 B033 B036	Basic SH AH6225 Fracture → SH AH6235 B036 Wear → SH T6215 B036 B036	Basic SH AH6235 Wear → SH AH6225 B036 B036
	Basic SH AH6225 Fracture → SH AH6235 B036 Wear → SH T6215 B036 Chip control → SM AH6225 B033 B036	Basic SH AH6225 Fracture → SH AH6235 B036 Wear → SH T6215 B036 B036	Basic SH AH6235 Wear → SH AH6225 B036 B036
	Basic SH AH6225 Fracture → SH AH6235 B036 Wear → SH T6215 B036 Chip control → SM AH6225 B033 B036	Basic SH AH6225 Fracture → SH AH6235 B036 Wear → SH T6215 B036 B036	Basic SH AH6235 Wear → SH AH6225 B036 B036

Please see the page B*** for the details.

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

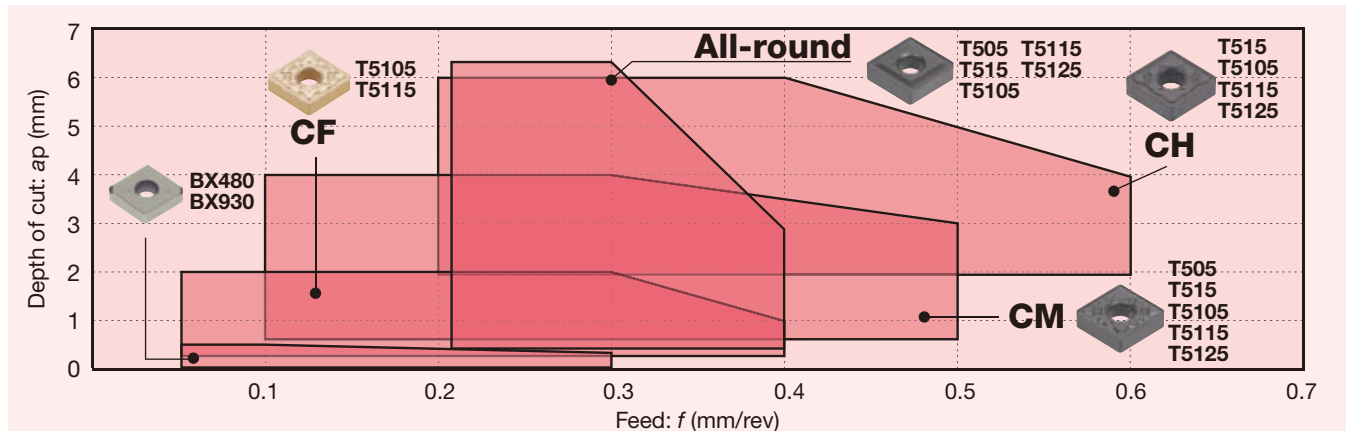
Index

Chipbreaker Guide

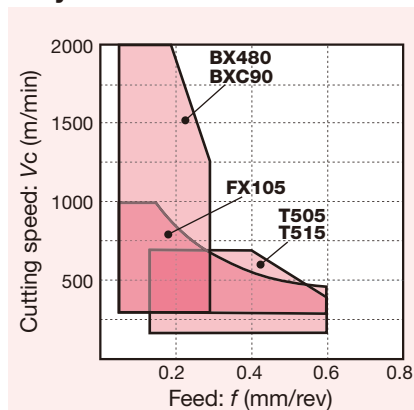
BASIC CHIPBREAKER: NEGATIVE TYPE

K Cast Iron

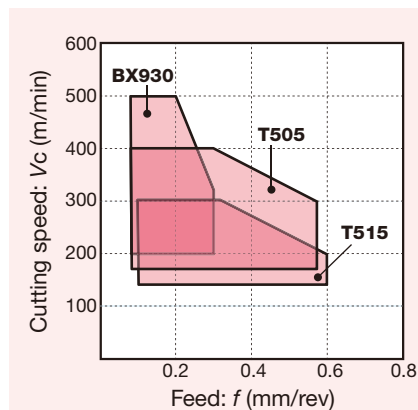
Chipbreaker System for Turning (Negative type)



Grey cast iron



Ductile cast iron



Chipbreaker	Shape	Feature
-		Excellent performance in high-speed finishing of cast iron with CBN sintered body on the cutting edge.
CF		Low cutting force chipbreaker for cast iron. Combined with an arc-shaped high rake angle (substantially 20°) drastically reduces cutting force and prevents the deformation and burr of thin-walled components.
All-round		Excellent performance in interrupted cutting. Highly reliable chipbreaker with great stability.

Chip-breaker	Shape	Feature
CM		First choice for cast iron. Versatile chipbreaker for a wide range of applications from continuous to interrupted cutting thanks to the positive land and wide chip pocket.
CH		Chipbreaker with reinforced cutting edge. The negative land and the land support provide stable insert seating and increase cutting edge strength, resulting in no fracture even in heavy cutting.

STANDARD CUTTING CONDITIONS

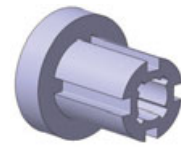
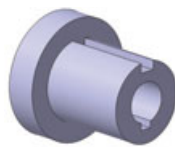
ISO	Operation	Chip-breaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed: V_c (m/min)	
						Grey cast iron	Ductile cast iron
K	High speed cutting	-	BX930	0.05 - 0.5	0.05 - 0.2	300 - 1200	200 - 500
		-	BX480	0.05 - 0.5	0.05 - 0.3	300 - 2000	200 - 300
		-	BXC90	0.08 - 3	0.05 - 0.4	300 - 2000	200 - 300
	Finishing	All-round	T505	1 - 5	0.1 - 0.5	180 - 700	180 - 400
		All-round	T515	1 - 5	0.1 - 0.5	150 - 700	150 - 300
	Medium cutting	All-round	T505	1 - 5	0.1 - 0.5	180 - 700	180 - 400
		All-round	T515	1 - 5	0.1 - 0.5	150 - 700	150 - 300
	Medium to heavy cutting	CH	T515	3 - 6	0.2 - 0.6	150 - 700	150 - 300
		All-round	T515	1 - 5	0.1 - 0.5	150 - 700	150 - 300
		CH	T515	3 - 6	0.2 - 0.6	150 - 700	150 - 300

Grey cast iron: FC250, etc. 250, etc. Ductile cast iron: FCD450, etc. 450-10S, etc.

Selection System

SELECTION SYSTEM: NEGATIVE TYPE

K Cast Iron



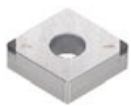
Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p \sim 0.5 \text{ mm}$]

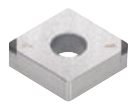
Basic



BX480

B168 - B188

Basic



BX480

B168 - B188

Fracture

All-round T515

B033

Basic

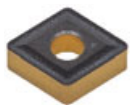


BXC90

B168 - B188

Finishing
[$a_p = 0.5 \sim 2 \text{ mm}$]

Basic



All-round T505

B033

Fracture

All-round T515

B033

Burr occurrence

CF T5105

B031

Basic



All-round T515

B033

Wear

All-round T505

B033

Fracture

CH T515

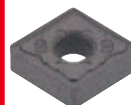
B036

Burr occurrence

CF T5115

B031

Basic



CH T515

B036

Wear

All-round T505

B033

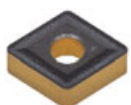
Burr occurrence

All-round T515

B033

Medium cutting
[$a_p = 1 \sim 5 \text{ mm}$]

Basic



All-round T505

B033

Fracture

All-round T515

B033

Burr occurrence

CF T5105

B031

Basic



All-round T515

B033

Wear

All-round T505

B033

Fracture

CH T515

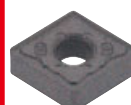
B036

Burr occurrence

CF T5115

B031

Basic



CH T515

B036

Wear

All-round T505

B033

Fracture

CH T5125

B036

Burr occurrence

All-round T515

B033

Medium to heavy cutting
[$a_p = 3 \sim 6 \text{ mm}$]

Basic



All-round T515

B033

Wear

All-round T505

B033

Burr occurrence

CF T5105

B031

Basic



All-round T515

B033

Wear

All-round T505

B033

Fracture

CH T515

B036

Burr occurrence

CF T5115

B031

Basic



CH T515

B036

Wear

All-round T505

B033

Fracture

CH T5125

B036

Burr occurrence

All-round T515

B033

Please see the page B*** for the details.

Tungaloy B009

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

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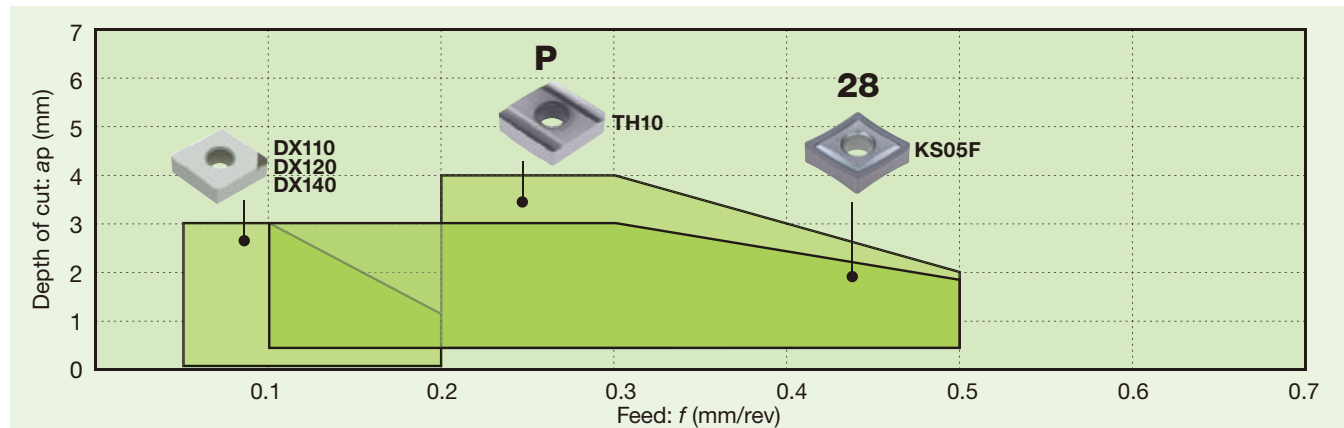
M

Chipbreaker Guide

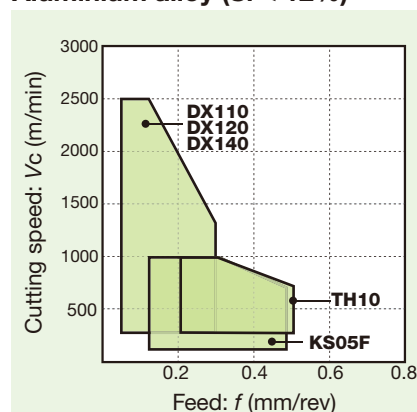
BASIC CHIPBREAKER: NEGATIVE TYPE

N Non-ferrous Metal

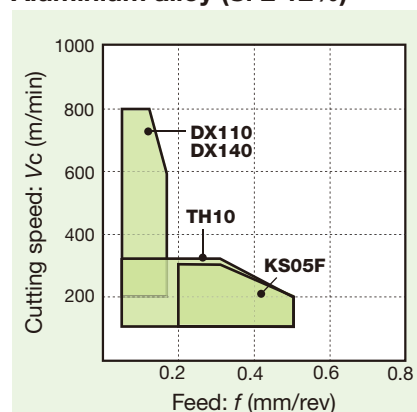
Chipbreaker System for Turning (Negative type)



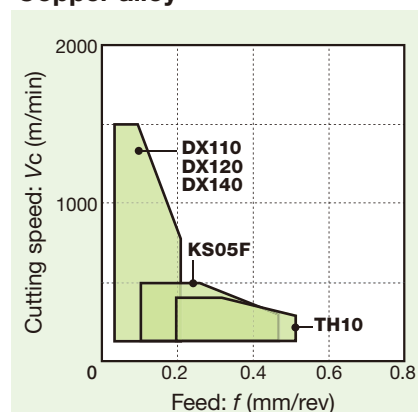
Aluminium alloy (Si < 12%)



Aluminium alloy (Si ≥ 12%)



Copper alloy



Chipbreaker	Shape	Feature
-		Excellent performance in high-speed finishing of non-ferrous metal, such as aluminium and copper alloy, with diamond sintered body on the cutting edge.
P		Excellent sharpness for non-ferrous metal, such as aluminium and copper alloy.

Chipbreaker	Shape	Feature
With chip-breaker		Wide chipbreaker for excellent chip control.
28		Low cutting geometry with large inclination for finishing to medium cutting range.

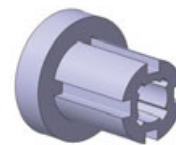
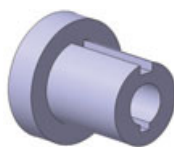
STANDARD CUTTING CONDITIONS

ISO	Operation	Chip-breaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed: V_c (m/min)		
						Aluminium alloy (Si < 12%)	Aluminium alloy (Si ≥ 12%)	Copper alloy
N	Precision finishing	With	DX110	0.05 - 0.5	0.05 - 0.15	500 - 2500	400 - 800	500 - 1500
		-	DX140	0.05 - 0.5	0.05 - 0.20	300 - 2500	400 - 800	500 - 1500
	Finishing	With	DX110	0.05 - 2	0.05 - 0.15	500 - 2500	400 - 800	500 - 1500
		-	DX140	0.05 - 2	0.05 - 0.15	300 - 1800	400 - 600	400 - 1200
		P	TH10	0.5 - 4	0.2 - 0.5	100 - 1000	100 - 300	100 - 300
	Medium cutting	P	KS05F	0.5 - 3	0.1 - 0.5	100 - 1200	100 - 300	100 - 300
		P	TH10	0.5 - 4	0.2 - 0.5	100 - 1000	100 - 300	100 - 300

Selection System

SELECTION SYSTEM: NEGATIVE TYPE

N Non-ferrous Metal



Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p \approx 0.5 \text{ mm}$]

Basic



With chipbreaker
DX110

B211 - B212

Wear

DX140

B211 - B212

Basic



DX140

B211 - B212

Surface quality

With chipbreaker
DX110

B211 - B212

Wear

DX160

B211 - B212

Finishing
[$a_p = 0.5 \sim 2 \text{ mm}$]

Basic



DX140

B211 - B212

Surface quality

With chipbreaker
DX110

B211 - B212

Wear

DX160

B211 - B212

Basic



DX140

B211 - B212

Fracture

P TH10

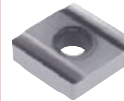
B035

Wear

DX160

B211 - B212

Basic

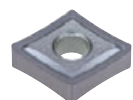


P TH10

B035

Medium cutting
[$a_p = 1 \sim 4 \text{ mm}$]

Basic



28 KS05F

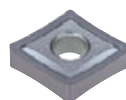
B035

Wear

DX140

B211 - B212

Basic



28 KS05F

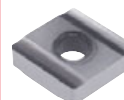
B035

Wear

DX140

B211 - B212

Basic



P TH10

B035

Please see the page B*** for the details.

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

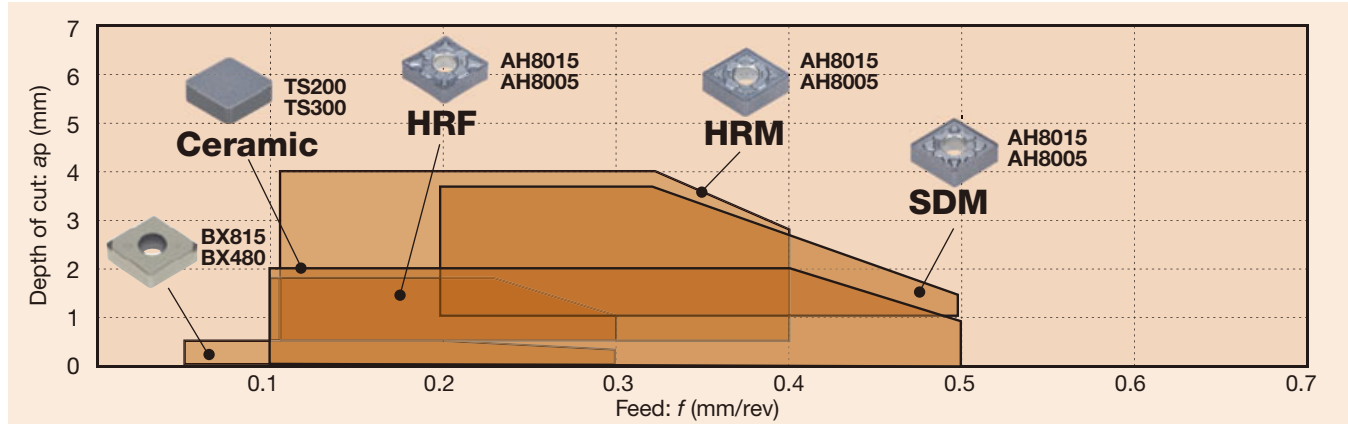
Index

Chipbreaker Guide

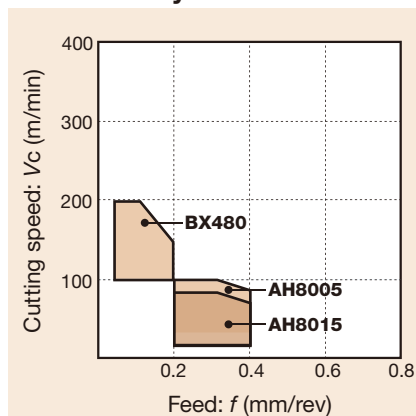
BASIC CHIPBREAKER: NEGATIVE TYPE

S Heat resistant superalloys

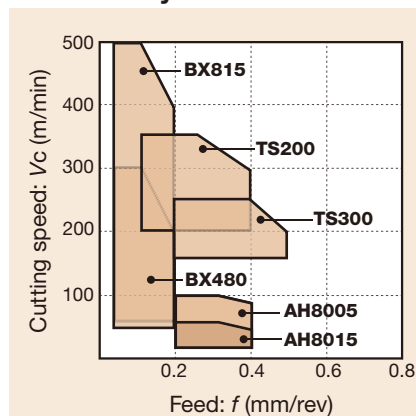
Chipbreaker System for Turning (Negative type)



Titanium alloy



Ni-base alloy



Chipbreaker	Shape	Feature
HRF		Suitable for finishing superalloy. Unique protrusion improves chip control in cutting low depth.
HRM		First choice for heat-resistant alloy. The geometry optimized for a wide range of depths of cut.
SDM		Light cutting geometry for notch wear and crater wear resistance.

Chipbreaker	Shape	Feature
-		Excellent performance in finishing of heat-resistant alloy and titanium alloy with CBN sintered body on the cutting edge.
Ceramic		Suitable for roughing operation of heat-resistant alloy, due to the SiAlON ceramic with high-temperature strength.

STANDARD CUTTING CONDITIONS

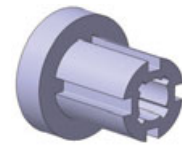
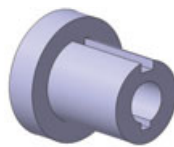
ISO	Operation	Chip-breaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed: V_c (m/min)	
						Titanium alloy	Ni-base alloy
S	Precision finishing	-	BX480	0.1 - 0.5	0.05 - 0.2	100 - 200	70 - 300
		-	BX815	0.1 - 0.5	0.05 - 0.2	-	70 - 500
	Finishing to medium cutting	-	TS200	0.1 - 2	0.1 - 0.4	-	200 - 350
		-	TS300	0.1 - 2	0.2 - 0.5	-	150 - 250
		HRF	AH8005	0.5 - 1.5	0.05 - 0.25	20 - 100	20 - 100
		HRF	AH8015	0.5 - 1.5	0.05 - 0.25	20 - 80	20 - 50
		HRF	AH8015	0.5 - 1.5	0.05 - 0.25	10 - 60	10 - 40
	Medium cutting	HRM	AH8005	0.5 - 4	0.1 - 0.4	20 - 100	20 - 100
		HRM	AH8015	0.5 - 4	0.1 - 0.4	20 - 80	20 - 50
		HRM	AH8015	0.5 - 4	0.1 - 0.4	10 - 60	10 - 40

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

Selection System

SELECTION SYSTEM: NEGATIVE TYPE

S Heat resistant superalloys



Continuous

Light interrupted

Heavy interrupted

Precision finishing [$a_p \sim 0.5 \text{ mm}$]	Continuous	Light interrupted	Heavy interrupted
	Basic Fracture → HRF AH8005 B038 BX815 B168 - B188	Basic Fracture → HRF AH8005 B038 BX480 B168 - B188	
Finishing [$a_p = 0.5 \sim 1.5 \text{ mm}$]	Continuous	Light interrupted	Heavy interrupted
	Basic Fracture → HRF AH8015 B031 Chip control → 28 AH8005 B035 High-speed wear → TS300 B038, B039 Crater wear → SDM AH8005 B033 HRF AH8005 B031	Basic Fracture → HRM AH8015 B035 Wear → HRF AH8005 B031 Chip control → 28 AH8015 B035 Crater wear → SDM AH8015 B033 HRF AH8015 B031	Basic Fracture → HRM AH8015 B034 Wear → HRF AH8005 B031 Crater wear → SDM AH8015 B033 HRF AH8015 B031
Medium cutting [$a_p = 0.5 \sim 4 \text{ mm}$]	Continuous	Light interrupted	Heavy interrupted
	Basic Fracture → HRM AH8015 B034 Burr occurrence → HRF AH8015 B031 Chip control → 28 AH8005 B035 Crater wear → SDM AH8005 B033 HRM AH8005 B034	Basic Fracture → SM AH630 B033 Wear → HRM AH8005 B034 Chip control → 28 AH8015 B035 Crater wear → SDM AH8015 B033 HRM AH8015 B035	Basic Wear → HRF AH8005 B031 Crater wear → SDM AH8015 B033 HRM AH8015 B034

Please see the page B*** for the details.

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

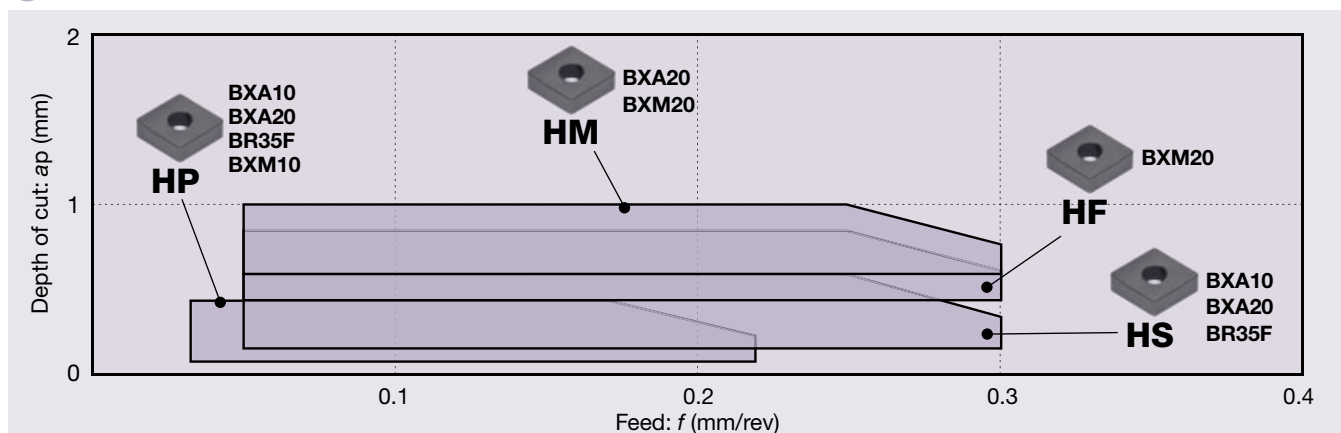
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Chipbreaker Guide

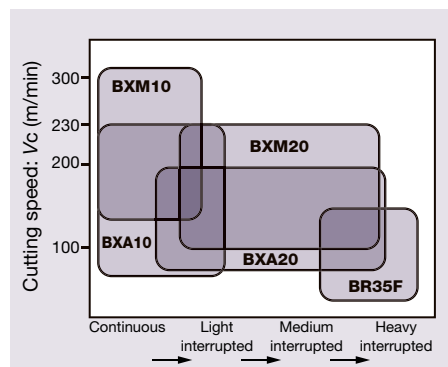
BASIC CHIPBREAKER: NEGATIVE TYPE

H Hard Materials

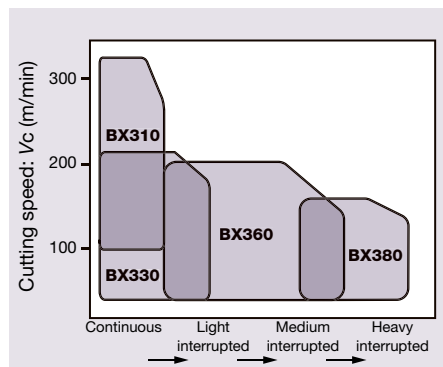
Chipbreaker System for Turning (Negative type)



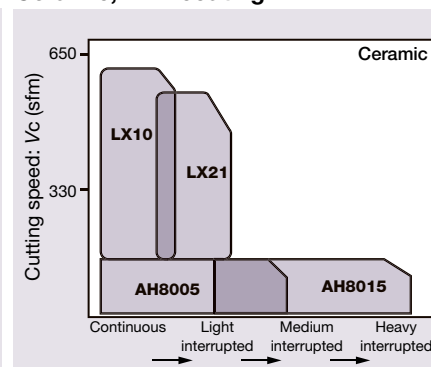
Coated CBN



T-CBN



Ceramic, PVD coating



Chipbreaker	Shape	Feature
-		Excellent performance in finishing of hard material with CBN sintered body on the cutting edge.
- (Ceramic)		Realizes economical hardened steel medium speed finishing.
HRF		Excellent chip control in Hardent steel medium finishing.

Chipbreaker	Shape	Feature
HF		Excellent chip control in removing carburized layer at small depth of cut.
HM		Excellent chip control in removing carburized layer at large depth of cut.
HP		Excellent chip control in precision finishing.
HS		Provides the excellent chip-control at a high-feed condition in the precise finishing operation.

STANDARD CUTTING CONDITIONS

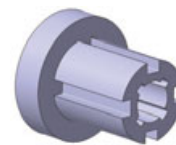
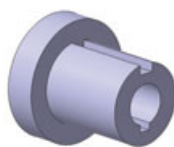
ISO	Operation	Chipbreaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed V_c (m/min)
H	Precision finishing	HP	BXA10 BXA20 BR35F	0.03 - 0.25	0.03 - 0.22	70 - 350
		HS	BXA10 BXA20 BR35F	0.1 - 0.35	0.05 - 0.3	70 - 350
	Finishing	-	BXM10 BXM20 BXA20	0.05 - 0.5	0.05 - 0.25	70 - 350
		-	LX10 LX21	0.05 - 0.5	0.05 - 0.25	60 - 180
	Removing of carburized layer	HF	BXM20	0.3 - 0.75	0.05 - 0.3	70 - 200
		HM	BXA20 BXM20	0.5 - 1	0.05 - 0.3	70 - 200
	Medium cutting	HRF	AH8005 AH8015	0.05 - 2	0.05 - 0.25	10 - 50

Hardened steels, Pre-hardened steels: SKD11, SKD61, etc. X153CrMoV12, X40CrMoV5-1, etc.

Selection System

SELECTION SYSTEM: NEGATIVE TYPE

H Hard Materials



Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p \sim 0.35 \text{ mm}$]

Basic



**HP
BXA10**

B168 - B188



**HS
BXA10**

B168 - B188

Basic



BXA20

B168 - B188



**-H
BXA20**

B168 - B188

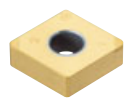


BXA10

B168 - B188

Finishing
[$a_p \sim 0.5 \text{ mm}$]

Basic



BXA10

B168 - B188



LX10

B038, B039

Basic



BXA20

B168 - B188



**-H
BXA20**

B168 - B188



LX21

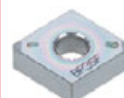
B038, B039



BXA10

B168 - B188

Basic



BR35F

B168 - B188

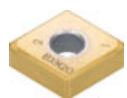


**-HC
BR35F**

B168 - B188

Removing of carburized layer
[$a_p \sim 1 \text{ mm}$]

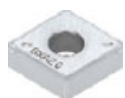
Basic



**HF
BXM20**

B168 - B188

Basic



**HM
BXA20**

B168 - B188

Medium cutting
[$a_p \sim 2 \text{ mm}$]

Basic



**HRF
AH8005**

B031



**HRF
AH8015**

B034

Basic



**HRF
AH8015**

B031



**HRM
AH8015**

B034

Basic



**HRF
AH8015**

B031



**HRM
AH8015**

B034

Please see the page B*** for the details.

Tungaloy B015

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

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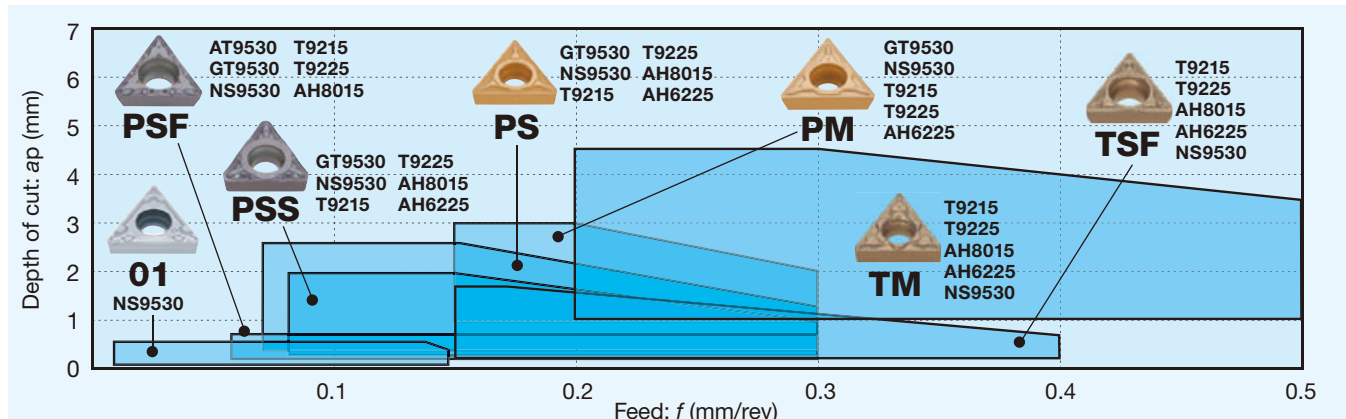


Chipbreaker Guide

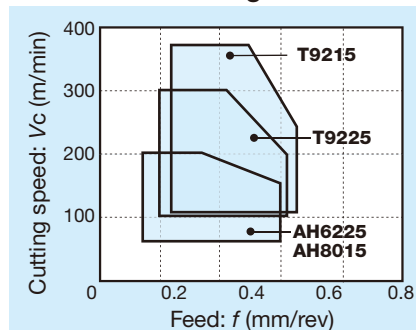
BASIC CHIPBREAKER: POSITIVE TYPE

P Steel

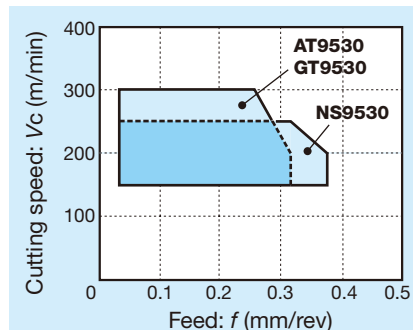
Chipbreaker System for Turning (Positive Type)



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.
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
PM		First choice for medium cutting with excellent sharpness and good chip control. Delivers stable machining of stainless steel.
TSF		Optimal chipbreaker width and geometry enable smooth chip control in high-feed machining.
TM		Optimal cutting edge design and chipbreaker shape achieve excellent chip control in large depth of cut machining.

STANDARD CUTTING CONDITIONS

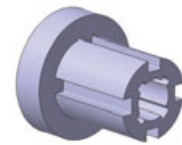
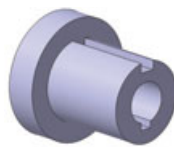
ISO	Operation	Chip-breaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed: V_c (m/min)		
						Low carbon steels, Alloy steels	Medium carbon steels, Alloy steels	High carbon steels, Alloy steels
P	Precision finishing	01	NS9530	0.05 - 0.5	0.03 - 0.15	150 - 250	80 - 220	80 - 180
		01	NS9530	0.05 - 0.5	0.03 - 0.15	150 - 250	80 - 220	80 - 180
	Finishing	PSS	NS9530	0.1 - 0.5	0.05 - 0.3	150 - 250	80 - 220	80 - 180
		PSS	NS9530	0.1 - 0.5	0.05 - 0.3	150 - 250	80 - 220	80 - 180
		PSS	NS9530	0.1 - 0.5	0.05 - 0.3	150 - 250	80 - 220	80 - 180
	Finishing to light cutting	PS	T9215	0.3 - 2	0.08 - 0.3	120 - 350	100 - 350	80 - 250
		PS	T9215	0.3 - 2	0.08 - 0.3	120 - 350	100 - 350	80 - 250
		PS	T9215	0.3 - 2	0.08 - 0.3	120 - 350	100 - 350	80 - 250
	Finishing to Medium cutting	PS	T9215	0.5 - 2.5	0.08 - 0.3	120 - 350	100 - 350	80 - 250
		PS	T9225	0.5 - 2.5	0.08 - 0.3	100 - 300	80 - 300	80 - 250
	Medium cutting	PM	T9215	1 - 3	0.15 - 0.3	150	100 - 200	80 - 180
		PM	T9225	1 - 3	0.15 - 0.3	120	80 - 180	80 - 120

Low carbon steels, Alloy steels: S10C, SCM415, SS400, SCr420H, etc. C10, 18CrMo4, E275A, 20Cr4, etc. Medium carbon steels, Alloy steels: S45C, SCM440, etc. C45, 42CrMo4, etc. Hi carbon steels, Alloy steels: SNCM439, etc. 41CrNiMo2, etc.

Selection System

SELECTION SYSTEM: POSITIVE TYPE

P Steel



Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p = \sim 0.5 \text{ mm}$]

Basic



**01
NS9530**

B040, B045

Basic



**01
NS9530**

B040, B045

Fracture

**PSF
NS9530**

B040, B045, B049

Finishing
[$a_p = 0.1 \sim 0.5 \text{ mm}$]

Basic



**PSS
NS9530**

B042, B046, B049

Fracture

**PSS
T9215**

B042, B045, B049

Wear

**PSS
GT9530**

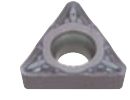
B042, B045, B049

Chip control

**PSF
NS9530**

B040, B045, B049

Basic



**PSS
NS9530**

B042, B046, B049

Fracture

**PSS
T9215**

B042, B046, B049

Wear

**PSS
GT9530**

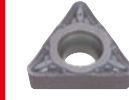
B042, B046, B049

Chip control

**PSF
NS9530**

B040, B045, B049

Basic



**PSS
NS9530**

B042, B046, B049

Fracture

**PSS
T9215**

B042, B046, B049

Wear

**PSS
GT9530**

B042, B046, B049

Chip control

**PSF
NS9530**

B040, B045, B049

Finishing to medium cutting
[$a_p = 0.5 \sim 2.5 \text{ mm}$]

Basic



**PS
T9215**

B042, B046, B049

Fracture

**PS
T9225**

B042, B046, B049

Wear

**PS
NS9530**

B042, B046, B049

Chip control

**TSF, TM
T9215**

B040, B042,
B045, D046,
B049

Basic



**PS
T9215**

B042, B046, B049

Fracture

**PS
T9225**

B042, B046, B049

Wear

**PS
NS9530**

B042, B046, B049

Chip control

**TSF, TM
T9215**

B040, B042,
B045, D046,
B049

Basic



**PS
T9215**

B042, B046, B049

Fracture

**PS
T9225**

B042, B046

Chip control

**TSF, TM
T9215**

B040, B042,
B045, D046,
B049

Medium cutting
[$a_p = 1 \sim 3 \text{ mm}$]

Basic



**PM
T9215**

B044, B048

Fracture

**PM
T9225**

B044, B048

Wear

**PM
NS9530**

B044, B048

Chip control

**TSF, TM
T9215**

B040, B042,
B045, D046,
B049

Basic



**PM
T9215**

B044, B048

Fracture

**PM
T9225**

B044, B048

Chip control

**TSF, TM
T9215**

B040, B042,
B045, D046,
B049

Basic



**PM
T9215**

B044, B048

Fracture

**PM
T9225**

B044, B048

Chip control

**TSF, TM
T9215**

B040, B042,
B045, D046,
B049

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

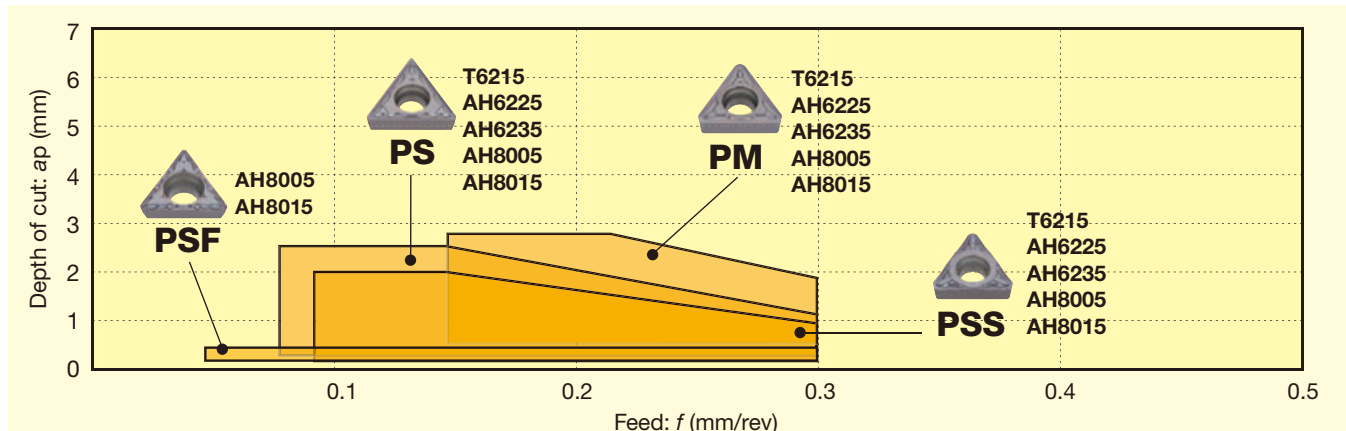


Chipbreaker Guide

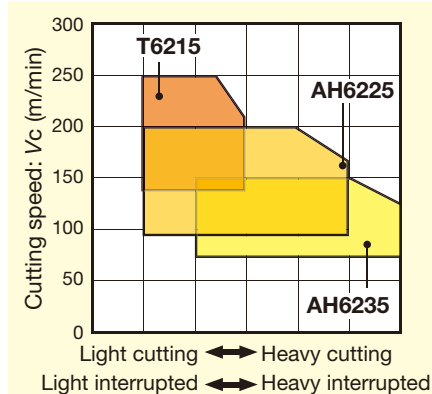
BASIC CHIPBREAKER: POSITIVE TYPE

M Stainless Steel

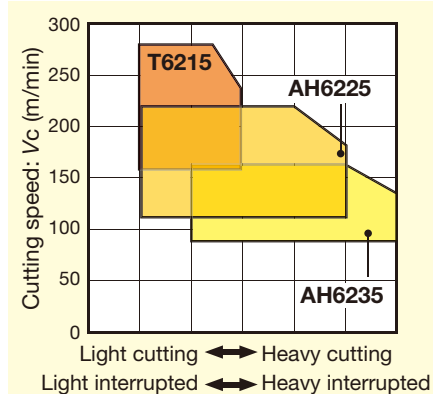
Chipbreaker System for Turning (Positive Type)



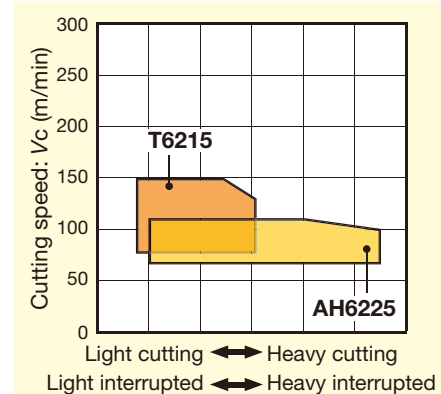
Austenitic stainless steel



Ferritic / martensite stainless steel



Precipitation hardened stainless steel



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.

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.

STANDARD CUTTING CONDITIONS

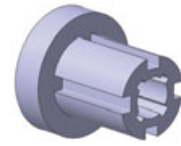
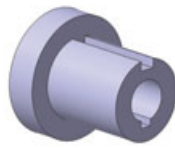
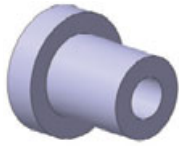
ISO	Operation	Chipbreaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed: V_c (m/min)		
						Austenitic stainless steel	Ferritic / martensite stainless steel	Precipitation hardened stainless steel
M	Finishing	PSS	T6215	0.3 - 2	0.08 - 0.3	140 - 240	160 - 280	80 - 150
			AH6225	0.3 - 2	0.08 - 0.3	90 - 200	110 - 240	60 - 110
			AH6235	0.3 - 2	0.08 - 0.3	50 - 150	70 - 170	-
	Finishing to medium cutting	PS	T6215	0.5 - 2.5	0.08 - 0.3	140 - 240	160 - 280	80 - 150
			AH6225	0.5 - 2.5	0.08 - 0.3	90 - 200	110 - 240	60 - 110
			AH6235	0.5 - 2.5	0.08 - 0.3	50 - 150	70 - 170	-
	Medium cutting	PM	T6215	1 - 3	0.15 - 0.3	140 - 240	160 - 280	80 - 150
			AH6225	1 - 3	0.15 - 0.3	90 - 200	110 - 240	60 - 110
			AH6235	1 - 3	0.15 - 0.3	50 - 150	70 - 170	-

* For CCMT0602 and DCMT0702 type inserts, $a_p = 0.5 - 2.5$
 Stainless steels: SUS304, SUS316, etc. X5CrNi18-9, X5CrNiMo17-12-3, etc.

