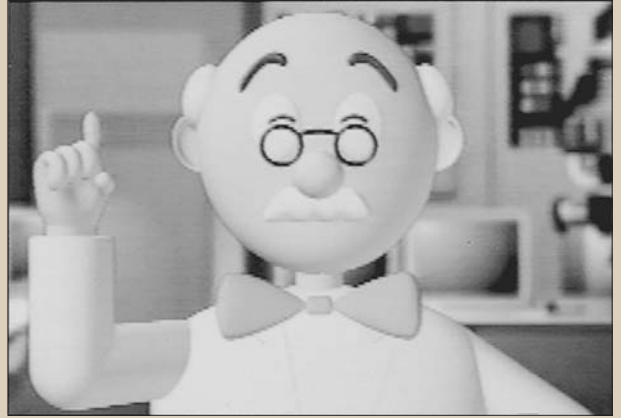


# Insert Selection

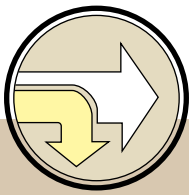
**A1 ~ A14**

# A



Insert  
Selection

Insert Selection	<b>Sumitomo Grades</b> .....	A2 - 3
According to Work Materials	<b>Steel</b> .....	A4 - 5
	<b>Stainless Steel</b> .....	A6
	<b>Cast Iron</b> .....	A7
	<b>Non-Ferrous Metal</b> .....	A8
	<b>Exotic Metal</b> .....	A8
	<b>Hardened Steel</b> .....	A9
	<b>According to Breaker Types</b> .....	A10-11
Chipbreaker Selection	<b>Chipbreaker Application Table</b> .....	A12-13
Comparison Chart	<b>Chipbreaker</b> .....	A14



# Selection of Sumitomo Grades (Turning)

● According to Work Materials and Applications

Insert Selection

**P**

Steel (Carbon steel, Alloy steel)					
Application	Finishing ~ Light cutting		Medium cutting	Roughing ~ Heavy roughing	
	P01	P10	P20	P30 (M30)	P40 (M40)
Coated Carbide	AC700G				
				AC820P <b>New</b>	
				AC830P <b>New</b>	
Coated Cermet	T2000Z				
			T3000Z		
Cermet	T110A				
	T1200A				
Coated Ceramic					
Uncoated Ceramic					
Uncoated Carbide			A30		
CBN					

**K**

Cast iron		
Finishing	Medium cutting	
K01	K10 (M10)	K20 (M20)
	AC410K	
	AC700G	
	AC900G	
	T110A	
	T1200A	
	NS260C	
	NS260	
	G10E	
	BNS800	
	BN700	
	BN500	

**H**

Hardened steel		
Application	Finishing ~ Light	Medium ~ Rough
Coated CBN	BNC100	
	BNC160	
	BNC200	
	BNC300	
CBN	BNX10	
	BNX20	
	BNX25	
	BN300	
	NB100C	
Ceramic		

**M**

Stainless steel		
Application	Finishing ~ Light	Medium ~ Rough
Coated Carbide	AC610M	
	AC630M	
		AC530U
Cermet	T1200A	

**S**

Super Alloy		
Application	Finishing ~ Light	Medium ~ Rough
Coated Carbide	AC510U <b>New</b>	
	AC520U <b>New</b>	
		AC530U
CBN	BN700	
	BNS800	

**N**

Non-Ferrous Metals		
Application	Finishing ~ Light	Medium ~ Rough
PCD	DA2200	
	DA150	
Carbide		H1
Sintered Component		
CBN	BN700	
Coated HM	<b>New</b>	AC510U

# Selection of Sumitomo Grades (Milling)



According to Work Materials and Applications

Insert  
Selection

**P**

Steel (Carbon steel, Alloy steel)						
Application	Finishing ~ Light cutting		Medium cutting	Roughing ~ Heavy roughing		
ISO	P01	P10	P20	P30 (M30)	P40 (M40)	
Coated Carbide	ACP100		ACP200		ACP300	
	T250A					
				A30N		
Cermet						
Ceramic						
Uncoated Carbide						
CBN						

**K**

Cast iron		
Finishing	Medium cutting	
K01	K10 (M10)	K20 (M20)
ACK200		
		ACK300
NS260		
		G10E
BNS800		
BN700 (BN600)		
BN500		

**H**

Hardened steel	
Application	Finishing
CBN	BN700
	BN300
Ceramic	—

**M**

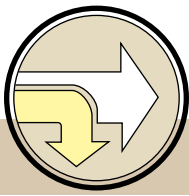
Stainless steel		
Application	Finishing ~ Light	Medium ~ Rough
Coated carbide	ACP200	ACP300
	Uncoated carbide	A30N
Cermet	T250A	

**S**

Super alloy		
Application	Finishing ~ Light	Medium ~ Rough
Coated carbide	EH520Z	EH20Z
	Uncoated carbide	EH520
		EH20

**N**

Non-ferrous metals		
Application	Finishing ~ Light	Medium ~ Rough
PCD	DA2200	
Coated carbide		DL1000
Uncoated carbide		H1



# Grade and Chipbreaker Selection (1)

● According to Work Materials and Applications

Insert Selection

**P**  
Steel

## Steel

### Carbon Steel

- USt 42-2
- C10
- C45
- C55
- etc.

### Alloy Steel

- 15CrMo5
- 20Cr4
- 42CrMo4
- etc.

### High Alloy Steel

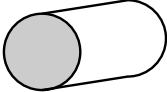
- 40NiCrMo6
- etc.

