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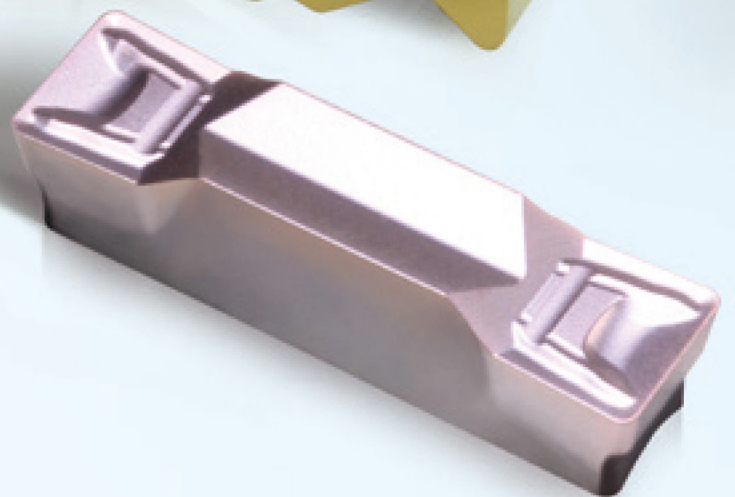
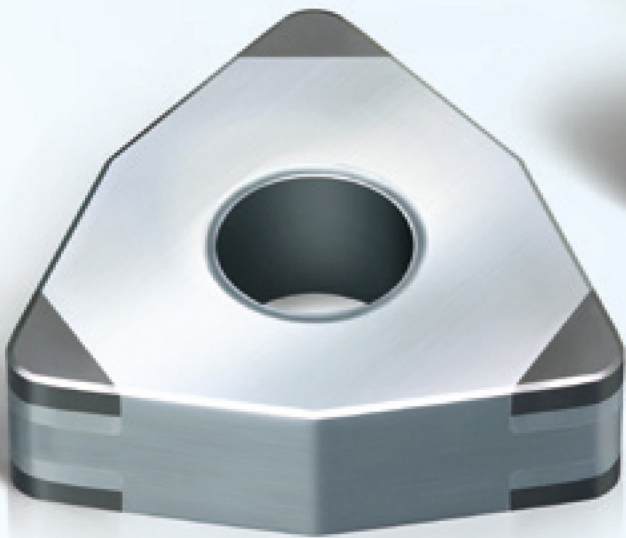
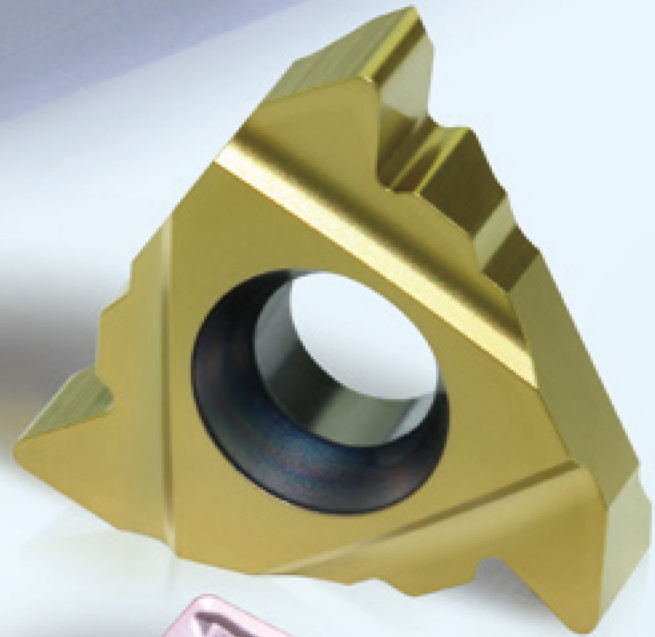
D

E

F

- This catalog shows basic types of standard series inserts and cutting tools. If you have any questions or feedback, please feel free to contact our Sales Department. We will try our best to satisfy you.
- All information in this catalog relates to current products. We will improve our products as our technology develops.
- All technical data in this catalog is prescribed for given working conditions. Please use it as a reference for your own working conditions.