Selection System

SELECTION SYSTEM: POSITIVE TYPE

M Stainless Steel



Continuous

Light interrupted

Heavy interrupted

Finishing $[a_p = 0.3 \sim 1.5 \text{ mm}]$	Basic  PSS AH6225 Wear → PSS T6215 B042, B046, B049	Basic  PSS AH6225 Fracture → PSS AH6235 B042, B046, B049 Wear → PSS T6215 B042, B046, B049	Basic  PSS AH6225 Fracture → PSS AH6235 B042, B046, B049 Wear → PSS T6215 B042, B046, B049
	Basic  PS AH6225 Wear → PS T6215 B042, B046, B049	Basic  PS AH6225 Fracture → PM AH6235 B044, B048 Wear → PS T6215 B042, B046, B049	Basic  PS AH6225 Fracture → PM AH6235 B044, B048 Wear → PS T6215 B042, B046, B049
	Basic  PM AH6225 Wear → PM T6215 B044, B048	Basic  PM AH6225 Fracture → PM AH6235 B044, B048 Wear → PM T6215 B044, B048	Basic  PM AH6225 Fracture → PM AH6235 B044, B048

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

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Milling cutter

Miniature tool

Endmill

Drilling tool

Tooling System

User's Guide

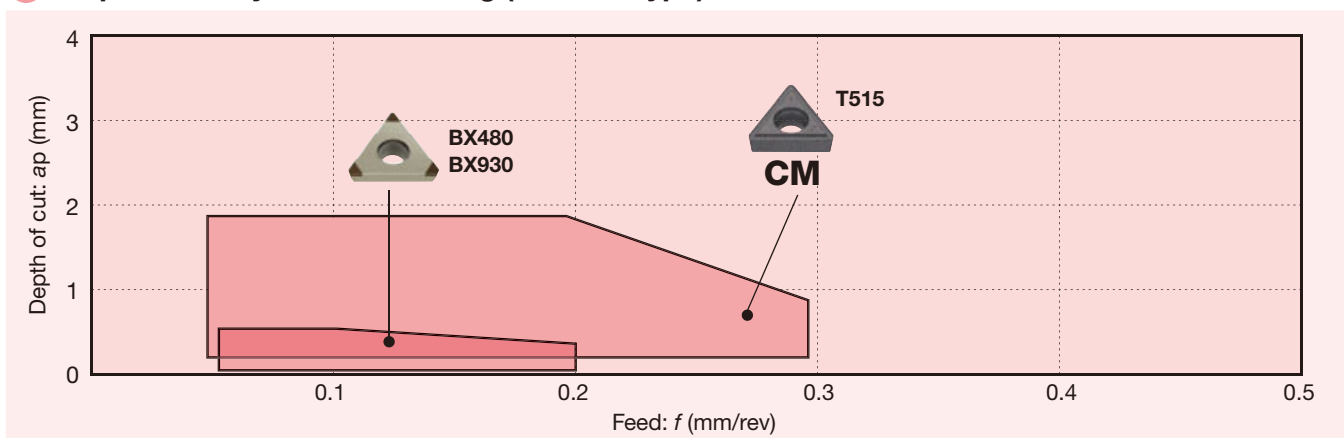
Index

Chipbreaker Guide

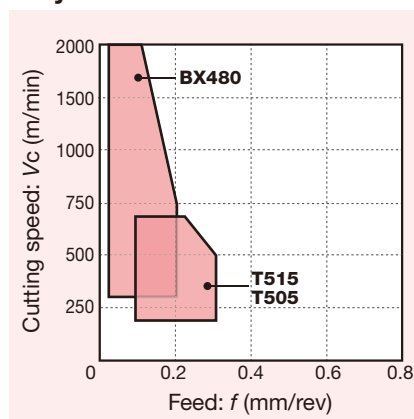
BASIC CHIPBREAKER: POSITIVE TYPE

K Cast Iron

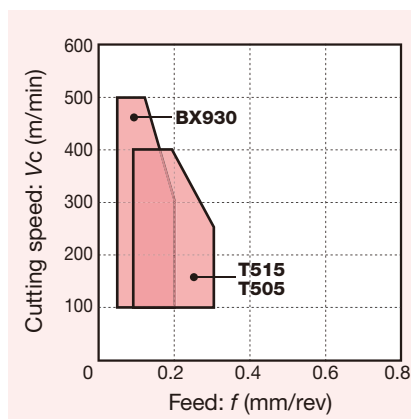
Chipbreaker System for Turning (Positive Type)



Grey cast iron



Ductile cast iron



Chipbreaker	Shape	Feature
-		Excellent performance in high-speed finishing of cast iron with CBN sintered body on the cutting edge.

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

STANDARD CUTTING CONDITIONS

ISO	Operation	Chip-breaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed: V_c (m/min)	
						Grey cast iron	Ductile cast iron
K	Precision finishing	-	BX930	0.05 - 0.5	0.05 - 0.2	300 - 1200	100 - 500
		-	BX480	0.05 - 0.5	0.05 - 0.2	300 - 2000	-
	Finishing	CM	T515	0.05 - 2	0.05 - 0.3	150 - 700	150 - 300
		CM	T515	0.05 - 2	0.05 - 0.3	100 - 200	100 - 200
	Medium cutting	CM	T515	0.05 - 2	0.05 - 0.3	100 - 300	100 - 250

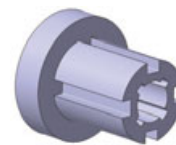
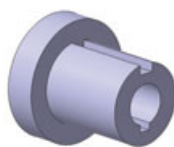
Grey cast iron: FC250, etc. 250, etc.

Ductile cast iron: FCD450, etc. 450-10S, etc.

Selection System

SELECTION SYSTEM: POSITIVE TYPE

K Cast Iron



Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p = \sim 0.5 \text{ mm}$]

Basic



-
BX480

B189 - B209

Basic



-
BX480

B189 - B209

Finishing to Medium cutting
[$a_p = 0.5 \sim 3 \text{ mm}$]

Basic



**CM
T515**

B042, B046, B049



**CM
T505**

B042, B046, B049

Basic



**CM
T515**

B042, B046, B049



**CM
T505**

B042, B046, B049

Basic



**CM
T515**

B042, B046, B049



**CM
T505**

B042, B046, B049

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

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

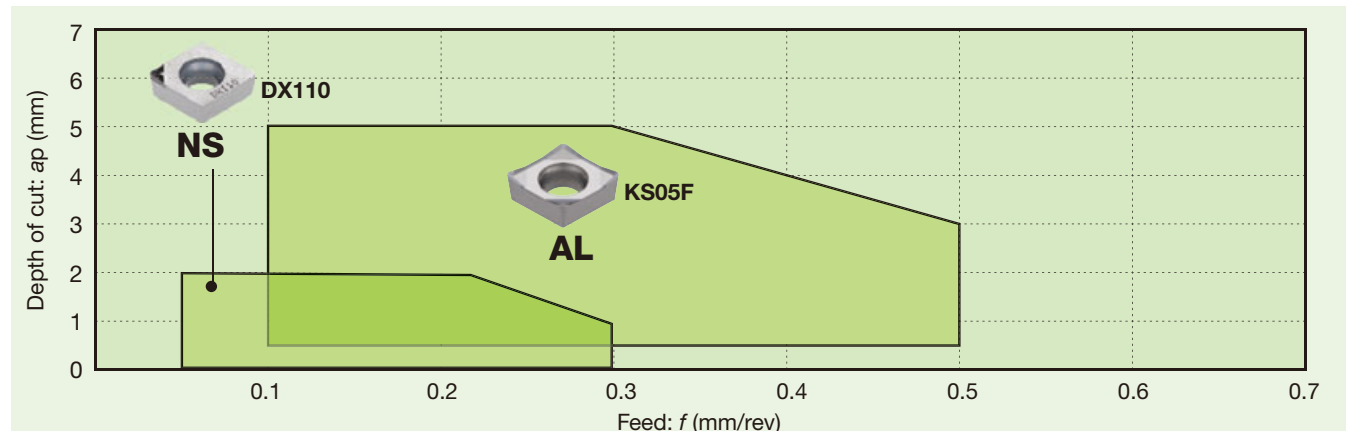
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Chipbreaker Guide

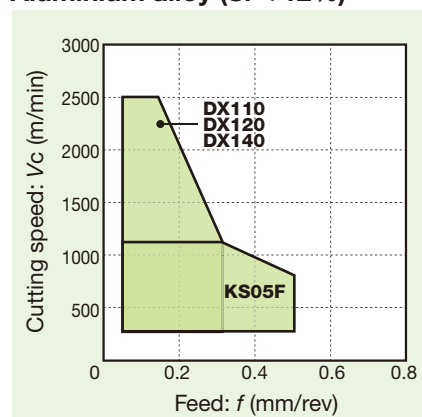
BASIC CHIPBREAKER: POSITIVE TYPE

N Non-ferrous Metal

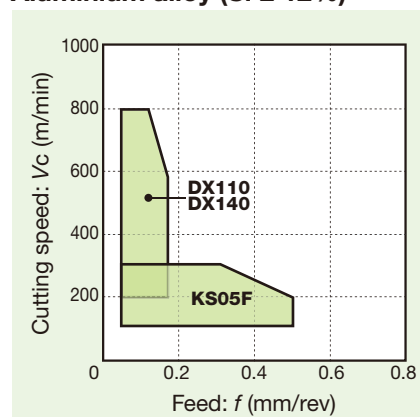
Chipbreaker System for Turning (Positive Type)



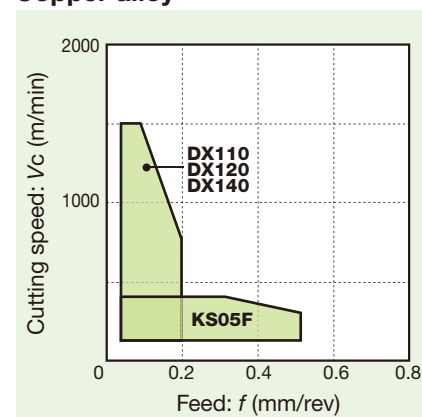
Aluminium alloy (Si < 12%)



Aluminium alloy (Si ≥ 12%)



Copper alloy



Chipbreaker	Shape	Feature
-		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
NS		A unique three-dimensional chipbreaker. Covers a wide range of condition from roughing to finishing.

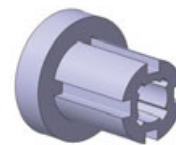
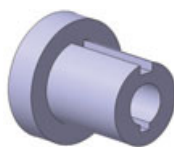
STANDARD CUTTING CONDITIONS

ISO	Operation	Work condition	Chip-breaker	Grade	Depth of cut ap (mm)	Feed f (mm/rev)	Cutting speed: Vc (m/min)		
							Aluminium alloy (Si < 12%)	Aluminium alloy (Si ≥ 12%)	Copper alloy
N	Precision finishing	Continuous	NS	DX110	0.05 - 2	0.05 - 0.15	500 - 2500	400 - 800	500 - 1500
		Light interrupted	-	DX140	0.05 - 1	0.05 - 0.2	300 - 2500	-	500 - 1500
	Finishing	Continuous	NS	DX110	0.05 - 2	0.05 - 0.3	500 - 2500	400 - 800	500 - 1500
		Light interrupted	-	DX140	0.05 - 1	0.05 - 0.15	300 - 1800	400 - 600	400 - 1200
		Heavy interrupted	AL	KS05F	0.5 - 5	0.1 - 0.5	100 - 600	100 - 200	-
	Medium cutting	Continuous	AL	KS05F	0.5 - 5	0.1 - 0.5	100 - 1200	100 - 300	100 - 300
		Light interrupted	AL	KS05F	0.5 - 5	0.1 - 0.5	100 - 900	100 - 200	100 - 200
		Heavy interrupted	AL	KS05F	0.5 - 5	0.1 - 0.5	100 - 600	100 - 200	-

Selection System

SELECTION SYSTEM: POSITIVE TYPE

N Non-ferrous Metal



Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p \approx 0.5 \text{ mm}$]

Basic



**NS
DX110**

B213 -

Wear

DX140

B213 -

Basic



**With
chipbreaker
DX110**

B213 -

Wear

DX140

B213 -

Finishing
[$a_p \approx 0.5 \sim 2 \text{ mm}$]

Basic



**NS
DX110**

B213 -

Wear

DX160

B213 -

Basic



DX140

B213 -

Fracture

**AL
KS05F**

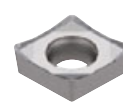
B042

Wear

DX160

B213 -

Basic



**AL
KS05F**

B043

Medium cutting
[$a_p \approx 1 \sim 5 \text{ mm}$]

Basic



**AL
KS05F**

B043

Wear

**With chipbreaker
DX120**

B213 -

Basic



**AL
KS05F**

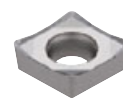
B043

Wear

DX140

B213 -

Basic



**AL
KS05F**

B043

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

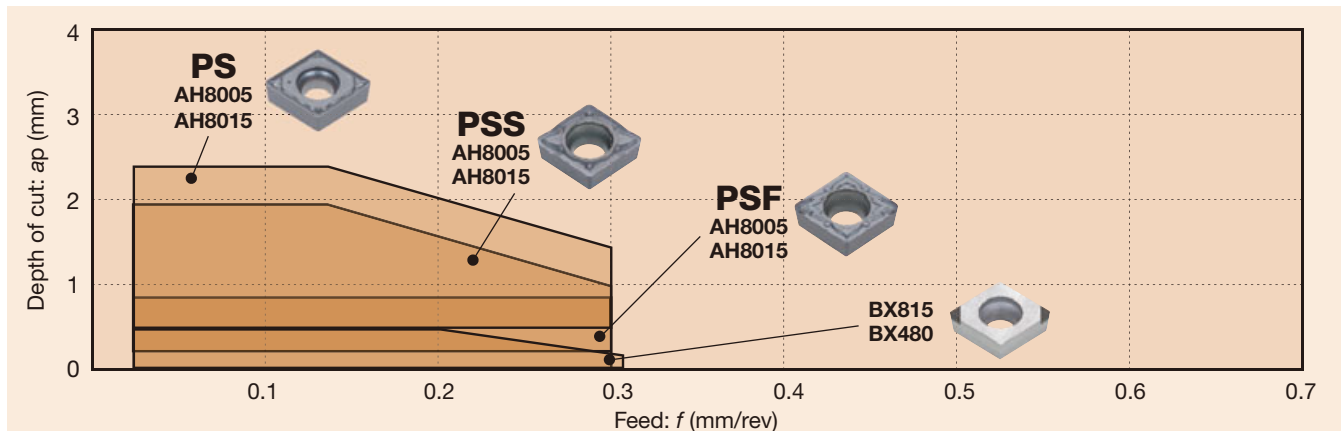
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Chipbreaker Guide

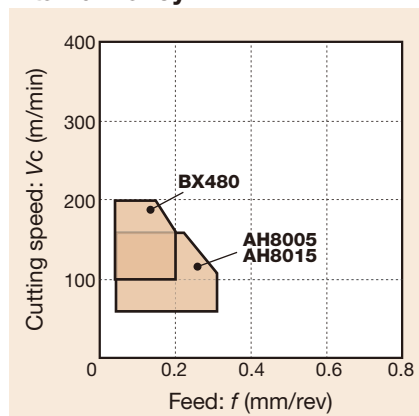
BASIC CHIPBREAKER: POSITIVE TYPE

S Heat resistant superalloys

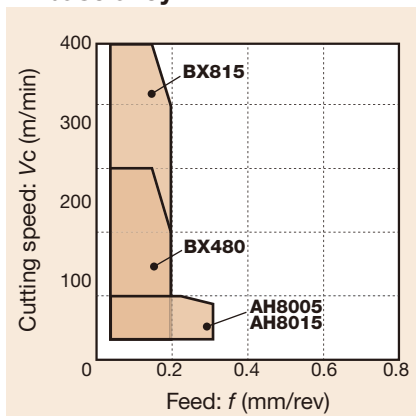
Chipbreaker System for Turning (Positive Type)



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.
-		Excellent performance in finishing of heat-resistant alloy and titanium alloy with CBN sintered body on the cutting edge.

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

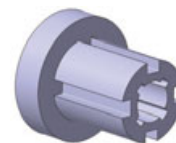
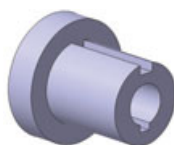
ISO	Operation	Chip-breaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed: V_c (m/min)	
						Titanium alloy	Ni-base alloy
S	Precision finishing	-	BX480	0.1 - 0.5	0.05 - 0.2	100 - 200	70 - 300
		-	BX815	0.1 - 0.5	0.05 - 0.2	-	70 - 500
	Finishing	PSS	AH8015	0.3 - 2	0.02 - 0.3	20 - 150	20 - 100
		PSS	AH8015	0.3 - 2	0.02 - 0.3	20 - 150	20 - 100
	Finishing to medium cutting	PS	AH8015	0.5 - 2.5	0.02 - 0.3	20 - 150	20 - 100
		PS	AH8015	0.5 - 2.5	0.02 - 0.3	20 - 150	20 - 100

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

Selection System

SELECTION SYSTEM: POSITIVE TYPE

S Heat resistant superalloys



Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p \approx 0.5 \text{ mm}$]

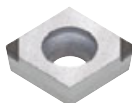
Basic



BX815

B189 - B209

Basic

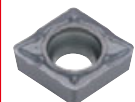


BX480

B189 - B209

Finishing
[$a_p \approx 0.3 \sim 2 \text{ mm}$]

Basic



PSS AH8015

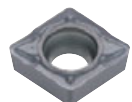
B042, B046, B049

Wear

PSS AH8005

B042, B046, B049

Basic



PSS AH8015

B042, B046, B049

Wear

PSS AH8005

B042, B046, B049

Fracture

PS AH8015

B042, B046, B049

Finishing to medium cutting
[$a_p \approx 0.5 \sim 2.5 \text{ mm}$]

Basic



PS AH8015

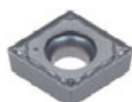
B042, B046, B049

Wear

PSS AH8005

B042, B046, B049

Basic



PS AH8015

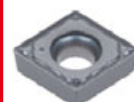
B042, B046, B049

Fracture

All-round AH8015

B043, B047

Basic



PS AH8015

B042, B046, B049

Fracture

All-round AH8015

B043, B047

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

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

User's Guide

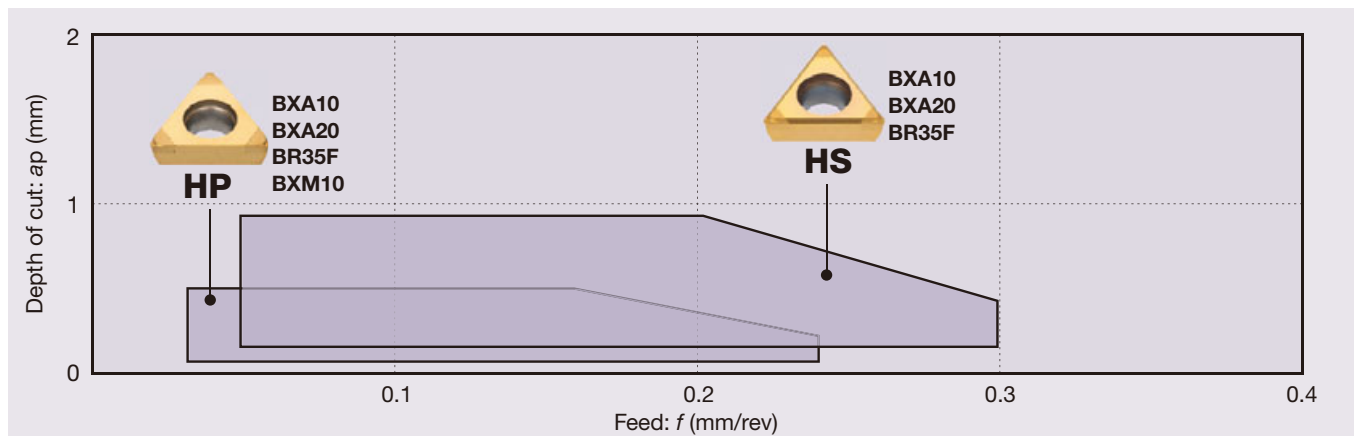
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Chipbreaker Guide

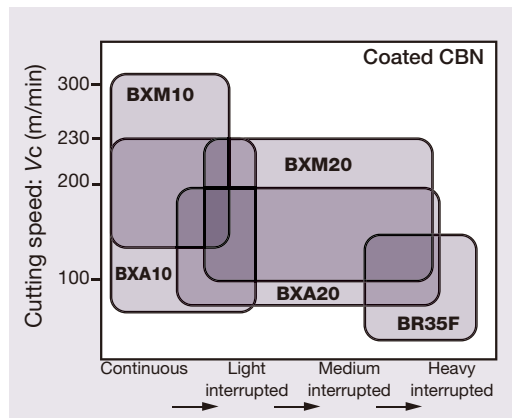
BASIC CHIPBREAKER: POSITIVE TYPE

H Hard Materials

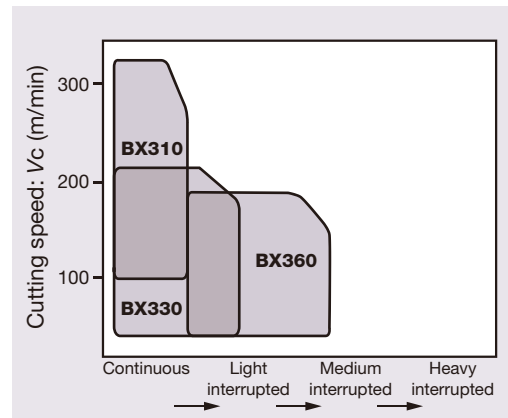
Chipbreaker System for Turning (Positive Type)



Coated CBN



CBN



Chipbreaker	Shape	Feature	Chipbreaker	Shape	Feature
-		Excellent performance in high-speed finishing of hard material with CBN sintered body on the cutting edge.	HP		Excellent chip control in precision finishing.
			HS		Provides the excellent chip-control at a high-feed condition in the precise finishing operation.

STANDARD CUTTING CONDITIONS

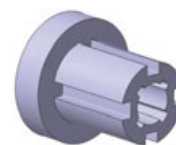
ISO	Operation	Chipbreaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed V_c (m/min)
H	Precision finishing	HP	BXM10 BXA20 BR35F	0.03 - 0.25	0.03 - 0.22	70 - 350
		HS	BXM10 BXA20 BR35F	0.1 - 0.35	0.05 - 0.3	70 - 350
	Finishing	-	BXM10 BXA20 BR35F	0.05 - 0.5	0.05 - 0.25	70 - 350

Hardened steels, Pre-hardened steels: SKD11, SKD61, etc. X153CrMoV12, X40CrMoV5-1, etc.

Selection System

SELECTION SYSTEM: POSITIVE TYPE

H Hard Materials



Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p \approx 0.35 \text{ mm}$]

Basic



**HP
BXA10**

B189 -



**HS
BXA10**

B189 -

Basic



BXA20

B189 -



**-H
BXA20**

B189 -

Finishing
[$a_p \approx 0.5 \text{ mm}$]

Basic



BXA10

B189 -

Basic



BXA20

B189 -



**-H
BXA20**

B189 -



BXA10

B189 -

Basic



**SR
BR35F**

B189 -



**HC
BR35F**

B189 -

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

Drilling tool

Tooling System

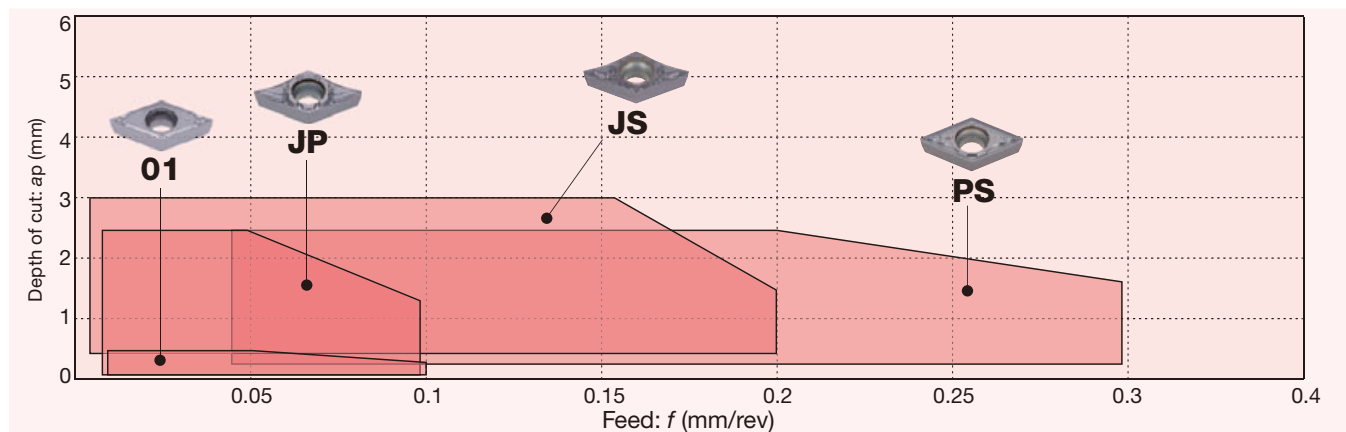
User's Guide

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Chipbreaker Guide

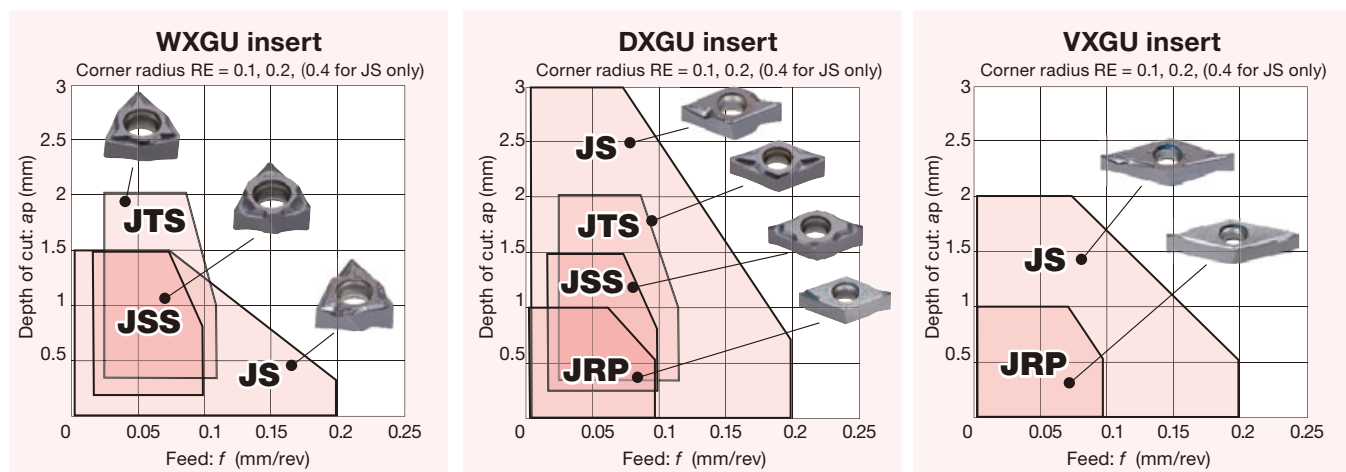
For Miniature machining

BASIC CHIPBREAKER: POSITIVE TYPE



Chipbreaker	Shape	Feature	Chipbreaker	Shape	Feature
JP		Excellent performance in finishing of hard material with CBN sintered body on the cutting edge.	JS		Excellent chip control in removing carburized layer at small depth of cut.

BASIC CHIPBREAKER: DOUBLE-SIDED POSITIVE TYPE



STANDARD CUTTING CONDITIONS POSITIVE TYPE

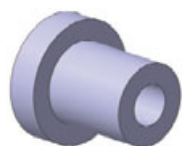
Operation	Chip-breaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed V_c (m/min)
Precision finishing	JP	SH725	0.05 - 2.5	0.02 - 0.1	10 - 200
Finishing	JP	SH725	0.05 - 2.5	0.02 - 0.1	50 - 250
	JS	SH725	0.2 - 3	0.02 - 0.2	10 - 200
Finishing to light cutting	JP	SH725	0.05 - 2.5	0.02 - 0.1	50 - 250
	JS	SH725	0.5 - 2	0.02 - 0.2	10 - 200
	JS	SH725	0.5 - 3	0.03 - 0.15	10 - 200
Medium cutting	PS	AH8015	0.5 - 2.5	0.02 - 0.2	20 - 200
	PS	AH6225	0.5 - 2.5	0.02 - 0.2	60 - 240

STANDARD CUTTING CONDITIONS DOUBLE-SIDED POSITIVE TYPE

Operation	Chip-breaker	Grade	Depth of cut a_p (mm)	Feed f (mm/rev)	Cutting speed V_c (m/min)
Precision finishing	JRP	SH725	0.05 - 0.5	0.03 - 0.08	50 - 250
Finishing	JSS	SH725	0.2 - 1.5	0.03 - 0.1	50 - 250
	JS	SH725	0.2 - 3	0.03 - 0.2	50 - 250
	JS	SH725	0.5 - 3	0.03 - 0.2	50 - 250
Finishing to light cutting	JTS	SH725	0.5 - 2	0.03 - 0.1	50 - 250
Medium cutting	JS	SH725	0.5 - 3	0.03 - 0.2	50 - 250

Selection System

SELECTION SYSTEM: POSITIVE TYPE/DOUBLE-SIDED POSITIVE TYPE



Continuous

Light interrupted

Heavy interrupted

Precision finishing
[$a_p \approx 0.5 \text{ mm}$]

Basic
Positive



**JP
SH725**

Double-sided
positive



**JRP
SH725**

B040, B052

Basic
Positive



**JP
SH725**

Double-sided
positive



**JRP
SH725**

B040, B052

Finishing
[$a_p = 0.1 \sim 0.5 \text{ mm}$]

Basic
Positive



**JS
SH725**

Double-sided
positive



**JSS
SH725**

B040, B045, B049, B052

Chip control
**JP
SH725**
B040

Fracture
**JSS
AH725**
B052

Basic
Positive



**JS
SH725**

Double-sided
positive



**JSS
AH725**

B040, B045, B049, B052

Chip control
**JP
SH725**
B040

Fracture
**JSS
AH725**
B052

Basic
Positive



**JS
SH725**

Double-sided
positive



**JSS
AH725**

B040, B045, B049, B052

Finishing to medium cutting
[$a_p = 0.5 \sim 3 \text{ mm}$]

Basic
Positive



**JS
SH725**

Double-sided
positive



**JTS
SH725**

B040, B045, B049, B052

Chip control
**JP
SH725**
B040

Fracture
**JSS
AH725**
B052

Basic
Positive



**JS
SH725**

Double-sided
positive



**JTS
SH725**

B040, B045, B049, B052

Chip control
**JP
SH725**
B040

Fracture
**JSS
AH725**
B052

Basic
Positive



**JS
AH725**

Double-sided
positive



**JTS
AH725**

B040, B045, B049, B052

Fracture
**TS
AH8015**
B052

Medium cutting
[$a_p = 1 \sim 4 (3) \text{ mm}$]

Basic
Positive



**JS
SH725**

Double-sided
positive



**JSS
AH725**

B040, B045, B049, B052

Fracture
**PS
AH8015
AH6225**
B042, B046, B049

Basic
Positive



**PS
AH8015
AH6225**

Double-sided
positive



**JTS
AH725**

B042, B046, B049, B052

Basic
Positive



**PS
AH8015
AH6225**

Double-sided
positive

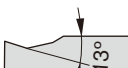
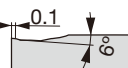
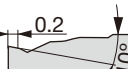
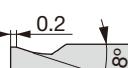


**JTS
AH725**

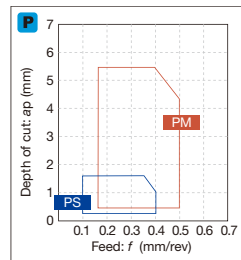
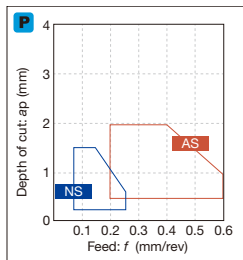
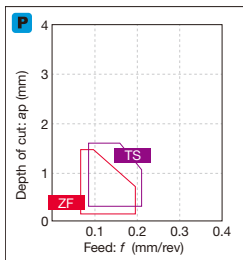
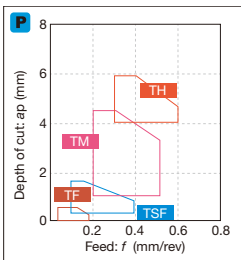
B042, B046, B049, B052

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

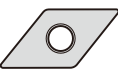
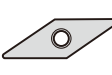
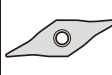
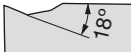
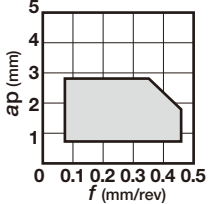
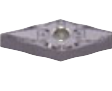
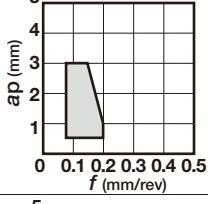
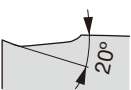
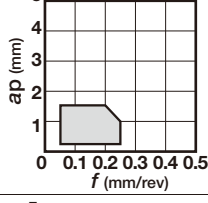
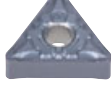
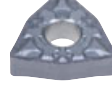
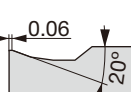
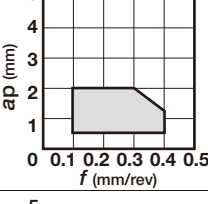
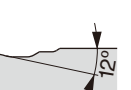
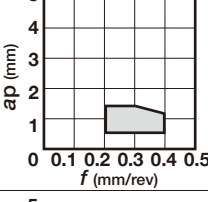
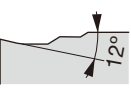
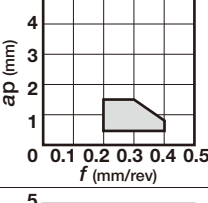
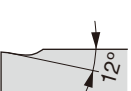
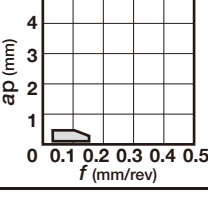
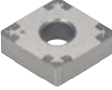
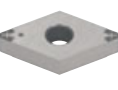
Chipbreaker Overview

Application	Negative type with hole	C	D	F	G	S	T	V	W	Y
										
		80°	55°	45°	70°	90°	60°	35°	80°	25°
Finishing	TF  ap (mm) f (mm/rev)									
		B054	B066			B077	B087	B098	B102	
	TSF  ap (mm) f (mm/rev)									
		B054	B066	B075	B075	B077	B087	B098	B102	
Finishing for mild steel	PS  ap (mm) f (mm/rev)									
		B054	B066			B077	B087	B098	B102	
	ZF  ap (mm) f (mm/rev)									
		B054	B066			B077	B087	B098	B102	B110
Finishing	AS  ap (mm) f (mm/rev)									
		B054	B066			B077	B087		B102	
	NS  ap (mm) f (mm/rev)									
		B054	B066			B077	B087		B102	
Finishing	TS  ap (mm) f (mm/rev)									
		B054	B067			B078	B089	B098	B103	

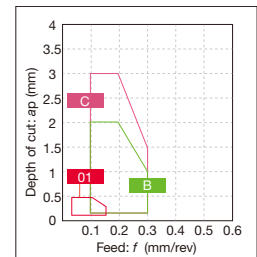
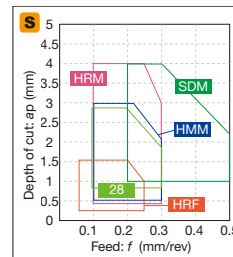
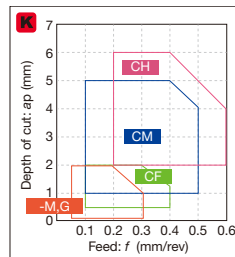
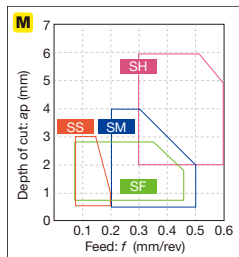
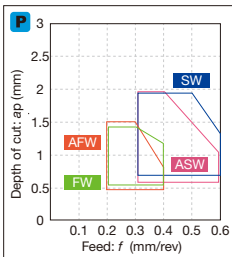
Chip control range



Please see the page B*** for the product details.

Application	Negative type with hole	C	D	S	T	V	W	Y
		 80°	 55°	 90°	 60°	 35°	 80°	 25°
Finishing	SF  	 B055	 B067	 B078	 B088	 B098	 B103	
	SS  	 B055	 B067	 B078	 B088	 B098	 B103	
	HRF  	 B055	 B067	 B078	 B088	 B098	 B103	
	CF  	 B055	 B067	 B078	 B088	 B099	 B104	
Finishing (wiper)	FW  	 B056	 B067		 B088		 B104	
	AFW  	 B056					 B104	
Finishing	01  	 B056	 B067	 B078	 B089	 B099	 B104	

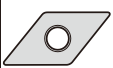
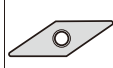
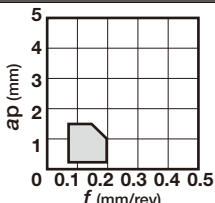
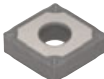
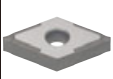
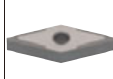
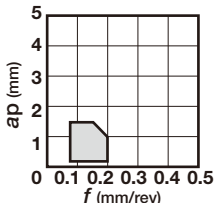
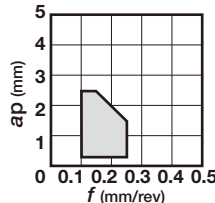
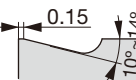
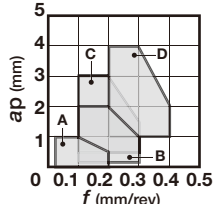
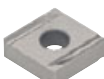
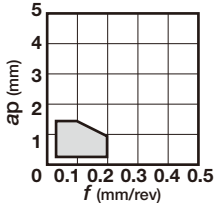
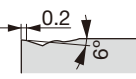
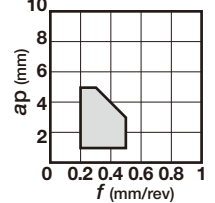
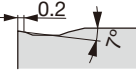
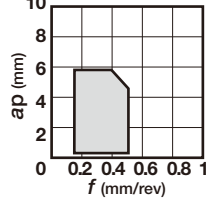
Chip control range



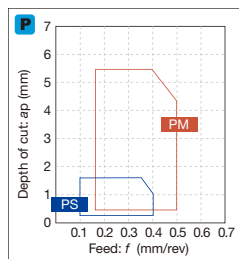
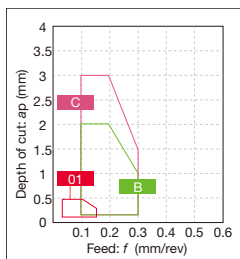
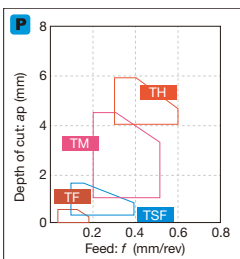
Please see the page B*** for the product details.

*-M,G: Without chipbreaker

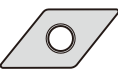
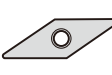
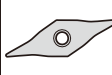
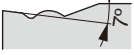
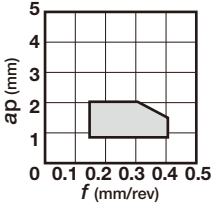
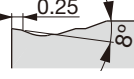
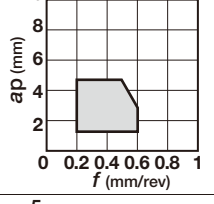
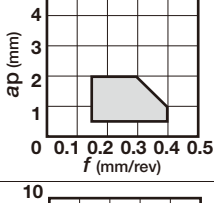
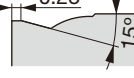
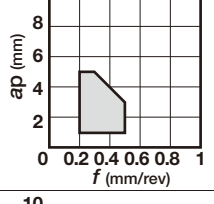
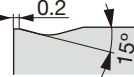
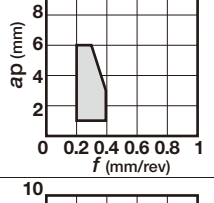
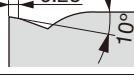
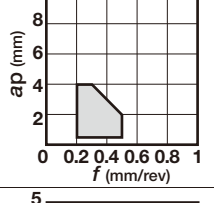
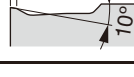
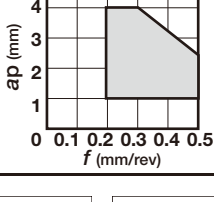
Chipbreaker Overview

Application	Negative type with hole	C	D	F	G	S	T	V	W
		 80°	 55°	 45°	 70°	 90°	 60°	 35°	 80°
Finishing	11  	 B056	 B068			 B078	 B089	 B099	 B104
Finishing for mild steel	17  	 B056	 B068			 B079	 B089		 B104
Boring (double side)	CB  	 B056	 B068				 B089		 B104
Finishing	A~D  	 B056				 B079	 B090		
Finishing	W  						 B090		
Medium cutting	TM  	 B057	 B069	 B075	 B075	 B079	 B090	 B099	 B105
	PM  	 B057	 B069			 B079	 B091	 B099	 B105

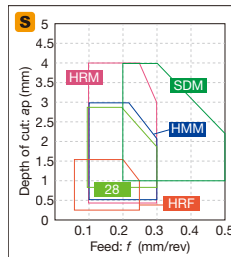
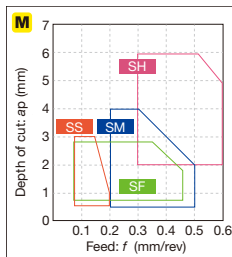
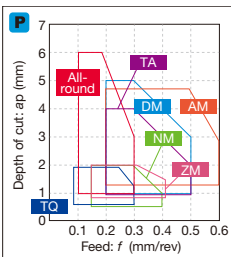
Chip control range



Please see the page B*** for the product details.

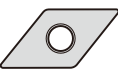
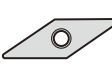
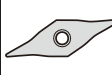
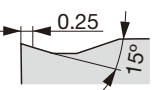
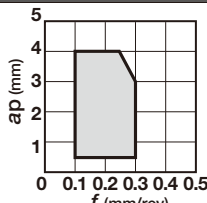
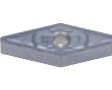
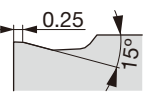
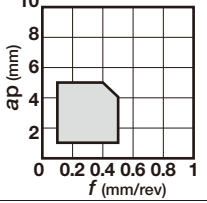
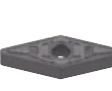
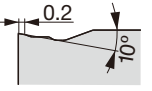
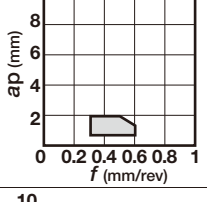
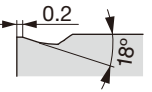
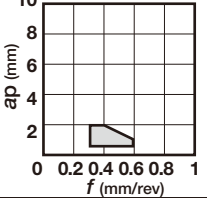
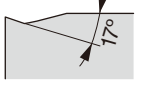
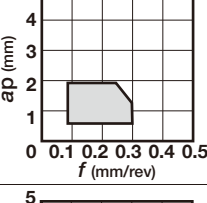
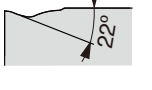
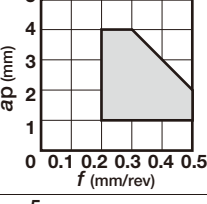
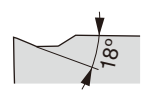
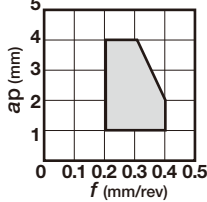
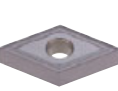
Application	Negative type with hole	C	D	S	T	V	W	Y
		 80°	 55°	 90°	 60°	 35°	 80°	 25°
Medium cutting for mild steel	ZM  	 B057	 B069	 B080	 B091	 B099	 B105	 B110
	AM  	 B058	 B069		 B091		 B106	
	NM  	 B058	 B070		 B091		 B106	
	DM  	 B058	 B070	 B080	 B092	 B100	 B106	
	All-round  	 B058	 B070	 B080	 B092	 B100	 B106	
	SM  	 B059	 B070	 B080	 B092	 B100	 B106	
	SDM  	 B059	 B070	 B080	 B092	 B100	 B106	

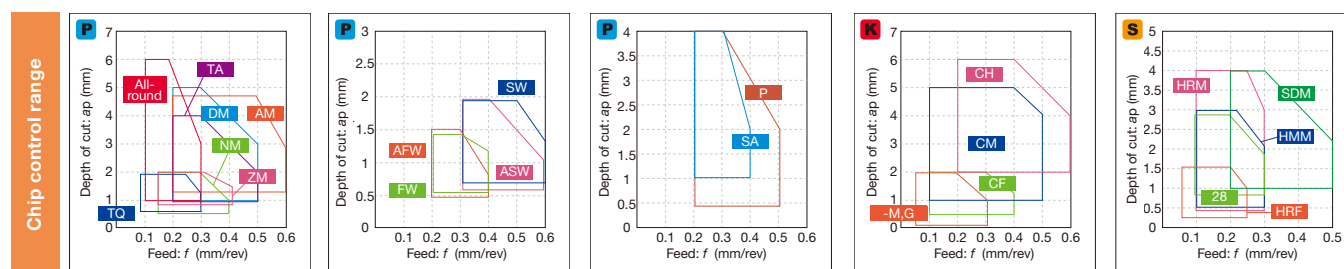
Chip control range

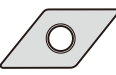
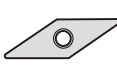
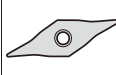
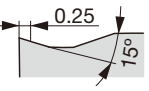
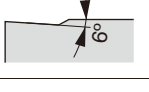
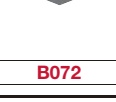


Please see the page B*** for the product details.