## 1 Fine Finishing

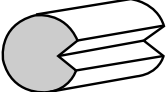
Eg. **GE Type** ← Chipbreaker  
**AC820P** ← Grade

**FA Type**  
**T2000Z**

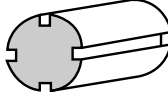
**FL Type**  
**T3000Z**



Continuous Cut



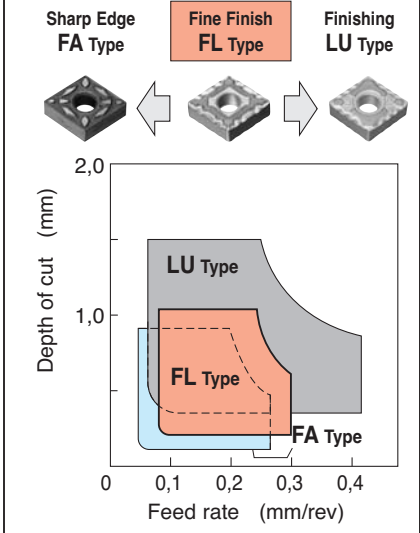
Medium Cut



Interrupted Cut

Work	HB	Cond. Grade	Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
			T2000Z	T3000Z		
Low Carbon Steel	180		210 ~ 400	190 ~ 300	0,05 ~ 0,25	0,2 ~ 1,0
Carbon Steel, Alloy Steel	250		170 ~ 300	150 ~ 240		
High Alloy Steel	300		140 ~ 250	130 ~ 200		

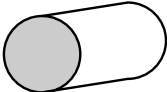
### ● Chipbreaker Selection



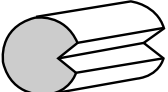
## 2 Finishing

**SU Type**  
**AC700G**

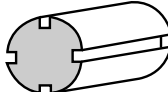
**SU Type**  
**AC820P** New



Continuous Cut



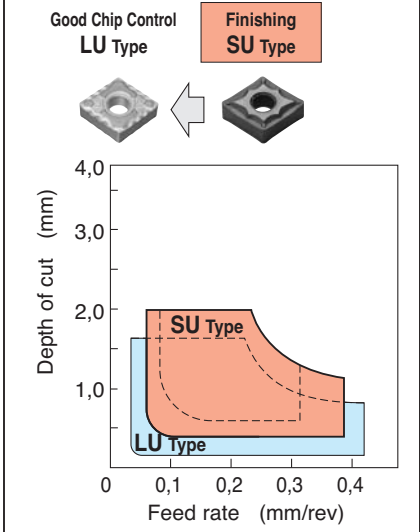
Medium Cut



Interrupted Cut

Work	HB	Cond. Grade	Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
			AC700G	AC820P		
Low Carbon Steel	180		260 ~ 420	200 ~ 310	0,1 ~ 0,3	0,5 ~ 2,0
Carbon Steel, Alloy Steel	250		210 ~ 340	160 ~ 250		
High Alloy Steel	300		170 ~ 280	130 ~ 210		

### ● Chipbreaker Selection





**P**  
Steel

**Steel**

**Carbon Steel**

- USt 42-2
- C10
- C45
- C55
- etc.

**Alloy Steel**

- 15CrMo5
- 20Cr4
- 42CrMo4
- etc.

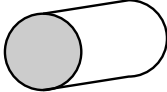
**High Alloy Steel**

- 40NiCrMo6
- etc.

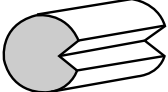
**3 Medium Cut**

**GU/GE Type**  
(UX Type)  
**AC820P**

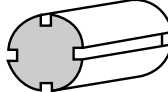
**GU/GE Type**  
(UX Type)  
**AC830P**



Continuous Cut

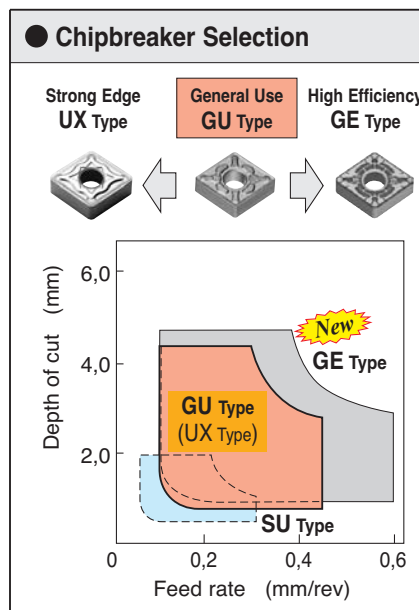


Medium Cut



Interrupted Cut

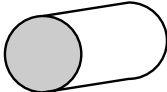
Work	HB	Cond. Grade	Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
			AC820P	AC830P		
Low Carbon Steel	180		180 ~ 280	160 ~ 250	0,2 ~ 0,5	1,0 ~ 4,0
Carbon Steel, Alloy Steel	250		150 ~ 230	130 ~ 200		
High Alloy Steel	300		120 ~ 190	100 ~ 170		



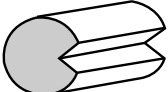
**4 Roughing**

**MU Type**  
**AC820P**

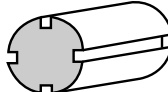
**MU Type**  
**AC830P**



Continuous Cut

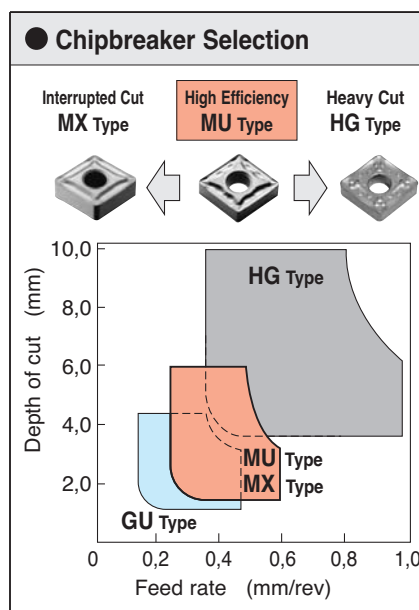


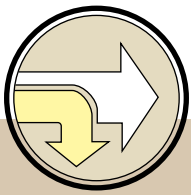
Medium Cut



Interrupted Cut

Work	HB	Cond. Grade	Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
			AC820P	AC830P		
Low Carbon Steel	180		160 ~ 250	140 ~ 220	0,3 ~ 0,6	2,0 ~ 6,0
Carbon Steel, Alloy Steel	250		130 ~ 200	110 ~ 160		
High Alloy Steel	300		110 ~ 170	90 ~ 150		