# Turning Tools





DV JNR2525M16  
40829344

V16BM CMSM22C SM5M8.65XA1 SPR6 C6RA



SCE-CT DC  
40829344





Turning

# **GENERAL TURNING TOOLS**

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### Product overview

#### Turning inserts

For finishing



**CNMG-XF**    **DNMG-XF**    **SNMG-XF**    **TNMG-XF**    **VNMG-XF**    **WNMG-XF**

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**DNEG-NGF**    **VNEG-NGF**    **CNMG-DF**    **CNMG-SF**    **CNMG-EF**    **CNEG-NF**    **DNMG-DF**    **DNMG-SF**

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**DNMG-EF**    **DNEG-NF**    **SNMG-DF**    **SNMG-EF**    **SNMG-SF**    **TNMG-DF**    **TNMG-SF**    **TNMG-EF**

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**VNMG-DF**    **VNMG-EF**    **VNEG-NF**    **VNMG-SF**    **WNMG-DF**    **WNMG-SF**    **WNMG-EF**    **WNEG-NF**

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For semi-finishing



**CNMG-XM**    **DNMG-XM**    **SNMG-XM**    **TNMG-XM**    **VNMG-XM**    **WNMG-XM**

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**CNMG-PM**    **CNMG-DM**    **CNMG-EM**    **CNMG-NM**    **DNMG-PM**    **DNMG-DM**    **DNMG-EM**    **DNMG-NM**

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**SNMG-PM**    **SNMG-DM**    **SNMG-EM**    **SNMG-NM**    **TNMG-PM**    **TNMG-DM**    **TNMG-EM**    **VNMG-PM**

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**VNMG-DM**    **VNMG-EM**    **VNMG-NM**    **WNMG-PM**    **WNMG-DM**    **WNMG-EM**    **WNMG-NM**

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Negative inserts

A

Negative inserts

For roughing



CNMG-SNR

DNMG-SNR

SNMG-SNR

TNMG-SNR

VNMG-SNR

WNMG-SNR

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CNMG-DR

CNMM-DR

CNMG-ER

CNMM-ER

DNMG-DR

DNMM-DR

DNMG-ER

DNMM-ER

Page

A33

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A34

A34

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A40



SNMG-DR

SNMM-DR

SNMG-ER

SNMM-ER

TNMG-DR

TNMG-ER

WNMG-DR

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Conventional chipbreaker



CNMG

SNMG

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A47

Without chipbreaker (flat top)



CNMA

DNMA

SNMA

TNMA

WNMA

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A41

A47

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Positive inserts

For fine finishing



CCGT-SF

DCGT-SF

VCGT-SF

CPGT-SF

DPGT-SF

TPGT-SF

TPGH-L

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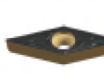
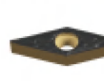
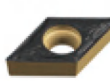
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For finishing



CCMT-XF

DCMT-XF

SCMT-XF

TCMT-XF

VBMT-XF

VCMT-XF

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A

Positive inserts

							
<b>VCGT-NGF</b>	<b>VBET-NGF</b>	<b>CCMT-HF</b>	<b>CCMT-EF</b>	<b>DCMT-HF</b>	<b>DCMT-EF</b>	<b>SCMT-HF</b>	<b>SCMT-EF</b>
Page A68	A70	A57	A57	A60	A61	A63	A63
							
<b>TCMT-HF</b>	<b>TCMT-EF</b>	<b>VBMT-HF</b>	<b>VBMT-EF</b>				
Page A65	A65	A70	A70				
<b>For semi-finishing</b>							
	<b>CCMT-XM</b>	<b>DCMT-XM</b>	<b>SCMT-XM</b>	<b>TCMT-XM</b>	<b>VBMT-XM</b>	<b>VCMT-XM</b>	
Page A58	A58	A61	A63	A65	A71	A68	
							
<b>CCMT-HM</b>	<b>CCMT-EM</b>	<b>DCMT-HM</b>	<b>DCMT-EM</b>	<b>SCMT-HM</b>	<b>SCMT-EM</b>	<b>TCMT-HM</b>	<b>TCMT-EM</b>
Page A58	A58	A61	A61	A63	A63	A66	A66
							
<b>VBMT-HM</b>	<b>VBMT-EM</b>						
Page A71	A70						
<b>For roughing</b>							
	<b>VBMT-SNR</b>	<b>CCMT-HR</b>	<b>DCMT-HR</b>	<b>SCMT-HR</b>	<b>TCMT-HR</b>	<b>VBMT-HR</b>	
Page A71	A71	A59	A62	A64	A66	A71	
<b>For Al-machining</b>							
	<b>CCGX-LC</b>	<b>CCGX-LH</b>	<b>DCGX-LC</b>	<b>DCGX-LH</b>	<b>SCGX-LC</b>	<b>SCGX-LH</b>	<b>TCGX-LC</b>
Page A59	A59	A59	A62	A62	A64	A64	A67
							