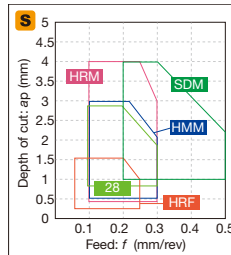
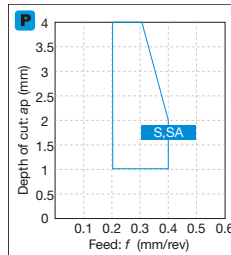
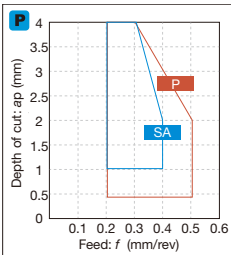
Chipbreaker Overview

Application	Negative type with hole	C	D	S	T	V	W	Y
		 80°	 55°	 90°	 60°	 35°	 80°	 25°
Medium cutting	HRM  	 B059	 B070	 B081	 B092	 B100	 B106	
	CM  	 B059	 B071	 B080	 B092	 B100	 B107	
Medium cutting (wiper)	SW  	 B059	 B071		 B093		 B107	
	ASW  	 B060					 B107	
Medium cutting	TQ  	 B060	 B071		 B093	 B100	 B107	
	TA  	 B060		 B081	 B093		 B107	
	SA  	 B060	 B071	 B081	 B093		 B108	



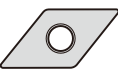
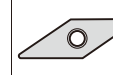
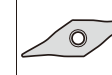
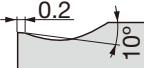
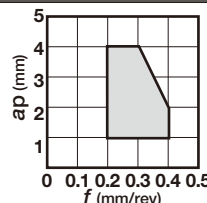
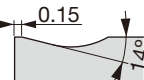
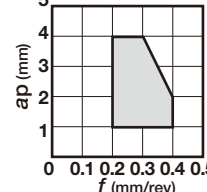
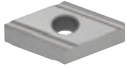
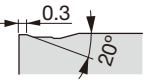
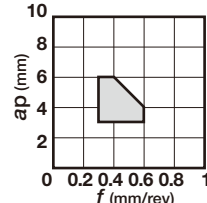
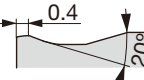
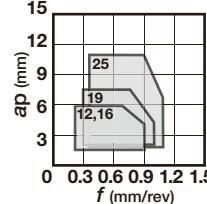
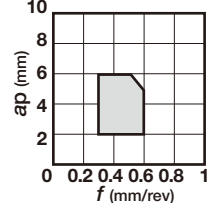
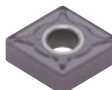
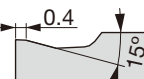
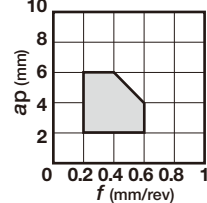
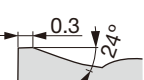
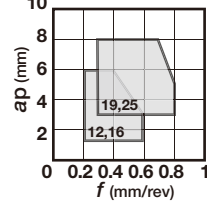
Application	Negative type with hole	C	D	S	T	V	W	Y
		 80°	 55°	 90°	 60°	 35°	 80°	 25°
Medium cutting	HMM  ap (mm) f (mm/rev)	 B060	 B071	 B081	 B093	 B100	 B108	
	P  ap (mm) f (mm/rev)	 B060	 B072	 B081	 B094			
	S  ap (mm) f (mm/rev)	 B060	 B072	 B082	 B094			
	27  ap (mm) f (mm/rev)	 B061	 B072	 B082	 B094		 B108	
	28  ap (mm) f (mm/rev)	 B061	 B072		 B094	 B101		
	33  ap (mm) f (mm/rev)	 B061	 B072	 B082	 B094	 B101	 B108	
	37  ap (mm) f (mm/rev)	 B061	 B072	 B082	 B094		 B108	

Chip control range

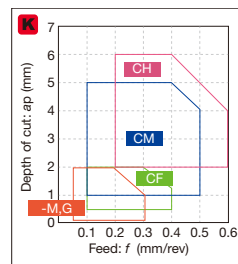
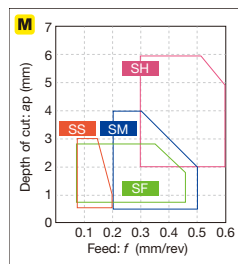
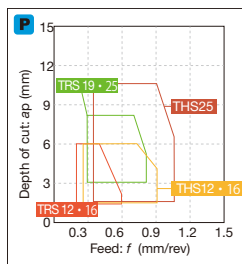
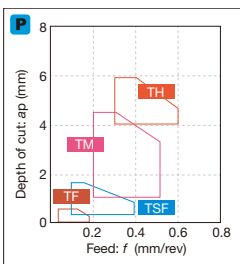


Please see the page B*** for the product details.

Chipbreaker Overview

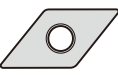
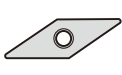
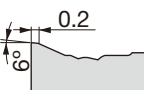
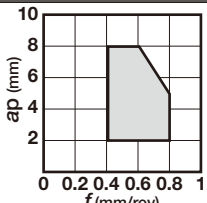
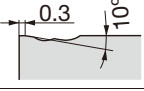
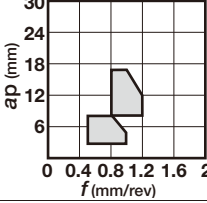
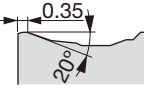
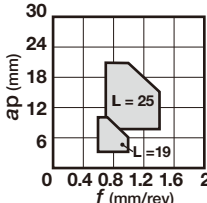
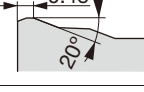
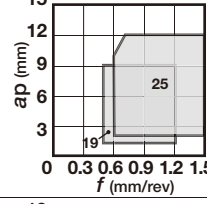
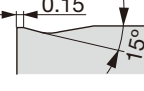
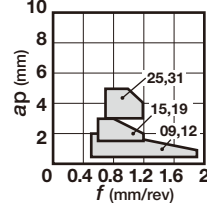
Application	Negative type with hole	C	D	S	T	V	W	Y
		 80°	 55°	 90°	 60°	 35°	 80°	 25°
Medium cutting	38  	 B061	 B072		 B095			
	Parallel  		 B072					
Medium to heavy cutting	TH  	 B061	 B073	 B082	 B095		 B108	
	THS  	 B062	 B073	 B082	 B095		 B108	
	SH  	 B062	 B073	 B083			 B109	
	CH  	 B062	 B073	 B083	 B095		 B109	
	TRS  	 B062		 B083				

Chip control range

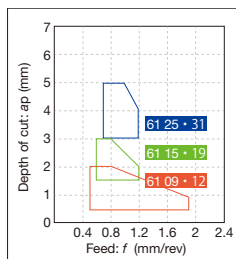
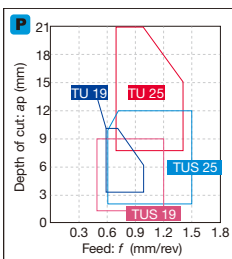


Please see the page B*** for the product details.

*-M,G: Without chipbreaker

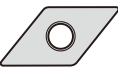
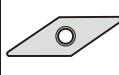
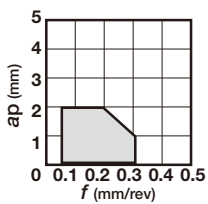
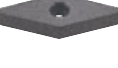
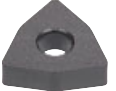
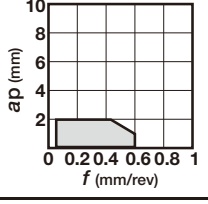
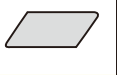
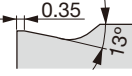
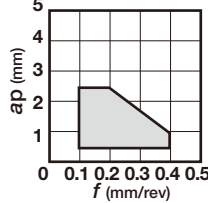
Application	Negative type with hole	C	D	R	S	T	V	W
		 80°	 55°		 90°	 60°	 35°	 80°
Medium to heavy cutting (single side)	57  	 B062	 B073		 B083	 B095		
	65  	 B062			 B083			
Heavy cutting (single side)	TU  	 B063			 B084			
	TUS  	 B063			 B084			
Heavy cutting	61  			 B076				

Chip control range

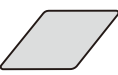
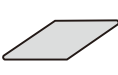
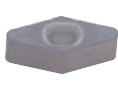
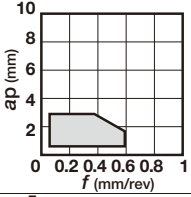
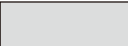
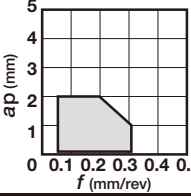


Please see the page B*** for the product details.

Chipbreaker Overview

Application	Negative type with hole	C	D	R	S	T	V	W
		 80°	 55°		 90°	 60°	 35°	 80°
Finishing to medium cutting	M,G-class  	 B063	 B073, B074	 B076	 B084	 B096	 B101	 B109
	Wiper M-class  	 B064						
Application	Negative type without hole	C	D	KNMX	LNGN	R	S	T
		 80°	 55°	 55°	 90°	 90°	 90°	 60°
Finishing	S1  			 B110				

Please see the page B*** for the product details.

Application		C	D	H	R	S	T	V
Negative type without hole								
		80°	55°	120°		90°	60°	35°
Finishing to medium cutting	 G-class 							
		B065	B074	B111		B085		B101
Finishing to medium cutting	 M,G-class 							
		B065	B074		B076	B085	B097	

Grade

Insert

Ext. Toolholder

Int. Toolholder

Threading

Grooving

Miniature tool

Milling cutter

Endmill

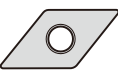
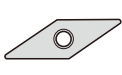
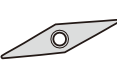
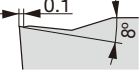
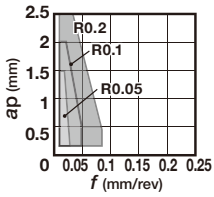
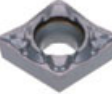
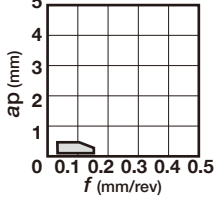
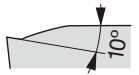
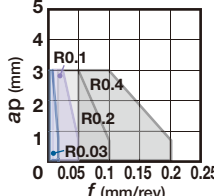
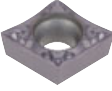
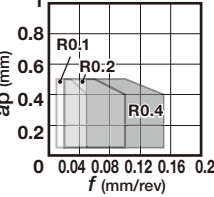
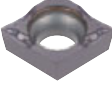
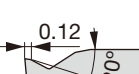
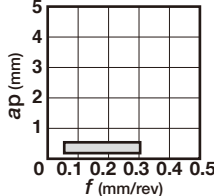
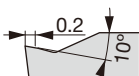
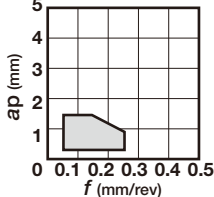
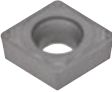
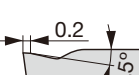
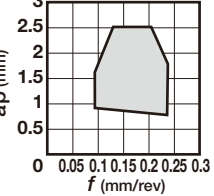
Drilling tool

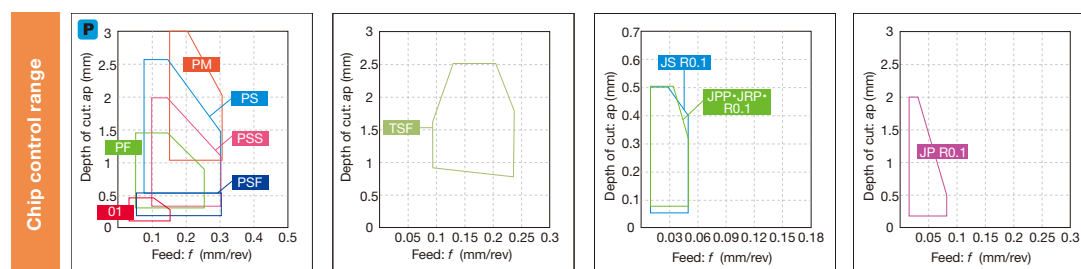
Tooling System

User's Guide

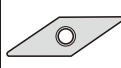
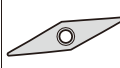
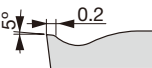
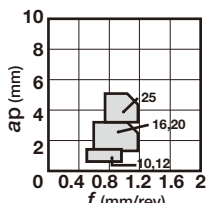
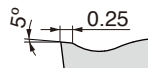
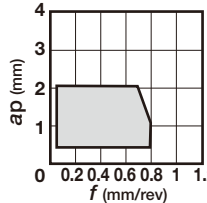
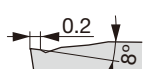
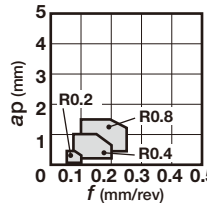
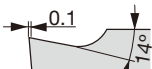
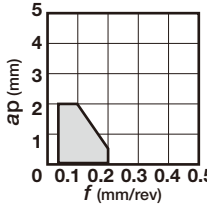
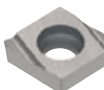
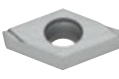
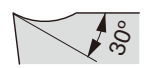
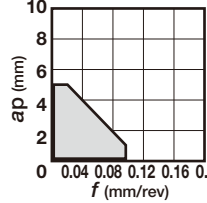
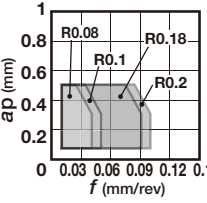
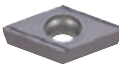
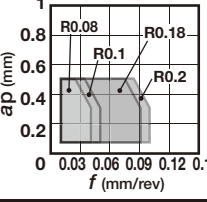
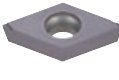
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Chipbreaker Overview

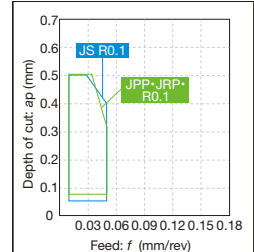
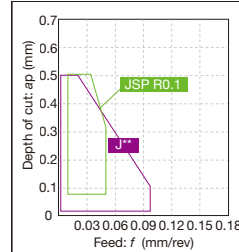
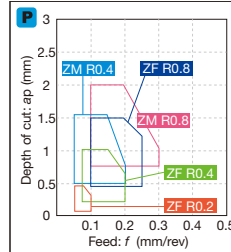
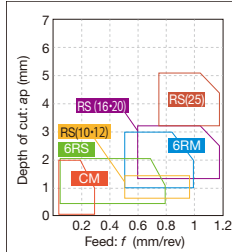
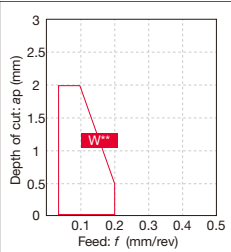
Application	Positive 7° with hole	C	D	R	S	T	V	Y
		 80°	 55°		 90°	 60°	 35°	 25°
Precision finishing (sharp edge)	JP  	 B112	 B121			 B138		
	01  	 B112	 B121			 B138		
Finishing (sharp edge)	JS  	 B112	 B121			 B138		
	JS  	 B112	 B121			 B138		
Finishing	PSF  	 B113	 B121			 B138	 B152	
	PF  	 B113	 B122				 B152	
	TSF  	 B113	 B122			 B138	 B152	



Please see the page B*** for the product details.

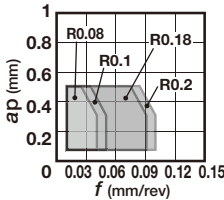
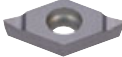
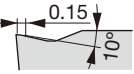
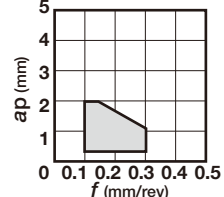
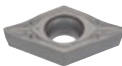
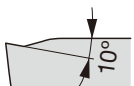
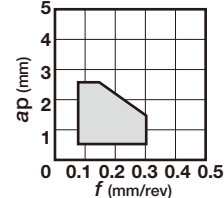
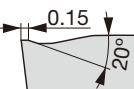
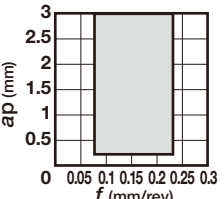
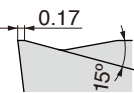
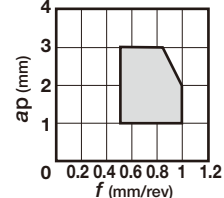
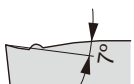
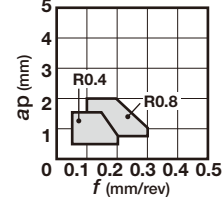
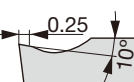
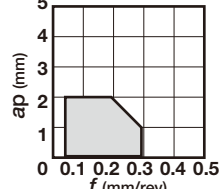
Application	Positive 7° with hole	C	D	R	S	T	V	Y
								
		80°	55°		90°	60°	35°	25°
Finishing	RS  			 B130				
	6RS  			 B130				
	ZF  							 B159
	W**  	 B114, B115	 B122			 B139		
	J**  	 B113	 B122			 B139		
Finishing (sharp edge)	JPP  		 B123					
	JRP  		 B123					

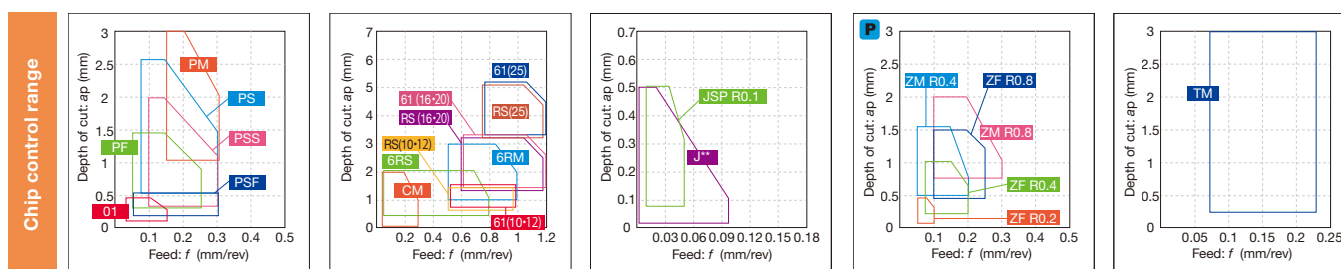
Chip control range



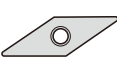
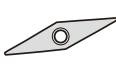
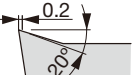
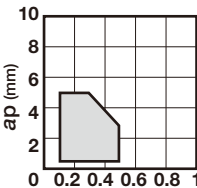
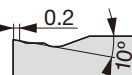
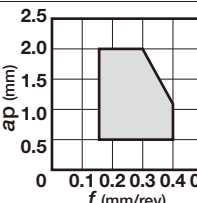
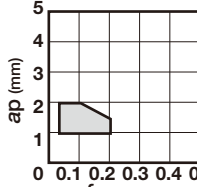
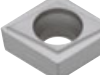
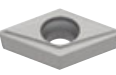
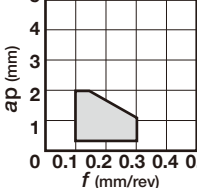
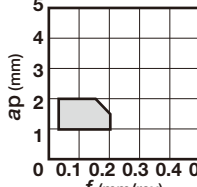
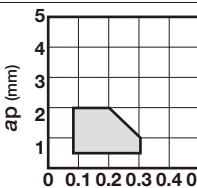
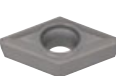
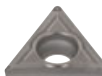
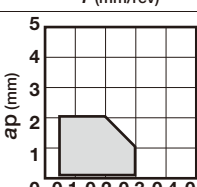
Please see the page B*** for the product details.

Chipbreaker Overview

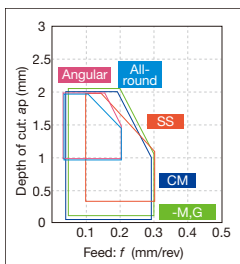
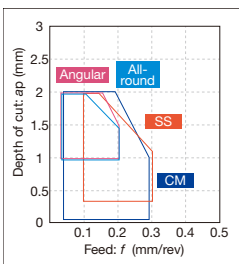
Application		Positive 7° with hole		C	D	R	S	T	V	Y
				80°	55°		90°	60°	35°	25°
Finishing (sharp edge)	JSP  		 B123							
	PSS  	 B115	 B124			 B140	 B152			
	PS  	 B115	 B124		 B134	 B140	 B152			
	TM  	 B115	 B124			 B140	 B152			
	6RM  			 B130						
	ZM  							 B159		
	CM  	 B115	 B124	 B130	 B134	 B140	 B152			



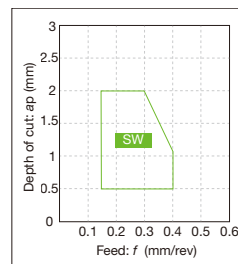
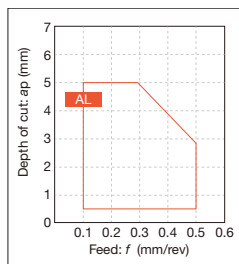
Please see **the page B***** for the product details.

Application	Positive 7° with hole	C	D	R	S	T	V	Y
		 80°	 55°	 90°	 90°	 60°	 35°	 25°
Finishing to medium cutting (for non-ferrous alloys)	AL  	 B116	 B124	 B130		 B140	 B153	
Finishing to medium cutting (wiper)	SW  	 B116						
Finishing to medium cutting	All-round  	 B116	 B124				 B153	
	SS  					 B140		
	Angular  	 B116	 B124					
	23  	 B116	 B125		 B134	 B140		
	M,G-class  	 B116, B117	 B125					

Chip control range

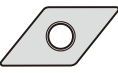
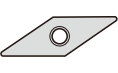
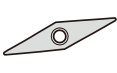
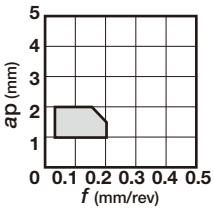
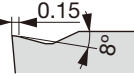
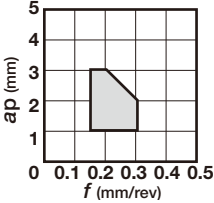
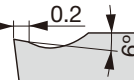
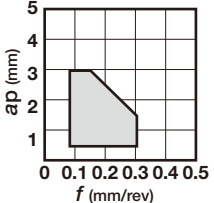
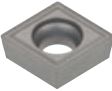
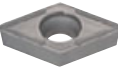
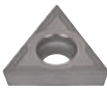
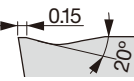
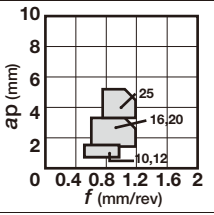


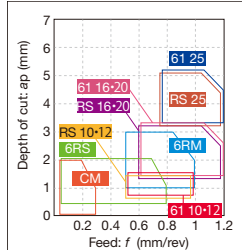
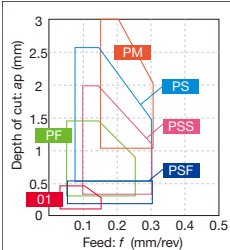
*M,G: Without chipbreaker



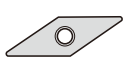
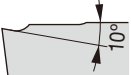
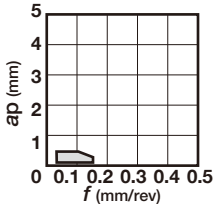
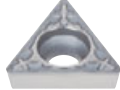
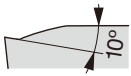
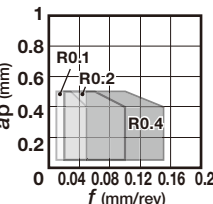
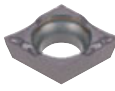
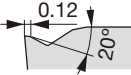
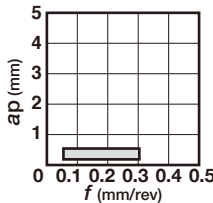
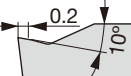
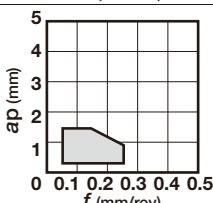
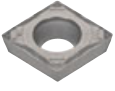
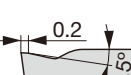
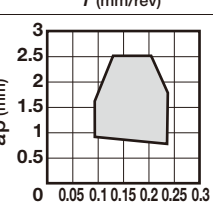
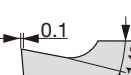
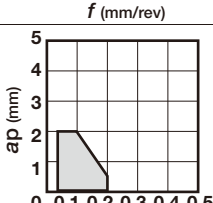
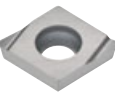
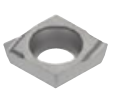
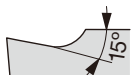
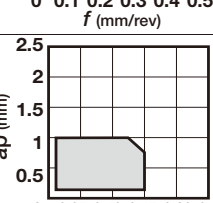
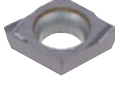
Please see the page B*** for the product details.

Chipbreaker Overview

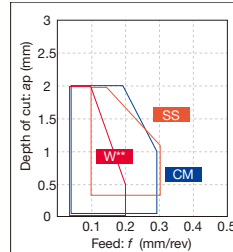
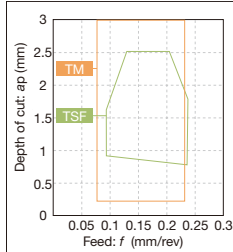
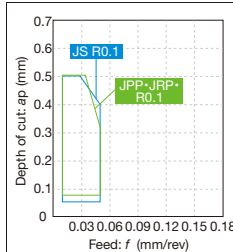
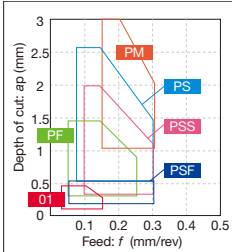
Application	Positive 7° with hole	C	D	R	S	T	V	Y
		 80°	 55°		 90°	 60°	 35°	 25°
Finishing to medium cutting	 					 B141		
	PM  	 B117	 B125		 B134	 B141		
	24  	 B117	 B125		 B134	 B141	 B153	
Heavy cutting	61  			 B131				



Please see the page B*** for the product details.

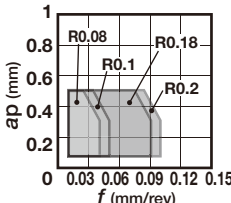
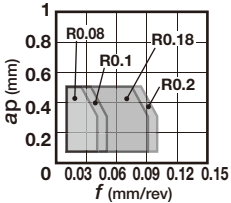
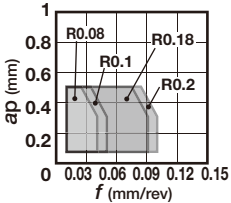
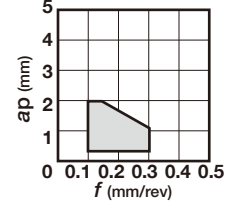
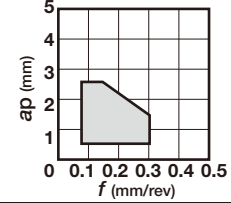
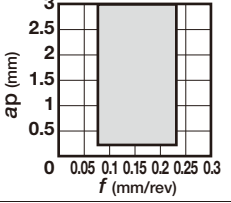
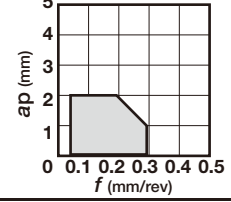
Application	Positive 11° with hole	C	E	S	T	V
		 80°	 75°	 90°	 60°	 35°
Precision finishing	01  				 B142	
	JS  		 B128		 B142	
Finishing	PSF  	 B118			 B142	
	PF  	 B118			 B142	
	TSF  	 B118			 B143	
	W**  	 B118	 B129	 B135	 B143, B144	
	J08  		 B128			

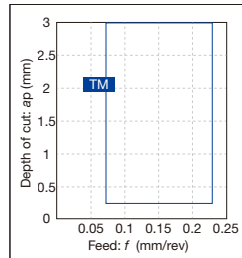
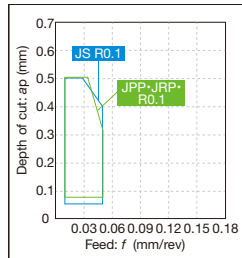
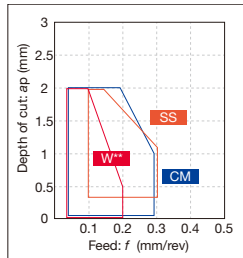
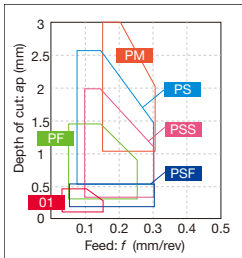
Chip control range



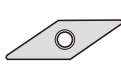
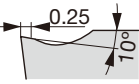
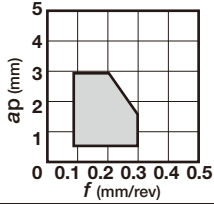
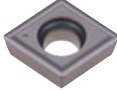
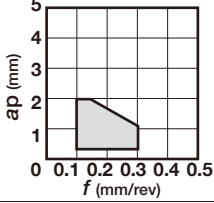
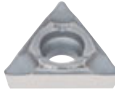
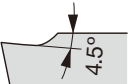
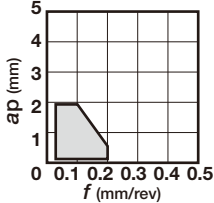
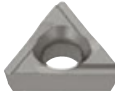
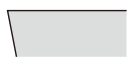
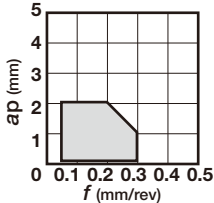
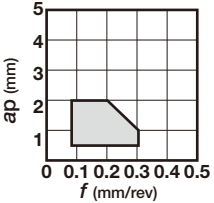
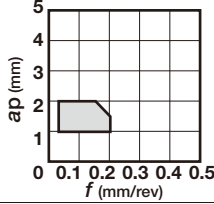
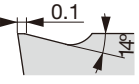
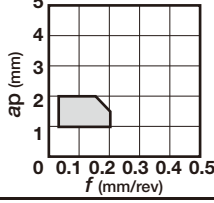
Please see the page B*** for the product details.

Chipbreaker Overview

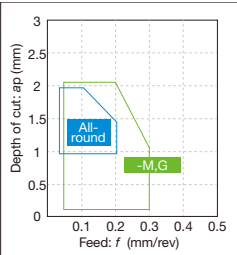
Application	Positive 11° with hole	C	D	S	T	V
		80°	55°	90°	60°	35°
Finishing (sharp edge)	JPP  					 B154
	JRP  					 B154
	JSP  					 B154
Finishing to medium cutting	PSS  	 B118			 B145	
	PS  	 B119	 B126	 B135	 B145	
	TM  	 B119			 B145	
	CM  	 B119		 B135	 B146	



Please see the page B*** for the product details.

Application	Positive 11° with hole	C	S	T	V
		 80°	 90°	 60°	 35°
Finishing to medium cutting	All-round  	 B119			
	SS  			 B144	
	H**  			 B146	
	M,G-class  	 B120	 B138	 B147	
	23  		 B135	 B146	
	(with hand)  		 (Tungaloy standard hole specification) ISO non-compliant B136		
	(with hand)  			 (Tungaloy standard hole specification) ISO non-compliant B146	

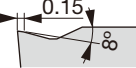
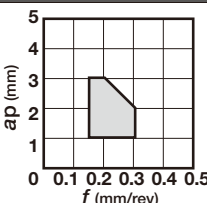
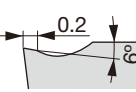
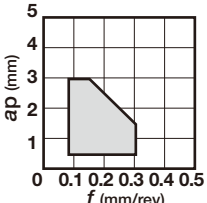
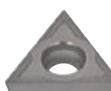
Chip control range

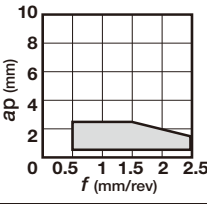


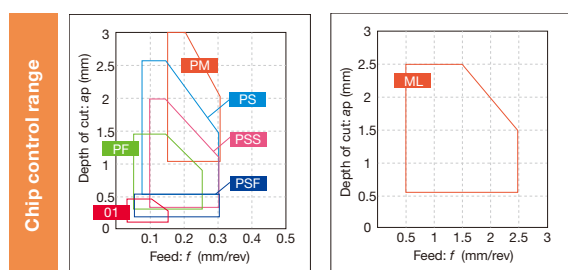
*-M,G: Without chipbreaker

Please see the page B*** for the product details.

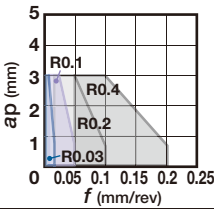
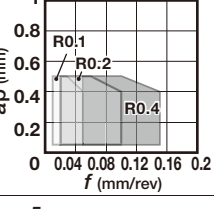
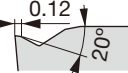
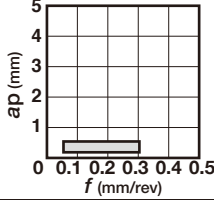
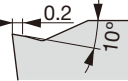
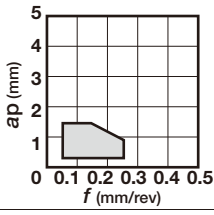
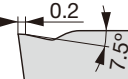
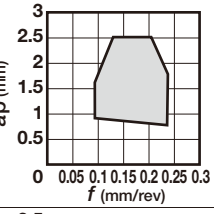
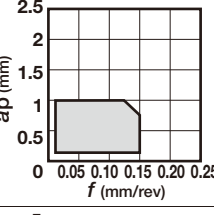
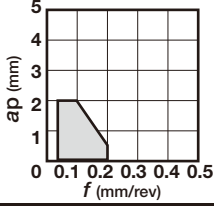
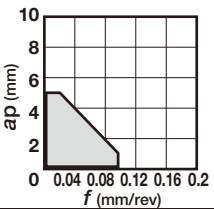
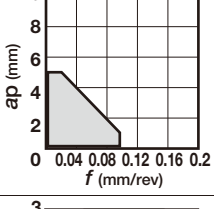
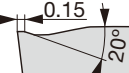
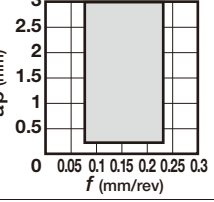
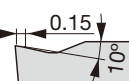
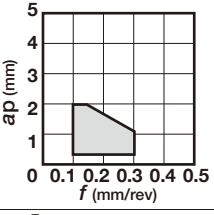
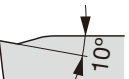
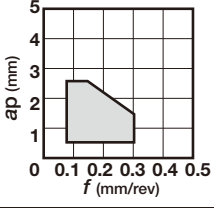
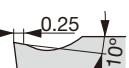
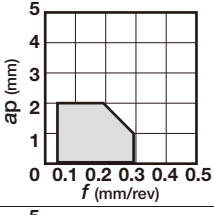
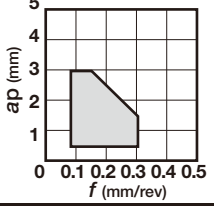
Chipbreaker Overview

Application	Positive 11° with hole	C	T
		80°	60°
Medium cutting	PM  	 B120	 B147
	24  	 B120	 B147

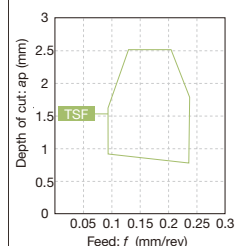
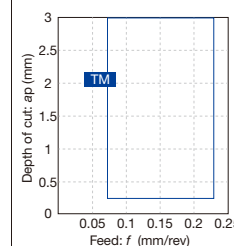
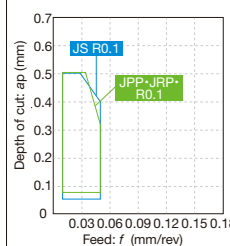
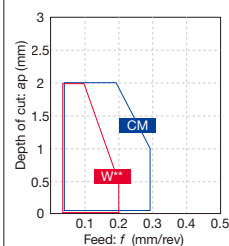
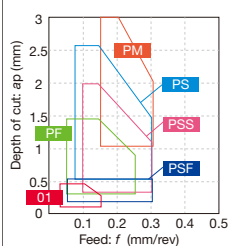
Application	Positive 11° with hole	W
		80°
Heavy cutting	ML  	 B155



Please see the **page B***** for the product details.

Application		V	W
Positive 5° with hole		35°	80°
Finishing (sharp edge)	JS  	 B150	
	JS  		 B156
Finishing	PSF  	 B150	
	PF  	 B150	
	TSF  	 B150	
	W08  		 B156
	W11  		 B156
Application		V	W
Positive 5° with hole		35°	80°
Finishing (sharp edge)	J10  	 B150	
Finishing	J10  	 B150	
Finishing to medium cutting	TM  	 B151	
	PSS  	 B151	
	PS  	 B151	
	CM  	 B151	
	24  	 B151	

Chip control range



Please see the page B*** for the product details.

Chipbreaker Overview

Application	Positive type with hole	JXF
Front turning		 B159

Application	Positive type with hole	J10E
Back turning		 B161

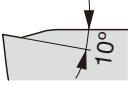
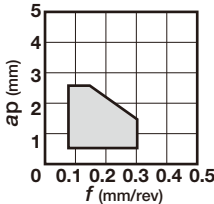
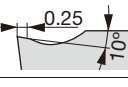
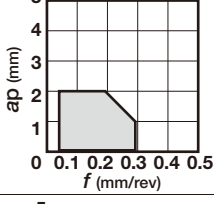
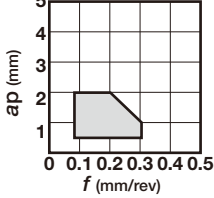
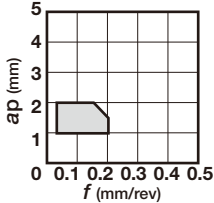
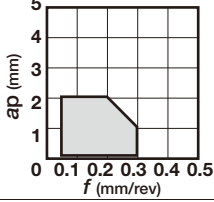
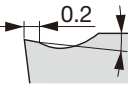
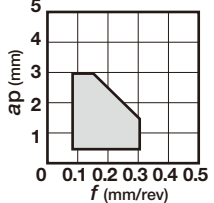
Application	Positive type with hole	JXB
Back turning		 B160

Application	Positive type with hole	JXR
Reverse turning		 B160

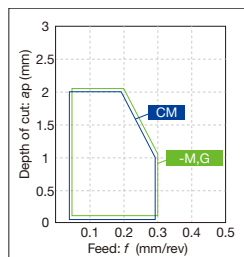
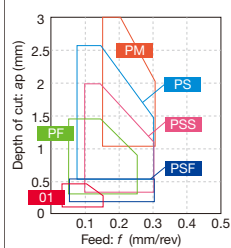
Application	Positive type with hole	JTB
Back turning		 B161

Application	Round	RT
Medium cutting		 B131

Special round insert

Application	Positive 11° without hole	R	S	T
			 90°	 60°
Finishing to medium cutting	PS  			 B148
	CM  		 B137	 B148
	23  		 B137	 B148
	 (with hand)  		 B137	 B148
	 M,G-class 		 B137	 B148, B149
Medium cutting	24  			 B149

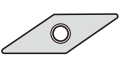
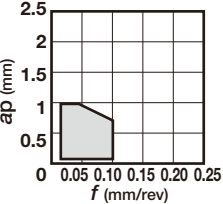
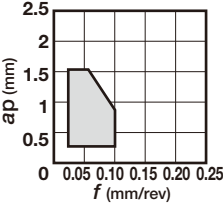
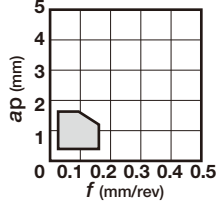
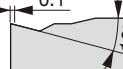
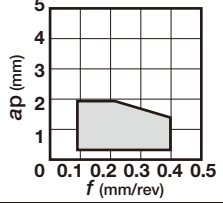
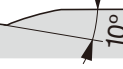
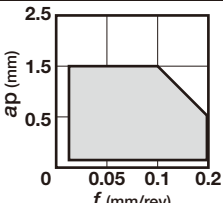
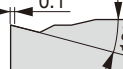
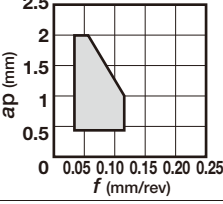
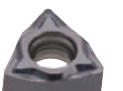
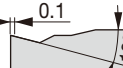
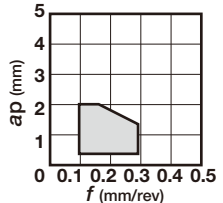
Chip control range

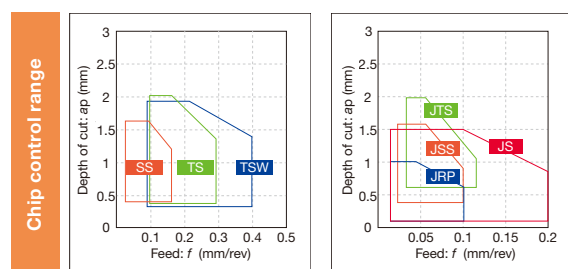


*M,G: Without chipbreaker

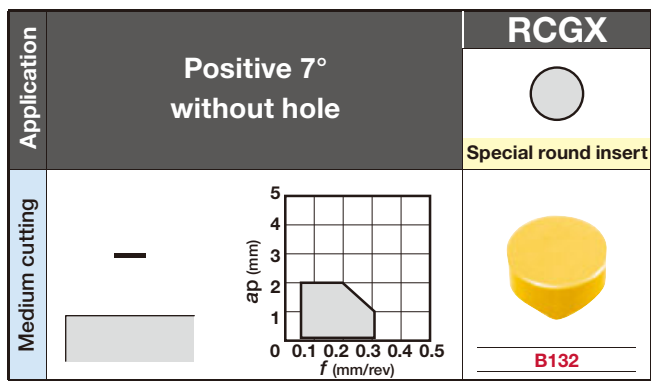
Please see the page B*** for the product details.

Chipbreaker Overview

Application	Double-sided positive type with hole	D	V	W
		 55°	 35°	 80°
Finishing (sharp edge)	JRP  	 B126	 B155	
	JSS  	 B126		 B157
Finishing to medium cutting	SS  	 B126		 B157
Finishing	TSW  			 B157
Finishing to medium cutting (sharp edge)	JS  	 B127	 B155	 B157
	JTS  	 B127		 B158
Finishing to medium cutting	TS  	 B127		 B158



Please see the page B*** for the product details.