# Grade and Chipbreaker Selection (2)

● According to Work Materials and Applications

Insert Selection

**M**  
Stainless Steel

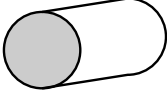
## Stainless Steel

- X5CrNi18-10
- X5CrNiMo17-12-2
- etc.

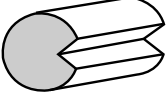
### 1 Finishing

**SU Type**  
**AC610M**

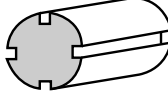
**SU Type**  
**AC630M**



Continuous Cut



Medium Cut



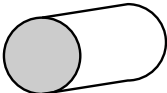
Interrupted Cut

Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
AC610M	AC630M		
160 ~ 260	140 ~ 220	0,1 ~ 0,2	0,2 ~ 1,0

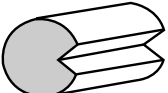
### 2 Medium Cut

**EX Type**  
**AC630M**

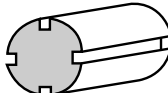
**GU Type**  
**AC830P** New



Continuous Cut



Medium Cut



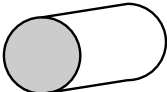
Interrupted Cut

Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
AC630M	AC830P		
120 ~ 190	130 ~ 200	0,1 ~ 0,3	0,5 ~ 2,0

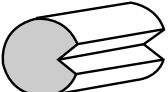
### 3 Roughing

**MU Type**  
**AC630M**

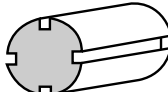
**MU Type**  
**AC830P** New



Continuous Cut

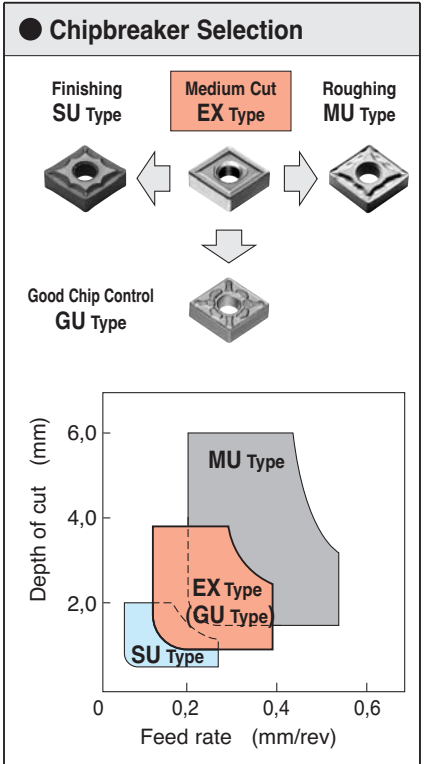


Medium Cut



Interrupted Cut

Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
AC630M	AC830P		
110 ~ 180	120 ~ 190	0,2 ~ 0,4	1,5 ~ 4,0





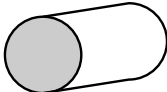
## Cast Iron

- GG25
- GGG45
- etc.

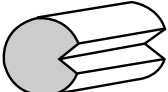
### 1 Finishing

( ) 2nd choice

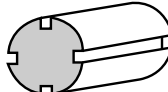
<b>GG</b>	<b>BN700</b> ( <b>BNS800</b> )
<b>GGG</b>	<b>BN500</b>



Continuous Cut



Medium Cut



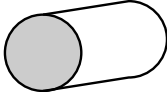
Interrupted Cut

Work	Cond. Grade HB	Cutting speed (m/min)	Feed rate (mm/rev)	D.O.C. (mm)		
				BN700	BN500	BNS800
GG	200	200 ~ 2000	0,1 ~ 0,5	~ 1,0	–	~ 4,0
GGG	250	100 ~ 350	0,1 ~ 0,4	–	~ 0,5	–

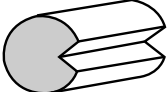
### 2 Finishing ~ Medium Cut

( ) 2nd choice

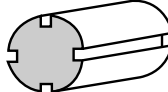
<b>UZ Type</b> <b>AC410K</b>	<b>UX Type</b> <b>AC410K</b>	<b>UX Type</b> <b>AC700G</b>
---------------------------------	---------------------------------	---------------------------------



Continuous Cut



Medium Cut

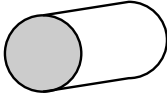


Interrupted Cut

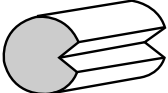
Work	Cond. Grade HB	Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
		AC410K	AC700G		
GG	200	230 ~ 360	180 ~ 300	0,1 ~ 0,3	0,5 ~ 3,0
GGG	250	200 ~ 310	160 ~ 260		

### 3 Roughing

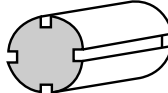
<b>UZ Type</b> <b>AC410K</b>	<b>UX Type</b> <b>AC700G</b>	No Breaker <b>AC900G</b>
---------------------------------	---------------------------------	-----------------------------