<b>TCGX-LH</b>	<b>VCGX-LC</b>	<b>VCGX-LH</b>					
Page A67	A69	A69					



### PCBN inserts



	<b>CNGA</b>	<b>CNGA</b>	<b>DNGA</b>	<b>DNGA</b>	<b>SNGA</b>	<b>SNGA</b>	<b>TNGA</b>	<b>TNGA</b>
Page	A82	A83	A84-A85	A86	A87-A88	A89	A90	A91



	<b>VNGA</b>	<b>VNGA</b>	<b>WNGA</b>	<b>WNGA</b>
Page	A92	A93	A94	A95

### Solid PCBN inserts



	<b>CNGN</b>	<b>DNGN</b>	<b>SNGN</b>	<b>TNGN</b>	<b>VNGN</b>	<b>WNGN</b>
Page	A83	A86	A89	A91	A93	A95

### PCD inserts



	<b>CNMX</b>	<b>DNMX</b>	<b>TNMX</b>	<b>VNMX</b>
Page	A106	A106	A107	A107

### PCBN inserts



	<b>CCGW</b>	<b>DCGW</b>	<b>TCGW</b>	<b>VBGW</b>	<b>VCGW</b>	<b>TPGW</b>
Page	A96	A97	A98	A99	A100	A101

### PCD inserts



	<b>CCGW</b>	<b>CCMX</b>	<b>DCGW</b>	<b>DCMX</b>	<b>TCGW</b>	<b>TCMX</b>	<b>VBGW</b>	<b>VBMX</b>
Page	A108	A108	A109	A109	A110	A110	A111	A111



	<b>VCGW</b>	<b>VCMX</b>	<b>TPMX</b>
Page	A112	A112	A113

Negative inserts

Positive inserts

### Parting and grooving inserts

#### Little squirrel series



ZP□D-MG

ZP□S-MG

ZT□D-MG

ZT□S-MG

ZT□D-MM

ZT□D-EG

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ZT□D-EG

ZIMF-SM

ZR□D-MG

ZR□D-NM

ZR□D-EG

ZIGQ-NM

ZIGQ-NF

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### Threading inserts

Right hand type

ISO metric thread

General pitch thread

Whitworth thread



External thread

Internal thread

External thread

Internal thread

External thread

Internal thread

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C176

C177

C178

C178

C179

C179

Right hand type

Unified thread

British standard taper pipe threads

NPT American standard taper pipe threads



External thread

Internal thread

External thread

Internal thread

External thread

Internal thread

Page

C180

C180

C181

C181

C182

C182

Right hand type

ISO metric thread  
Full Form(Thin type)

General pitch thread  
Without end(Thin type)

Whitworth thread(Thin type)

Thin type



External thread

Internal thread

External thread

Internal thread

External thread

Internal thread

Page

C183

C184

C185

C185

C186

C186

Right hand type

Unified thread(Thin type)

British standard taper pipe threads  
(Thin type)

American standard taper pipe threads  
(Thin type)



External thread

Internal thread

External thread

Internal thread

External thread

Internal thread

Page

C187

C187

C188

C188

C189

C189



### Turning toolholders

#### External turning toolholders

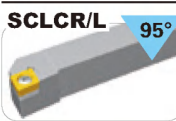


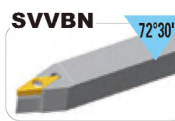


##### D - Multi clamp

 <b>DCLNR/L</b> 95°	 <b>DDJNR/L</b> 93°	 <b>DSBNR/L</b> 75°	 <b>DTGNR/L</b> 91°	 <b>DVVNN</b> 72°30'	 <b>DVJNR/L</b> 93°	 <b>DWLNR/L</b> 95°
Page A118	A119	A119	A120	A120	A121	A121

##### M - Multi clamp

 <b>MCLNR/L</b> 95°	 <b>MDJNR/L</b> 93°	 <b>MTJNR/L</b> 93°	 <b>MTJNR/L-Z</b> 93°	 <b>MVJNR/L</b> 93°	 <b>MWLNR/L</b> 95°
Page A122	A122	A123	A123	A124	A124