Grade

A

Insert

B

Ext. Toolholder

C

Int. Toolholder

D

Threading

E

Grooving

F

Miniature tool

G

Milling cutter

H

Endmill

I

Drilling tool

J

Tooling System

K

User's Guide

L

Index

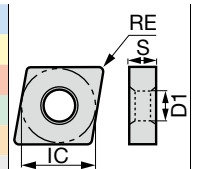
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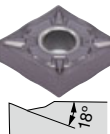
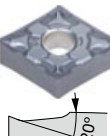
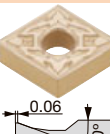
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting



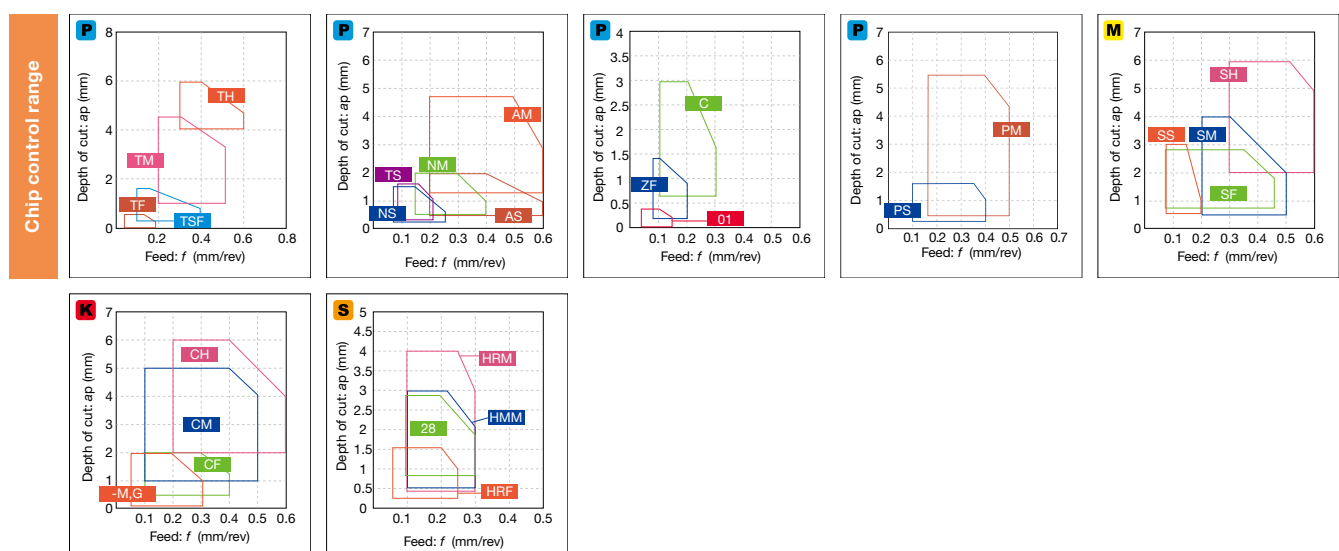
**Rhombic, 80°
with hole**

	P	M	K	N	S	H
Steel	c					
Stainless	e		e	e	e	
Cast iron		e	e			
Non-ferrous						
Superalloy			e	e		
Hard material						



Application	Chipbreaker	Designation	Coated								Dimension (mm)									
			T6215	T5105	T5115	AH8005	AH8015	AH6225	AH6235	AH120	GH330	RE	IC	S	D1					
Finishing		SF	CNMG090304-SF	●				●								0.4	9.525	3.18	3.81	
			CNMG090308-SF	●				●									0.8	9.525	3.18	3.81
			CNMG120404-SF	●				●									0.4	12.7	4.76	5.16
			CNMG120408-SF	●				●									0.8	12.7	4.76	5.16
			CNMG120412-SF	●				●									1.2	12.7	4.76	5.16
		SS	CNMG090404E-SS					●	●								0.4	9.525	4.76	3.81
			CNMG090408E-SS					●	●								0.8	9.525	4.76	3.81
			CNMG120404-SS	●				●	●	●	●						0.4	12.7	4.76	5.16
			CNMG120408-SS	●				●	●	●	●						0.8	12.7	4.76	5.16
			CNMG120412-SS	●				●	●		●						1.2	12.7	4.76	5.16
		HRF	CNMG120404-HRF				●	●									0.4	12.7	4.76	5.16
			CNMG120408-HRF				●	●									0.8	12.7	4.76	5.16
			CNMG120412-HRF				●	●									1.2	12.7	4.76	5.16
		CF	CNMG120404-CF		●	●											0.4	12.7	4.76	5.16
			CNMG120408-CF		●	●											0.8	12.7	4.76	5.16
			CNMG120412-CF		●	●											1.2	12.7	4.76	5.16

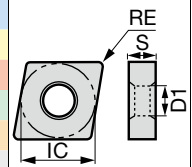
● : Line up



*-M.G: Without chipbreaker

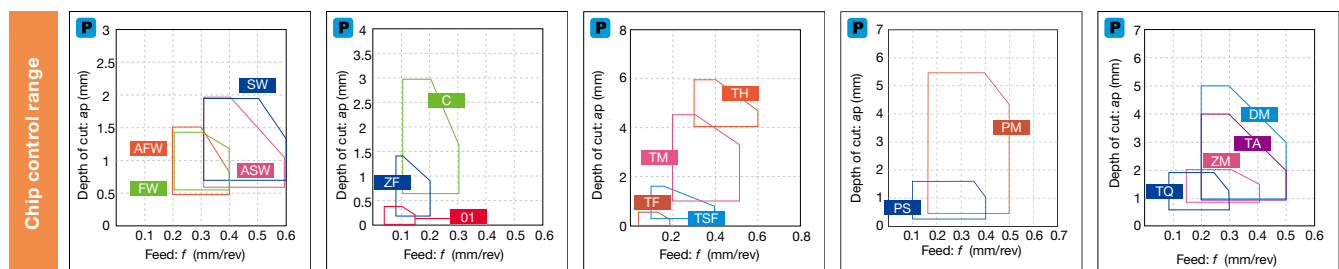
Reference pages: External toolholder → **C015 -** Internal toolholder → **D025 -**
 J-Series toolholder → **G050** TungCap → **K008 -**
 PINZBOHR® → **K178 -** Cartridge → **K181 -**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

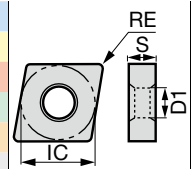
Application	Chipbreaker	Designation	Material												Coated		Coated cermet	Cermet	Dimension (mm)				
			T9205	T9215	T9225	T9235	T6215	T515	AH8015	AH6225	AH6235	AH725	AH110	AH120	GT9530	NS9530					RE	IC	S
Medium cutting	TM	CNMG090304-TM	●	●																0.4	9.525	3.18	3.81
		CNMG090308-TM	●	●	●															0.8	9.525	3.18	3.81
		CNMG090404E-TM	●	●		●	●	●	●				●							0.4	9.525	4.76	3.81
		CNMG090408E-TM	●	●		●	●	●	●				●							0.8	9.525	4.76	3.81
		CNMG090412E-TM	●	●		●	●	●	●				●							1.2	9.525	4.76	3.81
		CNMG120404-TM	●	●	●	●	●	●	●	●			●							0.4	12.7	4.76	5.16
		CNMG120408-TM	●	●	●	●	●	●	●	●	●		●							0.8	12.7	4.76	5.16
		CNMG120412-TM	●	●	●	●	●	●	●	●	●	●	●							1.2	12.7	4.76	5.16
		CNMG120416-TM		●	●	●	●	●	●	●			●							1.6	12.7	4.76	5.16
		CNMG160608-TM		●																0.8	15.875	6.35	6.35
		CNMG160612-TM	●	●	●	●							●							1.2	15.875	6.35	6.35
		CNMG190608-TM	●	●	●	●							●							0.8	19.05	6.35	7.93
		CNMG190612-TM	●	●	●	●							●							1.2	19.05	6.35	7.93
	Medium cutting for mild steel	ZM	CNMG090404E-ZM	●	●		●		●	●											0.4	9.525	4.76
		CNMG090408E-ZM	●	●		●		●	●											0.8	9.525	4.76	3.81
		CNMG090412E-ZM	●	●		●		●	●											1.2	9.525	4.76	3.81
		CNMG120404-ZM	●	●		●		●	●											0.4	12.7	4.76	5.16
		CNMG120408-ZM	●	●	●	●		●	●					●	●					0.8	12.7	4.76	5.16
		CNMG120412-ZM	●	●	●	●		●	●						●					1.2	12.7	4.76	5.16
		CNMG120416-ZM	●	●		●		●	●											1.6	12.7	4.76	5.16

● : Line up



Reference pages: External toolholder → **C015 -** Internal toolholder → **D025 -**
 J-Series toolholder → **G050** TungCap → **K008 -**
 PINZBOHR® → **K178 -** Cartridge → **K181 -**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

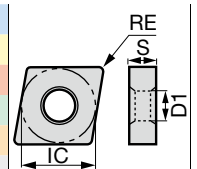
* Please see **L011 - L015** about the adjustment of the machining program for rounding or taper machining by using SW/FW. ● : Line up
Please contact our sales representatives if you have any question.

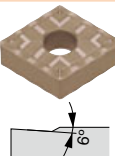
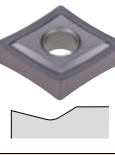
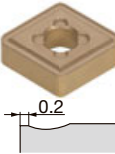
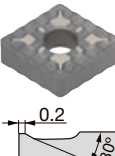
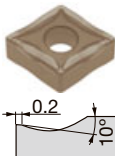


Index	User's Guide	Tooling System	Drilling tool	Endmill	Milling cutter	Miniature tool	Grooving	Threading	Int. toolholder	Ext. toolholder	Insert	Grade
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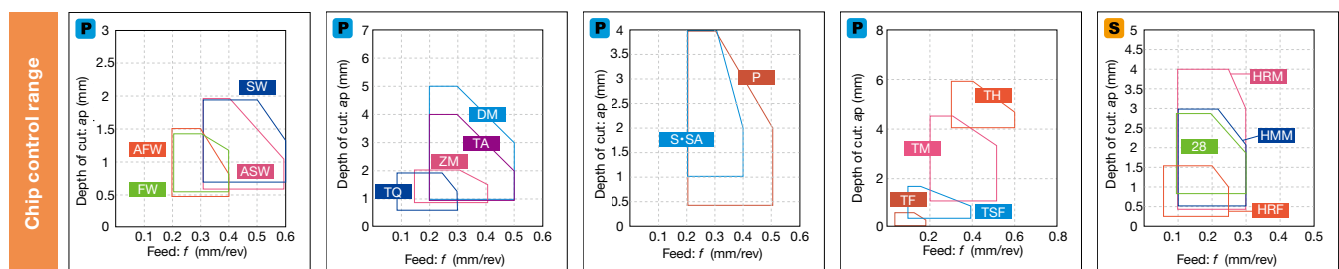
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Rhombic, 80°
with hole**

[illegible]

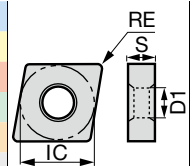
Application	Chipbreaker	Designation	Coated												Coated cermet		Cermet		Uncoated		Dimension (mm)				
			T9205	T9215	T9225	T9235	T515	AH8005	AH8015	AH6225	AH725	AH110	AH120	GH330	GT720		NS9530		KS05F	TH10	RE	IC	S	D1	
Medium cutting		27	CNMG120404-27	●	●												●				0.4	12.7	4.76	5.16	
			CNMG120408-27	●	●	●												●				0.8	12.7	4.76	5.16
			CNMG120412-27			●																1.2	12.7	4.76	5.16
		28	CNMG120404-28			●		●	●		●	●							●		0.4	12.7	4.76	5.16	
			CNMG120408-28					●	●		●	●							●		0.8	12.7	4.76	5.16	
			CNMG120412-28					●	●												1.2	12.7	4.76	5.16	
			CNMG120402-28																●		0.2	12.7	4.76	5.16	
			CNMG120404-28																●		0.4	12.7	4.76	5.16	
			CNMG120408-28																●		0.8	12.7	4.76	5.16	
		33	CNMG120408-33								●				●						0.8	12.7	4.76	5.16	
			CNMG120416-33		●																1.6	12.7	4.76	5.16	
		CNMG160612-33		●																1.2	15.875	6.35	6.35		
		CNMG190612-33		●																1.2	19.05	6.35	7.93		
	37	CNMG120404-37		●												●				0.4	12.7	4.76	5.16		
		CNMG120408-37		●	●							●				●		●		0.8	12.7	4.76	5.16		
		CNMG120412-37		●																1.2	12.7	4.76	5.16		
	38	CNMG120404-38									●									0.4	12.7	4.76	5.16		
		CNMG120408-38		●					●		●									0.8	12.7	4.76	5.16		
Medium to heavy cutting		TH	CNMG120408-TH	●	●	●	●	●		●	●		●							0.8	12.7	4.76	5.16		
			CNMG120412-TH	●	●	●	●	●		●	●		●								1.2	12.7	4.76	5.16	
			CNMG120416-TH	●	●	●	●	●		●			●								1.6	12.7	4.76	5.16	
			CNMG160612-TH	●	●	●	●					●									1.2	15.875	6.35	6.35	
			CNMG160616-TH	●	●	●	●					●									1.6	15.875	6.35	6.35	
			CNMG190612-TH	●	●	●	●					●									1.2	19.05	6.35	7.93	
			CNMG190616-TH	●	●	●	●					●									1.6	19.05	6.35	7.93	

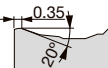
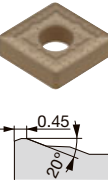
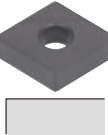
● : Line up



Reference pages: External toolholder → **C015 -** Internal toolholder → **D025 -**
 J-Series toolholder → **G050** TungCap → **K008 -**
 PINZBOHR® → **K178 -** Cartridge → **K181 -**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

Application	Chipbreaker	Designation	Coated					Cermet	Uncoated	Ceramic	Dimension (mm)								
			T9205	T9215	T9225	T9235	T505				T515	T5105	T5115	T5125	RE	IC	S	D1	
Medium to heavy cutting (single side)		TU	CNMM190612-TU			●	●								1.2	19.05	6.35	7.93	
			CNMM190616-TU			●	●									1.6	19.05	6.35	7.93
			CNMM190624-TU		●	●	●									2.4	19.05	6.35	7.93
			CNMM250924-TU			●	●									2.4	25.4	9.52	9.12
		TUS	CNMM190608-TUS		●	●									0.8	19.05	6.35	7.93	
			CNMM190612-TUS		●	●	●									1.2	19.05	6.35	7.93
			CNMM190616-TUS		●	●	●									1.6	19.05	6.35	7.93
			CNMM190624-TUS		●	●	●									2.4	19.05	6.35	7.93
			CNMM190632-TUS		●	●										3.2	19.05	6.35	7.93
			CNMM250916-TUS		●	●	●									1.6	25.4	9.52	9.12
			CNMM250924-TUS		●	●	●									2.4	25.4	9.52	9.12
			CNMM250932-TUS		●	●										3.2	25.4	9.52	9.12
	Finishing to medium cutting		-	CNMA090404E					●							0.4	9.525	4.76	3.81
			CNMA090408E					●								0.8	9.525	4.76	3.81
			CNMA090412E					●								1.2	9.525	4.76	3.81
			CNMA090416E					●								1.6	9.525	4.76	3.81
			CNMA120404						●	●	●					0.4	12.7	4.76	5.16
			CNMA120408	●			●	●	●	●	●	●				0.8	12.7	4.76	5.16
			CNMA120412	●			●	●	●	●	●	●				1.2	12.7	4.76	5.16
			CNMA120416	●					●	●	●	●				1.6	12.7	4.76	5.16
			CNMA160608						●		●					0.8	15.875	6.35	6.35
			CNMA160612					●	●	●	●					1.2	15.875	6.35	6.35
			CNMA160616					●								1.6	15.875	6.35	6.35
			CNMA190612					●		●	●					1.2	19.05	6.35	7.93
			CNMA190616					●			●					1.6	19.05	6.35	7.93

*-M,G: Without chipbreaker

Reference pages: External toolholder → **C015 -** Internal toolholder → **D025 -**
 J-Series toolholder → **G050** TungCap → **K008 -**
 PINZBOHR® → **K178 -** Cartridge → **K181 -**

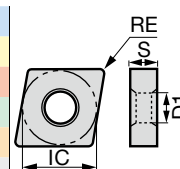
Insert NEGATIVE TYPE

● : Continuous cutting
 ● : Light interrupted cutting
 * : Heavy interrupted cutting

CN

**Rhombic, 80°
with hole**

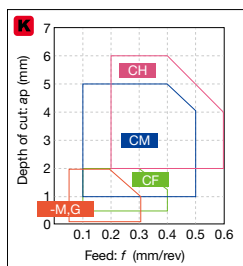
P	Steel	●●
M	Stainless	
K	Cast iron	●●
N	Non-ferrous	
S	Superalloy	
H	Hard material	●●●●●●



Application	Chipbreaker	Designation	Cermet		Ceramic						Dimension (mm)			
			NS520		TZ120	FX105	CX710	LX10	LX11	LX21	RE	IC	S	D1
Finishing to medium cutting	Wiper	CNMA120408W				●					0.8	12.7	4.76	5.16
		CNMA120412W				●					1.2	12.7	4.76	5.16
		CNMA120416W				●					1.6	12.7	4.76	5.16
	-	CNGA120404				●	●	▲	●		0.4	12.7	4.76	5.16
		CNGA120408	●		●	●	●	●	▲	●	0.8	12.7	4.76	5.16
		CNGA120412			●	●	●	▲	●		1.2	12.7	4.76	5.16
		CNGA120416			●	●	●	▲			1.6	12.7	4.76	5.16
		CNGA120420					●	▲			2	12.7	4.76	5.16

● : Line up
 ▲ : To be discontinued

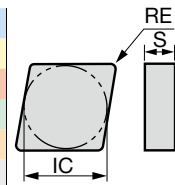
Chip control range



*-M,G: Without chipbreaker

Reference pages: External toolholder → **C015 -** Internal toolholder → **D025 -**
 J-Series toolholder → **G050** TungCap → **K008 -**
 PINZBOHR® → **K178 -** Cartridge → **K181 -**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting

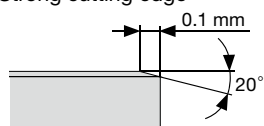
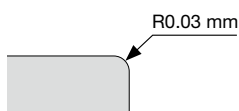
 Rhombic, 80°
without hole[illegible]

Finishing to medium cutting

● : Line up
▲ : To be discontinued

E: Low cutting force

T1: Strong cutting edge



Reference pages: CNGD...: External toolholder → C020

	User's Guide	Tooling System	Drilling tool	Endmill	Milling cutter	Miniature tool	Grooving	Threading	Int. Toolholder	Ext. Toolholder	Insert Grade
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DN

Rhombic, 55°
with hole

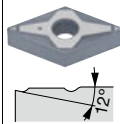
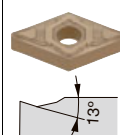
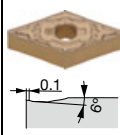
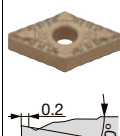
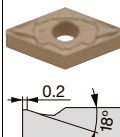
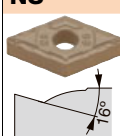
RE

S

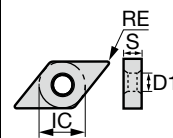
D1

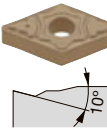
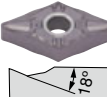
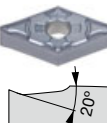
IC

P	Steel	●	●	●	●	✱	✱	●										●	●	●		●			
M	Stainless		●	●				●		●	●	●	●									●			
K	Cast iron	●	●	●				●	●		●	●						●	●	●		●			
N	Non-ferrous																					●			
S	Superalloy									●		●	●												
H	Hard material																								

Application	Chipbreaker	Designation	Coated							Coated cermet		Cermet	Uncoated	Dimension (mm)							
			T9205	T9215	T9225	T9235	T6215	T515	AH8015	AH6225	AH120	GT9530	AT9530	NS9530		TH10	RE	IC	S	D1	
Finishing		TF DNMG110402E-TF	●	●			●			●	●			●				0.2	9.525	4.76	3.81
		TF DNMG110404E-TF	●	●			●			●	●			●				0.4	9.525	4.76	3.81
		TF DNMG110408E-TF	●	●			●			●	●			●				0.8	9.525	4.76	3.81
		TF DNMG150402-TF	●	●			●			●	●			●				0.2	12.7	4.76	5.16
		TF DNMG150404-TF	●	●			●			●	●			●		●		0.4	12.7	4.76	5.16
		TF DNMG150408-TF	●	●			●			●	●			●				0.8	12.7	4.76	5.16
		TSF DNMG110402E-TSF	●	●			●			●	●	●		●				0.2	9.525	4.76	3.81
		TSF DNMG110404E-TSF	●	●		●	●			●	●	●		●				0.4	9.525	4.76	3.81
		TSF DNMG110408E-TSF	●	●		●	●			●	●	●		●				0.8	9.525	4.76	3.81
		TSF DNMG110412E-TSF	●	●						●		●	●	●				1.2	9.525	4.76	3.81
		TSF DNMG150402-TSF	●	●			●			●	●			●				0.2	12.7	4.76	5.16
		TSF DNMG150404-TSF	●	●	●	●	●	●		●	●	●		●				0.4	12.7	4.76	5.16
		TSF DNMG150408-TSF	●	●	●	●	●	●		●	●	●		●				0.8	12.7	4.76	5.16
		TSF DNMG150412-TSF	●	●	●	●	●	●		●	●			●				1.2	12.7	4.76	5.16
		TSF DNMG150602-TSF		●	●		●			●	●			●				0.2	12.7	6.35	5.16
		TSF DNMG150604-TSF		●	●		●			●	●	●		●				0.4	12.7	6.35	5.16
		TSF DNMG150608-TSF	●	●	●	●	●			●	●	●		●				0.8	12.7	6.35	5.16
		TSF DNMG150612-TSF	●	●	●	●	●			●	●			●				1.2	12.7	6.35	5.16
		PS DNMG110402E-PS		●	●		●			●	●			●				0.2	9.525	4.76	3.81
		PS DNMG110404E-PS		●	●		●			●	●			●				0.4	9.525	4.76	3.81
		PS DNMG110408E-PS		●	●		●			●	●			●				0.8	9.525	4.76	3.81
		PS DNMG150402-PS		●	●		●			●	●			●				0.2	12.7	4.76	5.16
		PS DNMG150404-PS		●	●		●			●	●			●				0.4	12.7	4.76	5.16
		PS DNMG150408-PS		●	●		●			●	●			●				0.8	12.7	4.76	5.16
		PS DNMG150412-PS		●	●		●			●	●			●				1.2	12.7	4.76	5.16
		PS DNMG150602-PS		●	●		●			●	●			●				0.2	12.7	6.35	5.16
		PS DNMG150604-PS		●	●		●			●	●			●				0.4	12.7	6.35	5.16
		PS DNMG150608-PS		●	●		●			●	●			●				0.8	12.7	6.35	5.16
PS DNMG150612-PS		●	●		●			●	●			●				1.2	12.7	6.35	5.16		
Finishing for mild steel		ZF DNMG110402E-ZF		●	●		●			●	●			●				0.2	9.525	4.76	3.81
		ZF DNMG110404E-ZF		●	●		●			●	●			●				0.4	9.525	4.76	3.81
		ZF DNMG110408E-ZF		●	●		●			●	●			●				0.8	9.525	4.76	3.81
		ZF DNMG150402-ZF		●	●		●			●	●			●				0.2	12.7	4.76	5.16
		ZF DNMG150404-ZF		●	●	●	●			●	●	●		●				0.4	12.7	4.76	5.16
		ZF DNMG150408-ZF		●	●	●	●			●	●	●		●				0.8	12.7	4.76	5.16
		ZF DNMG150412-ZF		●	●	●	●			●	●			●				1.2	12.7	4.76	5.16
		ZF DNMG150602-ZF		●	●		●			●	●			●				0.2	12.7	6.35	5.16
		ZF DNMG150604-ZF		●	●		●			●	●			●				0.4	12.7	6.35	5.16
		ZF DNMG150608-ZF		●	●	●	●			●	●			●				0.8	12.7	6.35	5.16
		ZF DNMG150612-ZF		●	●		●			●	●			●				1.2	12.7	6.35	5.16
		AS DNMG150404-AS		●		●								●				0.4	12.7	4.76	5.16
AS DNMG150408-AS			●	●	●								●				0.8	12.7	4.76	5.16	
AS DNMG150412-AS			●	●	●												1.2	12.7	4.76	5.16	
AS DNMG150604-AS			●														0.4	12.7	6.35	5.16	
AS DNMG150608-AS			●	●													0.8	12.7	6.35	5.16	
AS DNMG150612-AS			●														1.2	12.7	6.35	5.16	
Finishing		NS DNMG150404-NS			●								●				0.4	12.7	4.76	5.16	
		NS DNMG150408-NS	●	●	●									●				0.8	12.7	4.76	5.16
																					

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

 Rhombic, 55°
with hole[illegible]

Application	Chipbreaker	Designation	Coated										Coated cermet		Cermet		Uncoated		Dimension (mm)						
			T9205	T9215	T9225	T9235	T6215	AH8005	AH8015	AH6225	AH6235	AH120	GH330	GT9530	AT9530	NS9530	NS520	KS20			RE	IC	S	D1	
Finishing		TS	DNMG110402E-TS		●	●		●		●	●				●		●					0.2	9.525	4.76	3.81
		DNMG110404E-TS		●	●		●		●	●					●		●					0.4	9.525	4.76	3.81
		DNMG110408E-TS		●	●		●		●	●					●		●					0.8	9.525	4.76	3.81
		DNMG150402-TS		●	●		●		●	●						●						0.2	12.7	4.76	5.16
		DNMG150404-TS		●	●	●	●		●	●				●	●	●	●					0.4	12.7	4.76	5.16
		DNMG150408-TS	●	●	●	●	●		●	●				●	●	●	●					0.8	12.7	4.76	5.16
		DNMG150412-TS	●	●	●	●	●		●	●						●						1.2	12.7	4.76	5.16
		DNMG150602-TS		●	●				●	●						●						0.2	12.7	6.35	5.16
		DNMG150604-TS		●	●		●		●	●				●	●	●	●					0.4	12.7	6.35	5.16
		DNMG150608-TS		●	●		●		●	●				●	●	●	●					0.8	12.7	6.35	5.16
		DNMG150612-TS		●	●		●		●	●						●						1.2	12.7	6.35	5.16
			SF	DNMG150404-SF					●			●											0.4	12.7	4.76
	DNMG150408-SF						●				●											0.8	12.7	4.76	5.16
	DNMG150604-SF						●				●											0.4	12.7	6.35	5.16
	DNMG150608-SF						●				●											0.8	12.7	6.35	5.16
		SS	DNMG110404E-SS								●	●										0.4	9.525	4.76	3.81
		DNMG110408E-SS									●	●										0.8	9.525	4.76	3.81
		DNMG150404-SS						●			●	●	●									0.4	12.7	4.76	5.16
		DNMG150408-SS						●			●	●	●	●				●				0.8	12.7	4.76	5.16
		DNMG150412-SS						●			●	●	●	●								1.2	12.7	4.76	5.16
		DNMG150604-SS						●			●	●	●	●	●							0.4	12.7	6.35	5.16
		DNMG150608-SS						●			●	●	●	●	●							0.8	12.7	6.35	5.16
		DNMG150612-SS						●			●	●										1.2	12.7	6.35	5.16
		HRF	DNMG150404-HRF						●	●												0.4	12.7	4.76	5.16
		DNMG150408-HRF							●	●												0.8	12.7	4.76	5.16
		DNMG150604-HRF							●	●												0.4	12.7	6.35	5.16
DNMG150608-HRF								●	●												0.8	12.7	6.35	5.16	

Chip control range

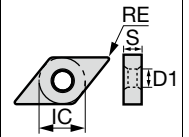
Figure 1 displays five subplots (P, P, P, M, S) showing the depth of cut (a_p) in mm versus feed (f) in mm/rev for various cutting conditions. The conditions are labeled with letters: TH, TM, TF, TSF, PS, PM, TS, NS, ZF, AS, SS, SM, SF, SH, 28, HMM, HRF, HRM. The plots show the range of stable cutting conditions for each tool and material combination.

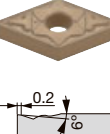
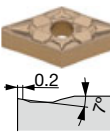
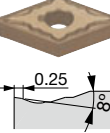
Reference pages: External toolholder → **C034 -** Internal toolholder → **D069 -**
J-Series toolholder → **G068** TungCap → **C034 -, K012 -**

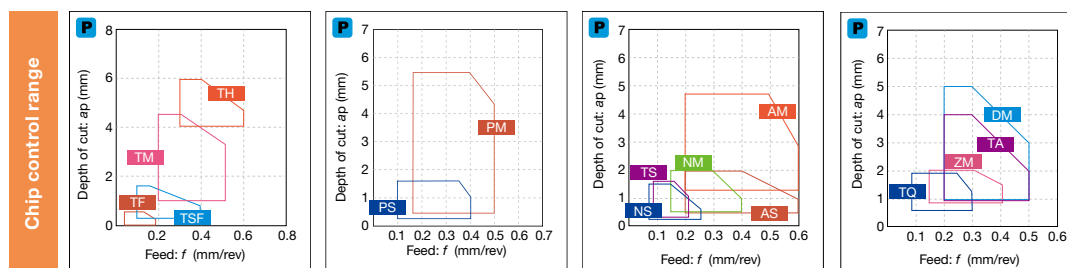
Index	User's Guide	Tooling System	Drilling tool	Endmill	Milling cutter	Miniature tool	Grooving	Threading	Int. Toolholder	Ext. Toolholder	Insert	Grade
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- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

 Rhombic, 55°
with hole

[illegible]

Application	Chipbreaker	Designation	Coated										Coated cermet		Cermet		Dimension (mm)						
			T9205	T9215	T9225	T9235	T6215	T515	AH8005	AH8015	AH6225	AH6235	AH110	AH120	GT9530		NS9530			RE	IC	S	D1
Medium cutting		TM	DNMG110404E-TM	●	●	●	●			●	●		●						0.4	9.525	4.76	3.81	
			DNMG110408E-TM	●	●	●	●			●	●		●							0.8	9.525	4.76	3.81
			DNMG110412E-TM	●	●	●	●			●	●		●							1.2	9.525	4.76	3.81
			DNMG110404-TM	●	●	●	●													0.4	9.525	4.76	3.81
			DNMG110408-TM	●	●	●	●													0.8	9.525	4.76	3.81
			DNMG150404-TM	●	●	●	●	●		●	●	●		●						0.4	12.7	4.76	5.16
			DNMG150408-TM	●	●	●	●	●		●	●	●		●						0.8	12.7	4.76	5.16
			DNMG150412-TM	●	●	●	●	●		●	●	●	●	●						1.2	12.7	4.76	5.16
			DNMG150416-TM	●	●	●	●	●		●	●	●		●						1.6	12.7	4.76	5.16
			DNMG150604-TM	●	●	●	●	●		●	●			●						0.4	12.7	6.35	5.16
			DNMG150608-TM	●	●	●	●	●		●	●			●						0.8	12.7	6.35	5.16
			DNMG150612-TM	●	●	●	●	●		●	●			●						1.2	12.7	6.35	5.16
		DNMG150616-TM	●	●	●	●	●		●	●									1.6	12.7	6.35	5.16	
		PM	DNMG110404E-PM	●	●		●				●	●							0.4	9.525	4.76	3.81	
			DNMG110408E-PM	●	●		●					●	●							0.8	9.525	4.76	3.81
			DNMG110412E-PM	●	●		●					●	●							1.2	9.525	4.76	3.81
			DNMG150404-PM	●	●		●					●	●							0.4	12.7	4.76	5.16
			DNMG150408-PM	●	●		●					●	●							0.8	12.7	4.76	5.16
			DNMG150412-PM	●	●		●					●	●							1.2	12.7	4.76	5.16
			DNMG150416-PM	●	●		●					●	●							1.6	12.7	4.76	5.16
		DNMG150604-PM	●	●		●					●	●							0.4	12.7	6.35	5.16	
Medium cutting for mild steel	ZM	DNMG110404E-ZM	●	●		●				●	●								0.4	9.525	4.76	3.81	
		DNMG110408E-ZM	●	●		●				●	●								0.8	9.525	4.76	3.81	
		DNMG110412E-ZM	●	●		●				●	●								1.2	9.525	4.76	3.81	
		DNMG150404-ZM	●	●		●					●	●							0.4	12.7	4.76	5.16	
		DNMG150408-ZM	●	●	●	●					●	●		●	●				0.8	12.7	4.76	5.16	
		DNMG150412-ZM	●	●	●	●					●	●							1.2	12.7	4.76	5.16	
		DNMG150416-ZM	●	●		●					●	●							1.6	12.7	4.76	5.16	
		DNMG150604-ZM	●	●		●					●	●							0.4	12.7	6.35	5.16	
		DNMG150608-ZM	●	●	●	●					●	●							0.8	12.7	6.35	5.16	
		DNMG150612-ZM	●	●		●					●	●							1.2	12.7	6.35	5.16	
		DNMG150616-ZM	●	●		●					●	●							1.6	12.7	6.35	5.16	
	Medium cutting		AM	DNMG150408-AM	●	●														0.8	12.7	4.76	5.16
			DNMG150412-AM	●	●															1.2	12.7	4.76	5.16
			DNMG150416-AM	●	●															1.6	12.7	4.76	5.16
			DNMG150608-AM	●	●															0.8	12.7	6.35	5.16
			DNMG150612-AM	●	●															1.2	12.7	6.35	5.16
			DNMG150616-AM	●	●															1.6	12.7	6.35	5.16

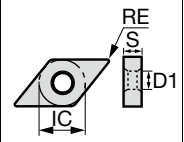


Reference pages: External toolholder → **C034 -** Internal toolholder → **D069 -**
J-Series toolholder → **G068** TungCap → **C034 -, K012 -**

Tungaloy B069

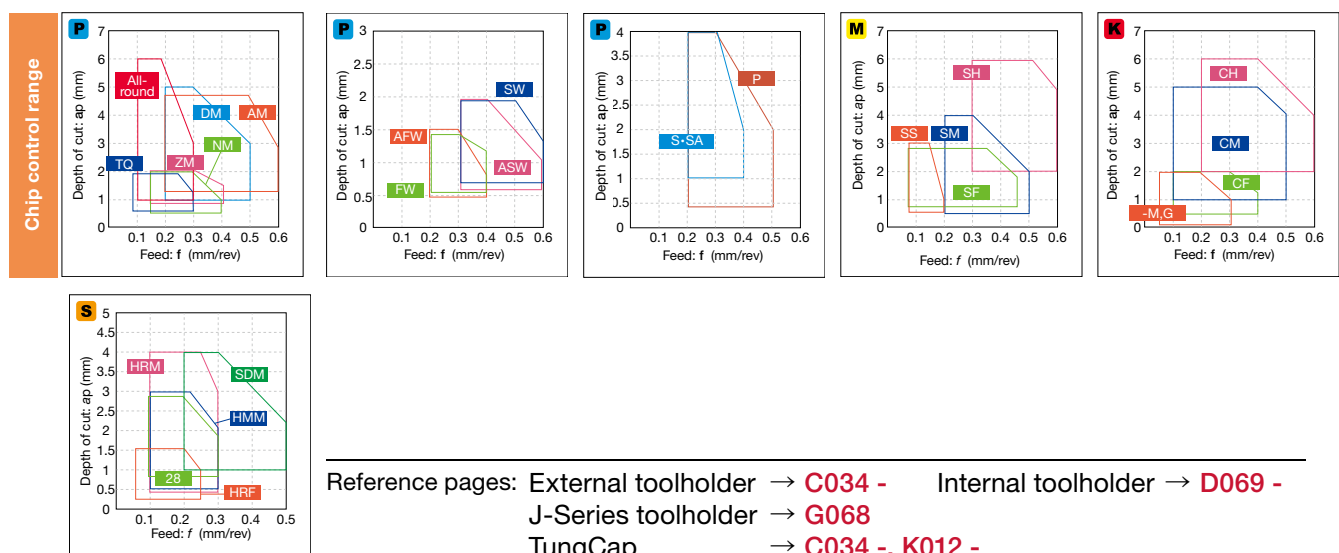
[illegible]

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

 Rhombic, 55°
with hole[illegible]

* Please see **L011 - L015** about the adjustment of the machining program for rounding or taper machining by using SW/FW.
Please contact our sales representatives if you have any question.

● : Line up



Reference pages: External toolholder → **C034 -** Internal toolholder → **D069 -**
 J-Series toolholder → **G068**
 TungCap → **C034 -, K012 -**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

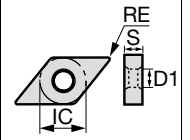
 Rhombic, 55°
with hole[illegible]

Figure 10 displays four subplots (P, Q, M, K) showing the chip control range (Depth of cut: a_p (mm) vs. Feed: f (mm/rev)) for various tool-chip combinations. The legend indicates that a black dot represents a line up.

- Subplot P:** Shows the chip control range for tool-chip combinations TH (red), TM (magenta), TF (orange), and TSF (blue). The y-axis ranges from 0 to 8 mm, and the x-axis ranges from 0 to 0.8 mm/rev.
- Subplot Q:** Shows the chip control range for tool-chip combination THS15 (orange). The y-axis ranges from 0 to 12 mm, and the x-axis ranges from 0 to 1.2 mm/rev.
- Subplot M:** Shows the chip control range for tool-chip combinations SS (red), SM (blue), SH (magenta), and SF (green). The y-axis ranges from 0 to 7 mm, and the x-axis ranges from 0 to 0.6 mm/rev.
- Subplot K:** Shows the chip control range for tool-chip combinations CH (red), CM (blue), CF (green), and -M, G (orange). The y-axis ranges from 0 to 7 mm, and the x-axis ranges from 0 to 0.6 mm/rev.

*-M,G: Without chipbreaker

Internal toolholder → D069 -
TungCap → C034 -, K012 -

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Rhombic, 45°
with hole**

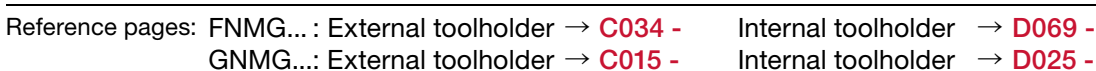
Make sure to offset the cutting edge position after insert change.
Please note that the insert shim may interfere with the workpiece when FNMG insert is used with Q-style toolholder to undercut a work diameter of 50 mm or smaller.

● : Line up

**Rhombic, 70°
with hole**

Make sure to offset the cutting edge position after insert change.
Do not use ISO-EcoTurn cartridge set for CNMG09 (AD-CL-4/3-SET or -SET-S) with GNM09 insert.
The insert may move during machining.