Continuous Cut



Medium Cut



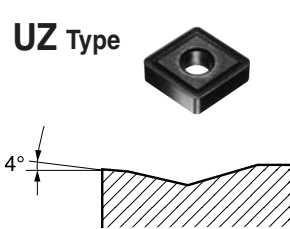
Interrupted Cut

Work	Cond. Grade HB	Cutting speed (m/min)			Feed rate (mm/rev)	D.O.C. (mm)
		AC410K	AC700G	AC900G		
GG	200	190 ~ 290	150 ~ 240	100 ~ 220	0,3 ~ 0,6	2,0 ~ 6,0
GGG	250	160 ~ 250	130 ~ 210	100 ~ 200		

**● Chipbreaker Selection**

Sharp Edge

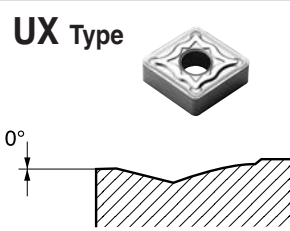
**UZ Type**



4°

Strong Edge

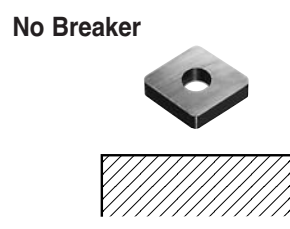
**UX Type**

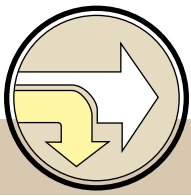


0°

Strong Edge

**No Breaker**





# Grade and Chipbreaker Selection (3)

● According to Work Materials and Applications

Insert Selection



## Non-Ferrous Metal

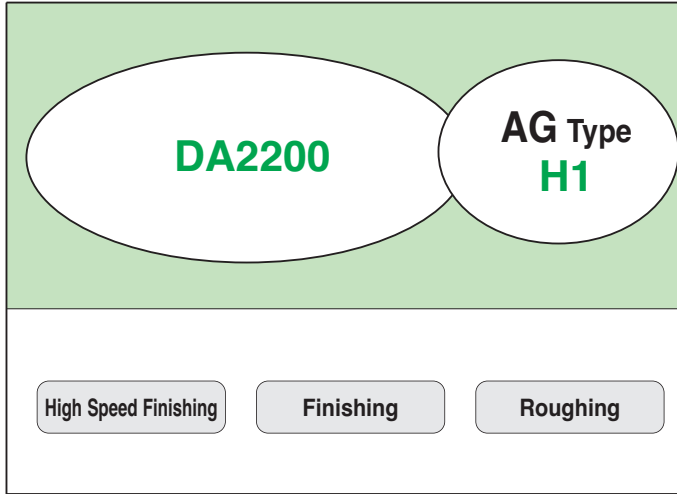
**Aluminum Alloy (below Si 13%)**

- A6061
- ADC12
- usw.

**Aluminum Alloy (over Si 13%)**

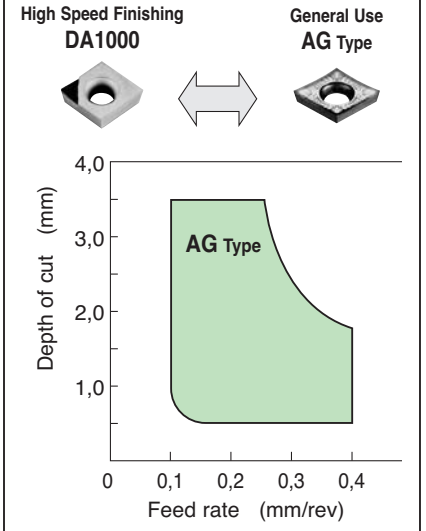
- A390
- usw.

**Brass**



Process	Cond. Grade	Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
		DA1000	H1		
High Speed Finishing	Al. Alloy (below Si 13%)	~2000		0,05 ~ 0,2	0,1 ~ 3,0
	Al. Alloy (over Si 13%)	~1000		0,05 ~ 0,2	0,1 ~ 3,0
Finishing			400 ~ 1000	0,1 ~ 0,3	0,3 ~ 1,5
Roughing			150 ~ 500	0,1 ~ 0,5	1 ~ 5

### ● Chipbreaker Selection



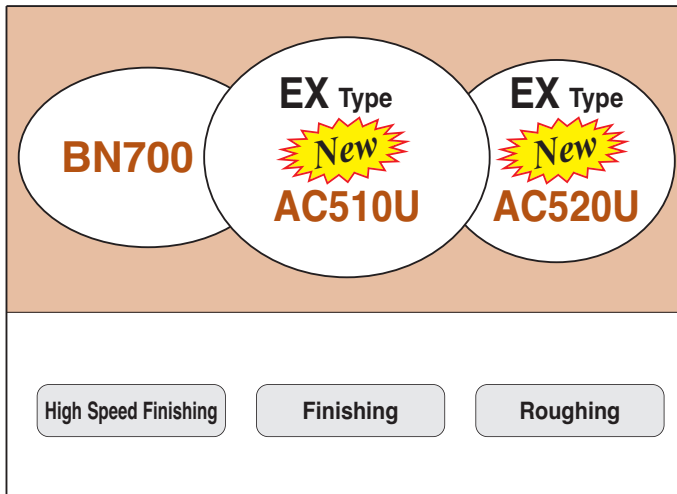
## Exotic Metal

**Ni-based Alloy**

- Inconel718
- Waspaloy
- etc.