##### S - Screw clamp

 <b>SCLCR/L</b> 95°	 <b>SDJCR/L</b> 93°	 <b>SVJBR/L</b> 93°	 <b>SVVBN</b> 72°30'	 <b>SVJCR/L</b> 93°	 <b>STGCR/L</b> 91°
Page A125	A125	A126	A126	A127	A128

#### Boring Bars

##### P - Lever clamp

 <b>PCLNR/L</b> 95°	 <b>PDUNR/L</b> 93°	 <b>PSKNR/L</b> 75°	 <b>PTFNR/L</b> 90°	 <b>PWLNR/L</b> 95°
Page A131	A131	A132	A132	A133

##### S - Screw clamp

 <b>SCLCR/L</b> 95°	 <b>SDUCR/L</b> 93°	 <b>STFCR/L</b> 91°
Page A134	A135	A136

#### Parting and grooving tools

 <b>QE□□R/L</b>	 <b>QECDR/L</b>	 <b>QE□S□□-□□R/L</b>	 <b>QX□DR/L</b>	 <b>QZS□</b>	 <b>QE□S□□N</b>	 <b>QF□□R/L</b>
Page B156-B157	B158	B158	B159	B160	B161	B161-B162

 <b>QF□DR/L</b>	 <b>C□□□□-Q□DR/L</b>
Page B163	B165

#### Threading tools

 <b>SWR/L</b>	 <b>SNR/L</b>	 <b>SWR□□□□B</b>	 <b>SNR□□□□B</b>
Page C192	C193	C194	C194

### ● Table of recommended grades for turning inserts

ISO	General turning								Threading	Parting and grooving			
	Code	Coated grade		Cermets	Coated cermet	Ceramic	Cemented carbide	PCBN	PCD	Coating	Coating		Cemented carbide
		CVD	PVD							PVD	CVD	PVD	
<b>P</b> Steel	01												
	10	YBC152 YBC103								YBG202 YBG203		YBG205	
	20	YBC252 YBC203		YBG102								YBG302	
	30			YBG202									
	40		YBC352										
<b>M</b> Stainless steel	01												
	10	YBM153 YBM251								YBG202 YBG203		YBG205	
	20	YBM253		YBG202								YBG302	
	30			YBM215 YBG205									
	40				YNG151 YNG151C								
<b>K</b> Cast iron	01												
	10	YBD052 YBD102 YBD152											
	20												
	30												
	40												
<b>N</b> non-ferrite materials	01												
	10												
	20												
	30												
	40												
<b>S</b> Heat-resistant steel, Titanium alloy	01												
	10												
	20												
	30												
	40												
<b>H</b> Hardened material	01												
	10												
	20												
	30												
	40												

### Introduction of chip-breakers


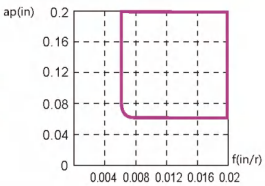
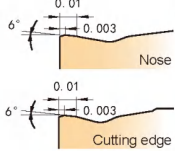


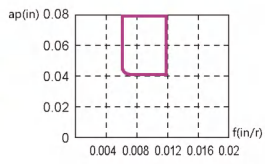
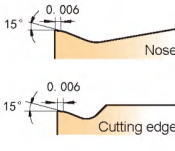


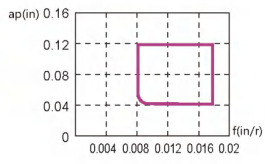
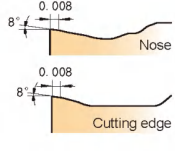


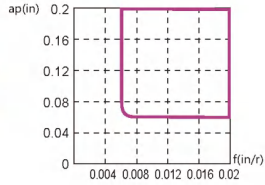
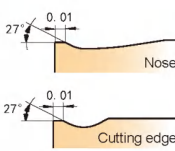


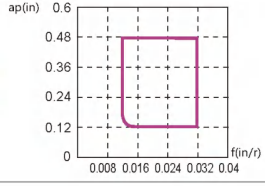
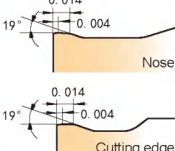


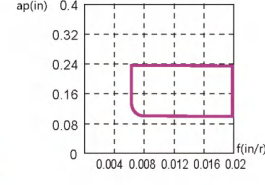
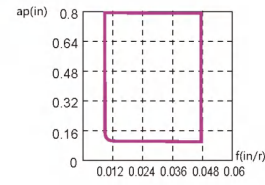
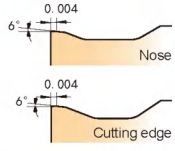
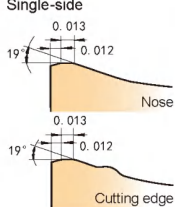