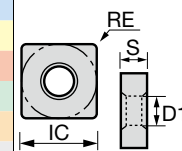
● : Line up



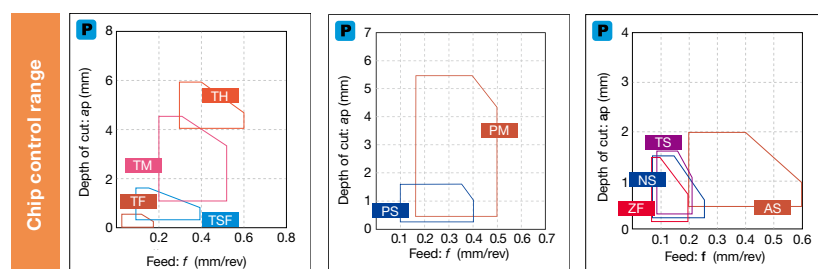
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting



**Square
with hole**

[illegible][illegible]

● : Line up



Reference pages: External toolholder → **C101** - Internal toolholder → **D043** -
Cartridge → **K181** -

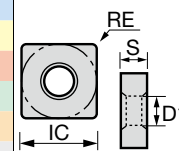
Insert **NEGATIVE TYPE**

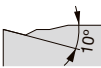
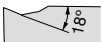
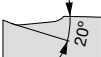
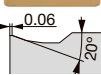
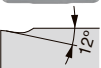
- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

SN



Square with hole

[illegible]

Application	Chipbreaker	Designation	Coated										Coated cermet		Cermet		Uncoated		Dimension (mm)								
			T9205	T9215	T9225	T9235	T6215	T5105	T5115	AH8005	AH8015	AH6225	AH6235	GH330	GT9530	AT9530		NS9530	NS520		TH10			RE	IC	S	D1
Finishing	TS	SNMG120402-TS		●	●		●			●	●							●						0.2	12.7	4.76	5.16
		SNMG120404-TS		●	●		●			●	●				●	●		●						0.4	12.7	4.76	5.16
		SNMG120408-TS	●	●	●	●	●			●	●				●	●		●						0.8	12.7	4.76	5.16
		SNMG120412-TS		●	●	●	●			●	●							●						1.2	12.7	4.76	5.16
																											
	SF	SNMG120404-SF					●				●													0.4	12.7	4.76	5.16
		SNMG120408-SF					●				●													0.8	12.7	4.76	5.16
																											
	SS	SNMG120404-SS					●				●	●	●											0.4	12.7	4.76	5.16
		SNMG120408-SS					●				●	●	●											0.8	12.7	4.76	5.16
		SNMG120412-SS					●				●	●												1.2	12.7	4.76	5.16
																											
	HRF	SNMG120408-HRF							●	●														0.8	12.7	4.76	5.16
		SNMG120412-HRF							●	●														1.2	12.7	4.76	5.16
																											
	CF	SNMG120408-CF						●	●															0.8	12.7	4.76	5.16
		SNMG120412-CF						●	●															1.2	12.7	4.76	5.16
																											
01	SNGG090302-01																●	●					0.2	9.525	3.18	3.81	
	SNGG090304-01																●						0.4	9.525	3.18	3.81	
	SNGG090308-01																●	●					0.8	9.525	3.18	3.81	
	SNGG120402-01																●						0.2	12.7	4.76	5.16	
	SNGG120404-01																●						0.4	12.7	4.76	5.16	
	SNGG120408-01																●	●					0.8	12.7	4.76	5.16	
																	●	●									
11	SNMG120404-11																●						0.4	12.7	4.76	5.16	
	SNMG120408-11																●		●				0.8	12.7	4.76	5.16	
																											

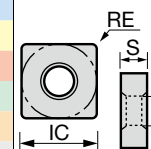
● : Line up

Reference pages: External toolholder → **C101 -** Internal toolholder → **D043 -**
Cartridge → **K181 -**

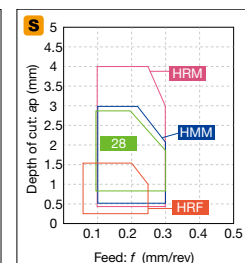
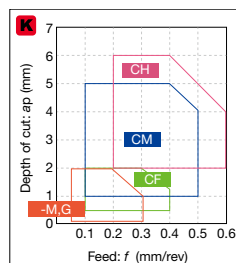
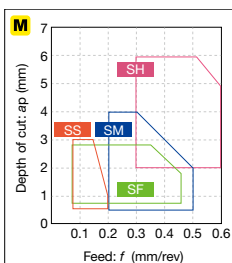
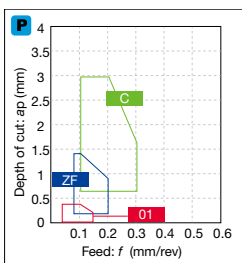
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting



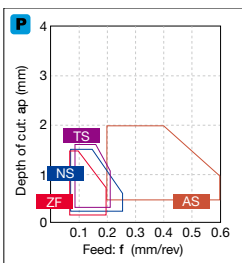
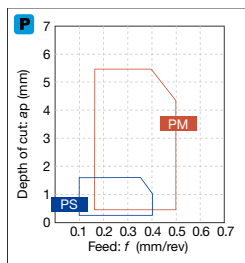
**Square
with hole**

[illegible][illegible]

● : Line up



*-M,G: Without chipbreaker

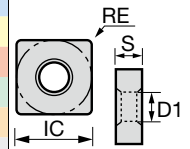


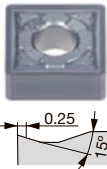
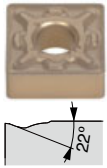
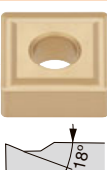
Reference pages: External toolholder → **C101** -
Internal toolholder → **D043** -
Cartridge → **K181** -

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

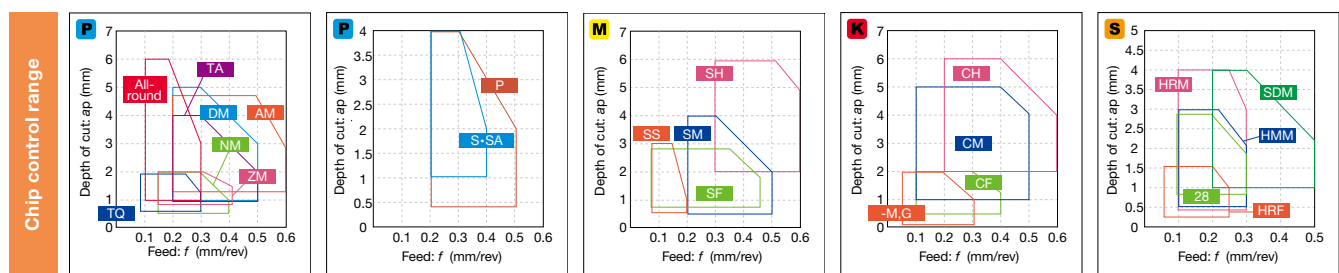


**Square
with hole**

[illegible]

Application	Chipbreaker	Designation	Material											Coated		Uncoated		Dimension (mm)								
			T9215	T9225	T6215	AH8005	AH8015	AH6225	AH6235	AH905	AH120	GH110	GH330		TH10	KS20					RE	IC	S	D1		
Medium cutting		HRM	SNMG120408-HRM																				0.8	12.7	4.76	5.16
			SNMG120412-HRM																				1.2	12.7	4.76	5.16
			SNMG150608-HRM																				0.8	15.875	6.35	6.35
			SNMG150612-HRM																				1.2	15.875	6.35	6.35
			SNMG190612-HRM																				1.2	19.05	6.35	7.93
			SNMG190616-HRM																				1.6	19.05	6.35	7.93
		TA	SNMG120408-TA											●	●								0.8	12.7	4.76	5.16
			SNMG120412-TA											●	●								1.2	12.7	4.76	5.16
		SA	SNMG120404-SA												●		●	●	●			0.4	12.7	4.76	5.16	
			SNMG120408-SA												●		●	●	●		●		0.8	12.7	4.76	5.16
			SNMG120412-SA												●		●	●	●			1.2	12.7	4.76	5.16	
			SNMG190612-SA															●		●		1.2	19.05	6.35	7.93	
		HMM	SNMG120408-HMM														●					0.8	12.7	4.76	5.16	
			SNMG120412-HMM														●						1.2	12.7	4.76	5.16
		P	SNGG090304R-P													●			●		0.4	9.525	3.18	3.81		
			SNGG090304L-P													●			●		0.4	9.525	3.18	3.81		
			SNGG090308R-P													●	●		●		0.8	9.525	3.18	3.81		
			SNGG090308L-P													●			●		0.8	9.525	3.18	3.81		
			SNGG120404R-P													●			●		0.4	12.7	4.76	5.16		
			SNGG120404L-P													●			●		0.4	12.7	4.76	5.16		
		SNGG120408R-P													●			●		0.8	12.7	4.76	5.16			
		SNGG120408L-P													●			●		0.8	12.7	4.76	5.16			

● : Line up



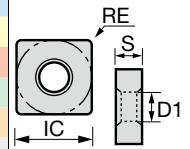
*-M,G: Without chipbreaker

Reference pages: External toolholder → **C101 -** Internal toolholder → **D043 -**
Cartridge → **K181 -**

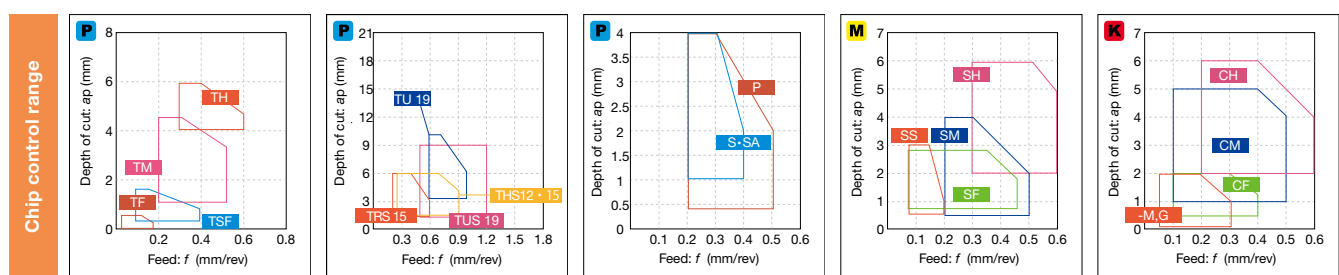
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting



**Square
with hole**

[illegible][illegible]

● : Line up



*-M,G: Without chipbreaker

Reference pages: External toolholder → **C101 -** Internal toolholder → **D043 -**
Cartridge → **K181 -**

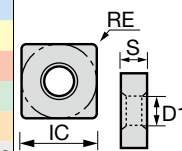
Insert **NEGATIVE TYPE**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

SN

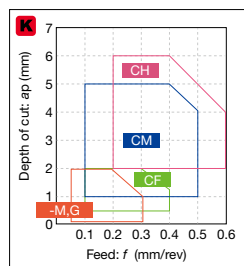
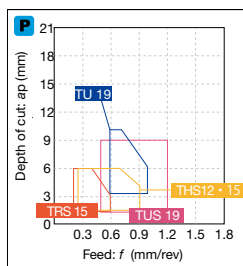


Square with hole

[illegible][illegible]

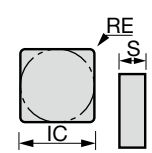
● : Line up
▲ : To be discontinued

Chip control range



Reference pages: External toolholder → **C101** -, Cartridge → **K181** -

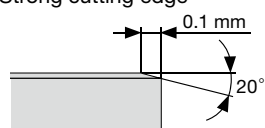
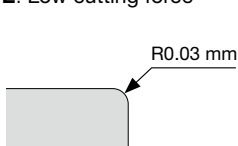
 **Square
without hole**

[illegible][illegible]

● : Line up
▲ : To be discontinued

E: Low cutting force

T1: Strong cutting edge



Negative

C

D



G

R

S

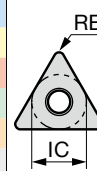


W

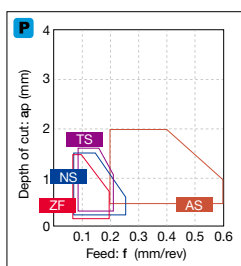
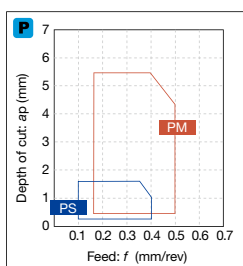
Y

MEMO

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

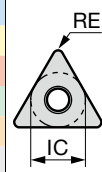
● : Line up



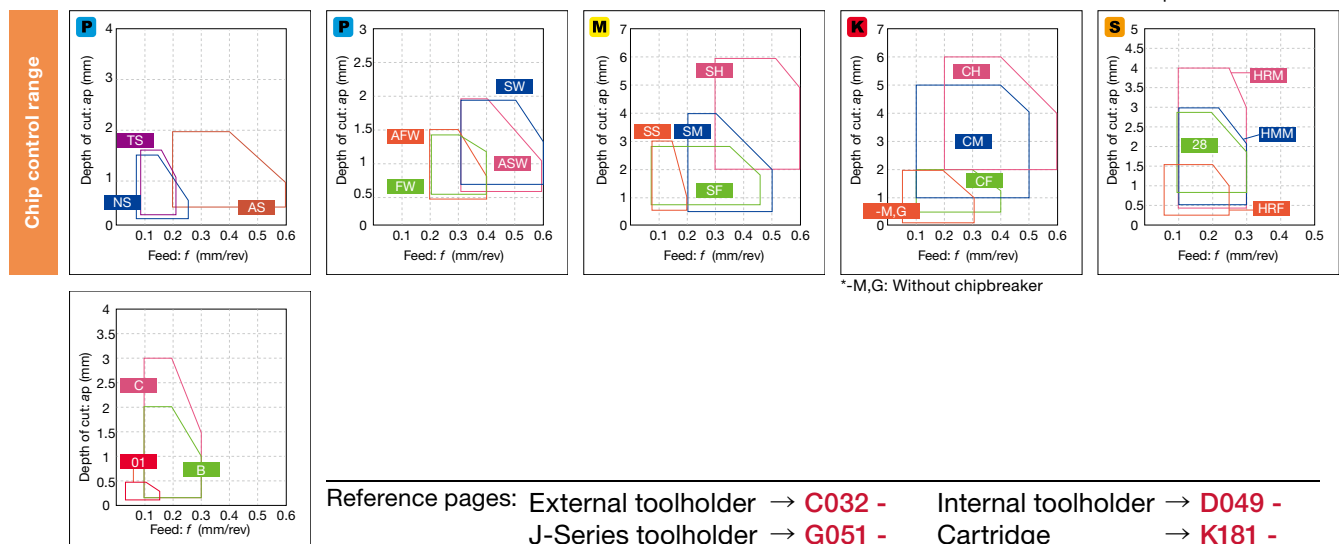
Tungaloy B087

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

Triangular with hole

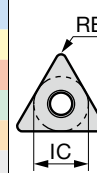
[illegible]

● : Line up

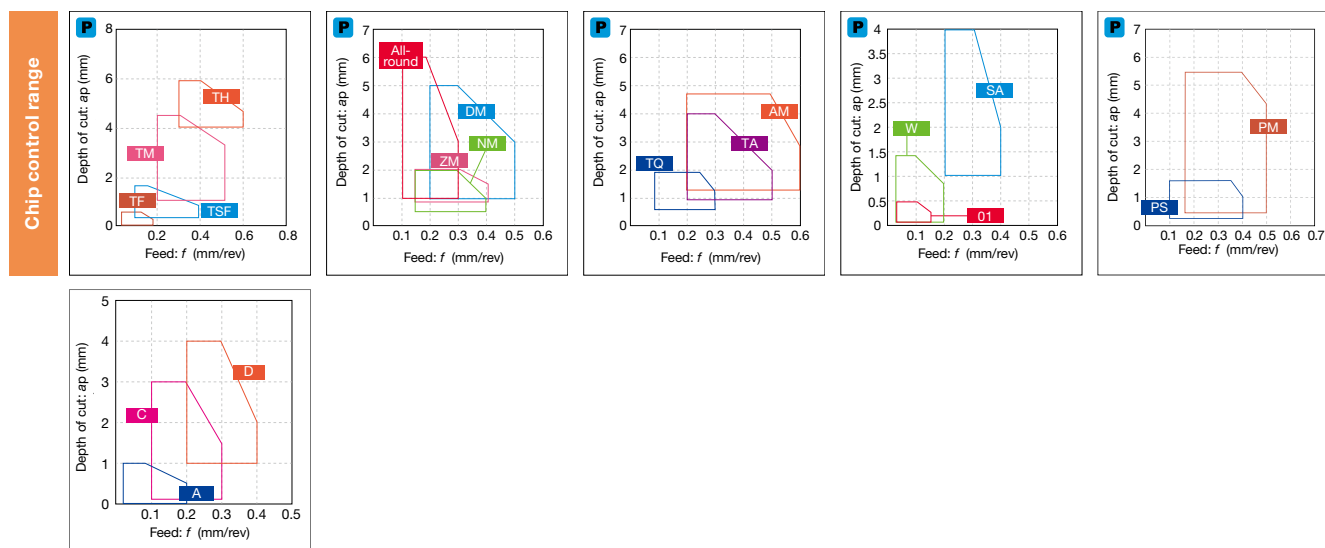


Reference pages: External toolholder → **C032** - Internal toolholder → **D049** -
J-Series toolholder → **G051** - Cartridge → **K181** -

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting

[illegible][illegible]

● : Line up

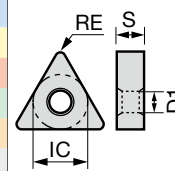


Reference pages: External toolholder → **C032** - Internal toolholder → **D049** -
J-Series toolholder → **G051** - Cartridge → **K181** -

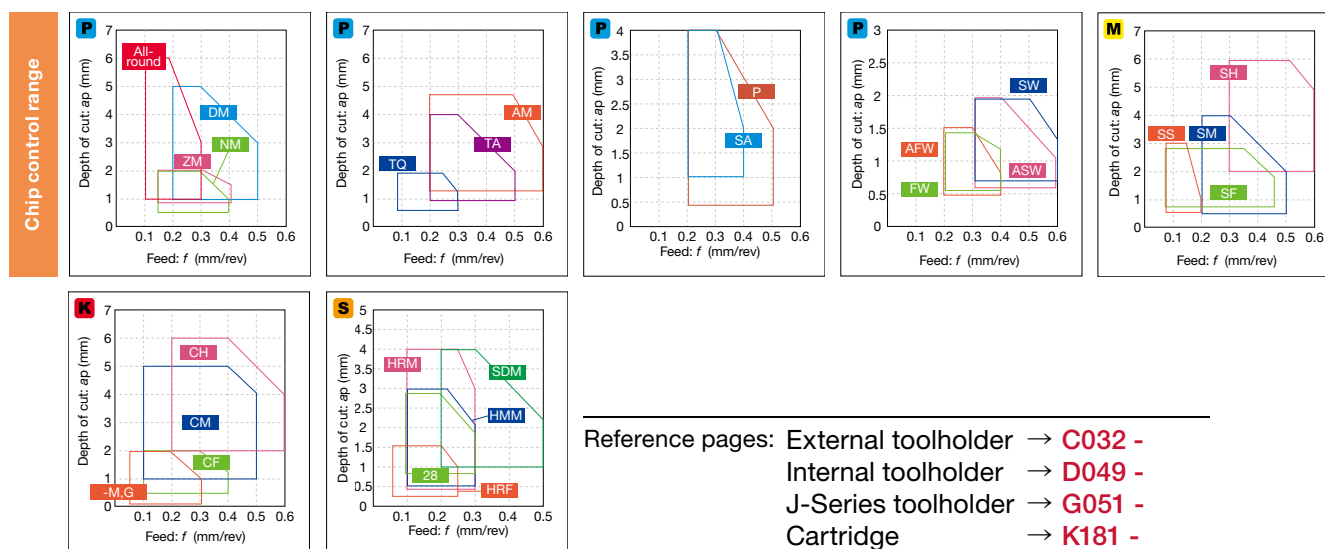
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting



**Triangular
with hole**

[illegible]

* Please see **L011 - L015** about the adjustment of the machining program for rounding or taper machining by using SW/FW. ● : Line up
Please contact our sales representatives if you have any question.



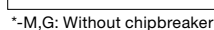
*-M.G: Without chipbreaker

Reference pages: External toolholder → **C032 -**
Internal toolholder → **D049 -**
J-Series toolholder → **G051 -**
Cartridge → **K181 -**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

Triangular with hole

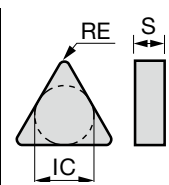
● : Line up



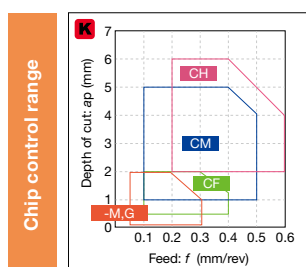
Tungaloy B095

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting

**Triangular
without hole**

[illegible][illegible]

● : Line up
▲ : To be discontinued



*-M,G: Without chipbreaker

Reference pages: Cartridge → **K193** -

Tungaloy B097

Index	User's Guide	Tooling System	Drilling tool	Endmill	Milling cutter	Miniature tool	Grooving	Threading	Int. Toolholder	Ext. Toolholder	Insert	Grade
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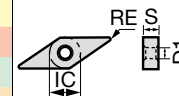
Insert **NEGATIVE TYPE**

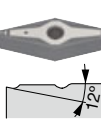
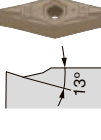
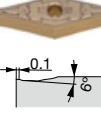
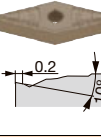
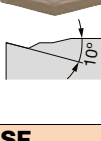
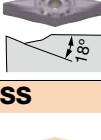
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

VN



**Rhombic, 35°
with hole**

[illegible]

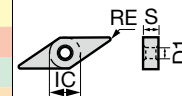
Application	material		Coated											Coated cermet			Cermet		Dimension (mm)							
	Chipbreaker	Designation	T9205	T9215	T9225	T9235	T6215	AH8005	AH8015	AH6225	AH6235	AH120	GH330	GT9530	GT720	AT9530	NS9530	NS520					RE	IC	S	D1
Finishing		TF	VNMG120402E-TF	●	●		●		●	●								●					0.2	7.15	4.76	3.81
			VNMG120404E-TF	●	●		●		●	●								●					0.4	7.15	4.76	3.81
			VNMG120408E-TF	●	●		●		●	●								●					0.8	7.15	4.76	3.81
			VNMG160402-TF	●	●		●		●	●								●					0.2	9.525	4.76	3.81
			VNMG160404-TF	●	●		●		●	●								●					0.4	9.525	4.76	3.81
			VNMG160408-TF	●	●		●		●	●						●		●					0.8	9.525	4.76	3.81
		TSF	VNMG120402E-TSF	●	●		●		●	●					●		●	●					0.2	7.15	4.76	3.81
			VNMG120404E-TSF	●	●		●		●	●					●		●	●					0.4	7.15	4.76	3.81
			VNMG120408E-TSF	●	●		●		●	●					●		●	●					0.8	7.15	4.76	3.81
			VNMG160402-TSF	●	●		●		●	●		●			●		●	●					0.2	9.525	4.76	3.81
			VNMG160404-TSF	●	●	●	●	●	●	●		●			●		●	●					0.4	9.525	4.76	3.81
			VNMG160408-TSF	●	●	●	●	●	●	●		●			●		●	●					0.8	9.525	4.76	3.81
			VNMG160412-TSF	●	●	●	●	●	●	●													1.2	9.525	4.76	3.81
		PS	VNMG120402E-PS	●	●		●		●	●								●					0.2	7.15	4.76	3.81
			VNMG120404E-PS	●	●		●		●	●								●					0.4	7.15	4.76	3.81
			VNMG120408E-PS	●	●		●		●	●								●					0.8	7.15	4.76	3.81
			VNMG160402-PS	●	●		●		●	●								●					0.2	9.525	4.76	3.81
			VNMG160404-PS	●	●		●		●	●								●					0.4	9.525	4.76	3.81
			VNMG160408-PS	●	●		●		●	●								●					0.8	9.525	4.76	3.81
			VNMG160412-PS	●	●		●		●	●								●					1.2	9.525	4.76	3.81
	ZF	VNMG120402E-ZF	●	●		●		●	●								●					0.2	7.15	4.76	3.81	
		VNMG120404E-ZF	●	●		●		●	●								●					0.4	7.15	4.76	3.81	
		VNMG120408E-ZF	●	●		●		●	●								●					0.8	7.15	4.76	3.81	
		VNMG160402-ZF	●	●		●		●	●								●					0.25	9.525	4.76	3.81	
		VNMG160404-ZF	●	●	●	●	●	●	●					●		●	●					0.4	9.525	4.76	3.81	
		VNMG160408-ZF	●	●	●	●	●	●	●					●		●	●					0.8	9.525	4.76	3.81	
		VNMG160412-ZF	●	●	●	●	●	●	●								●					1.2	9.525	4.76	3.81	
	TS	VNMG120402E-TS	●	●		●		●	●								●					0.2	7.15	4.76	3.81	
		VNMG120404E-TS	●	●		●		●	●								●					0.4	7.15	4.76	3.81	
		VNMG120408E-TS	●	●		●		●	●								●					0.8	7.15	4.76	3.81	
		VNMG160402-TS	●	●		●		●	●								●					0.2	9.525	4.76	3.81	
		VNMG160404-TS	●	●	●	●	●	●	●					●		●	●	●				0.4	9.525	4.76	3.81	
		VNMG160408-TS	●	●	●	●	●	●	●					●		●	●	●				0.8	9.525	4.76	3.81	
		VNMG160412-TS	●	●	●	●	●	●	●								●					1.2	9.525	4.76	3.81	
	SF	VNMG160404-SF					●		●													0.4	9.525	4.76	3.81	
		VNMG160408-SF					●		●													0.8	9.525	4.76	3.81	
	SS	VNMG120404E-SS					●		●	●												0.4	7.15	4.76	3.81	
		VNMG120408E-SS					●		●	●												0.8	7.15	4.76	3.81	
		VNMG160404-SS					●		●	●	●	●	●									0.4	9.525	4.76	3.81	
		VNMG160408-SS					●		●	●	●	●	●									0.8	9.525	4.76	3.81	
		VNMG160412-SS					●		●	●	●	●	●									1.2	9.525	4.76	3.81	
	HRF	VNMG160404-HRF						●	●													0.4	9.525	4.76	3.81	
		VNMG160408-HRF						●	●													0.8	9.525	4.76	3.81	

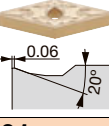
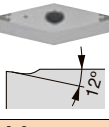
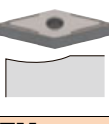
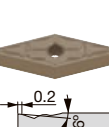
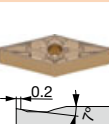
Reference pages: External toolholder → **C041 -** Internal toolholder → **D074 -**
TungCap → **C042 -, K014 -**

● : Line up

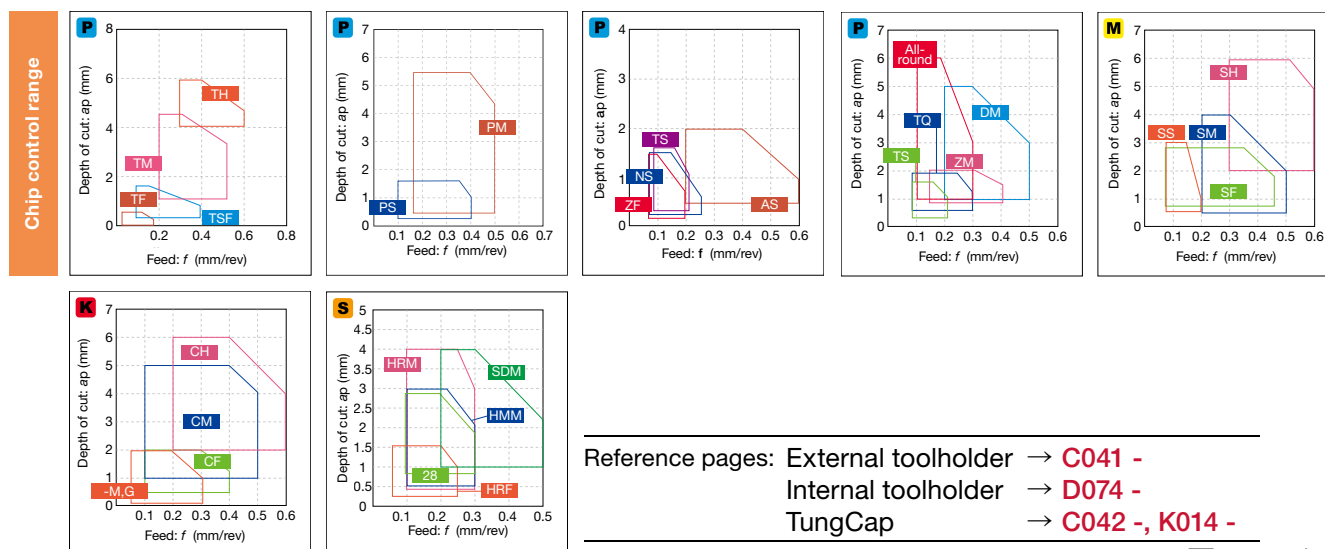
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting

A diagram showing a parallelogram with a circle centered inside it. A point labeled 'F' is located at the bottom right vertex of the parallelogram.

[illegible]

Application	Chipbreaker	Designation	Coated												Coated cermet		Cermet		Uncoated		Dimension (mm)					
			T9205	T9215	T9225	T9235	T6215	T5105	T5115	AH8015	AH6225	AH110	AH120	GH110	GH330	GT9530		NS9530	NS520		TH10		RE	IC	S	D1
Finishing	CF	VNMG160404-CF						●	●													0.4	9.525	4.76	3.81	
		VNMG160408-CF						●	●													0.8	9.525	4.76	3.81	
	01	VNGG160402-01											●				●	●		●		0.2	9.525	4.76	3.81	
		VNGG160404-01																●	●		●		0.4	9.525	4.76	3.81
		VNGG160408-01																●	●				0.8	9.525	4.76	3.81
	11	VNMG160404-11												●				●		●		0.4	9.525	4.76	3.81	
		VNMG160408-11																●				0.8	9.525	4.76	3.81	
		VNMG160412-11													●			●				1.2	9.525	4.76	3.81	
	Medium cutting	TM	VNMG120404E-TM		●	●		●			●	●											0.4	7.15	4.76	3.81
		VNMG120408E-TM		●	●		●			●	●											0.8	7.15	4.76	3.81	
		VNMG120412E-TM		●	●		●			●	●											1.2	7.15	4.76	3.81	
		VNMG160404-TM	●	●	●	●	●			●	●		●									0.4	9.525	4.76	3.81	
		VNMG160408-TM	●	●	●	●	●			●	●	●	●									0.8	9.525	4.76	3.81	
		VNMG160412-TM	●	●	●	●	●			●	●	●										1.2	9.525	4.76	3.81	
PM		VNMG120404E-PM		●	●		●			●	●											0.4	7.15	4.76	3.81	
		VNMG120408E-PM		●	●		●			●	●											0.8	7.15	4.76	3.81	
		VNMG120412E-PM		●	●		●			●	●											1.2	7.15	4.76	3.81	
		VNMG160404-PM		●	●		●			●	●											0.4	9.525	4.76	3.81	
		VNMG160408-PM		●	●		●			●	●											0.8	9.525	4.76	3.81	
	VNMG160412-PM		●	●		●			●	●											1.2	9.525	4.76	3.81		
Medium cutting for mild steel	ZM	VNMG120404E-ZM		●	●		●			●	●											0.4	7.15	4.76	3.81	
		VNMG120408E-ZM		●	●		●			●	●											0.8	7.15	4.76	3.81	
		VNMG120412E-ZM		●	●		●			●	●											1.2	7.15	4.76	3.81	
		VNMG160404-ZM		●	●		●			●	●											0.4	9.525	4.76	3.81	
		VNMG160408-ZM		●	●	●	●			●	●											0.8	9.525	4.76	3.81	
		VNMG160412-ZM		●	●	●	●			●	●											1.2	9.525	4.76	3.81	

● : Line up



*-M,G: Without chipbreaker

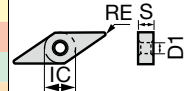
Reference pages: External toolholder → C041 -
Internal toolholder → D074 -
TungCap → C042 -, K014 -

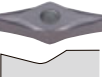
Tungaloy B099

Index	User's Guide	Tooling System	Drilling tool	Endmill	Milling cutter	Miniature tool	Grooving	Threading	Int. Toolholder	Ext. Toolholder	Insert	Grade
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- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

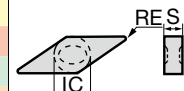
**Rhombic, 35°
with hole**

[illegible]

Application	Chipbreaker	Designation	Coated								Cermet		Uncoated		Ceramic		Dimension (mm)								
			T9215	T9225	T515	T5105	T5115	T5125	AH8005	AH8015	AH110	AH120		NS520		KS05F	TH10		LX10	LX11			RE	IC	S
Medium cutting	28	VNMG160404-28						●	●	●					●							0.4	9.525	4.76	3.81
		VNMG160408-28						●	●	●					●							0.8	9.525	4.76	3.81
																									
	33	VNMG160404-33		●						●					●							0.4	9.525	4.76	3.81
		VNMG160408-33	●	●											●							0.8	9.525	4.76	3.81
																									
Finishing to medium cutting	-	VNMA120404E			●																	0.4	7.15	4.76	3.81
		VNMA120408E			●																	0.8	7.15	4.76	3.81
		VNMA160402													●							0.2	9.525	4.76	3.81
		VNMA160404				●	●	●				●		●								0.4	9.525	4.76	3.81
		VNMA160408				●	●	●				●		●								0.8	9.525	4.76	3.81
		VNGA160404															●	▲				0.4	9.525	4.76	3.81
		VNGA160408															●	▲				0.8	9.525	4.76	3.81

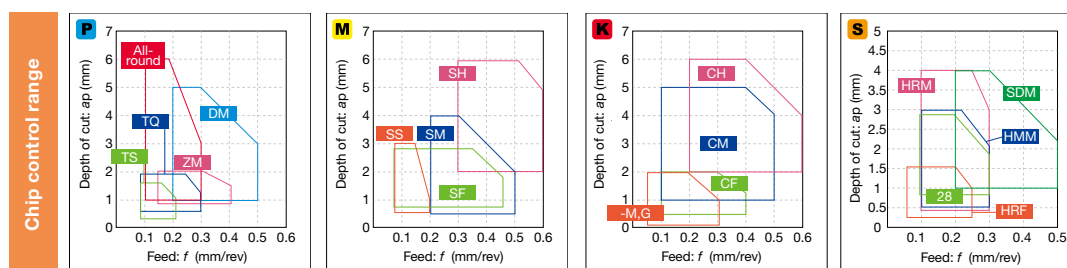
● : Line up
▲ : To be discontinued

**Rhombic, 35°
without hole**

[illegible]

Application	Chipbreaker	Designation	Material												Dimension (mm)					
			Ceramic														RE	IC	S	D1
Finishing to medium cutting	-	VNGD160712	●														1.2	9.525	4.76	-
	 																			

● : Line up



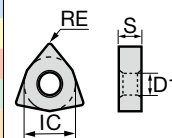
*-M,G: Without chipbreaker

VNGD...: External toolholder → **C051**

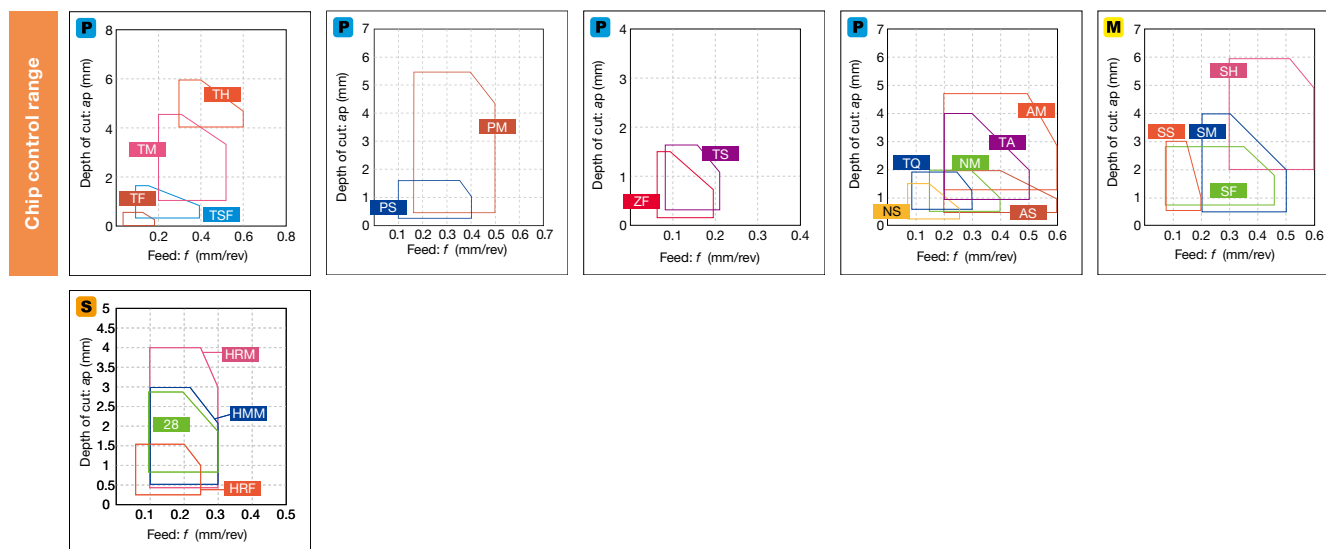
[illegible]

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting

**Trigon, 80°
with hole**

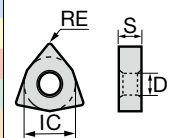
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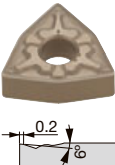
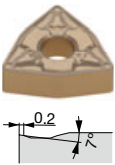
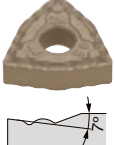
● : Line up



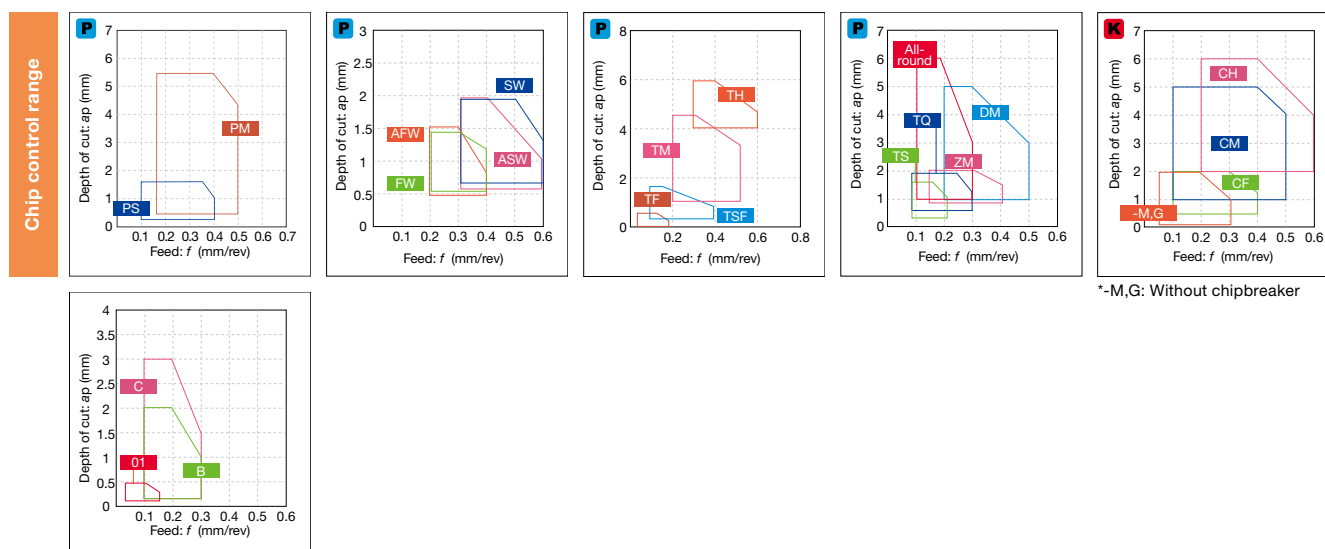
Reference pages: External toolholder → **C024** - Internal toolholder → **D031** -
TungCap → **C024** -, **K010**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting

[illegible]

Application	Chipbreaker	Designation	Coated								Coated cermet		Cermet		Dimension (mm)							
			T9205	T9215	T9225	T9235	T6215	T515	AH8015	AH6225	AH6235	AH725	AH120	GT9530		NS9530			RE	IC	S	D1
Medium cutting		TM WNMG060404E-TM		●	●		●		●	●		●							0.4	9.525	4.76	3.81
		WNMG060408E-TM		●	●		●		●	●		●							0.8	9.525	4.76	3.81
		WNMG060412E-TM		●	●		●		●	●		●							1.2	9.525	4.76	3.81
		WNMG060404-TM		●	●	●						●							0.4	9.525	4.76	3.81
		WNMG060408-TM	●	●	●	●						●							0.8	9.525	4.76	3.81
		WNMG080404-TM	●	●	●	●		●	●	●	●	●	●						0.4	12.7	4.76	5.16
		WNMG080408-TM	●	●	●	●	●	●	●	●	●	●	●						0.8	12.7	4.76	5.16
		WNMG080412-TM	●	●	●	●	●	●	●	●	●	●	●						1.2	12.7	4.76	5.16
		WNMG080416-TM	●	●	●		●	●	●	●	●	●	●						1.6	12.7	4.76	5.16
	PM WNMG060404E-PM		●	●		●		●	●									0.4	9.525	4.76	3.81	
	WNMG060408E-PM		●	●		●		●	●									0.8	9.525	4.76	3.81	
	WNMG060412E-PM		●	●		●		●	●									1.2	9.525	4.76	3.81	
	WNMG080404-PM		●	●		●		●	●									0.4	12.7	4.76	5.16	
	WNMG080408-PM		●	●		●		●	●									0.8	12.7	4.76	5.16	
	WNMG080412-PM		●	●		●		●	●									1.2	12.7	4.76	5.16	
	WNMG080416-PM		●	●		●		●	●									1.6	12.7	4.76	5.16	
Medium cutting for mild steel		ZM WNMG060404E-ZM		●	●		●		●	●								0.4	9.525	4.76	3.81	
		WNMG060408E-ZM		●	●		●		●	●								0.8	9.525	4.76	3.81	
		WNMG060412E-ZM		●	●		●		●	●								1.2	9.525	4.76	3.81	
		WNMG060408-ZM		●	●	●												0.8	9.525	4.76	3.81	
		WNMG060412-ZM		●	●	●												1.2	9.525	4.76	3.81	
		WNMG080404-ZM		●	●		●		●	●								0.4	12.7	4.76	5.16	
		WNMG080408-ZM		●	●	●	●		●	●			●		●			0.8	12.7	4.76	5.16	
		WNMG080412-ZM	●	●	●	●	●		●	●								1.2	12.7	4.76	5.16	
		WNMG080416-ZM		●	●		●		●	●								1.6	12.7	4.76	5.16	

● : Line up



Reference pages: External toolholder → **C024** - Internal toolholder → **D031** -
TungCap → **C024** -, **K010**

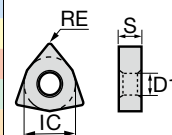
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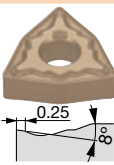
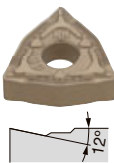
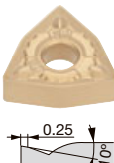
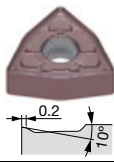
● : Continuous cutting
 ● : Light interrupted cutting
 * : Heavy interrupted cutting

WN

**Trigon, 80°
with hole**

P	Steel
M	Stainless
K	Cast iron
N	Non-ferrous
S	Superalloy
H	Hard material

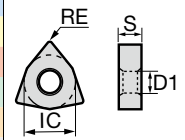


Application	Chipbreaker	Designation	Coated																Cermet		Uncoated		Dimension (mm)						
			T9205	T9215	T9225	T9235	T6215	T505	T515	T5105	T5115	T5125	AH8005	AH8015	AH6225	AH6235	AH725	AH110	AH120		NS9530	NS520	TH10			RE	IC	S	D1
Medium cutting	AM	WNMG080408-AM	●	●																					0.8	12.7	4.76	5.16	
		WNMG080412-AM	●	●																					1.2	12.7	4.76	5.16	
		WNMG080416-AM	●	●																						1.6	12.7	4.76	5.16
	NM	WNMG060412E-NM			●																				1.2	9.525	4.76	3.81	
		WNMG080408-NM	●	●	●																				0.8	12.7	4.76	5.16	
		WNMG080412-NM	●	●	●	●																				1.2	12.7	4.76	5.16
	DM	WNMG080404-DM		●	●		●							●	●											0.4	12.7	4.76	5.16
		WNMG080408-DM	●	●	●	●	●							●	●											0.8	12.7	4.76	5.16
		WNMG080412-DM	●	●	●	●	●							●	●											1.2	12.7	4.76	5.16
		WNMG080416-DM		●	●		●							●	●											1.6	12.7	4.76	5.16
	All-round	WNMG060404		●	●						●	●	●													0.4	9.525	4.76	3.81
		WNMG060408		●	●						●	●	●													0.8	9.525	4.76	3.81
		WNMG080404	●	●	●	●		●	●	●	●	●						●	●		●	●			0.4	12.7	4.76	5.16	
		WNMG080408	●	●	●	●		●	●	●	●	●						●	●		●	●			0.8	12.7	4.76	5.16	
		WNMG080412	●	●	●	●		●	●	●	●	●						●	●				●		1.2	12.7	4.76	5.16	
		WNMG080416	●	●	●	●		●	●	●	●														1.6	12.7	4.76	5.16	
	SM	WNMG060404E-SM					●							●												0.4	9.525	4.76	3.81
		WNMG060408E-SM					●							●												0.8	9.525	4.76	3.81
		WNMG060412E-SM					●							●												1.2	9.525	4.76	3.81
		WNMG060408-SM															●								0.8	9.525	4.76	3.81	
		WNMG080404-SM					●							●	●											0.4	12.7	4.76	5.16
		WNMG080408-SM					●							●	●	●										0.8	12.7	4.76	5.16
		WNMG080412-SM					●							●	●	●										1.2	12.7	4.76	5.16
SDM	WNMG080404-SDM					●							●	●											0.4	12.7	4.76	5.16	
	WNMG080408-SDM					●							●	●											0.8	12.7	4.76	5.16	
	WNMG080412-SDM					●							●	●											1.2	12.7	4.76	5.16	
HRM	WNMG080404-HRM											●	●												0.4	12.7	4.76	5.16	
	WNMG080408-HRM											●	●												0.8	12.7	4.76	5.16	
	WNMG080412-HRM											●	●												1.2	12.7	4.76	5.16	

● : Line up

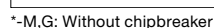
Reference pages: External toolholder → **C024 -** Internal toolholder → **D031 -**
 TungCap → **C024 -, K010**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

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Bore reamer	E
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Ext. toolholder	C
Insert	B
Grade	A

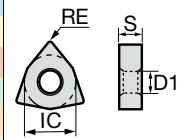
● : Line up

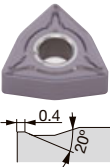
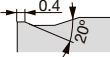
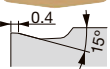


Tungaloy B107

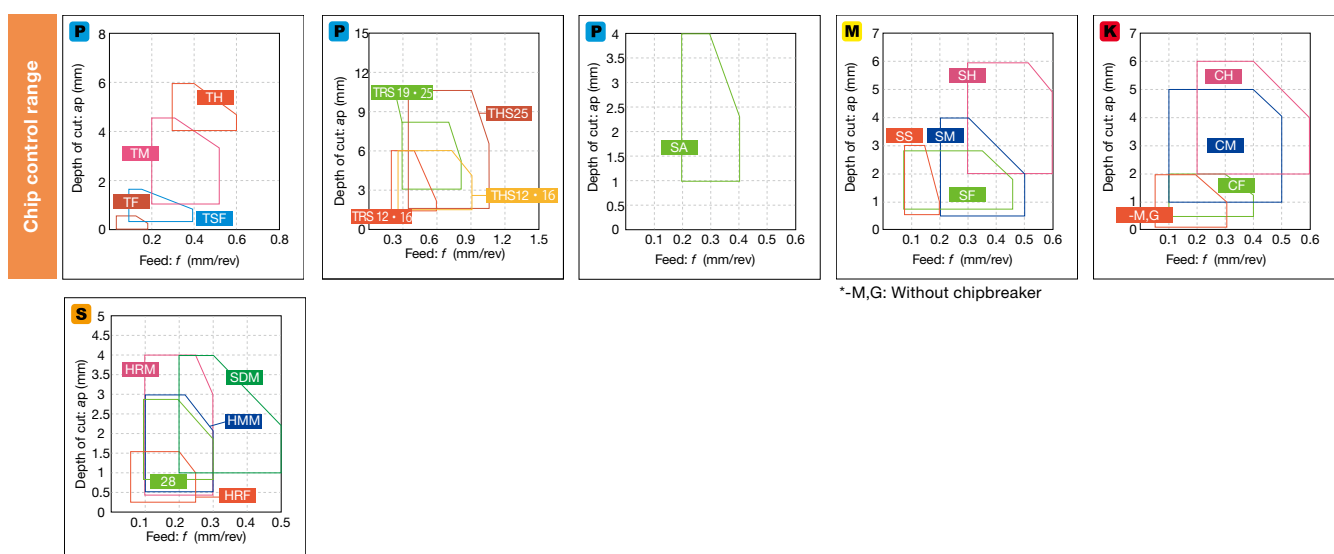
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Trigon, 80°
with hole**