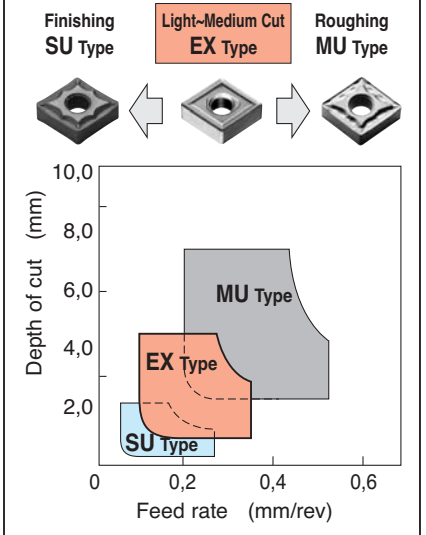
**Titanium Alloy**

- Ti-6Al-4V
- etc.



Process	Cond. Grade	Cutting speed (m/min)			Feed rate (mm/rev)	D.O.C. (mm)
		BN700	AC510U	AC520U		
High Speed Finishing		120 ~ 170			0,05 ~ 0,2	0,1 ~ 1,0
Finishing			30 ~ 70	20 ~ 50	0,1 ~ 0,25	0,3 ~ 1,5
Roughing			30 ~ 70	20 ~ 50	0,1 ~ 0,3	1 ~ 5

### ● Chipbreaker Selection







## Hardened Steel

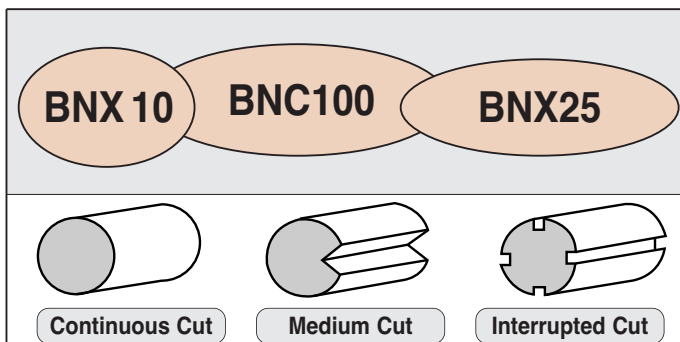
### General~Medium Alloy Steel

- C55
- 25CrMo4
- 41Cr4
- etc.

### High Alloy Steel

- 100Cr6
- X40CrMoV5-1
- HS18-0-1
- etc.

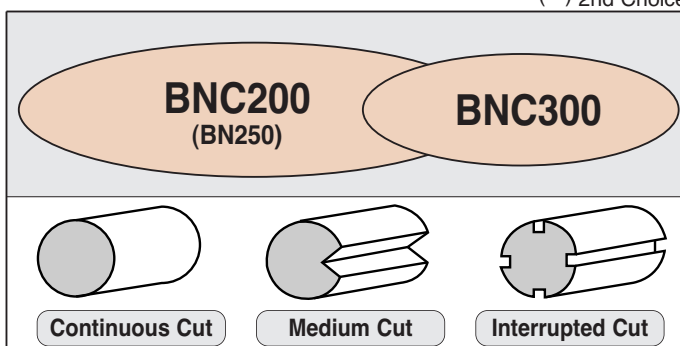
## 1 High Speed Finishing



Cutting speed (m/min)			Feed rate (mm/rev)	D.O.C. (mm)
BNX10	BNC100	BNX25		
120 ~ 300	120 ~ 300	120 ~ 220	0,03 ~ 0,15	0,03 ~ 0,20

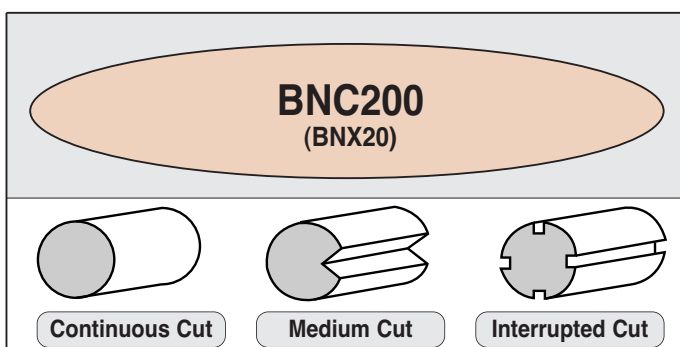
## 2 Finishing

( ) 2nd Choice

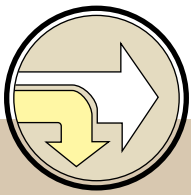


Cutting speed (m/min)			Feed rate (mm/rev)	D.O.C. (mm)
BN250	BNC200	BNC300		
50 ~ 150	50 ~ 200	50 ~ 120	0,03 ~ 0,20	0,03 ~ 0,30

## 3 High Efficiency (Removal of Carburised layer)



Cutting speed (m/min)		Feed rate (mm/rev)	D.O.C. (mm)
BNC200	BNX20		
50 ~ 170	70 ~ 170	0,03 ~ 0,30	0,03 ~ 0,50