Negative inserts with a hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Chipbreaker profile	Feature/Shape of insert
For finishing	SF	M			<b>Recommended chip-breaker for fine-finishing ISO P materials</b> Double-side chip-breaker with M-class tolerance has outstanding performance on machining P kind soft steel and medium-carbon steel to ensure high surface quality.
	XF	M			<b>Recommended chip-breaker for finishing ISO P materials</b> Curved edge inclination ensures the strength of the cutting edge and reduces cutting resistance, the special chip-breaker design ensures improved chip control performance within the finishing range.
	DF	M			<b>Recommended chip-breaker for finishing ISO P materials</b> Double-side chip-breaker with M-class tolerance for finish machining carbon and alloy steels.
	EF	M			<b>Recommended chip-breaker for finishing ISO M materials</b> Double-side chip-breaker with M-class tolerance with sharp edge for machining stainless steel to reduce built-up edge and work-hardening, while improving surface finish.
	NF	E			<b>Recommended chip-breaker for finishing ISO S materials</b> Double-side chip-breaker with E-class precision, for holding close tolerance when indexing. Wear resistance and work hardening resistance combine to achieve high machining precision.
	NGF	E			<b>Recommended chip-breaker for general finishing of ISO S materials</b> E-class double side chip breaker with excellent sharp edge. High positioning accuracy, light cutting force. -NGF is recommended chip-breaker for S series material general finishing.
For semi-finishing	XM	M			<b>Recommended chip-breaker for semi-finishing ISO P materials</b> With the specially designed cutting-edge structure to ensure its sharpness and strength, the newly designed chip-breaker geometry, and innovative coating grades, the cutting edge is superior in its strength and wear resistance.
	DM	M			<b>Recommended chip-breaker for semi-finishing ISO P materials</b> Double-side chip-breaker with M-class tolerance reduces cutting force and workpiece adhesion, with a broad chip-breaking range for machining alloy steel.



Negative inserts with a hole

### Introduction of chip-breakers

Application	Chipbreaker	Precision	Recommended cutting parameters	Chipbreaker profile	Feature/Shape of insert
For semi-finishing	<b>PM</b> 	<b>M</b>			<b>Recommended chip-breaker for semi-finishing ISO P materials</b> Double-side chip-breaker with M-class tolerance has higher toughness on cutting edge than DM chipbreaker. It's suitable for semi-finishing under unfavorable conditions. Also good for machining cast iron with low cutting force. 
	<b>NM</b> 	<b>M</b>			<b>Recommended chip-breaker for semi-finishing ISO S materials</b> Double-side chip-breaker with M-class tolerance with good capability to prevent wear and work-hardening when machining low-machinability rated metals. Possesses higher feed and depth of cut capability than NF chipbreaker. 
	<b>EM</b> 	<b>M</b>			<b>Recommended chip-breaker for semi-finishing ISO M materials</b> Double-side chip-breaker with M-class tolerance serves to reduce cutting force and workpiece adhesion when machining stainless steel. Possesses higher feed and depth of cut capability than EF chipbreaker. 
Light-load roughing	<b>Conventional Chipbreaker</b> 	<b>M</b>			<b>For machining ISO P, ISO M, ISO K materials from semifinishing to roughing</b> Double-side chip-breaker with M-class tolerance has good cutting edge toughness with wide application area. Unfavorable chip control compared to dedicated chipbreakers. 
	<b>DR</b> Double-side 	<b>M</b>			<b>Recommended chip-breaker for light-load roughing of ISO P and ISO K materials</b> Double-side chip-breaker with M-class tolerance for light roughing, higher metal removal rate, and greater cutting edge security. 
For roughing	<b>ER</b> Single/Double side 	<b>M</b>	 	<b>Double-side</b>  <b>Single-side</b> 	<b>Recommended chip-breaker for roughing ISO M materials</b> Single/Double side chip-breaker with M-class tolerance has good impact-resistance. The chipbreaker's cutting edge is designed to balance security and sharpness. High performance is achieved by reducing edge build-up and reducing heat when roughing stainless steel. 