[illegible]

Application	Chipbreaker	Designation	Coated						Cermet		Uncoated	Ceramic	Dimension (mm)				
			T505	T515	T5105	T5115	T5125	AH6225	AH6235	NS520	TH10	LX10	LX11	RE	IC	S	D1
Medium to heavy cutting	SH	WNMG080408-SH						●	●					0.8	12.7	4.76	5.16
		WNMG080412-SH						●	●					1.2	12.7	4.76	5.16
																	
	CH	WNMG080408-CH			●	●	●							0.8	12.7	4.76	5.16
		WNMG080412-CH			●	●	●							1.2	12.7	4.76	5.16
																	
Finishing to medium cutting	-	WNMA060404E		●										0.4	9.525	4.76	3.81
		WNMA060408E		●										0.8	9.525	4.76	3.81
		WNMA060412E		●										1.2	9.525	4.76	3.81
		WNMA060416E		●										1.6	9.525	4.76	3.81
		WNMA080404			●	●	●			●				0.4	12.7	4.76	5.16
		WNMA080408	●	●	●	●	●		●	●				0.8	12.7	4.76	5.16
		WNMA080412	●	●	●	●	●							1.2	12.7	4.76	5.16
		WNMA080416	●	●	●	●	●							1.6	12.7	4.76	5.16
		WNGA080404									●	▲		0.4	12.7	4.76	5.16
		WNGA080408									●	▲		0.8	12.7	4.76	5.16
		WNGA080412									●	▲		1.2	12.7	4.76	5.16

● : Line up
▲ : To be discontinued



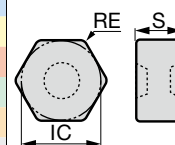
Reference pages: External toolholder → **C024** - Internal toolholder → **D031** -
TungCap → **C024** -, **K010**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊕ : Heavy interrupted cutting



Hexagonal,
120°
without hole

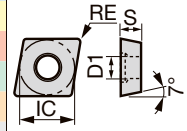
		Steel	Stainless	Cast iron	Non-ferrous	Superalloy	Hard material
P							
M							
K							
N							
S							
H							

[illegible]

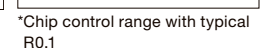
● : Line up

dex

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

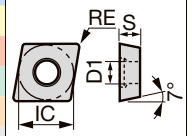
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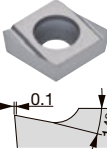
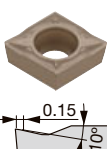
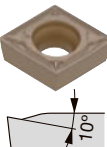
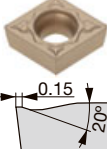
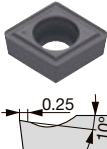
● : Line up



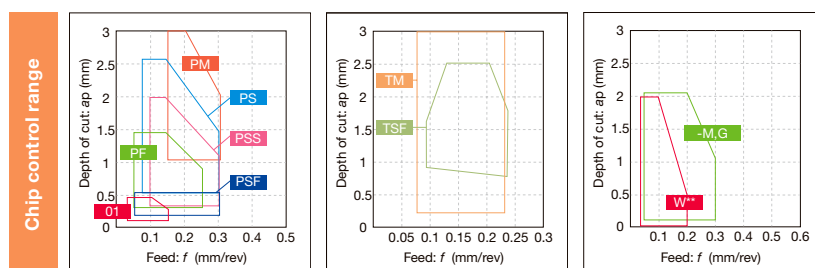
Tungaloy B113

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

Application	Chipbreaker	Designation	Coated												Coated cermet		Cermet	Uncoated	Dimension (mm)								
			T9215	T9225	T6215	T505	T515	T5115	AH8005	AH8015	AH6225	AH6235	AH725	AH120	GH730	GH330	GH110	GT9530	AT9530	NS9530		TH10		RE	IC	S	D1
Finishing	W20	CCGT09T302R-W20																		●		●		0.2	9.525	3.97	4.4
		CCGT09T302L-W20																	●		●		0.2	9.525	3.97	4.4	
		CCGT09T304R-W20																			●			0.4	9.525	3.97	4.4
		CCGT09T304L-W20														●	●		●		●		0.4	9.525	3.97	4.4	
		CCGT09T308R-W20																			●			0.8	9.525	3.97	4.4
		CCGT09T308L-W20																	●		●		0.8	9.525	3.97	4.4	
Finishing to medium cutting	PSS	CCMT060204-PSS	●	●	●			●	●	●	●	●						●		●			0.4	6.35	2.38	2.8	
		CCMT060208-PSS	●	●	●			●	●	●	●	●						●		●			0.8	6.35	2.38	2.8	
		CCMT09T304-PSS	●	●	●			●	●	●	●	●						●		●			0.4	9.525	3.97	4.4	
		CCMT09T308-PSS	●	●	●			●	●	●	●	●						●		●			0.8	9.525	3.97	4.4	
		CCMT120404-PSS	●	●	●					●	●	●											0.4	12.7	4.76	5.5	
		CCMT120408-PSS	●	●	●					●	●	●											0.8	12.7	4.76	5.5	
		CCMT120412-PSS	●	●	●					●	●	●											1.2	12.7	4.76	5.5	
	PS	CCMT060202-PS	●	●	●			●	●	●	●	●	●	●				●	●	●			0.2	6.35	2.38	2.8	
		CCMT060204-PS	●	●	●			●	●	●	●	●	●	●				●	●	●			0.4	6.35	2.38	2.8	
		CCMT060208-PS	●	●	●			●	●	●	●	●	●	●				●	●	●			0.8	6.35	2.38	2.8	
		CCMT09T302-PS	●	●	●			●	●	●	●	●	●	●				●	●	●			0.2	9.525	3.97	4.4	
		CCMT09T304-PS	●	●	●			●	●	●	●	●	●	●				●	●	●			0.4	9.525	3.97	4.4	
		CCMT09T308-PS	●	●	●			●	●	●	●	●	●	●				●	●	●			0.8	9.525	3.97	4.4	
		CCMT120404-PS	●	●	●			●	●	●	●	●											0.4	12.7	4.76	5.5	
		CCMT120408-PS	●	●	●			●	●	●	●	●											0.8	12.7	4.76	5.5	
		CCMT120412-PS	●	●	●					●	●	●											1.2	12.7	4.76	5.5	
	TM	CCMT060202-TM	●	●	●			●	●											●			0.2	6.35	2.38	2.8	
		CCMT060204-TM	●	●	●			●	●											●			0.4	6.35	2.38	2.8	
CCMT060208-TM		●	●	●			●	●											●			0.8	6.35	2.38	2.8		
CCMT09T302-TM		●	●	●			●	●											●			0.2	9.525	3.97	4.4		
CCMT09T304-TM		●	●	●			●	●											●			0.4	9.525	3.97	4.4		
CCMT09T308-TM		●	●	●			●	●											●			0.8	9.525	3.97	4.4		
CM	CCMT060204-CM				●	●	●															0.4	6.35	2.38	2.8		
	CCMT060208-CM				●	●	●															0.8	6.35	2.38	2.8		
	CCMT09T304-CM				●	●	●															0.4	9.525	3.97	4.4		
	CCMT09T308-CM				●	●	●															0.8	9.525	3.97	4.4		
	CCMT09T312-CM						●															1.2	9.525	3.97	4.4		
	CCMT120404-CM						●															0.4	12.7	4.76	5.5		
	CCMT120408-CM						●															0.8	12.7	4.76	5.5		

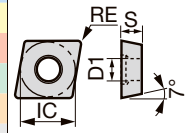
● : Line up



*-M,G: Without chipbreaker

Reference pages: External toolholder → **C030 -** Internal toolholder → **D014 -**
J-Series toolholder → **G040 -** PINZBOHR® → **K178**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

● : Line up

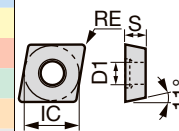


Tungaloy B117

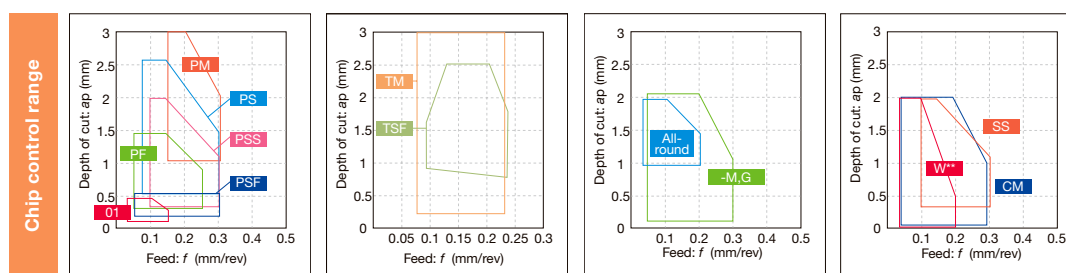
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting



P	Steel													
M	Stainless													
K	Cast iron													
N	Non-ferrous													
S	Superalloy													
H	Hard material													

[illegible]

● : Line up

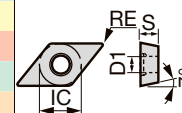


*-M,G: Without chipbreaker

Reference pages: Internal toolholder → **D018 -** Cartridge → **K181 -**
Boring bar tool → **K199**

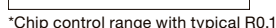
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

Rhombic, 55°
with hole
Positive 7°

[illegible]

Index	User's Guide	Tooling System	Drilling tool	Endmill	Milling cutter	Miniature tool	Grooving	Threading	Int. Toolholder	Ext. Toolholder	Insert	Grade
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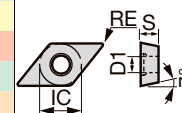
● : Line up



Tungaloy B121

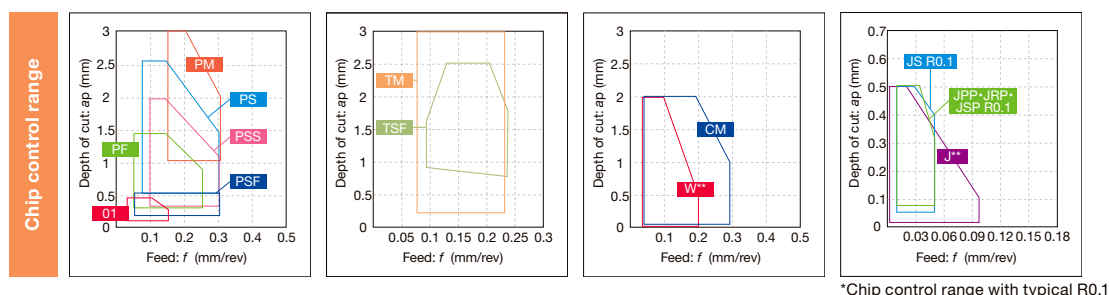
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

Rhombic, 55°
with hole
Positive 7°

[illegible]

*Corner radius (RE) with a sign of inequality (<) means minus tolerance.

● : Line up



*Chip control range with typical R0.1

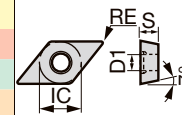
Reference pages: External toolholder → **C046** - Internal toolholder → **D056** -
J-Series toolholder → **G052** -

Insert POSITIVE TYPE

● : Continuous cutting
● : Light interrupted cutting
✱ : Heavy interrupted cutting

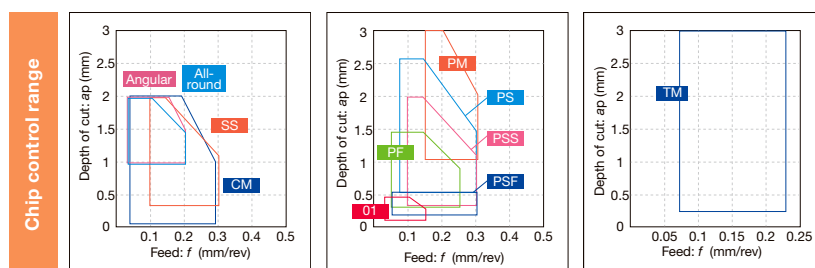
DC

Rhombic, 55°
with hole
Positive 7°



Application	Chipbreaker	Designation	Coated										Coated cermet	Cermet	Uncoated	Dimension (mm)			
			T9215	T9225	T6215	T5115	AH6225	AH6235	AH725	AH120	GH730	GH110	GT9530	NS9530	TH10	RE	IC	S	D1
Finishing to medium cutting		23 DCMT070204-23												●		0.4	6.35	2.38	2.8
		DCMT11T304-23												●		0.4	9.525	3.97	4.4
		DCMT11T308-23												●		0.8	9.525	3.97	4.4
		- DCMW070204				●										0.4	6.35	2.38	2.8
		DCMW070208				●										0.8	6.35	2.38	2.8
		DCMW11T304				●										0.4	9.525	3.97	4.4
		DCMW11T308				●										0.8	9.525	3.97	4.4
		- DCGW070202													●	0.2	6.35	2.38	2.8
		DCGW070204									●				●	0.4	6.35	2.38	2.8
		DCGW11T304													●	0.4	9.525	3.97	4.4
		DCGW11T308													●	0.8	9.525	3.97	4.4
Medium cutting		PM DCMT070204-PM	●	●	●		●	●	●	●			●	●		0.4	6.35	2.38	2.8
		DCMT070208-PM	●	●	●		●	●	●	●			●	●		0.8	6.35	2.38	2.8
		DCMT11T304-PM	●	●	●		●	●	●	●			●	●		0.4	9.525	3.97	4.4
		DCMT11T308-PM	●	●	●		●	●	●	●			●	●		0.8	9.525	3.97	4.4
		DCMT11T312-PM		●	●		●	●	●							1.2	9.525	3.97	4.4
		24 DCMT070202-24												●		0.2	6.35	2.38	2.8
		DCMT070204-24	●	●										●		0.4	6.35	2.38	2.8
		DCMT070208-24		●										●		0.8	6.35	2.38	2.8
		DCMT11T302-24		●										●		0.2	9.525	3.97	4.4
		DCMT11T304-24	●	●										●		0.4	9.525	3.97	4.4
		DCMT11T308-24	●	●			●							●		0.8	9.525	3.97	4.4

● : Line up



Reference pages: External toolholder → **C046** - Internal toolholder → **D056** -
J-Series toolholder → **G052** -

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

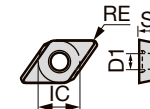
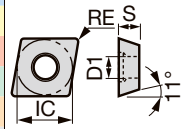
[illegible]

Figure 10 consists of three graphs showing the chip control range for various turning operations. The Y-axis represents the Depth of cut: ap (mm) and the X-axis represents the Feed: f (mm/rev). The graphs are for External toolholder (C045) and Internal toolholder (D036). The operations shown are PM, PS, PSS, PSF, PF, SS, TS, TSW, JTS, JSS, JRP, and JS. A legend indicates that a black dot represents the line up.

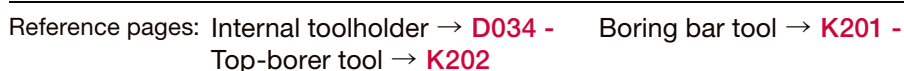
Reference External toolholder → C045 - pages:
Internal toolholder → D036 -

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Rhombic, 75°
with hole
Positive 11°**

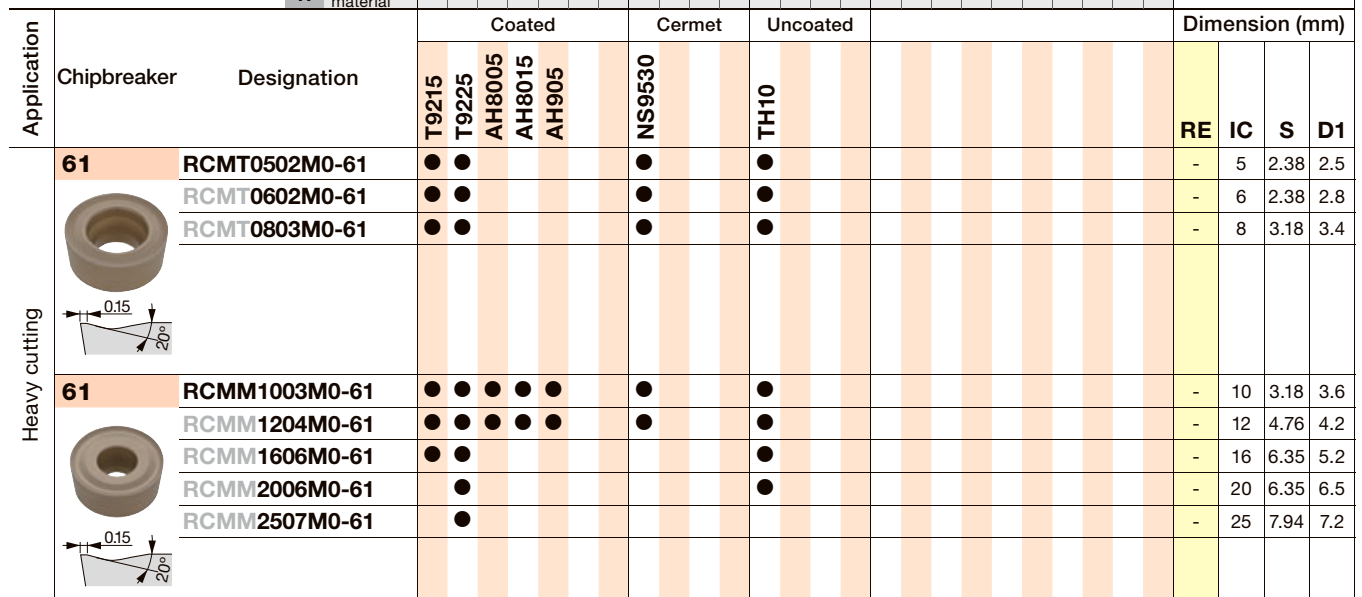
[illegible]

● : Line up



- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

Round,
with hole
Positive 7°

[illegible]

D1 (mm)	Designation	0502M0	0602M0	0803M0	1003M0	1204M0	1606M0	2006M0	2507M0
	RC*T	2.5	2.8	3.4	4.4	4.4	5.5	6.5	7.6
	RCMM	-	-	-	3.6	4.2	5.2	6.5	7.2

Special round insert

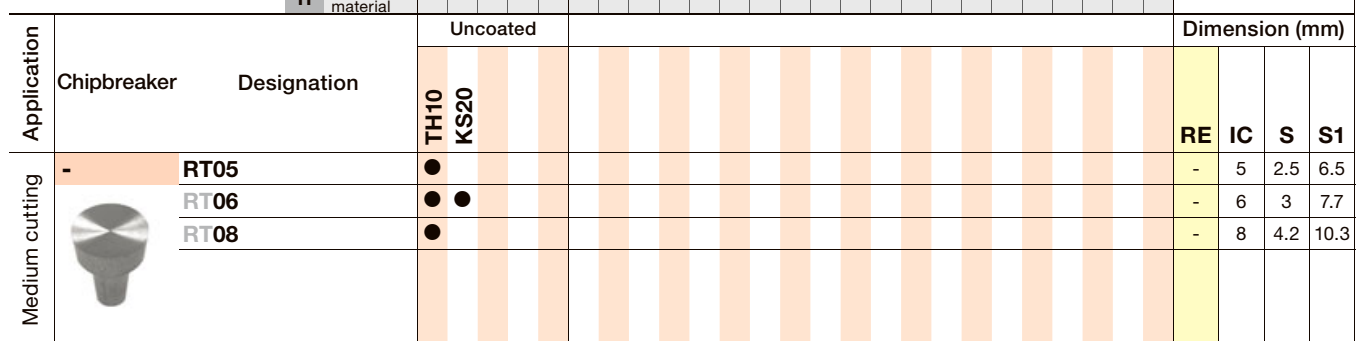
[illegible]

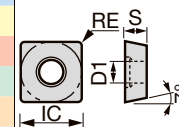
Figure 10 is a graph titled "Chip control range". The vertical axis is labeled "Depth of cut: ap (mm)" and ranges from 0 to 7. The horizontal axis is labeled "Feed: f (mm/rev)" and ranges from 0.2 to 1.2. The graph shows several colored regions representing different chip control strategies. The regions are labeled as follows: CM (red), 6RS (green), RS 10-12 (blue), RS 16-20 (purple), 6RM (cyan), RS 25 (magenta), 6T 25 (dark blue), and 6T 10-12 (dark red). The regions show that the depth of cut generally increases with feed, and different strategies have different ranges of control.

Reference pages: RC...: External toolholder → C056 -

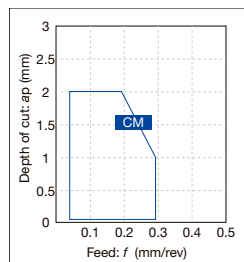
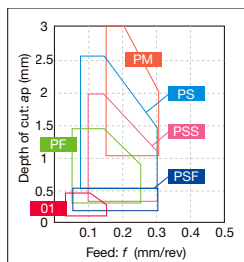
MEMO

Index	User's Guide	Tooling System	Drilling tool	Endmill	Milling cutter	Miniature tool	Grooving	Threading	Int. Toolholder	Ext. Toolholder	Insert	Grade
M	L	K	J	I	H	G	F	E	D	C	B	A

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting



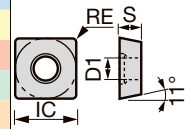
● : Line up



- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting



**Square
with hole
Positive 11°**

[illegible][illegible]

Chip control range

Depth of cut: a_p (mm)

Feed: f (mm/rev)

PM, PS, PSS, PSF, PF, OI

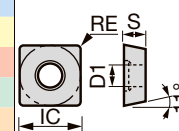
CM, W**, -M,G

*-M,G: Without chipbreaker

*-M,G: Without chipbreaker

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Square
with hole
Positive 11°**

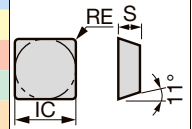
[illegible][illegible]

● : Line up

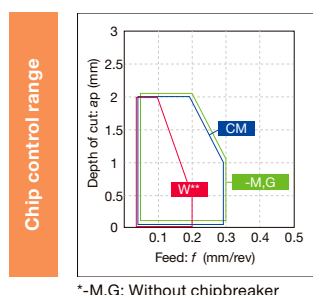
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Square
without hole
Positive 11°**

P	Steel	C						S												
M	Stainless		C					S												
K	Cast iron	C	C		C			S												
N	Non-ferrous							S												
S	Superalloy		C																	
H	Hard material									Ti	Ti	Ti								



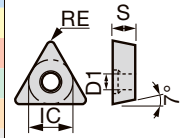
● : Line up
▲ : To be discontinued



*-M,G: Without chipbreaker

Reference pages: Internal toolholder → **D042** - Cartridge → **K181** -

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

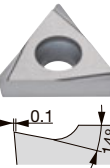
Application	Material		Coated		Coated cermet	Cermet	Uncoated	Dimension (mm)							
	Chipbreaker	Designation	SH725 J740		J9530		NS9530		TH10		RE	IC	S	D1	
Finishing (sharp edge)	J08	TCGT080200FR-J08	●	●					●		0.03	4.76	2.38	2.3	
		TCGT080200FL-J08	●	●					●		0.03	4.76	2.38	2.3	
		TCGT080201FR-J08	●	●					●		0.1	4.76	2.38	2.3	
		TCGT080201FL-J08	●	●					●		0.1	4.76	2.38	2.3	
		TCGT080202FR-J08	●	●					●		0.2	4.76	2.38	2.3	
		TCGT080202FL-J08	●	●					●		0.2	4.76	2.38	2.3	
		TCGT080204FR-J08	●								0.4	4.76	2.38	2.3	
	J10	TCGT110200FR-J10	●	●					●		0.03	6.35	2.38	2.8	
		TCGT110200FL-J10	●	●					●		0.03	6.35	2.38	2.8	
		TCGT110201FR-J10	●	●					●		0.1	6.35	2.38	2.8	
		TCGT110201FL-J10	●	●					●		0.1	6.35	2.38	2.8	
		TCGT110202FR-J10	●	●			●		●		0.2	6.35	2.38	2.8	
		TCGT110202FL-J10	●	●			●		●		0.2	6.35	2.38	2.8	
		TCGT110204FR-J10	●								0.4	6.35	2.38	2.8	
		TCGT110300FR-J10	●	●					●		0.03	6.35	3.18	2.8	
TCGT110300FL-J10		●	●					●		0.03	6.35	3.18	2.8		
TCGT110301FR-J10		●	●					●		0.1	6.35	3.18	2.8		
TCGT110301FL-J10		●	●					●		0.1	6.35	3.18	2.8		
TCGT110302FR-J10		●	●			●		●		0.2	6.35	3.18	2.8		
TCGT110302FL-J10		●	●			●		●		0.2	6.35	3.18	2.8		
Finishing	J10	TCGT110302R-J10			●						0.2	6.35	3.18	2.8	
		TCGT110302L-J10			●						0.2	6.35	3.18	2.8	
		W15	TCGT16T302L-W15					●		●		0.2	9.525	3.97	4.4
		TCGT16T304L-W15					●		●		0.4	9.525	3.97	4.4	
		TCGT16T308L-W15							●		0.8	9.525	3.97	4.4	

Figure 10 consists of three sub-graphs, each plotting 'Depth of cut: ap (mm)' on the y-axis against 'Feed: f (mm/rev)' on the x-axis. The graphs illustrate the chip control range for different cutting conditions.

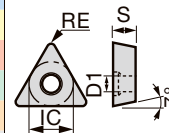
- Left Graph:** The y-axis ranges from 0 to 3 mm, and the x-axis ranges from 0 to 0.5 mm/rev. It shows six distinct chip control ranges:
 - PM (red):** A trapezoidal region starting at $f \approx 0.15$ mm/rev and $a_p \approx 1.2$ mm, extending to $f \approx 0.25$ mm/rev and $a_p \approx 2.8$ mm.
 - PS (blue):** A trapezoidal region starting at $f \approx 0.1$ mm/rev and $a_p \approx 0.5$ mm, extending to $f \approx 0.35$ mm/rev and $a_p \approx 2.5$ mm.
 - PSS (pink):** A trapezoidal region starting at $f \approx 0.1$ mm/rev and $a_p \approx 0.2$ mm, extending to $f \approx 0.3$ mm/rev and $a_p \approx 1.8$ mm.
 - PSF (dark blue):** A trapezoidal region starting at $f \approx 0.1$ mm/rev and $a_p \approx 0.1$ mm, extending to $f \approx 0.3$ mm/rev and $a_p \approx 0.5$ mm.
 - PF (green):** A trapezoidal region starting at $f \approx 0.1$ mm/rev and $a_p \approx 0.1$ mm, extending to $f \approx 0.15$ mm/rev and $a_p \approx 1.5$ mm.
 - 0.1 (red):** A small rectangular region at $f \approx 0.1$ mm/rev and $a_p \approx 0.1$ mm.
- Middle Graph:** The y-axis ranges from 0 to 0.7 mm, and the x-axis ranges from 0 to 0.18 mm/rev. It shows two chip control ranges:
 - JS R0.1 (blue):** A trapezoidal region starting at $f \approx 0.03$ mm/rev and $a_p \approx 0.05$ mm, extending to $f \approx 0.06$ mm/rev and $a_p \approx 0.5$ mm.
 - JPP-JRP-R0.1 (green):** A trapezoidal region starting at $f \approx 0.03$ mm/rev and $a_p \approx 0.05$ mm, extending to $f \approx 0.06$ mm/rev and $a_p \approx 0.5$ mm.
- Right Graph:** The y-axis ranges from 0 to 3 mm, and the x-axis ranges from 0 to 0.3 mm/rev. It shows one chip control range:
 - JP R0.1 (purple):** A trapezoidal region starting at $f \approx 0.05$ mm/rev and $a_p \approx 0.2$ mm, extending to $f \approx 0.1$ mm/rev and $a_p \approx 2.0$ mm.

Tungaloy B139

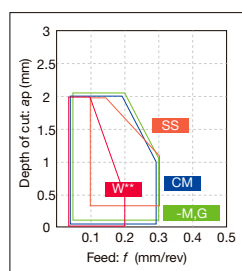
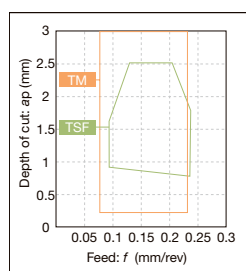
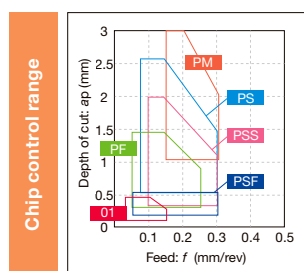
21.

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

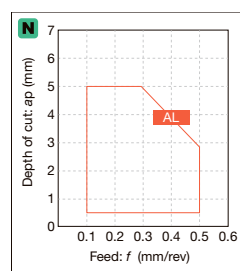
**Triangular
with hole
Positive 7°**

[illegible][illegible]

● : Line up



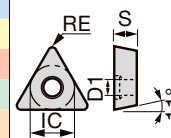
*-M.G: Without chipbreaker

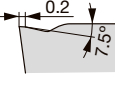
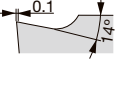
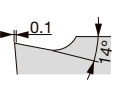
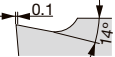


Internal toolholder → **D045**
PINZBOHR® → **K178 -**

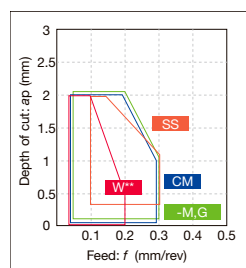
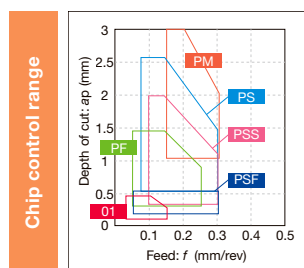
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Triangular
with hole
Positive 11°**

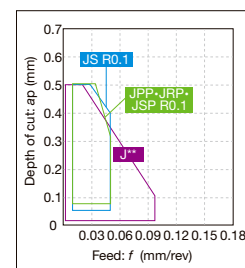
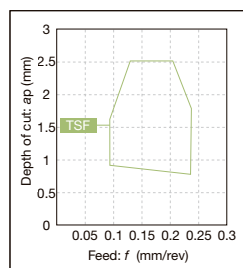
[illegible]

Application	Chipbreaker	Designation	Coated								Coated cermet		Cermet	Uncoated	Dimension (mm)			
			T9215	T9225	T6215	AH8015	AH6225	GH110	SH725	SH730	GT9530	NS9530	TH10	UX30	RE	IC	S	D1
Finishing	TSF	TPMT110204-TSF	●	●											0.4	6.35	2.38	2.8
	 	TPMT110208-TSF	●	●											0.8	6.35	2.38	2.8
		TPMT110302-TSF	●	●	●	●	●					●			0.2	6.35	3.18	3.4
		TPMT110304-TSF	●	●	●	●	●					●			0.4	6.35	3.18	3.4
		TPMT110308-TSF	●	●	●	●	●					●			0.8	6.35	3.18	3.4
		TPMT16T304-TSF	●	●											0.4	9.525	3.97	4.4
		TPMT16T308-TSF	●	●											0.8	9.525	3.97	4.4
Finishing (sharp edge)	W08	TPGT070100FR-W08						●							0.03	4.37	1.59	2.58
	 	TPGT070100FL-W08						●							0.03	4.37	1.59	2.58
		TPGT070101FR-W08						●							0.1	4.37	1.59	2.58
		TPGT070101FL-W08						●							0.1	4.37	1.59	2.58
		TPGT070102FR-W08						●							0.2	4.37	1.59	2.58
		TPGT070102FL-W08						●							0.2	4.37	1.59	2.58
		TPGT070104FR-W08						●							0.4	4.37	1.59	2.58
		TPGT070104FL-W08						●							0.4	4.37	1.59	2.58
Finishing	W08	TPGT070100R-W08						●					●		0.03	4.37	1.59	2.58
	 	TPGT070100L-W08						●					●		0.03	4.37	1.59	2.58
		TPGT070101R-W08						●					●		0.1	4.37	1.59	2.58
		TPGT070101L-W08						●					●		0.1	4.37	1.59	2.58
		TPGT070102R-W08						●					●		0.2	4.37	1.59	2.58
		TPGT070102L-W08						●					●		0.2	4.37	1.59	2.58
		TPGT070104R-W08						●					●		0.4	4.37	1.59	2.58
		TPGT070104L-W08						●					●		0.4	4.37	1.59	2.58
		TPGT080200L-W08								●		●			0.03	4.76	2.38	2.3
		TPGT080202L-W08						●		●		●	●	●	0.2	4.76	2.38	2.3
		TPGT080204L-W08						●		●		●	●	●	0.4	4.76	2.38	2.3
W10	TPGH080202L-W10								●		●			0.2	4.76	2.38	2.3	
 	TPGH080204L-W10									●		●		0.4	4.76	2.38	2.3	
	TPGH090204L-W10									●		●		0.4	5.56	2.38	3	

● : Line up



*-M,G: Without chipbreaker



*Chip control range with typical R0.1

Top-borer tool → **K203 -**

TP

Triangular with hole

Positive 11°

P

M

K

N

S

H

Steel

Stainless

Cast iron

Non-ferrous

Superalloy

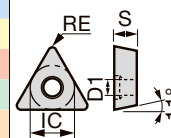
Hard material

Application	Chipbreaker	Designation	Coated		Coated cermet		Cermet		Uncoated		Dimension (mm)			
			GH110	GH330	GT9530		NS9530		TH10	UX30	RE	IC	S	D1
Finishing	W13 TPGH110204L-W13 TPGH110302L-W13 TPGH110304L-W13	TPGH110204L-W13			●		●				0.4	6.35	2.38	3.4
		TPGH110302L-W13			●		●				0.2	6.35	3.18	3.4
		TPGH110304L-W13			●		●				0.4	6.35	3.18	3.4
	W15 TPGT090202R-W15 TPGT090202L-W15 TPGT090204R-W15 TPGT090204L-W15 TPGT110202R-W15 TPGT110202L-W15 TPGT110204L-W15 TPGT110208R-W15 TPGT110208L-W15 TPGT110302L-W15 TPGT110304R-W15 TPGT110304L-W15 TPGT110308L-W15 TPGT130302R-W15 TPGT130302L-W15 TPGT130304R-W15 TPGT130304L-W15 TPGT130308L-W15 TPGT16T302R-W15 TPGT16T302L-W15 TPGT16T304R-W15 TPGT16T304L-W15 TPGT16T308L-W15	TPGT090202R-W15					●				0.2	5.56	2.38	2.5
		TPGT090202L-W15			●		●		●		0.2	5.56	2.38	2.5
		TPGT090204R-W15					●				0.4	5.56	2.38	2.5
		TPGT090204L-W15	●	●	●		●		●	●	0.4	5.56	2.38	2.5
		TPGT110202R-W15					●				0.2	6.35	2.38	2.8
		TPGT110202L-W15			●		●		●		0.2	6.35	2.38	2.8
		TPGT110204L-W15	●	●	●		●		●	●	0.4	6.35	2.38	2.8
		TPGT110208R-W15					●				0.8	6.35	2.38	2.8
		TPGT110208L-W15							●		0.8	6.35	2.38	2.8
		TPGT110302L-W15					●				0.2	6.35	3.18	3.4
		TPGT110304R-W15					●				0.4	6.35	3.18	3.4
		TPGT110304L-W15					●				0.4	6.35	3.18	3.4
		TPGT110308L-W15					●				0.8	6.35	3.18	3.4
		TPGT130302R-W15					●				0.2	7.94	3.18	3.4
		TPGT130302L-W15			●		●		●		0.2	7.94	3.18	3.4
		TPGT130304R-W15	●				●				0.4	7.94	3.18	3.4
		TPGT130304L-W15	●	●	●		●		●	●	0.4	7.94	3.18	3.4
		TPGT130308L-W15					●		●		0.8	7.94	3.18	3.4
		TPGT16T302R-W15					●				0.2	9.525	3.97	4.4
		TPGT16T302L-W15			●		●		●		0.2	9.525	3.97	4.4
		TPGT16T304R-W15					●		●		0.4	9.525	3.97	4.4
		TPGT16T304L-W15	●	●	●		●		●	●	0.4	9.525	3.97	4.4
		TPGT16T308L-W15					●		●	●	0.8	9.525	3.97	4.4
Finishing to medium cutting	SS TPGT110202-SS TPGT110204-SS TPGT130302-SS TPGT130304-SS TPGT16T304-SS	TPGT110202-SS					●				0.2	6.35	2.38	2.8
		TPGT110204-SS		●			●				0.4	6.35	2.38	2.8
		TPGT130302-SS					●				0.2	7.94	3.18	3.4
		TPGT130304-SS		●			●				0.4	7.94	3.18	3.4
		TPGT16T304-SS		●			●				0.4	9.525	3.97	4.4

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

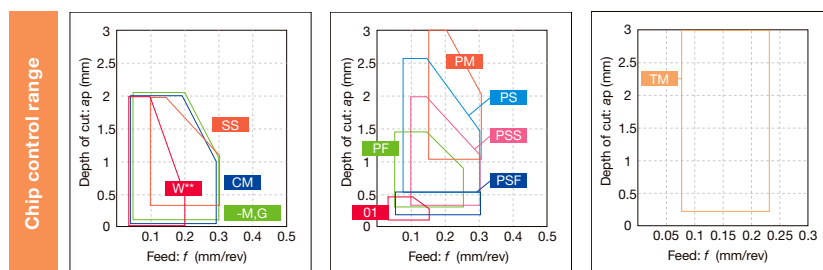


**Triangular
with hole
Positive 11°**

[illegible]

Application	Chipbreaker	Designation	Coated										Coated cermet		Cermet	Dimension (mm)								
			T9215	T9225	T6215	AH8005	AH8015	AH6225	AH6235	AH725	AH120	GH730	GT9530	AT9530		NS9530								
			RE	IC	S	D1																		
Finishing to medium cutting		PSS	TPMT090204-PSS	●	●	●			●	●	●		●		●					0.4	5.56	2.38	2.5	
			TPMT090208-PSS	●	●	●			●	●	●		●		●						0.8	5.56	2.38	2.5
			TPMT110204-PSS	●	●	●			●	●	●		●		●						0.4	6.35	2.38	2.8
			TPMT110208-PSS	●	●	●			●	●	●		●		●						0.8	6.35	2.38	2.8
			TPMT110304-PSS	●	●	●			●	●	●										0.4	6.35	3.18	3.4
			TPMT110308-PSS	●	●	●			●	●	●										0.8	6.35	3.18	3.4
			TPMT130304-PSS	●	●	●			●	●	●										0.4	7.94	3.18	3.4
			TPMT130308-PSS	●	●	●			●	●	●		●		●						0.8	7.94	3.18	3.4
			TPMT16T304-PSS	●	●	●			●	●	●		●		●						0.4	9.525	3.97	4.4
			TPMT16T308-PSS	●	●	●			●	●	●		●		●						0.8	9.525	3.97	4.4
		PS	TPMT090202-PS	●	●	●			●	●	●	●	●	●	●					0.2	5.56	2.38	2.5	
			TPMT090204-PS	●	●	●			●	●	●	●	●	●	●					0.4	5.56	2.38	2.5	
			TPMT090208-PS	●	●	●			●	●	●	●	●	●	●					0.8	5.56	2.38	2.5	
			TPMT110202-PS	●	●	●			●	●	●	●	●	●	●					0.2	6.35	2.38	2.8	
			TPMT110204-PS	●	●	●			●	●	●	●	●	●	●					0.4	6.35	2.38	2.8	
			TPMT110208-PS	●	●	●			●	●	●	●	●	●	●					0.8	6.35	2.38	2.8	
			TPMT110302 -PS	●	●	●		●	●						●					0.2	6.35	3.18	3.4	
			TPMT110304-PS	●	●	●		●	●	●	●	●	●	●	●					0.4	6.35	3.18	3.4	
			TPMT110308-PS	●	●	●	●	●	●	●	●	●	●	●	●					0.8	6.35	3.18	3.4	
			TPMT130302-PS	●	●					●			●	●	●					0.2	7.94	3.18	3.4	
			TPMT130304-PS	●	●	●			●	●	●		●	●	●					0.4	7.94	3.18	3.4	
			TPMT130308-PS	●	●	●			●	●	●		●	●	●					0.8	7.94	3.18	3.4	
			TPMT16T304-PS	●	●	●			●	●	●		●	●	●					0.4	9.525	3.97	4.4	
			TPMT16T308-PS	●	●	●			●	●	●		●	●	●					0.8	9.525	3.97	4.4	
		TM	TPMT110204-TM	●	●														0.4	6.35	2.38	2.8		
			TPMT110208-TM	●	●														0.8	6.35	2.38	2.8		
			TPMT110302-TM	●	●	●		●	●						●				0.2	6.35	3.18	3.4		
			TPMT110304-TM	●	●	●		●	●						●				0.4	6.35	3.18	3.4		
		TPMT110308-TM	●	●	●		●	●						●				0.8	6.35	3.18	3.4			
		TPMT16T304-TM	●	●														0.4	9.525	3.97	4.4			
		TPMT16T308-TM	●	●														0.8	9.525	3.97	4.4			

● : Line up

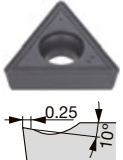
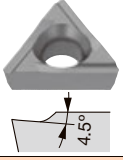


*-M,G: Without chipbreaker

Reference pages: Mounting hole specification → **B146**
Internal toolholder → **D046** - Cartridge → **K181** -
Boring bar tool → **K199** - Top-borer tool → **K203**

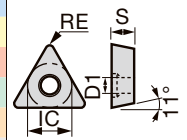
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

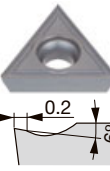
**Triangular
with hole
Positive 11°**

Application	Chipbreaker	Designation	Coated				Coated cermet	Cermet	Uncoated	Dimension (mm)							
			T9225	T505	T515	T5115	GT9530	NS9530	TH10	UX30	RE	IC	S	D1			
Finishing to medium cutting		CM	TPMT090204-CM				●						0.4	5.56	2.38	2.5	
		TPMT090208-CM				●							0.8	5.56	2.38	2.5	
		TPMT110204-CM				●							0.4	6.35	2.38	2.8	
		TPMT110208-CM				●							0.8	6.35	2.38	2.8	
		TPMT110304-CM				●							0.4	6.35	3.18	3.4	
		TPMT110308-CM				●							0.8	6.35	3.18	3.4	
		TPMT130304-CM				●							0.4	7.94	3.18	3.4	
		TPMT130308-CM				●							0.8	7.94	3.18	3.4	
		TPMT16T304-CM		●	●	●							0.4	9.525	3.97	4.4	
		TPMT16T308-CM		●	●	●							0.8	9.525	3.97	4.4	
		TPMT16T312-CM		●	●	●							1.2	9.525	3.97	4.4	
		H11	TPGH110302L-H11					●		●				0.2	6.35	3.18	3.4
	TPGH110304L-H11						●		●				0.4	6.35	3.18	3.4	
		23	TPMT090202-23						●				0.2	5.56	2.38	2.5	
		TPMT090204-23	●						●				0.4	5.56	2.38	2.5	
		TPMT110204-23	●						●				0.4	6.35	2.38	2.8	
		TPMT130304-23	●						●				0.4	7.94	3.18	3.4	
		TPMT130308-23	●						●				0.8	7.94	3.18	3.4	
TPMT16T304-23								●				0.4	9.525	3.97	4.4		
Finishing to medium cutting		-	TPGM070102R						●				0.2	4.37	1.59	2.7	
		TPGM070102L							●				0.2	4.37	1.59	2.7	
		TPGM070104R							●		●			0.4	4.37	1.59	2.7
		TPGM070104L							●		●			0.4	4.37	1.59	2.7
		TPGM090202R							●					0.2	5.56	2.38	3.2
		TPGM090202L							●					0.2	5.56	2.38	3.2
		TPGM090204L							●					0.4	5.56	2.38	3.2
		TPGM110202R							●					0.2	6.35	2.38	3
		TPGM110202L							●			●		0.2	6.35	2.38	3
		TPGM110204R							●			●		0.4	6.35	2.38	3
		TPGM110204L							●			●		0.4	6.35	2.38	3
		TPGM110302R							●					0.2	6.35	3.18	3
		TPGM110302L							●					0.2	6.35	3.18	3
		TPGM110302L-2									●			0.2	6.35	3.18	3
		TPGM110304R							●					0.4	6.35	3.18	3
		TPGM110304L							●			●		0.4	6.35	3.18	3
		TPGM110304L-2									●			0.4	6.35	3.18	3
		TPGM160302L							●					0.2	9.525	3.18	4
		TPGM160304R							●					0.4	9.525	3.18	4
		TPGM160304L							●			●		0.4	9.525	3.18	4
TPGM160304L-2									●			0.4	9.525	3.18	4		