# Chipbreaker Selection

● According to Breaker Types and Applications

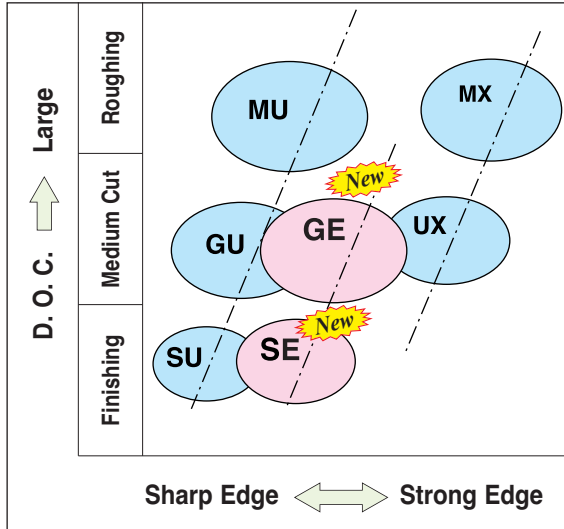
Insert Selection

Negative Type  
Bumpy Type

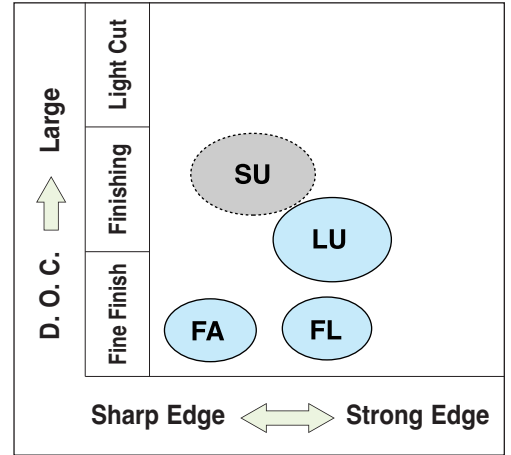
**New**  
GE Type (Eg.)



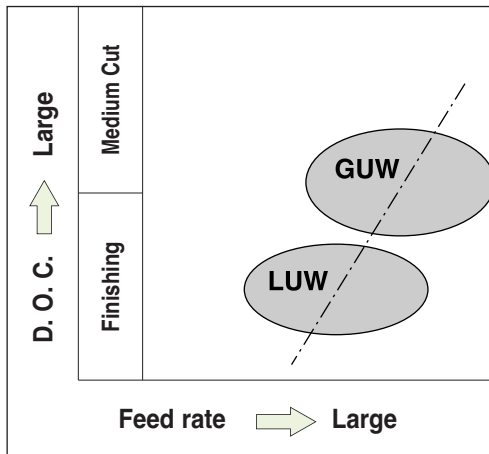
## 1 Main Chipbreaker for Steel



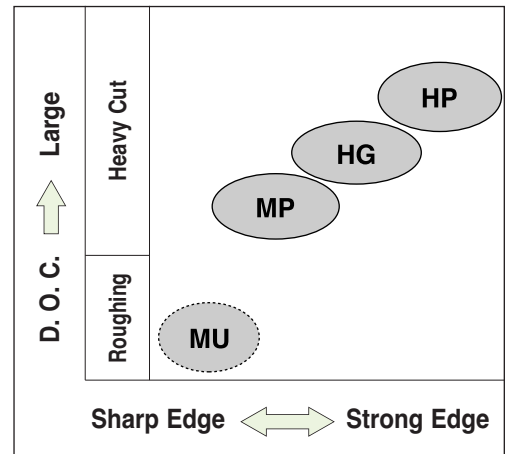
## 2 Sub-Chipbreaker for Finishing



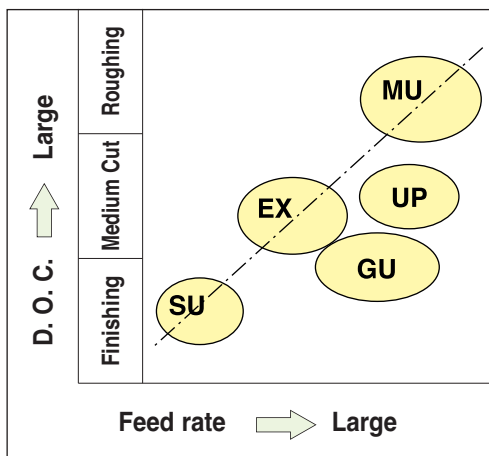
## 3 Wiper Insert (High Efficiency)