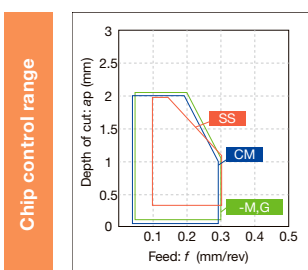
Mounting hole specification	TP*T	TPGM0701	TPGM (A) 0902~1603	TPGH		0701**	0802**	0902**	1102**	1103**	1303**	1603**	16T3*	
					D1 (mm)	TP*T(W)	-	2.3	2.5	2.8	3.4	3.4	-	4.4
						TPGM(A)	2.7	-	3.2	3.0	3.0	-	4.0	-
							TPGH	-	2.3	3.0	3.4	3.4	-	4.5

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

Application	Chipbreaker	Designation	Coated										Coated cermet		Cermet	Uncoated		Dimension (mm)						
			T9215	T9225	T6215	T5115	AH6225	AH6235	AH725	AH120	GH730	GH110		GT9530		NS9530		TH10	UX30		RE	IC	S	D1
Finishing to medium cutting	-	TPMW110204				●														0.4	6.35	2.38	2.8	
		TPMW110208				●														0.8	6.35	2.38	2.8	
		TPMW130304				●														0.4	7.94	3.18	3.4	
		TPMW130308				●														0.8	7.94	3.18	3.4	
		TPMW16T304				●														0.4	9.525	3.97	4.4	
		TPMW16T308				●														0.8	9.525	3.97	4.4	
	-	TPGA090204															●			0.4	5.56	2.38	3.2	
	(Tungaloy standard hole specification) ISO non-compliant 	TPGA110202														●		●		0.2	6.35	2.38	3	
		TPGA110204																●		0.4	6.35	2.38	3	
		TPGA110302														●		●		0.2	6.35	3.18	3	
		TPGA110304																●		0.4	6.35	3.18	3	
		TPGA160304														●		●		0.4	9.525	3.18	4	
		TPGA160308																●		0.8	9.525	3.18	4	
	-	TPGW090202														●		●		0.2	5.56	2.38	2.5	
		TPGW090204																●		0.4	5.56	2.38	2.5	
		TPGW110202																●		0.2	6.35	2.38	2.8	
		TPGW110204									●							●		0.4	6.35	2.38	2.8	
		TPGW110304																●		0.4	6.35	3.18	3.4	
		TPGW130304																●		0.4	7.94	3.18	3.4	
		TPGW16T304									●							●		0.4	9.525	3.97	4.4	
		TPGW16T308																●		0.8	9.525	3.97	4.4	
PM	TPMT090204-PM			●		●	●	●											0.4	5.56	2.38	2.5		
	TPMT090208-PM			●		●	●	●											0.8	5.56	2.38	2.5		
	TPMT110204-PM	●	●	●		●	●	●		●		●		●					0.4	6.35	2.38	2.8		
	TPMT110208-PM	●	●	●		●	●	●	●	●									0.8	6.35	2.38	2.8		
	TPMT110304-PM	●	●	●		●	●	●		●		●		●					0.4	6.35	3.18	3.4		
	TPMT110308-PM	●	●	●		●	●	●		●									0.8	6.35	3.18	3.4		
	TPMT130304-PM		●	●		●	●	●						●					0.4	7.94	3.18	3.4		
	TPMT130308-PM		●	●		●	●	●				●		●					0.8	7.94	3.18	3.4		
	TPMT16T304-PM		●	●		●	●	●						●					0.4	9.525	3.97	4.4		
	TPMT16T308-PM		●	●		●	●	●											0.8	9.525	3.97	4.4		
	TPMT16T312-PM		●	●		●	●	●											1.2	9.525	3.97	4.4		
	24	TPMT090204-24		●												●			0.4	5.56	2.38	2.5		
		TPMT110204-24		●												●			0.4	6.35	2.38	2.8		
TPMT110208-24															●			0.8	6.35	2.38	2.8			
TPMT130304-24				●											●			0.4	7.94	3.18	3.4			
TPMT130308-24				●											●			0.8	7.94	3.18	3.4			
TPMT16T304-24				●											●			0.4	9.525	3.97	4.4			
TPMT16T308-24				●											●			0.8	9.525	3.97	4.4			

● : Line up

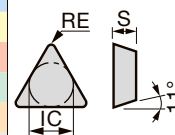


*-M,G: Without chipbreaker

Reference pages: Internal toolholder → **D046 -**
 Cartridge → **K181 -**
 Boring bar tool → **K199 -**

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

Triangular
without hole
Positive 11°

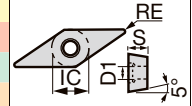
[illegible][illegible]

● : Line up
▲ : To be discontinued

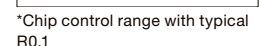
index

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Rhombic, 35°
with hole
Positive 5°**

[illegible]

● : Line up

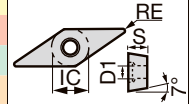


Tungaloy B151

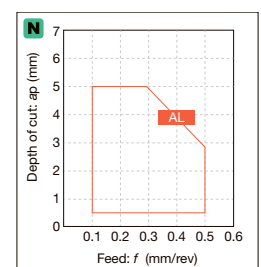
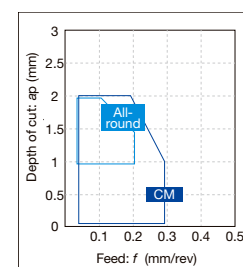
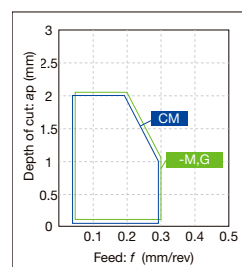
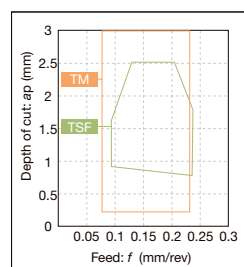
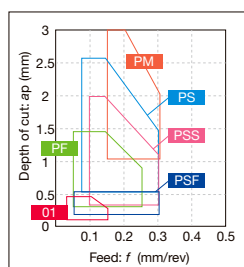
- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

**Rhombic, 35°
with hole
Positive 7°**

P	Steel	● ● ● ●						● ●										
M	Stainless																	
K	Cast iron																	
N	Non-ferrous																	
S	Superalloy																	
H	Hard material																	

[illegible]

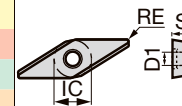
Chip control range



Reference pages: External toolholder → **C048** - Internal toolholder → **D039** -

[illegible]

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

 Rhombic, 35°
with hole[illegible]

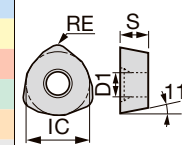
Application	Chipbreaker	Designation	Coated													Dimension (mm)				
			SH725														RE	IC	S	D1
Finishing (sharp edge)		JRP VXGU09T201MFRE-JRP**	●														<0.1*	5.56	2.47	2.5
		VXGU09T201MFLE-JRP**	●														<0.1*	5.56	2.47	2.5
		VXGU09T202MFRE-JRP**	●														<0.2*	5.56	2.47	2.5
		VXGU09T202MFLE-JRP**	●														<0.2*	5.56	2.47	2.5
Finishing to medium cutting (sharp edge)		JS VXGU09T201MFR-JS ⁽¹⁾	●													<0.1*	5.56	2.47	2.5	
		VXGU09T201MFL-JS ⁽¹⁾	●													<0.1*	5.56	2.47	2.5	
		VXGU09T202MFR-JS ⁽¹⁾	●													<0.2*	5.56	2.47	2.5	
		VXGU09T202MFL-JS ⁽¹⁾	●													<0.2*	5.56	2.47	2.5	
		VXGU09T204MFR-JS ⁽¹⁾	●													<0.4*	5.56	2.47	2.5	
		VXGU09T204MFL-JS ⁽¹⁾	●													<0.4*	5.56	2.47	2.5	

● : Line up

(1) Due to chipbreaker profile, max ap for face or ID turning is 1 mm



Trigon, 80°
with hole
Positive 11°

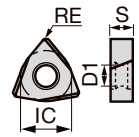
[illegible]

Application	Chipbreaker	Designation	Coated													Dimension (mm)				
			T9215	T9225	AH120												RE	IC	S	D1
Heavy cutting	ML	WPMT090725ZPR-ML	●	●	●												2.5	15	7	5.5
		WPMT090725ZPL-ML	●	●	●												2.5	15	7	5.5

● : Line up

Tungaloy B155

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

*Corner radius (RE) with a sign of inequality (<) means minus tolerance.
(1) Due to chipbreaker profile, max ap for face or ID turning is 1 mm.

Figure 10 consists of two graphs showing the chip control range, plotting Depth of cut: a_p (mm) on the y-axis (0 to 3) against Feed: f (mm/rev) on the x-axis (0 to 0.2 for the left graph, 0 to 0.5 for the right graph).

The left graph shows the chip control range for various cutting conditions:

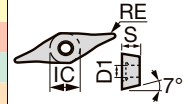
- JTS** (Green line): Depth of cut ranges from approximately 0.7 mm to 2.0 mm, with feed ranging from 0.05 mm/rev to 0.1 mm/rev.
- JSS** (Red line): Depth of cut ranges from approximately 0.5 mm to 1.5 mm, with feed ranging from 0.05 mm/rev to 0.15 mm/rev.
- JRP** (Blue line): Depth of cut ranges from approximately 0.5 mm to 1.0 mm, with feed ranging from 0.05 mm/rev to 0.1 mm/rev.
- JS** (Pink line): Depth of cut ranges from approximately 0.5 mm to 1.5 mm, with feed ranging from 0.05 mm/rev to 0.2 mm/rev.

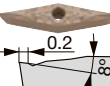
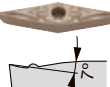
The right graph shows the chip control range for various cutting conditions:

- SS** (Red line): Depth of cut ranges from approximately 0.5 mm to 1.5 mm, with feed ranging from 0.1 mm/rev to 0.2 mm/rev.
- TS** (Green line): Depth of cut ranges from approximately 0.5 mm to 2.0 mm, with feed ranging from 0.1 mm/rev to 0.3 mm/rev.
- TSW** (Blue line): Depth of cut ranges from approximately 0.5 mm to 2.0 mm, with feed ranging from 0.2 mm/rev to 0.4 mm/rev.

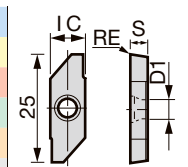
Tungaloy B157

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible]

Application	Chipbreaker	Designation	Coated					Coated cermet	Cermet						Dimension (mm)				
			T9215	T9225	T6215	AH8015	AH6225	GT9530	NS9530						RE	IC	S	D1	
Finishing to medium cutting		ZF	YWMT11T202-ZF	●	●	●	●	●	●							0.2	4.679	2.78	2.3
			YWMT11T204-ZF	●	●	●	●	●	●							0.4	4.679	2.78	2.3
			YWMT16T302-ZF	●	●	●	●	●	●							0.2	7.018	3.97	2.86
			YWMT16T304-ZF	●	●	●	●	●	●							0.4	7.018	3.97	2.86
			YWMT16T308-ZF	●	●	●	●	●	●							0.8	7.018	3.97	2.86
		ZM	YWMT11T202-ZM	●	●	●	●	●	●							0.2	4.679	2.78	2.3
			YWMT11T204-ZM	●	●	●	●	●	●							0.4	4.679	2.78	2.3
			YWMT16T302-ZM	●	●	●	●	●	●							0.2	7.018	3.97	2.86
			YWMT16T304-ZM	●	●	●	●	●	●							0.4	7.018	3.97	2.86
			YWMT16T308-ZM	●	●	●	●	●	●							0.8	7.018	3.97	2.86

JXF

[illegible]

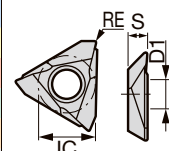
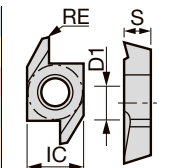
Application	material																		Dimension (mm)	
	Chipbreaker	Designation	Coated	Uncoated																
Front turning	-	JXFR8000F	●	●																
		JXFR8010F	●	●																
																				

Graph showing Depth of cut: a_p (mm) vs Feed: f (mm/rev) for different chip control ranges. The regions are defined by lines representing the boundaries between different chip control ranges.

Region	Feed Range (mm/rev)	Depth of Cut Range (mm)
ZM R0.4	0.1 - 0.2	0.5 - 1.5
ZF R0.8	0.2 - 0.4	1.5 - 2.5
ZM R0.8	0.2 - 0.4	1.0 - 1.5
ZF R0.4	0.2 - 0.4	0.5 - 1.0
ZF R0.2	0.2 - 0.4	0.0 - 0.5

Tungaloy B159

- : Continuous cutting
- ◐ : Light interrupted cutting
- ⊗ : Heavy interrupted cutting

[illegible][illegible][illegible][illegible]

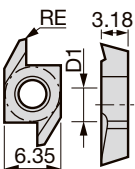
● : Line up

10E*



Back turning

P	Steel	●
M	Stainless	●
K	Cast iron	●
N	Non-ferrous	●
S	Superalloy	
H	Hard material	



Application	Chipbreaker	Designation	Uncoated											Dimension (mm)				
			TH10												RE	IC	S	D1
Back turning	-	10ER100B	●												0.03	6.35	3.18	3.0
		10EL100B	●												0.03	6.35	3.18	3.0
		10ER150B	●												0.03	6.35	3.18	3.0
		10EL150B	●												0.03	6.35	3.18	3.0
		10ER300	●												-	6.35	3.18	3.0
		10EL300	●												-	6.35	3.18	3.0

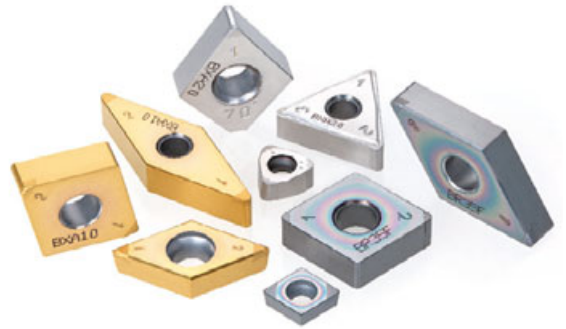
● : Line up



J

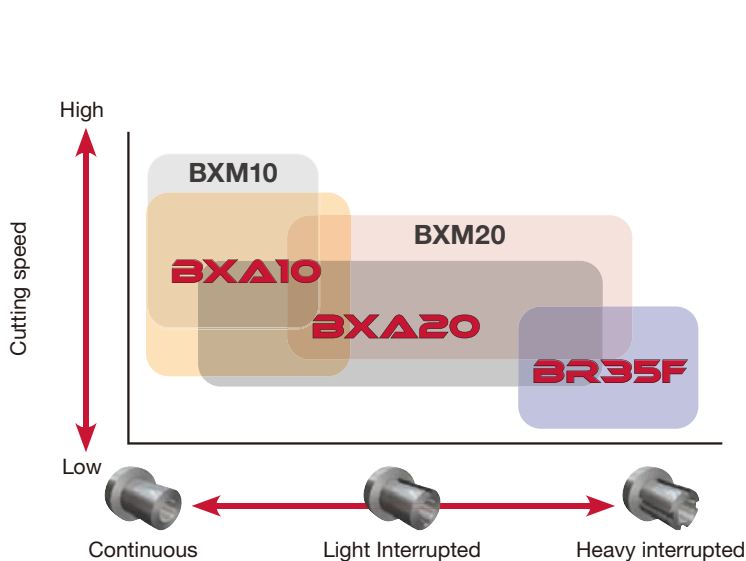
BXA10/BXA20/BR35F

Coated CBN series for a wide range of hard part turning



■ Application areas

The most suitable grade can be selected for your application requirements



BXA10

- First choice for continuous to light interrupted cuts
- For $V_c = 230$ m/min or less

BXA20

- Versatile grade from continuous to heavy interrupted cuts
- For $V_c = 180$ m/min or less

BR35F

- First choice for heavy interrupted cuts
- For $V_c = 150$ m/min or less

BXM10

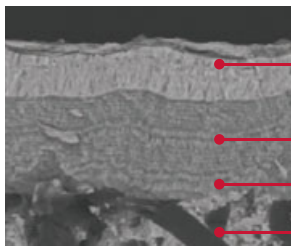
- Complementary grade for continuous to light interrupted cuts
- For extremely high cutting speeds of $V_c = 300$ m/min

BXM20

- Complementary versatile grade for continuous to heavy interrupted cuts
- For high cutting speeds of $V_c = 200$ m/min

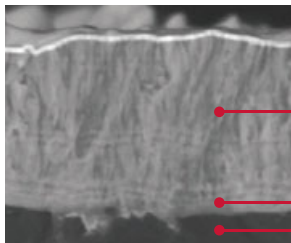
■ Grade properties

BXA10



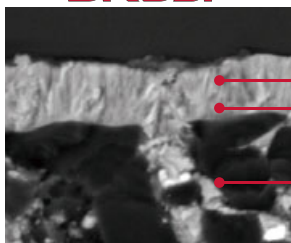
- TiCN coating with high thermal stability and wear resistance
- Multilayer TiAlN coating with good adhesion and resistance to delamination and chipping
- Strong coating-substrate adhesion prevents delamination
- Dedicated CBN substrate with excellent flank wear and crater wear resistance

BXA20



- Thick multilayer TiAlN coating with superior wear and chipping resistance
- Strong coating-substrate adhesion prevents delamination
- Dedicated CBN substrate with excellent crater wear and fracture resistance

BR35F



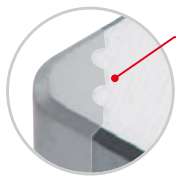
- Multilayer AlCrN coating with excellent fracture resistance
- Strong coating-substrate adhesion prevents delamination
- Dedicated CBN substrate with excellent chipping and fracture resistance

New brazing technology for increased machining efficiency

A maximum depth of cut up to 0.8 mm.
Reduces the number of passes to increase productivity.

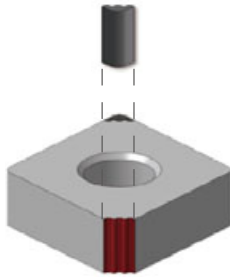
Innovative WavyJoint brazing technology

Prevents the CBN tips from debrazing, eliminating abrupt insert fractures during demanding dry machining, while securing stable and predictable hard turning operations.



The "wavy" contact surface enhances the brazing strength

WavyJoint

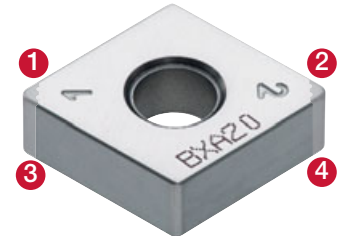
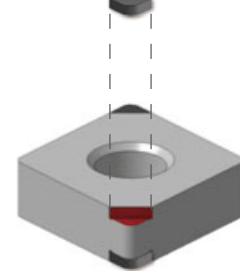


Vs.

CBN Tip Size: 200% larger for improved wear resistance of the cutting edge

Brazing Area: 160% larger for enhanced brazing strength

Standard



Double sided inserts

MINIFORCE

Double-sided **positive** insert with CBN tips

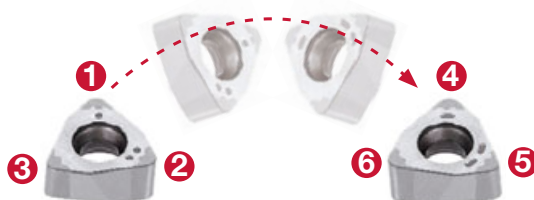
MiniForce-Turn now offers WavyJoint CBN inserts that provide additional strength and security in aggressive cutting conditions.

■ WXGQ0403... insert

Double-sided positive inserts

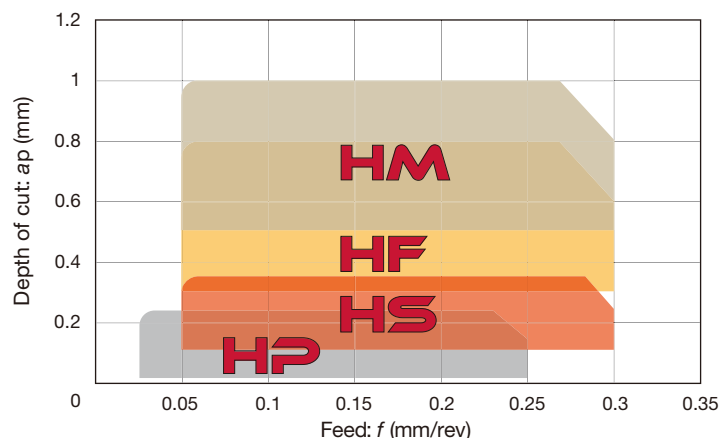


6-edged insert with dovetail design



HARDBREAKER SERIES

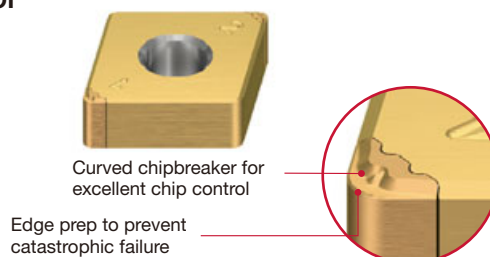
CBN inserts with chipbreaker ideal for carburized layer removal and finishing hardened steel



HS chipbreaker

Optimized chipbreaker design for excellent chip control during hard turning at aggressive conditions

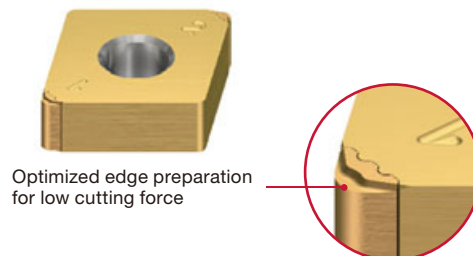
- Designed for high feed machining.
- Provides excellent chip control for a wide range of D.O.C. and feed rates.
- Edge preparation is designed to prevent catastrophic failure.



HP chipbreaker

Designed for finish machining of hardened parts with close tolerances

- Optimized chipbreaker geometry significantly reduces cutting force imposed on the cutting edge, ensuring long tool life.
- The edge preparation is designed to generate low cutting force, providing chatter-free machining and close tolerances.
- The built-in wiper yields excellent surface quality and good chip control.



HF and HM chipbreaker

- Suited for hard turning applications requiring great D.O.C. such as carburized layer removal.
- Effective chip breaking is possible for a wide range of hard materials.
- **BXA20** and **BXM20** CBN grade inserts are available for aggressive cutting depths.

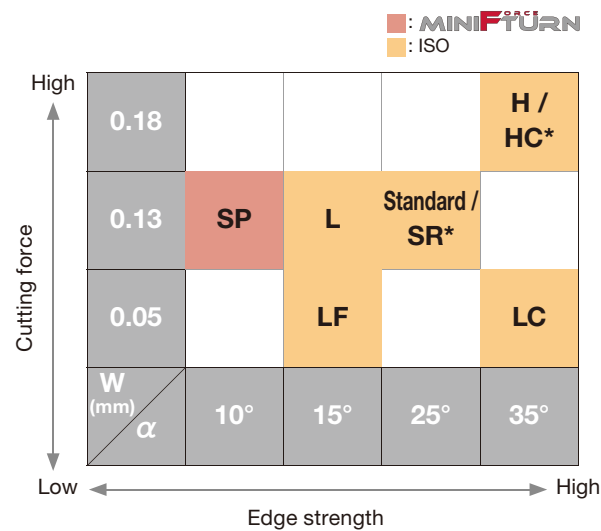
■ Edge preparations

Various styles of edge preparations are available according to the application needs

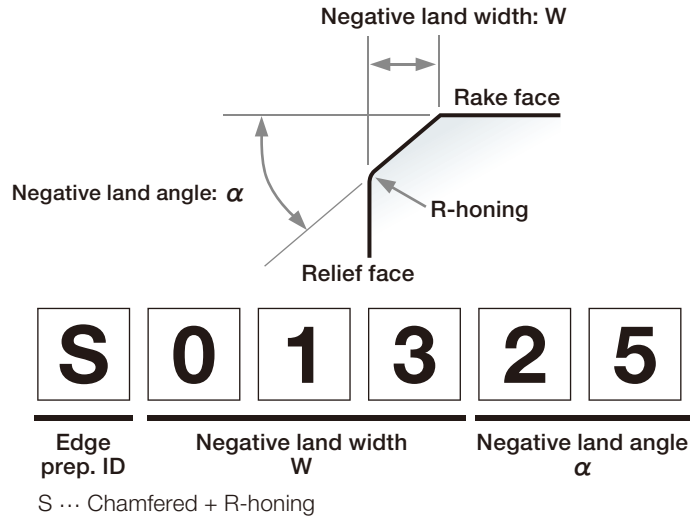
BXA10 and BXA20 grade ISO inserts are available in five different styles of edge preps: L, LF, LC, standard and -H; BR35F grade ISO inserts are offered in two styles of edge preps: SR and HC.

*For the new BR35F grade ISO inserts, "SR" is assigned for the edge prep symbol for S01325, instead of "Standard" as previously assigned. Likewise, "HC" for S01835, instead of conventional "H".

MiniForce-Turn inserts are available in the SP style edge prep (S01310).



*Edge prep symbol for BR35F grade inserts only



Non-Ferrous Application Series

Complete turning solutions for non-ferrous materials



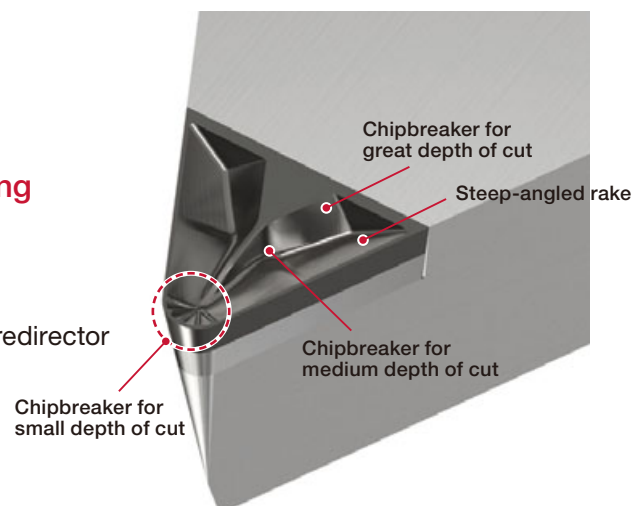
■ PCD inserts with 3D chipbreaker

NS chipbreaker

No more chip nesting in aluminum alloy machining

Unique 3D chipbreaker

- Versatile geometry allows excellent chip control
- One insert handles from rough to finish operations
- Optimal rake angle design effectively directs chips to the redirector



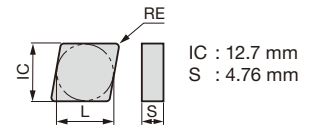
IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

● : Line up

Tungaloy B169

CN Solid insert

80° Rhombic without hole

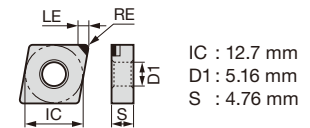


Application	Designation	Dimension (mm)		No. of corners	Wiper	Standard	Problem				Material	Grade
		RE	LE				Burr	Finak wear	Crater wear	Chipping		
Medium cutting	S-CNGN120408	0.8		4		○					●	
	S-CNGN120412	1.2		4		○					●	

● : Line up

CN

80° Rhombic with hole



Application	Designation	Dimension (mm)		No. of corners	Wiper	Standard	Problem				Material	Grade
		RE	LE				Burr	Finak wear	Crater wear	Chipping		
Medium cutting	CNGA120402-QBN	0.2	4.1	1		○					●	
	CNGA120404-QBN	0.4	4	1		○					●	
	CNGA120408-QBN	0.8	3.9	1		○					●	
	CNGA120412-QBN	1.2	3.9	1		○					●	

● : Line up





55° Rhombic
with hole

KCast iron

SSuperalloy

HHard material

Sintered metal

Application	Designation	Dimension (mm)		No. of corners	Wiper	Standard	Problem				BXA10	BXA20	BR35F	BXM10	BXM20	BXC50	BXA30	BXA40	BX310	BX330	BX360	BX380	BX470	BX480	BX930
		RE	LE				Burr	Finak wear	Crater wear	Chipping															
Finishing	2QP-DNGA150408	0.8	2.1	2		○					●	●		●	●				●	●	●	●	●	●	●
	2QP-DNGA150408SR		2.1	2		○							●												
	4QS-DNGA150408		1.6	4		○					●	●													
	4QS-DNGA150408SR		1.6	4		○							●												
	4QP-DNGA150408		2.1	4		○									●	●	●								
	2QP-DNGA150408-LC		2.1	2					○		●	●													
	4QS-DNGA150408-LC		1.6	4					○		●	●													
	2QP-DNGA150412		2	2		○					●	●		●	●				●	●	●	●		●	●
	2QP-DNGA150412SR	2	2		○							●													
	4QS-DNGA150412	1.6	4		○						●	●													
	4QS-DNGA150412SR	1.6	4		○								●												
	4QP-DNGA150412	2	4		○										●	●	●								
	2QP-DNGA150412-LC	2	2					○		●	●														
	4QS-DNGA150412-LC	1.6	4					○		●	●														
	2QP-DNGA150416	1.6	3.4	2		○					●	●													
	2QP-DNGA150416SR		3.4	2		○							●												
	2QP-DNGA150420	2	3	2		○					●	●													
	2QP-DNGA150420SR		3	2		○							●												
2QP-DNGA150424	2.4	2.6	2		○					●	●														
2QP-DNGA150424SR		2.6	2		○							●													
Medium cutting	2QP-DNGA150404-H	0.4	2.5	2						○	●	●			●						●	●			
	2QP-DNGA150404HC		2.5	2						○			●												
	4QS-DNGA150404-H		2	4						○	●	●													
	4QS-DNGA150404HC		2	4						○			●												
	4QP-DNGA150404-H		2.5	4						○							●								
	2QP-DNGA150408-H	0.8	2.1	2						○	●	●			●					●	●				
	2QP-DNGA150408HC		2.1	2						○			●												
	4QS-DNGA150408-H		1.6	4						○	●	●													
	4QS-DNGA150408HC		1.6	4						○			●												
	4QP-DNGA150408-H		2.1	4						○							●					●	●		
	2QP-DNGA150412-H	1.2	2	2						○	●	●			●						●	●			
	2QP-DNGA150412HC		2	2						○			●												
	4QS-DNGA150412-H		1.6	4						○	●	●													
	4QS-DNGA150412HC		1.6	4						○			●												
	4QP-DNGA150412-H		2	4						○							●								
	2QP-DNGA150416HC	1.6	3.4	2						○			●												
	2QP-DNGA150420HC	2	3	2						○			●												
	2QP-DNGA150424HC	2.4	2.6	2						○			●												

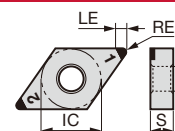
● : Line up

● : Line up

DN



55° Rhombic with hole



IC : 12.7 mm
D1 : 5.16 mm
S : 6.35 mm

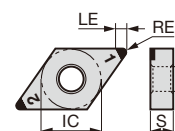
[illegible]

● : Line up

DN with chipbreaker



55° Rhombic with hole

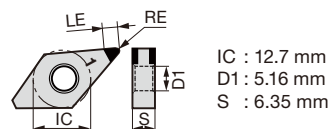


IC : 12.7 mm
D1 : 5.16 mm
S : 6.35 mm

[illegible]

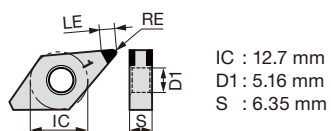
● : Line up

**45° Rhombic
with hole**

[illegible]

● : Line up

**45° Rhombic
with hole**

[illegible]

● : Line up

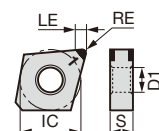
CBN Insert NEGATIVE TYPE

● : Continuous cutting
 ● : Light interrupted cutting
 ✱ : Heavy interrupted cutting

GN



70° Rhombic
with hole



IC : 12.7 mm
 DT : 5.16 mm
 S : 4.76 mm



70° Rhombic with hole

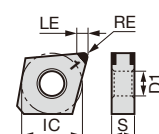
K	Cast iron																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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● : Line up

GN with chipbreaker



70° Rhombic
with hole



IC : 12.7 mm
 DT : 5.16 mm
 S : 4.76 mm



70° Rhombic

with hole

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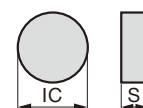
● : Line up

Reference pages: External toolholder → **C015 -** Internal toolholder → **D025 -**
 J-Series toolholder → **G050** TungCap → **K008 -**

RN Solid insert



Round, without hole



IC : 9.525 mm
S : 3.18 mm

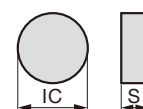
[illegible]

● : Line up

RN Solid insert



Round, without hole



IC : 12.7 mm
S : 4.76 mm

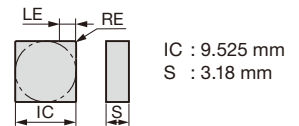
Round, without hole											
Application	Designation	Dimension (mm)		No. of corners	Wiper	Standard	Problem				Material
		RE	LE				Burr	Flak wear	Crater wear	Chipping	
Medium cutting	S-RNGN120400			-		○					● BXC90

● : Line up

SN Solid insert



Square without hole

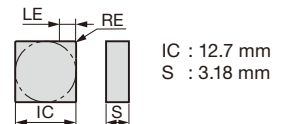
[illegible]

● : Line up

SN Solid insert



Square without hole

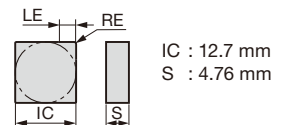
[illegible]

● : Line up

SN Solid insert

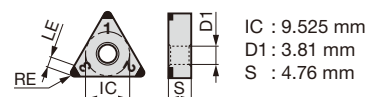


Square without hole

[illegible]

● : Line up

Reference pages: External toolholder → **C101 -** Internal toolholder → **D043 -**
Cartridge → **K181 -**

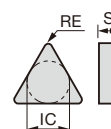
[illegible]

● : Line up

TN Solid insert



Triangular without hole



IC : 9.525 mm
S : 4.76 mm

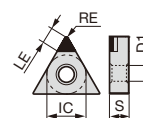
[illegible]

● : Line up

TN



Triangular with hole



IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm

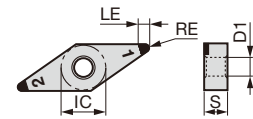
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● : Line up

VN with chipbreaker



35° Rhombic with hole



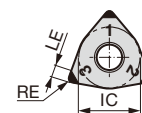
IC : 9.525 mm
D1 : 3.81 mm
S : 4.76 mm

[illegible]

● : Line up

WN

 **80° Trigon
with hole**



IC : 12.7 mm
D1 : 5.16 mm
S : 4.76 mm

[illegible]

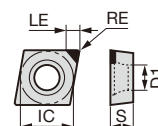
● : Line up

Reference pages: VN: External toolholder → **C041** -, Internal toolholder → **D074** -, TungCap → **C042** -, **K014** -
WN: External toolholder → **C024** -, Internal toolholder → **D031** -, TungCap → **C024** -, **K010** -

CC



80° Rhombic with hole, Positive 7°



IC : 3.57 mm
D1: 1.9 mm
S : 1.39 mm

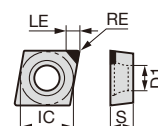
[illegible]

● : Line up

CC



80° Rhombic with hole, Positive 7°



IC : 4.37 mm
D1 : 2.3 mm
S : 1.79 mm

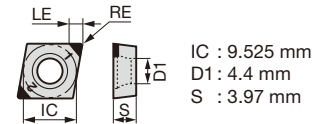
[illegible]

● : Line up

CC



**80°Rhombic
with hole, Positive 7°**



	80°Rhombic with hole, Positive 7°		K Cast iron																		cc	cc	cc																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</
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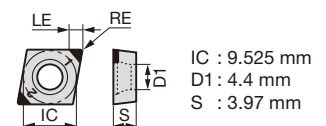
● : Line up

CC

with chipbreaker



**80°Rhombic
with hole, Positive 7°**



 80°Rhombic with hole, Positive 7°		K	Cast iron																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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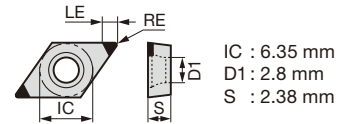
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Reference pages: External toolholder → **C030** - Internal toolholder → **D014** -
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**55° Rhombic
with hole, Positive 7°**





55° Rhombic

with hole, Positive 7°

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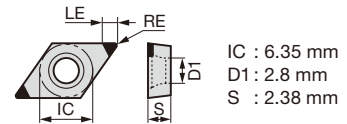
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**55° Rhombic
with hole, Positive 7°**



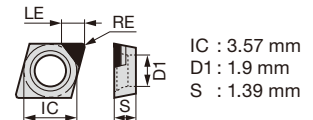
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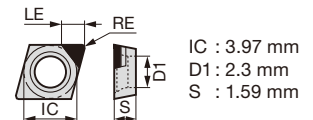
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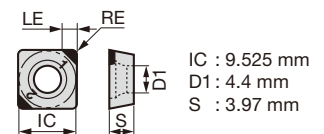
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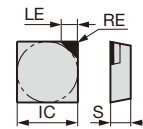
● : Line up

Reference pages: EP: Internal toolholder → **D034** -, Boring bar tool → **K201** -, Top-borer tool → **K202**
SP: Internal toolholder → **D041** -, Cartridge → **K181** -

SP



Square Positive 11° without hole



IC : 12.7 mm
S : 3.18 mm

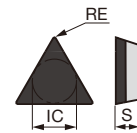
[illegible]

● : Line up

TB



Triangular Positive 5° without hole



IC : 3.97 mm
S : 1.59 mm

[illegible]

● : Line up

TC



Triangular Positive 7° with hole



IC : 5.56 mm
D1 : 2.5 mm
S : 2.38 mm

[illegible]

● : Line up

Reference pages: SP: Internal toolholder → **D042**, Cartridge → **K181** -
TC: External toolholder → **C054**, Internal toolholder → **D045**
J-Series toolholder → **G074** -, PINZBOHR® → **K178** -

TP



Triangular Positive 11° with hole



IC : 5.56 mm
D1 : 2.5 mm
S : 2.38 mm

[illegible]

● : Line up

TP



Triangular Positive 11° with hole



IC : 6.35 mm
D1 : 2.8 mm
S : 2.38 mm



Triangular Positive 11°
with hole

K

Cast iron

S

Superalloy

H

Hard material

Sintered metal

● : Line up

CBN Insert POSITIVE TYPE

● : Continuous cutting
 ● : Light interrupted cutting
 ✱ : Heavy interrupted cutting

TP



**Triangular Positive 11°
with hole**



IC : 6.35 mm
 D1 : 3.4 mm
 S : 3.18 mm

		Triangular Positive 11° with hole		K		Cast iron																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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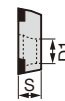
● : Line up

TP

with chipbreaker



**Triangular Positive 11°
with hole**



IC : 6.35 mm
 D1 : 3.4 mm
 S : 3.18 mm

		Triangular Positive 11° with hole		K		Cast iron																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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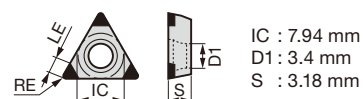
● : Line up

Reference pages: Internal toolholder → **D046** - Cartridge → **K181** -
 Boring bar tool → **K199** - Top-borer tool → **K203**

TP



Triangular Positive 11° with hole





Triangular Positive 11°

with hole

K

Cast iron

S

Superalloy

H

Hard material

Sintered metal

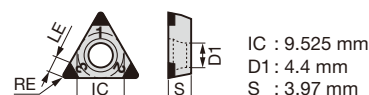
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● : Line up

TP



Triangular Positive 11° with hole



	Triangular Positive 11° with hole				K	Cast iron													●					
	S	Superalloy																	●					
	H	Hard material				●	●	●	●	●	●	●	●	●	●	●	●	●						
		Sintered metal																	●					
Application	Designation	Dimension (mm)		No. of corners	Wiper	Standard	Problem				BXA10	BXA20	BXM10	BXM20	BXA30	BXA40	BX310	BX330	BX360	BX480	BX930			
		RE	LE				Burr	Flak wear	Crater wear	Chipping														
Finishing	3QP-TPGW16T302	0.2	2.3	3		○					●	●												
	3QP-TPGW16T304	0.4	2.2	3		○					●	●	●	●	●	●					●			
	3QP-TPMW16T304		2.2	3		○									●	●	●							
	Q-TPGW16T304		2.3	1		○										●					●			
	3QP-TPGW16T308	0.8	1.9	3		○					●	●	●	●	●	●		●						
	3QP-TPMW16T308		1.9	3		○									●									

● : Line up

CBN Insert POSITIVE TYPE

● : Continuous cutting
 ● : Light interrupted cutting
 ✱ : Heavy interrupted cutting

TP



Triangular Positive 11° with hole



IC : 9.525 mm
 D1 : 4.4 mm
 S : 4.76 mm

		Triangular Positive 11° with hole				K		Cast iron																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															</
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● : Line up

TP



Triangular Positive 11° without hole



IC : 6.35 mm
 S : 3.18 mm



Triangular Positive 11°

without hole

K	Cast iron																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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● : Line up

Reference pages: Internal toolholder → **D046** - Cartridge → **K181** -
 Boring bar tool → **K199** - Top-borer tool → **K203**

TP



Triangular Positive 11° without hole

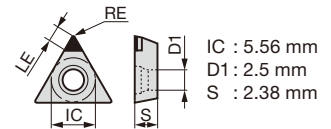
[illegible]

● : Line up

TP



Triangular Positive 11° with hole

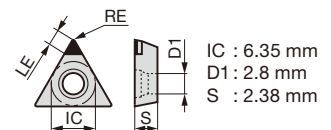
[illegible]

● : Line up

TP



Triangular Positive 11° with hole

[illegible]

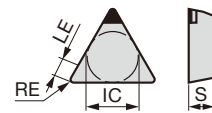
● : Line up

Reference pages: Internal toolholder → **D046** - Cartridge → **K181** -
Boring bar tool → **K199** - Top-borer tool → **K203**

TP



Triangular Positive 11° without hole



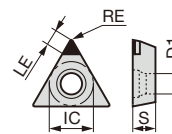
IC : 9.525 mm
S : 3.18 mm

[illegible]

TP



Triangular Positive 11° with hole



● : Line up

IC : 5.56 mm
D1 : 3.2 mm
S : 2.38 mm

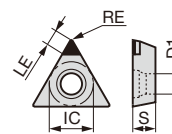
[illegible]

Tungaloy's standard hole specification (ISO non-compliant)

TP



Triangular Positive 11° with hole



IC : 6.35 mm
D1 : 3 mm
S : 2.38 mm

[illegible]

Tungaloy's standard hole specification (ISO non-compliant)

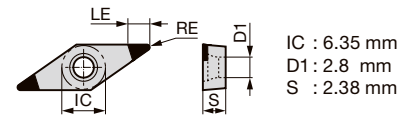
● : Line up

Reference pages: Mounting hole specification → **B146**
Internal toolholder → **D046** - Cartridge → **K181** -
Boring bar tool → **K199** - Top-borer tool → **K203**

VB



35° Rhombic Positive 5° with hole

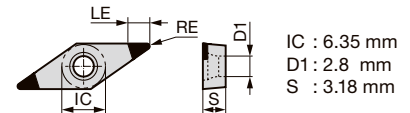
[illegible]

● : Line up

VB



35° Rhombic Positive 5° with hole

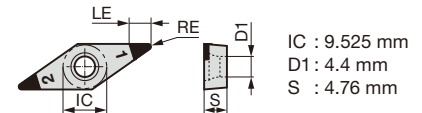
[illegible]

● : Line up

VB with chipbreaker



35° Rhombic Positive 5° with hole

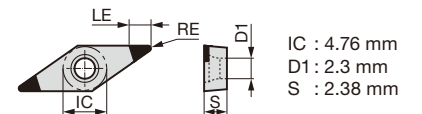
[illegible][illegible]

● : Line up

VC



35° Rhombic Positive 7° with hole

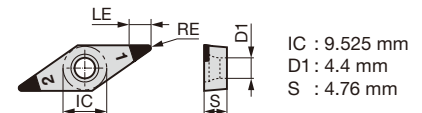
[illegible][illegible]

● : Line up

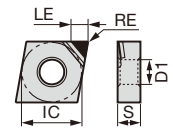
VC



35° Rhombic Positive 7° with hole

[illegible][illegible]

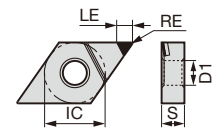
● : Line up

CN**80° Rhombic with hole**

IC : 12.7 mm
 D1 : 5.16 mm
 S : 4.76 mm

		80°Rhombic with hole		N Non-ferrous		●c ●c ●c																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX110	DX120	DX140																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

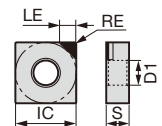
● : Line up

DN**55° Rhombic with hole**

IC : 12.7 mm
 D1 : 5.16 mm
 S : 4.76 mm

Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX120	DX140	DX160													
Finishing	DNMM150402-DIA	0.2	3.3	1	○	●															
	DNMM150404-DIA	0.4	3.1	1	○	●															
	DNGA150404-DIA		3.1	1			●	●													
	DNGA150408-DIA	0.8	2.8	1			●														

● : Line up

SN**Square with hole**

IC : 12.7 mm
 D1 : 5.16 mm
 S : 4.76 mm

Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX140															
Finishing	SNGA120404-DIA	0.4	3.6	1		●															
	SNGA120408-DIA	0.8	3.6	1		●															

● : Line up

Reference pages: CN: External toolholder → **C015 -**, Internal toolholder → **D025 -**
 J-Series toolholder → **G050**, TungCap → **K008 -**
 PINZBOHR® → **K178 -**, Cartridge → **K181 -**
 DN: External toolholder → **C034 -**, Internal toolholder → **D069 -**
 J-Series toolholder → **G068**, TungCap → **C034 -**, **K012 -**
 SN: External toolholder → **C101 -**, Internal toolholder → **D043 -**
 Cartridge → **K181 -**

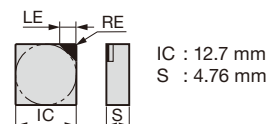
PCD Insert NEGATIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

SN



Square without hole



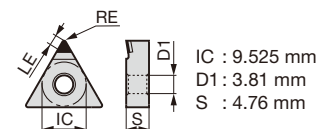
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	SNGN120408-DIA	0.8	3.6	1		●															

● : Line up

TN



Triangular with hole



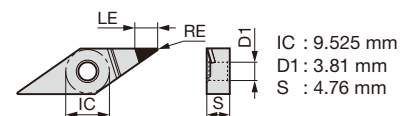
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-TNMM160402	0.2	2.7	1	○	●															
	TNMM160402-DIA		3.3	1	○		●														
	1QP-TNMM160404	0.4	2.6	1	○	●															
	TNMM160404-DIA		3.2	1	○		●														
	TNGA160404-DIA		3.2	1				●	●												
	TNGA160408-DIA	0.8	2.9	1				●	●												

● : Line up

VN



35° Rhombic with hole



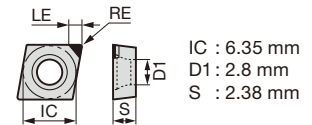
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	VNMM160402-DIA	0.2	4.8	1	○	●															
	VNMM160404-DIA	0.4	4.4	1	○	●															
	VNMM160408-DIA	0.8	3.6	1	○	●															

● : Line up

Reference pages: SN: External toolholder → C101 -, Internal toolholder → D043 -, Cartridge → K181 -
 TN: External toolholder → C032 -, Internal toolholder → D049 -, Cartridge → K181 -
 VN: External toolholder → C041 -, Internal toolholder → D074 -, TungCap → C042 -, K014 -

CC

**80° Rhombic
Positive 7°
with hole**

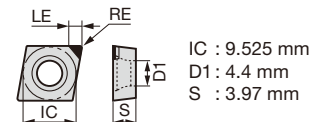


 80°Rhombic Positive 7° with hole		N		Non-ferrous		●	●	●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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● : Line up

CC

**80° Rhombic
Positive 7°
with hole**

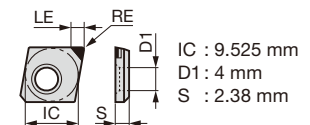


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX110	DX120	DX140	DX160												
Finishing	CCMT09T302-DIA	0.2	2.4	1	○		●														
	CCGW09T302-DIA		3.5	1				●													
	1QP-CCGT09T304-NS		3.1	1	○	●															
	1QP-CCMT09T304	0.4	2.4	1	○	●															
	CCMT09T304-DIA		2.4	1	○		●														
	CCGW09T304-DIA		3.5	1				●	●												
	1QP-CCGT09T308-NS	0.8	3	1	○	●															
	CCGW09T308-DIA		3.4	1				●													

● : Line up

CP

**80° Rhombic
Positive 11°
with hole**



Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX140															
Finishing	CPGA090202-DIA	0.2	2.4	1		●															
	CPGA090204-DIA	0.4	2.4	1		●															

Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

Reference pages: CC: External toolholder → **C030** -, Internal toolholder → **D014** -
 J-Series toolholder → **G040** -, PINZBOHR® → **K178** -

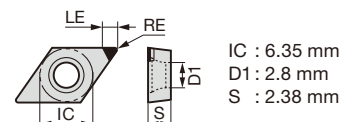
PCD Insert POSITIVE TYPE

- : Continuous cutting
- : Light interrupted cutting
- : Heavy interrupted cutting

DC



**55° Rhombic
Positive 7°
with hole**



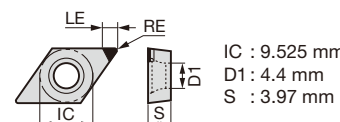
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX110	DX120	DX140													
Finishing	DCGW070200-DIA	0.05	2.4	1		●●	●●	●●													
	DCMT070202-DIA	0.2	2.3	1	○		●														
	DCGW070202-DIA		2.3	1			●	●													
	1QP-DCGT070204-NS	0.4	3	1	○	●															
	DCMT070204-DIA		2.1	1	○		●														
	DCGW070204-DIA		2.1	1				●													

● : Line up

DC



**55° Rhombic
Positive 7°
with hole**



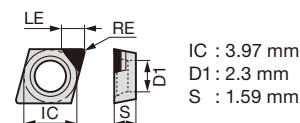
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX110	DX120	DX140													
Finishing	DCMT11T302-DIA	0.2	3.2	1	○		●														
	DCGW11T302-DIA		3.2	1				●													
	1QP-DCGT11T304-NS	0.4	3	1	○	●															
	DCMT11T304-DIA		3	1	○		●														
	DCGW11T304-DIA		3	1				●													
	1QP-DCGT11T308-NS	0.8	3	1	○	●															
	DCGW11T308-DIA		2.7	1				●													

● : Line up

EP



**75° Rhombic
Positive 11°
with hole**



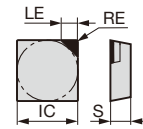
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX140															
Finishing	EPGW040102-DIA	0.2	2	1		●															
	EPGW040104-DIA	0.4	1.9	1		●															

● : Line up

Reference pages: DC: External toolholder → **C046 -**, Internal toolholder → **D056 -**, J-Series toolholder → **G052 -**
 EP: Internal toolholder → **D034 -**, Boring bar tool → **K201 -**, Top-borer tool → **K202**

SP

**Square
Positive 11°
without hole**



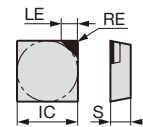
IC : 9.525 mm
S : 3.18 mm

Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	SPGN090308-DIA	0.8	3.6	1		●															

● : Line up

SP

**Square
Positive 11°
without hole**



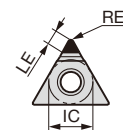
IC : 12.7 mm
S : 3.18 mm

Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	SPGN120302-DIA	0.2	3.6	1		●															
	SPGN120304-DIA	0.4	3.6	1		●															
	SPGN120308-DIA	0.8	3.6	1		●	●														

● : Line up

TC

**Triangular
Positive 7°
with hole**



IC : 4.76 mm
D1 : 2.7 mm
S : 2.38 mm

Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	TCMT080202-DIA	0.2	2.2	1	○	●															
	TCMT080204-DIA	0.4	2	1	○	●															

● : Line up

Reference pages: SP: Internal toolholder → **D041** -, Cartridge → **K181** -
 TC: External toolholder → **C054**, Internal toolholder → **D045**
 J-Series toolholder → **G074** -, PINZBOHR® → **K178** -

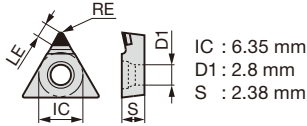
PCD Insert POSITIVE TYPE

● : Continuous cutting
 ● : Light interrupted cutting
 ✱ : Heavy interrupted cutting

TC



Triangular
Positive 7°
with hole



IC : 6.35 mm
 D1 : 2.8 mm
 S : 2.38 mm

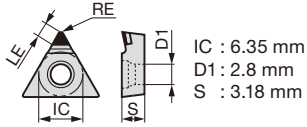
		Triangular Positive 7° with hole		N Non-ferrous		●●																					
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX120																					
		RE	LE																								
Finishing	TCMT110202-DIA	0.2	2.4	1	○	●																					
	TCMT110204-DIA	0.4	2.2	1	○	●																					

● : Line up

TC



Triangular
Positive 7°
with hole



IC : 6.35 mm
 D1 : 2.8 mm
 S : 3.18 mm

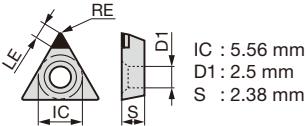
		Triangular Positive 7° with hole		N		Non-ferrous		●●		●●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								</
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● : Line up

TP



Triangular
Positive 11°
with hole



IC : 5.56 mm
 D1 : 2.5 mm
 S : 2.38 mm

		Triangular Positive 11° with hole		N		Non-ferrous		●●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												</
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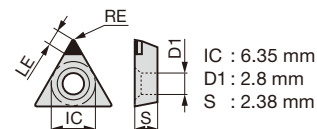
Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

Reference pages: TC: External toolholder → **C054**, Internal toolholder → **D045**
 J-Series toolholder → **G074 -**, PINZBOHR® → **K178 -**
 TP: Mounting hole specification → **B146**, Internal toolholder → **D046 -**, Cartridge → **K181 -**
 Boring bar tool → **K199 -**, Top-borer tool → **K203**

TP

**Triangular
Positive 11°
with hole**



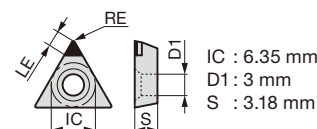
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX140										
		RE	LE													
Finishing	TPGA110202-DIA	0.2	2.4	1		●										
	TPGA110204-DIA	0.4	2.2	1		●										

Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

TP

**Triangular
Positive 11°
with hole**



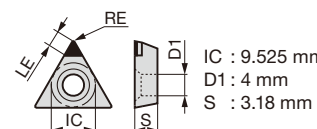
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX140										
		RE	LE													
Finishing	TPGA110302-DIA	0.2	2.4	1		●										
	TPGA110304-DIA	0.4	2.2	1		●										
	TPGA110308-DIA	0.8	2.9	1		●										

Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

TP

**Triangular
Positive 11°
with hole**



Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX140										
		RE	LE													
Finishing	TPGA160302-DIA	0.2	3.3	1		●										
	TPGA160304-DIA	0.4	3.2	1		●										
	TPGA160308-DIA	0.8	2.9	1		●										

Tungaloy's standard hole specification (ISO non-compliant)

● : Line up

Reference pages: Mounting hole specification → **B146**Internal toolholder → **D046 -**Boring bar tool → **K199 -**Cartridge → **K181 -**Top-borer tool → **K203**

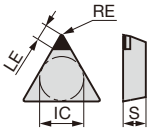
PCD Insert POSITIVE TYPE

● : Continuous cutting
 ● : Light interrupted cutting
 ✖ : Heavy interrupted cutting

TP



**Triangular
Positive 11°
without hole**



IC : 5.56 mm
 S : 2.38 mm

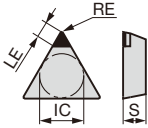
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	TPGN090204-DIA	0.4	2.2	1		●	●														

● : Line up

TP



**Triangular
Positive 11°
without hole**



IC : 6.35 mm
 S : 3.18 mm

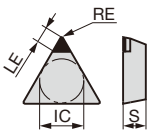
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	TPGN110304-DIA	0.4	3.2	1		●	●														
	TPGN110308-DIA	0.8	2.9	1		●	●														

● : Line up

TP



**Triangular
Positive 11°
without hole**



IC : 9.525 mm
 S : 3.18 mm

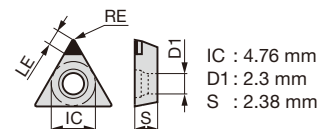
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	TPGN160302-DIA	0.2	3.3	1		●	●														
	TPGN160304-DIA	0.4	3.2	1		●	●														
	TPGN160308-DIA	0.8	2.9	1		●	●														

● : Line up

Reference pages: Internal toolholder → **D047** - Cartridge → **K181** -
 Boring bar tool → **K199** - Top-borer tool → **K203**

TP

**Triangular
Positive 11°
with hole**

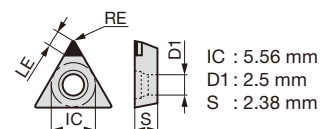


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	TPGW080202-DIA	0.2	2.4	1		●	●														
	TPGW080204-DIA	0.4	2.3	1		●	●														

● : Line up

TP

**Triangular
Positive 11°
with hole**

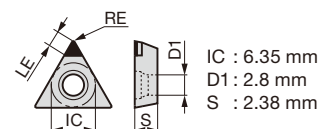


Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	TPGW090202-DIA	0.2	2.4	1		●	●														
	TPGW090204-DIA	0.4	2.2	1		●	●														

● : Line up

TP

**Triangular
Positive 11°
with hole**



Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	TPGW110202-DIA	0.2	2.4	1		●	●														
	TPGW110204-DIA	0.4	2.2	1		●	●														

● : Line up

Reference pages: Internal toolholder → **D046** - Cartridge → **K181** -
 Boring bar tool → **K199** - Top-borer tool → **K203**

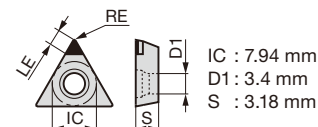
PCD Insert POSITIVE TYPE

- : Continuous cutting
- ◐ : Light interrupted cutting
- ✱ : Heavy interrupted cutting

TP



**Triangular
Positive 11°
with hole**



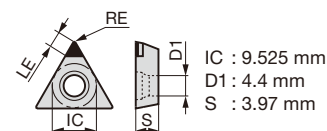
		Triangular Positive 11° with hole		N Non-ferrous		●c	●c																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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● : Line up

TP



**Triangular
Positive 11°
with hole**



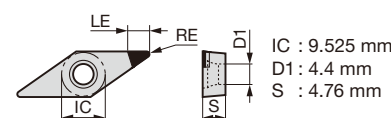
		Triangular Positive 11° with hole		N Non-ferrous		● c																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Application	Designation	Dimension (mm)		No. of corners	Chipbreaker	DX140																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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Finishing	TPGW16T302-DIA	0.2	3.3	1		●																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

● : Line up

VC



**35° Rhombic
Positive 7°
with hole**



Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE			DX110	DX120	DX140													
Finishing	VCMT160402-DIA	0.2	4.8	1	○		●														
	VCGW160402-DIA		4.8	1				●													
	1QP-VCMT160404-NS		3	1	○	●															
	VCMT160404-DIA	0.4	4.4	1	○		●														
	VCGW160404-DIA		4.4	1				●													
	1QP-VCMT160408-NS	0.8	3	1	○	●															

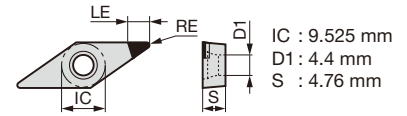
● : Line up

Reference pages: TP: Internal toolholder → **D046 -**, Cartridge → **K181 -**Boring bar tool → **K199 -**, Top-borer tool → **K203**VC: External toolholder → **C048 -**, Internal toolholder → **D039 -**, TungCap → **K015 -**

VB



**35° Rhombic
Positive 5°
with hole**



Application	Designation	Dimension (mm)		No. of corners	Chipbreaker																
		RE	LE																		
Finishing	1QP-VBGT160404-NS	0.4	3	1	○	●															
	1QP-VBGT160408-NS	0.8	3	1	○	●															

● : Line up

Technical Guide - Grade Comparison Chart

●CVD Coated Grades for Turning

ISO		Tungaloy	Mitsubishi Carbide	Sumitomo Electric	Sandvik	Kyocera	Moldino	NTK	Kennametal	Seco Tools	Walter	Iscar	TaeguTec	Ceratizit
Classification	Symbol													
P	P01	T9205	UE6105		GC4305	CA510	HG8010		KCP05B KCP05 KCPK05	TP0501	WPP05S	IC8150 IC9150	TT8105 TT8105B	CTCK110
	P10	T9205 T9215	UE6105 UE6110 MC6015 MC6115	AC8015P AC8020P	GC4305 GC4315 GC4415	CA515	HG8010 GM8020	CP7	KCP10B KCP10	TP0501 TP1501	WPP10S WPP10G WPPV10	IC8150 IC9150	TT8115 TT8115B	CTC3110 CTCK120 CTCP115-P
	P20	T9215 T9225	MC6015 MC6025 MC6115 MC6125	AC8015P AC8020P AC8025P	GC4315 GC4325 GC4415 GC4425	CA515 CA525 CA025P	HG8025 GM8020 GM25	CP7	KCP25B KCP25	TP1501 TP2501	WPP20S WPP20G WPPV20	IC8150 IC9150 IC8250 IC9250	TT8125 TT8125B TT5100	CTCP115 CTCP115-P CTCP125 CTCP125-P
	P30	T9225 T9235	MC6025 MC6035 MC6125	AC8025P AC8035P AC6030M	GC4325 GC4335 GC4425	CA530 CA025P	HG8025 GM8035 GM25		KCP30B KCP30	TP2501 TP3501	WPP30S WPP30G	IC8350 IC9350	TT8125 TT8125B TT5100 TT8135 TT8135B	CTCP125 CTCP125-P CTCP135-P
	P40	T9235 T6215	MC6035	AC8035P AC6030M	GC4335	CA530	GM8035 GX30		KCP40B KCP40	TP3501		IC8350 IC9350	TT8135 TT8135B TT7100	
M	M10	T6215	MC7015	AC6020M	GC2015	CA6515			KCM15B KCM15	TM1501		IC9250	TT9215	CTCM120
	M20	T6215	MC7015 MC7025	AC6020M	GC2015 GC2025 GC2220	CA6525	HG8025 GM25		KCM25B KCM25	TM1501 TM2501		IC9350	TT9215 TT9225	CTCM120 CTCM130
	M30	T6215	MC7025 US735	AC6030M	GC2025 GC2035	CA6525	GM8035 GM25 GX30		KCM35B KCM35	TM2501 TM3501		IC9350	TT9225 TT9235	CTCM130
	M40		US735		GC2035		GX30			TM4000			TT9235	
K	K01	T505 T5105	MC5005 MC5105 UC5105	AC405K	GC3005 GC3205	CA4505 CA310	HX3505	CP1	KCK05B KCK05	TK0501		IC5005	TT7005	
	K10	T505 T515 T5105 T5115	MC5015 MC5115 MH515 UC5115	AC4010K AC415K	GC3210 GC3215	CA4515 CA315	HX3515 HG8010	CP1	KCK15B KCK15	TK0501	WKK10S WKV10 WAK10	IC9150 IC5005 IC5010	TT7005 TT7015	CTC3110 CTCK110
	K20	T515 T5115 T5125	MC5015 MC5125 UC5115	AC4015K AC420K	GC3225	CA320	HX3515 GM8020	CP1	KCK20B KCK20	TK1501	WKK20S WKV20 WAK20	IC9150 IC5010	TT7015 TT7025 TT7310	CTCK120 CTCP115
	K30	T5125		AC8025P			HG8025				WAK30	IC4050 IC8150	TT7025	CTCP125

Note: The above table is selected from a publication. We have not obtained approval from each company.

●PVD Coated Grade for Turning

ISO Classification	Symbol	Tungaloy	Mitsubishi Carbide	Sumitomo Electric	Sandvik	Kyocera	Moldino	NTK	Kennametal	Seco Tools	Walter	Iscar	TaeguTec	Ceratizit
P	P01					PR1705								
	P10	AH8005	VP10RT MS6015	AC1030U AC530U ACZ150	GC1105	PR1705 PR930 PR1725	IP2000	VM1 DT4 DM4	KC5010 KCU10	TS2000 CP200		IC807 IC907 IC808 IC908 IC1007	TT4410 TT7010	CTPX710 CTPX715
	P20	AH120 AH725 SH725 AH730 J740 AH8015 AH6225	VP15TF VP20MF VP10RT VP20RT UP20M MS6015	AC1030U AC530U	GC1125	PR1725 PR930 PR1225 PR1025	IP2000	VM1 DT4 DM4 TM4 QM3	KC5025 KCU25 KCS10 KCU10 KC5010	TS2500 CP200		IC807 IC907 IC808 IC908 IC830 IC1010	TT9030 TT4410	CTPX710 CTPX715 CTPM125
	P30	AH120 AH725 AH7025 SH725 SH730 J740 AH8015 AH6225	VP15TF VP20MF VP20RT UP20M MS7025	AC1030U	GC1125	PR1725 PR1225 PR1535 PR1025	IP3000	QM3 TM4	KC5025 KCU25 KCU25	CP500 CP600		IC928 IC528 IC228 IC830 IC1010 IC1030	TT9030 TT8020 TT8010 TT9080 TT7220	CTPM125
	P40	AH120 AH725 AH6225	MS7025			PR1535	IP3000	QM3		CP500 CP600		IC228 IC528 IC1030	TT8020 TT8010 TT4430 TT9020	CTPM125
M	M01										WSM01	IC806 IC1007		
	M10	AH8005 AH6225	VP10RT	AC5005S ACZ150	GC1105 GC1115	PR930 PR1725	IP100S IP050S	VM1 DT4 DM4 ZM3	KC5010 KCU10 KCS10B KCS10	TS2000 TS2500 CP200	WSM10 WSM10S WSM01	IC807 IC907 IC808 IC908 IC1010	*TT4410 TT5080*	CTPM125 CTPX710 CTPX715
	M20	AH8015 AH120 AH7025 AH725 SH725 SH730 AH6225	VP10RT VP15TF VP20MF VP20RT UP20M MS7025 MS9025	AC5015S	GC1115 GC1125	PR930 PR1225 PR1725 PR1025	IP100S IP050S	VM1 DT4 DM4 ST4 TM4 ZM3 QM3	KC5025 KCU25 KCS10 KCU10 KC5010	TS2500 CP200 CP500 CP600	WSM20S	IC808 IC908 IC830 IC1030	TT9030 TT8010 TT4410 TT5080 TT9080	CTPM125 CWN15
	M30	AH120 AH725 SH725 SH730 J740 AH6235	VP15TF VP20MF VP20RT UP20M MP7035 MS7025 MS9025	AC6040M AC1030U AC5025S AC530U	"GC1125 GC2035"	PR1225 PR1535 PR1725 PR1025	IP100S	DT4 DM4 QM3 ST4 TM4 ZM3	KC5025 KCU25	CP500 CP600	WSM30S	IC528 IC228 IC830 IC1030	TT8020 TT4430 TT8010 TT8080 TT7220	CTPM125
	M40	AH6235	MP7035	AC6040M	GC2035	PR1535		ST4 QM3 TM4		CP600		IC228 IC528	TT8010 TT8020	
K	K01	AH110												
	K10	GH110 AH110	VP10RT	ACZ150					KC5010 KCU10 KCS10B KCS10	TS2000 CP200		IC807 IC907	TT9030 TT7010 TT6080	CTPX715
	K20	AH120 AH7025 AH8015 AH6225	VP10RT VP20RT VP15TF	AC1030U					KC5025 KCU25	TS2500 CP200 TS2000		IC807 IC907 IC808 IC908 IC1007 IC1010	*TT9030 TT7010 TT6080 TT9080	CTPX715
	K30	AH120 GH130	VP15TF VP20RT							CP500		IC807 IC907 IC808 IC908	TT9030	CTPX715
S	S01	AH8005	VP05RT MP9005	AC5005S AC5015S ACZ150		PR005S	JP9105		KCS10B		WSM10S	IC804 IC806	TT3010	
	S10	AH8005 AH8015 AH6225	VP10RT MP9015	AC5005S AC5015S	GC1105	PR015S PR005S	JP9105 JP9115	QM3 ZM3	KC5025 KCU25 KCS10B KCS10 KC5010 KCU10	TS2000 TS2500 CP200 CP500	WSM10S WSM01 WNN10	IC806 IC1007 IC1010	TT3010 TT3020 TT5080	CTPX710 CTPX715
	S20	AH8015 AH7025 AH6225	MP9015 VP20RT MP9025 MS9025	AC5015S AC5025S	GC1115 GC1125	PR015S PR1535	JP9115		KC5025 KCU25 KCS10B	TS2000 TS2500 CP200 CP500 CP600	WSM20S	IC807 IC907 IC808 IC908 IC806 IC1010	TT3020 TT4430 TT9030 TT9080	CTPX710 CTPX715
	S30	AH7025 AH6235	VP20RT MP9025 MS9025	AC5025S	GC1125	PR1535				CP600	WSM30S	IC830 IC928	TT4430 TT8020 TT9030	

Note: The above table is selected from a publication. We have not obtained approval from each company.

Technical Guide - Grade Comparison Chart

●Cermet for Turning

ISO		Tungaloy	Mitsubishi Carbide	Sumitomo Electric	Sandvik	Kyocera	Moldino	NTK	Kennametal	Seco Tools	Walter	Iscar	TaeguTec	Ceratizit
Classification	Symbol													
P	P01	NS520	AP25N VP25N	T1000A		TN610 PV710						IC20N IC520N	PV3010	CTEP10 TCM407
	P10	AT9530 GT9530 J9530	AP25N VP25N NX2525	T1500Z T1500A	CT5015 GC1525	TN610 TN620 PV710 PV720 CCX			KT315 KTP10	TP1020	WCE10	IC20N IC30N IC520N IC530N	PV3010 CT3000	CTEP10 TCM10 TCM407
	P20	AT9530 GT9530 NS9530 J9530	AP25N VP25N VP45N NX2525 NX3035 MP3025	T1500A T1500Z T2500A T2500Z	GC1525	TN620 PV720	CZ25			TP1020 TP1030	WCE10	IC20N IC30N IC520N IC530N	PV3010 CT3000	TCM10
	P30	NS9530	VP45N NX3035 MP3025	T2500Z T3000Z		PV730	CZ25					IC530N		
M	M10	NS520	AP25N VP25N NX2525	T1000A	GC1525	TN620 TN610 PV720 PV710			KT315 KTP10	TP1030		IC20N IC30N IC520N IC530N	PV3010 CT3000	CTEP10 TCM10 TCM407
	M20	AT9530 GT9530 NS9530 J9530	AP25N VP25N NX2525	T1500A		TN620 PV720 PV730	CZ25					IC30N IC530N	PV3010 CT3000	
	M30	NS9530		T3000Z			CZ25							
K	K01	NS520	AP25N VP25N	T1000A		PV7005							PV3010	CTEP10 TCM10 TCM407
	K10	AT9530 GT9530 NS9530 J9530	AP25N VP25N NX2525		CT5015	TN60 CCX	CZ25		KT315 KTP10				PV3010 CT3000	TCM10
	K20	NS9530	AP25N VP25N NX2525				CZ25						PV3010 CT3000	

Note: The above table is selected from a publication. We have not obtained approval from each company.

●Cemented Carbide for Turning

ISO Classification	Symbol	ISO												
		Tungaloy	Mitsubishi Carbide	Sumitomo Electric	Sandvik	Kyocera	Moldino	NTK	Kennametal	Seco Tools	Walter	Iscar	TaeguTec	Ceratizit
P	P01													
	P10	TH10		ST10P										S26T
	P20	KS20		ST20E								IC50M	P20	S26T S40T
	P30	KS15F UX30	UTi20T	A30								IC28 IC50M	P30	S40T
	P40		UTi20T									IC28		
M	M10	TH10		EH510					K313 KU10 K68	890		IC20		
	M20	KS20	UTi20T	EH520					K313 KU10 K68	HX 883		IC20		CTW7120 H210T U17T
	M30	UX30	UTi20T	A30								IC28		
	M40											IC28		S40T
K	K01	TH03	HTi05											CTWK601
	K10	TH10	HTi10	G10E	H13A	KW10	WH10		K313 KU10 K68	890		IC20	K10	H210T H10T U17T
	K20	KS15F KS20	UTi20T	G10E	H13A	KW10				890 HX 883		IC20	K20	CTW7120 H210T H10T U17T
	K30		UTi20T		H13A					883				TSM30
	K40													
N	N01	KS05F			H10	GW05						IC04		
	N10	TH10	HTi10	H1	H10	GW05 KW10	WH10	KM1	K313 KU10 K68	890 HX KX	WK1	IC20 IC28	K10	H210T H10T U17T
	N20	KS15F		H1	H13A			KM1		890 HX KX 883	WK1	IC20 IC28	K20	CTW7120 H210T H10T U17T
	N30									883				
S	S01		MT9005 RT9005		H10A	SW05						IC20		
	S10	KS05F TH10	MT9015 RT9010	EH510	H10F	SW10 KW10	WH10	KM1	K313 KU10 K68	890 883	WK1 WS10	IC20	K10	H210T H10T
	S20	KS15F KS20	MT9015 RT9010	EH520	H13A H10F	SW25		KM1		890 883	WK1 WS10	IC20 IC28	K20	CTW7120 H210T H10T
	S30									883				
H	H01											IC20		
	H10	TH10			H13A		WH10					IC20	K10	
	H20									890 HX 883				

Note: The above table is selected from a publication. We have not obtained approval from each company.

Technical Guide - Grade Comparison Chart

●CBN and PCD for Turning

ISO		Tungaloy	Mitsubishi Carbide	Sumitomo Electric	Sandvik	Kyocera	Moldino	Dijet	NTK	Seco Tools	Kennametal	Iscar	Ingersoll	TaeguTec	Widia	Walter	Ceratizit
Classification	Symbol																
K	K01	BX930 BX910 BX870	MB710 MB730 MB5015	NCB100 BN500 BNC500	CB50	KBN475 KBN60M			B52		KB1630 KB1345	IB10K		TB7015	WBH10C	WCB80	CTB S10U
	K10	BX470 BX480	MB730 MB5015 MB4020	BN7000 BN500	CB7525 CB50	KBN65M KBN65B		JBN795	B23 B30 B52	CBN200 CBN300 CBN400C	KB1640 KB1345	IB05S IB10S	TB730	TB730	WBK40U	WCB80 WCB50	CTB S10U
	K20	BXC90 BX90S	MB4020 MB4120 MBS140	BNC8115 BNS8125	CB7925	KBN900 KBN70M			B23 B30 B52	CBN300 CBN500	KB5630	IB90A IB90 IB25KD		TB7020	WBK45U	WCB80	CTB S20C
	K30	BXC90 BX90S	MBS140 BC5030	BNS8125		KBN900			B16	CBN500	KB9640	IB90A IB25KD	KB90A	KB90A			
S	S01	BX815	MB730	NCB100 BN7000				JBN795	JP2	CBN170		IB05S IB10S		KB90			CTB S10U
	S10	BX480	MB4020 MB4120	BN7500 BN7115	CB7050	KBN65B KBN65M			B23 B30	CBN200	KB1630	IB05S IB10S		KB90A	WBK45U	WCB80	CTB S20C
H	H01	BXM10 BX310	BC8105 BC8110 MBC010 MB810 MB8110	BNC2010 BNC2115 BN1000 BN2000 BNX10 BN1000	CB7105	KBN510 KBN05M KBN10M			B52 B5K	CBN010 CBN100 CBN160C CBN050C	KB1610 KB5610*	IB05H IB10HC	TB610	TB610	WBH10C	WCB30	CTB H15C CTB H15U
	H10	BXA10 BXM10 BX330 BX530	BC8210 MB020 MB8025 MB8110 MB825	BNC2020 BNC2115 BN2000	CB7015 CB7115 CB7025	KBN525 KBN05M KBN10M		JBN245	B36 B52 B6K	CBN150 CBN200 CBN300 CBN060K CBN160C CBN400C	KB9610 KB1610 KB5610	IB50 IB55 IB10H IB10HC IB20H IB25HA		TB2015	WBH10C WBH10P WBH10U	WCB30 WCB50	CTB H15C CTB H15U
	H20	BXM20 BXA20 BX360	BC8220 MBC020 MB8025 MB8120	BNC200 BNC2020 BNC2125 BNX20	CB7015 CB7125 CB50	KBN525 KBN05M KBN10M KBN25M KBN020		JBN300	B22 B36 B40 B6K	CBN200 CBN300 CBN160C CBN400C CH2540	KB5625 KB1625	IB20H IB20HC IB25HA IB25HC	TB650 TB2030	TB650	WBH25P	WCB50 WCB80	CTB H20C CTB H21U
	H30	BR35F BXC50 BX380	BC8130 MB8130 MB835	BNC300 BN350 BNX25		KBN30M KBN35M KBN900		JBN300	B22 B40	CH3515	KB1630 KB9640	IB25HC IB90	TB670	TB670	WBH40C		CTB H40C CTB H40U
N	N01	DX160 DX180	MD205	DA90	CD05	KPD230		JDA30 JDA735	PD1		KD1405	ID5					CTD PU20
	N10	DX140	MD205 MD220	DA150	CD10	KPD010 KPD230		JDA715	PD1	PCD05 PCD10	KD100 KD1400 KD1425	ID5	IN90D	TD810	WDN25U	WCD10	CTD PU20
	N20	DX120	MD220 MD230	DA2200 DA1000	CD10	KPD010		JDA715	PD2	PCD05 PCD20	KD1425		IN90D	KP300	WDN25U	WCD10	CTD PD20
	N30	DX110	MD2030 MD230	DA2200 DA1000		PKD001		JDA10		OVD20 PCD30 PCD30M				TD830		WCD10	

Note: The above table is selected from a publication. We have not obtained approval from each company.

●Ceramic for Turning

ISO		Tungaloy	Mitsubishi Carbide	Sumitomo Electric	Sandvik	Kyocera	Moldino	Dijet	NTK	Seco Tools	Kennametal	Iscar	Ingersoll	TaeguTec	Widia	Walter	Ceratizit
Classification	Symbol																
K	K01	TZ120 LX21		NB90S	CC620	KA30 A65 KT66 PT600M			HC1 HW2		KY1310 KY1615	IN110		AW120 AB30	CW2015		CTN3105 CTS3105
	K10	CX710 FX105			CC6190 CC650	A65 KT66 A66N PT600M			HC2 HC5 HC6		KY1310 KY1615	IN23 IS6	IN70N	AB30 AS10	CW2015 CW5025	WSN10	CTN3105 CTM3110 CTI3105 CTN3110 CTS3105
	K20	FX105 CX710			CC6190	KS6000 KS6050			SP2 SP9 SX8 SX9		KY1320 KY3400 KY3500 KY4300	IS8	IN70N	SC10	CW5025	WSN10	CTM3110 CTN3110
S	S01	TS200							JX1	CS100	KY1525 KY2100	IS25		TC3020			
	S10	TW43 TS300 FX510		WX120	CC670 CC6060 CC6065	KS6030 KS6040			WA1 WA5 SX9	CW100 CS300	KY1540 KYS30 KY2100 KY4300	IW7 IS35		TC430 TC3030	CW3020	WWS20	
H	H01	LX10 LX11		NB100C	CC6050 CC650	PT600M			HC2 HC5 HC6		KY4300	IN420 IN22		AB2010	CW2015		CTS3105
	H10				CC6050 CC670 CC6190	A66N PT600M			HC7 WA1		KY4400	IN23		AB2010 AB20 AB30	CW2015		CTS3105

Note: The above table is selected from a publication. We have not obtained approval from each company.

Technical Guide - Chipbreaker Comparison Chart

●Negative insert type

ISO Classification	Cutting Mode	Tungaloy	Mitsubishi Carbide	Sumitomo Electric	Kyocera	Sandvik	Moldino	Kennametal	Seco Tools	Iscar	TaeguTec	Walter	Ceratizit
P	Precision finishing	01 TF	PK FH	FA	GP	PF	FE	FS, LF	FF1	SF, PP, TF	FA		
	Finishing and light cutting	TS, TSF PS, ZF NS AS TQ	FP FY LP SH SA SY	SU FL SE, SX	XP, PP XQ, HQ, CJ, XS	PF LC MF R/L-K XF	BE, BH AB, CT CE	FF, FN	MF2	F3P NF, SF	FG VF, EA FC MC ML, MP	NF3 NS6	CF, TF
	Finishing and light cutting (With Wiper)	AFW, FW ASW, SW	SW MW	LUW SEW GUW	WP WQ WF	WL, WF WMX WM, WR		FW MW RW	W-FF2 W-MF1 W-M3 W-M6	WF WG	WS WT	NF NM	TFQ TMQ
	Medium cutting	TM, AM PM, DM ZM, NM All-round, TA	MA MH, MP	GU GE, UX	HS, PT, GT CS, PS	PM, QM XM, XRM	AH AE, AY, B	MN	MF5 M3	M3P, M3M PP, TF, GN	PC, MT MC, MG	NMT, NM4	TMF, TMM M50
	Medium to heavy cutting	TH THS	RP, GH	MU, ME HG	PH All-round	HM, PR MR	RE	RN, RP MR	M5 MR7	NR MR	RT	MM5, NM6 NM9	TM TRM
	Heavy cutting	TU TRS TUS	HM, HX HL, HR HZ, HV	HG, HP HU, HW HF	PX	PR, MR HR, QR	TE, UE HX, HE H	RM RH	R RR	R3P NM	HT, HD RX, RH HY, HZ	NR6 NRF NRR	TRR, TR R28, R58 R88
M	Finishing and light cutting	SF SS	GM, LM	EX, EG SU, EF	GU MQ	MF, XF	MP BH, AB	FP, FF	FF1 MF1 MF3	TF, VL	EA, SF, SU FG	NF4 NMS	CF, F30, M34 F32, TF
	Medium cutting	SM, SA S, TA SDM	MM, MA MS	GU HM	MU	MM, QM XM	PV, SE DE	MP, P	MF4 M3	M3M, PP	EM, ET	NM4	TMF, M42 M30, M52
	Heavy cutting	SH, TH TU	GH, RM HL	EM, MU	MS TK	MR HM, PR	AH, AE	UP, RP	M5 MR3	MR, MH		NR4 NRT, NRS	TM, M60 TRM, TMR, TRR R80
K	Finishing	CF	LK, MA	UZ	C	KF, XF	Y, AH	FN, MT		GN	FG		CF
	Medium cutting	CM All-round	MK GK	GZ	ZS All-round	KM, QM XM, XMR	RE VA	RP, UN	M4 M5		MT MG	NM5	M50
	Heavy cutting	CH Flat-top	RK Flat-top	Flat-top	GC Flat-top	KR Flat-top	RE,V	MA Flat-top	MR9 Flat-top		RT	Flat-top	TMR, TR R28 R58, R88
N	Cutting of non-ferrous metals	P 28		AX	AH, A3	MF		MS GR		PP			F32
S	Finishing	HRF	FJ, LS MJ	EF EX	SQ, SX	SF	VI	FS MS	MF1			NFT NF4	
	Medium cutting	HRM HMM SA, 28 SDM	MS RS, GJ	EG MU EM	SQ, SX	SMR	VI	UP RP	MF4 M1	PP	SM	NMS NM4, NRS, NR4	M34, M52

Note: Above charts are based on published data and not authorized by each manufacturer.

●Positive insert type

ISO Classification	Cutting Mode	Tungaloy	Mitsubishi Carbide	Sumitomo Electric	Kyocera	Sandvik	Moldino	NTK	Kennametal	Seco Tools	Iscar	TaeguTec	Walter	Ceratizit
P	Precision finishing	01	FV	FC	CF, CK		JQ		GM	FF1 F1	SF		PF2	F32
	Finishing and light cutting	PSF, PF, SS PS, PSS TS, TSF TSW, SW W08-20	FP, FV, SV LP SVX SW, MW	FP, LU FK, SC SU LUW, SDW	GQ GP XP PP, VF WP	R/L-K PF UF WF, WK, WM	JQ JE		11, LF VF, FP FW, MW	MF2	PF SM, 14, 17 19, XL R/L RF, LF	FA FG GF	PF5 PF4 PS5 PF, PM	SF SMF SMW, 25Q
	Medium cutting	PM TM All-round RS	MP MV No sign	SU, MU SC	All-round HQ, XQ GK	PM UM, PR UR	JE		MP MF	M3 M5	DT, HQ	MT MT	PM5	SM
	High-feed, small depth of cut cutting	61									No sign 14	No sign		
M	Finishing	PSF, SS	FM, SV	FC		R/L-K UF, MF			11, VF	FF1 MF2		FG		
	Finishing to Medium cutting	PSS PS	LM SV	SI, GU LB, SU	MQ	MM UM			LF, FP	M3			PF4	SF, SMF
	Medium cutting	PM	MM	MU	HQ	MR UR			MF, MP	M5			PM5	F23, F43 SM
K	Cutting of cast irons	CM Flat-top	MK Flat-top	FC, MU Flat-top	KF KM UM, KR	Flat-top			11, VF, FP MP, MF Flat-top	M5 Flat-top	19	MT Flat-top	PS5, PM5 Flat-top	SF 25P 27, 29
N	Cutting of non-ferrous metals	AL P Ground	AZ R/L-F R/L	AG AY AW LD, GD	AH	AL			HP, LF	AL	AS	FL	PF2 PM2	23P 25P 27, 29
S	Finishing	PSF	FJ	FC	MQ	MF, UF, R/L-K			HP	F1				SF
	Finishing to Medium cutting	PSS PS	LS, MS	SU, GU		MM SM			LF, FP	MF2				F23
	Medium cutting	All-round		SI		UM, MR, UR						FG	PF2, PF4	SM, 25P, 29
P	Turning on small lathes	JP, 01	R/L-SR R/L-SN R/L-SS FS-P, F	W, SD	CF, SKS R/L-F, R/L-FSF ER/L-U FR/L-U R/L-U FR/L-U, R/L-USF MF, R/F-FSF SK, GF CK, GQ	F, M UM	No sign	AMX	LF		SM F2M	GF, GW	PM5	
M		W08, W15, W20 J08		FX, FY				AZ7 YL, AM3				SL SA SM SH		
N		JS, JSS	LS-P	LU, FP, FK, SU FC, SI, SC				U						
S		JRP, JSR, JPP J10, TS, JTS TSW SS	SW, MW SRF SMG	LUW, SDW				CL						

Note: Above charts are based on published data and not authorized by each manufacturer.