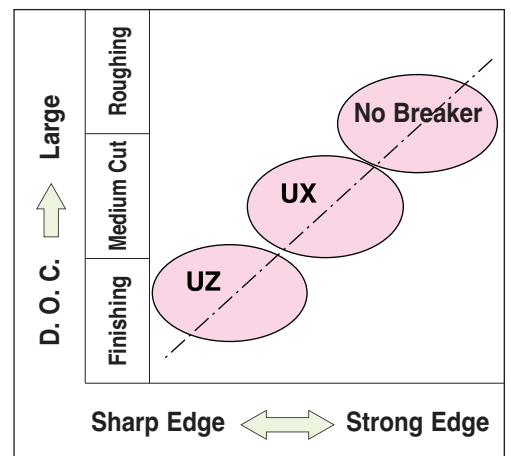
## 4 Heavy Cutting



## 5 Stainless Steel, Exotic Metal



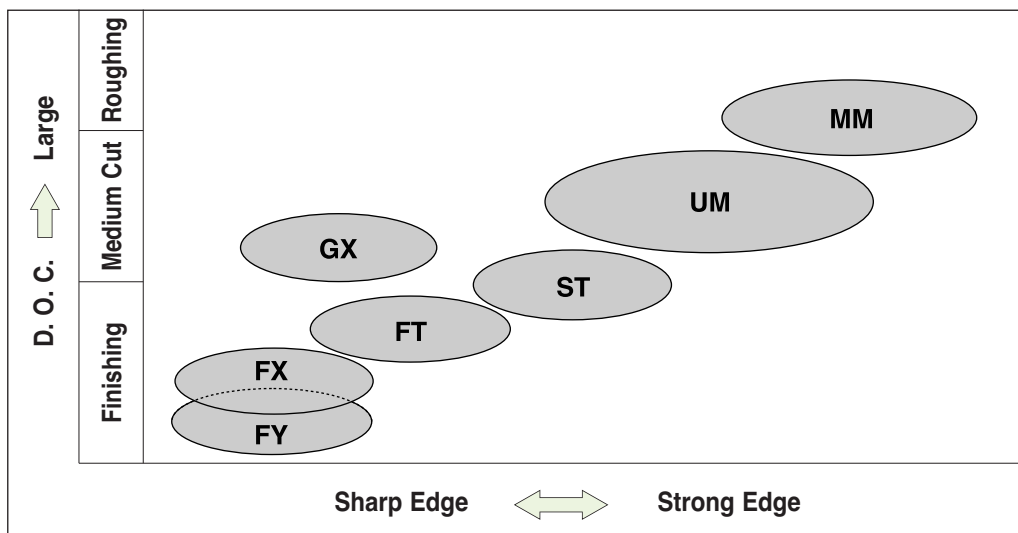
## 6 Cast Iron





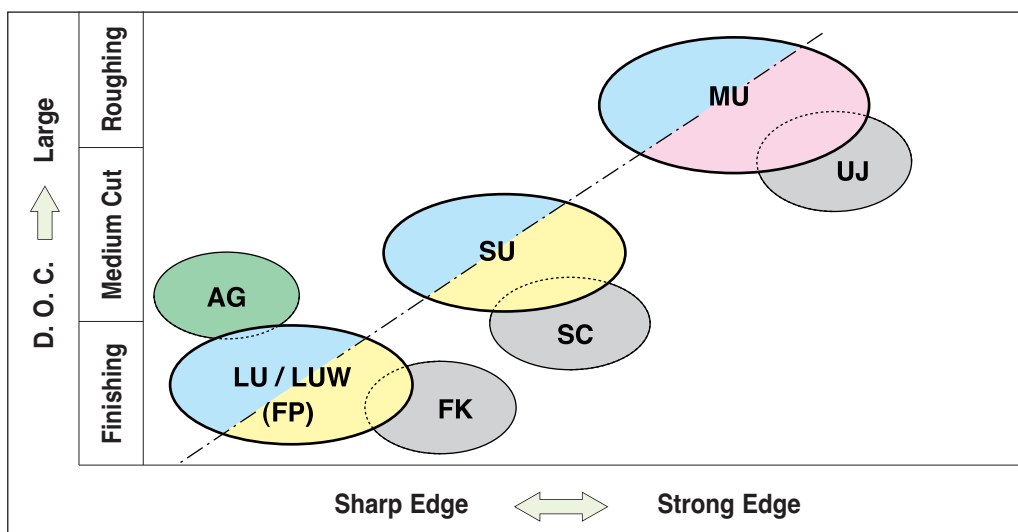
### Negative Type Handed Type

UM Type (Eg.)



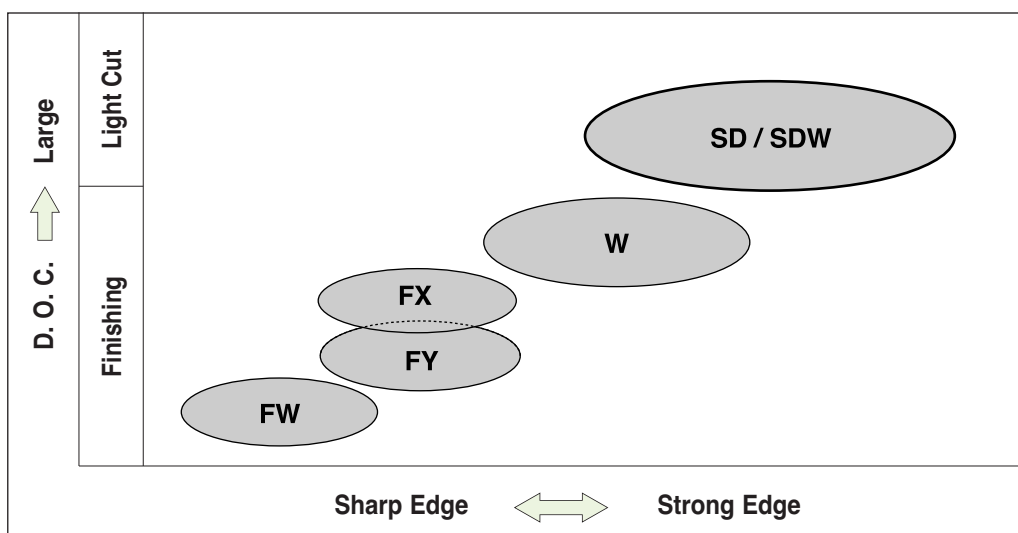
### Positive Type Bumpy Type

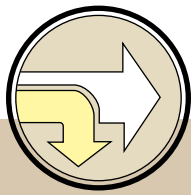
SU Type (Eg.)



### Positive Type Handed Type

FY Type (Eg.)





# Chipbreaker Application Table

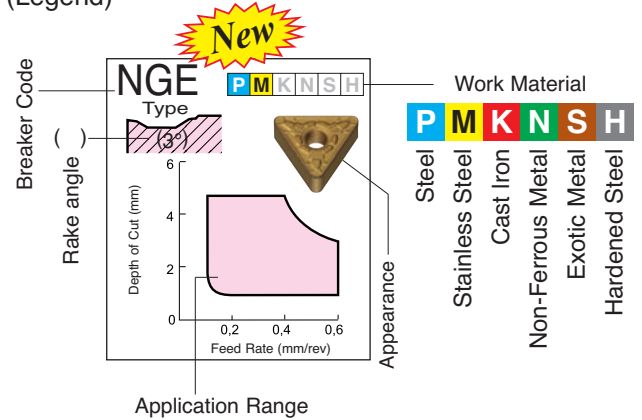
● According to Application

Insert Selection

## Negative Inserts

- Bumpy chipbreaker
- Standard chipbreaker
- Handed chipbreaker
- Sumiboron/Sumidia Break Master

(Legend)



Application	Insert Code	Material	Rake Angle	Depth of Cut (mm)	Feed Rate (mm/rev)
Fine Finishing	NFA	P M K N S H	20°	0 - 1	0.2 - 0.6
	NFL	P M K N S H	10°	0 - 1	0.2 - 0.6
Finishing	NSU	P M K N S H	13°	0 - 2	0.2 - 0.6
	NLU	P M K N S H	10°	0 - 2	0.2 - 0.6
	NLU-W	P M K N S H	10°	0 - 2	0.2 - 0.6
	R/LFY	P M K N S H	15°	0 - 1	0.2 - 0.6
	R/LFX	P M K N S H	14°	0 - 2	0.2 - 0.6
Light~Medium Cut	NSE	P M K N S H	15°	0 - 2	0.2 - 0.6
	NEX	P M K N S H	16°	0 - 4	0.2 - 0.6
	NUP	P M K N S H	10°	0 - 4	0.2 - 0.6
	NSV	P M K N S H	35°	0 - 1	0.2 - 0.6
Light~Medium Cut	NGU	P M K N S H	7°	0 - 4	0.2 - 0.6
	NGE	P M K N S H	3°	0 - 4	0.2 - 0.6
	NGU-W	P M K N S H	10°	0 - 4	0.2 - 0.8
	NUX	P M K N S H	0°	0 - 4	0.2 - 0.6
	NUG	P M K N S H	4°	0 - 4	0.2 - 0.6
Roughing	NMU	P M K N S H	4°	0 - 4	0.2 - 0.6
	NMX	P M K N S H	15°	0 - 4	0.2 - 0.6
	NUZ	P M K N S H	4°	0 - 4	0.2 - 0.6

Carburized Layer Removal

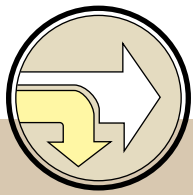


## Negative Inserts

<b>Heavy Roughing</b>	<b>NHG</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NMP</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NHP</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NHU</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NHW</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>

## Positive Inserts

<b>Finishing</b>	<b>NLU</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NLU-W</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NFP</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>R/LFX</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NFC</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>
<b>Light~Medium Cut</b>	<b>R/LSD</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>R/LSDW</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>R/LW</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NFK</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>R/LDM</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>
<b>Light~Medium Cut</b>	<b>NSU</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NSC</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NSK</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NAG</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NUS</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>
<b>Roughing</b>	<b>NMU</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>NSF</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	<b>Roughing</b>		<b>NRX</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>
				<b>NRP</b> <span style="background-color: #00FFFF; border: 1px solid black; padding: 2px;">P</span> <span style="background-color: #FFFF00; border: 1px solid black; padding: 2px;">M</span> <span style="background-color: #FF00FF; border: 1px solid black; padding: 2px;">K</span> <span style="background-color: #00FF00; border: 1px solid black; padding: 2px;">N</span> <span style="background-color: #FF0000; border: 1px solid black; padding: 2px;">S</span> <span style="background-color: #0000FF; border: 1px solid black; padding: 2px;">H</span>	



# Chipbreaker Comparison

## ■ Negative Type

Class	Application	Sumitomo	Mitsubishi	Walter	Sandvik	Seco	Kennametal	Iscar
<b>P</b> Steel	Fine · Finishing	FA	FH	NF3	QF	FF1	MG-FF	SF
		FL	FS	NF3		FF1	MG-FF	SF
	Finishing	SU	SH	NS6		MF2	MG-FN	NF
		LU	SA	NS6		MF2	MG-FN	NF
	Wiper Edge	LUW	SW	NF	WF	W-MF2	MG-FW	WF
	Finishing to Light Cut	SE <b>New</b>	SH, C	NS6	PF, LC	MF3, MF2		TF / NF
	Medium Cut	GU	MA, MZ, MV	NM4	PM, QM	M3	MG-MG	GN / PP
		GE <b>New</b>	MH, MP, MP	NM4	PM, QM	MG-MN	MG-MN	GN
		UX	MH	NM4	SM	MG-MN	MG-MN	GN
	Wiper Edge	GUW	MW	NM	WM	W-M3	MG-MW	WG
	Roughing	MU	GH	NM6	MG-PR	M5 / MR5	MG-RN	TNM / TR
		MX	MAT, MT			MG	MG	
	Heavy Cut	MP	HA, HZ	NR6	MM-PR,QR	R4	MM-RH	NM
		HG	HA, HZ	NR6	MM-PR,QR	R4 / R6	MM-RH	NM
		HP	HH, HV, HX		HR	RR9 / R8	MM-H	
		HU	HV					
HW		HCS						
<b>M</b> Stainless Steel	Finishing	SU	SH	NF4	MF	MF1	MG-FP	
	Light to Medium Cut	EX	MS	NM4	23	MF3	MP	PP
		GU		NM4	MM	MF3	MP	PP
	Roughing	HM	ES, 1M, 2M					
		MU	GH	NR4	MR	M5 / MR5	MG-MP	
<b>K</b> Cast Iron		UZ		NM5	KF		MG-UN	
		UX	GH,Standard	NM5	KM, KR		UM	

## ■ Positive Type

Class	Application	Sumitomo	Mitsubishi	Walter	Sandvik	Seco	Kennametal	Iscar
-	Finishing	LU	FV, SQ	PF4	PF, UF, MF	FF1 / F1	11, UF	PF
		Wiper Edge	LUW	SW	PF4	WF	W-F1	FW
	SDW				WK			
	Light Cut	SU	SV, MQ	PS5	PM, UM, MM	F2	LF	SM
	Light to Medium Cut	MU	MV	PM5	PR, UR, MR		MF	17
<b>N</b> Non-ferrous Metal		AG		PM2	AL	AL	HP	AS