### Introduction of chip-breakers

Negative inserts with a hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Chipbreaker profile	Feature/Shape of insert
For roughing	<b>DR</b> Single-side	M			<p><b>Recommended chip-breaker for roughing ISO P materials</b> Single-side chip-breaker with M-class tolerance has high security on cutting edge for higher removal rates and low cutting force at large cutting depth and high feed rates.</p>
	<b>SNR</b>	M			<p><b>Recommended chip-breaker for ISO S material high efficiency roughing</b> M-level double-sided chip-breaker perfectly combines sharpness and strength of the cutting edge, with small cutting resistance and high edge strength can effectively reduce groove wear. SNR is recommended chipbreaker for high depth roughing of S- materials.</p>
Heavy-load machining	<b>HDR</b>	M			<p><b>Recommended chip-breaker for heavy-load machining ISO P materials</b> Single-side chip-breaker with M-class tolerance has high strength and security on cutting edge, with strong capability to prevent plastic-deformation under high metal removing rate.</p>
Cast iron machining	Without chipbreaker (flat top)	M			<p><b>For machining cast iron</b> Double-side with M-class tolerance has high cutting edge strength to effectively machine through workpiece imperfections, such as sand pockets in cast iron.</p>
Super hard inserts	Without chipbreaker (flat top)	G			<p><b>For machining non-ferrous metal and high-hardness material</b> G-class tolerance is the best choice for machining nonferrous metals with high-hardness materials by soldering PCBN and PCD onto cemented carbide substrate.</p>



Positive inserts with a hole


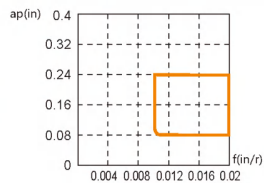
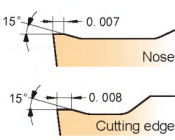


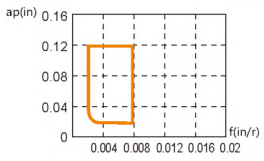
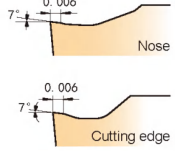


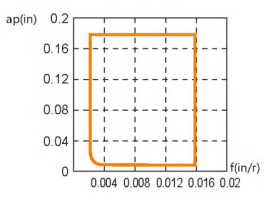
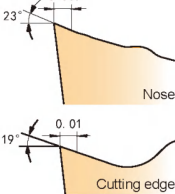


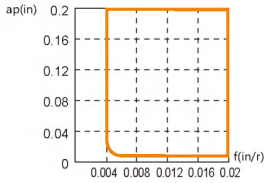
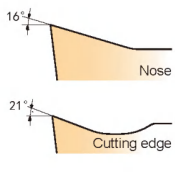


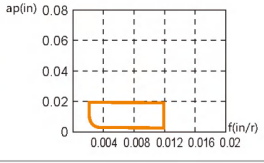


### Introduction of chip-breakers

Application	Chipbreaker	Precision	Recommended cutting parameters	Chipbreaker profile	Feature/Shape of insert
For extra finishing	<b>SF</b>	<b>G</b>			<p><b>First choice for finish machining</b> G-class tolerance is recommended for precision finishing.</p>
	<b>XF</b>	<b>M</b>			<p><b>Recommended chip-breaker for finishing ISO P materials</b> Curved edge inclination ensures the strength of the cutting edge and reduces cutting resistance, the special chip-breaker design ensures improved chip control performance within the finishing range.</p>
For finishing	<b>HF</b>	<b>M</b>			<p><b>Chipbreaker for finishing with wide application</b> With M-class tolerance suitable for internal and external finishing machining for various materials such as steel and cast iron etc.</p>
	<b>EF</b>	<b>M</b>			<p><b>Recommended chip-breaker for finishing ISO M materials</b> M-class tolerance; sharp cutting edge suitable for finishing materials as stainless steel and soft steel, etc. where edge build-up is problem.</p>
	<b>NGF</b>	<b>E</b> <b>G</b>			<p><b>Recommended chip-breaker for ISO S material general finishing</b> E, G grade accuracy, for inner hole finishing of S materials.</p>
For semi-finishing	<b>XM</b>	<b>M</b>			<p><b>Recommended chip-breaker for semi-finishing ISO P materials</b> With the specially designed cutting-edge structure to ensure its sharpness and strength, the newly designed chip-breaker geometry, and innovative coating grades, the cutting edge is superior in its strength and wear resistance.</p>
	<b>HM</b>	<b>M</b>			<p><b>Chipbreaker for semi-finishing with wide application</b> M-class tolerance; suitable for boring and o.d. semi-finishing materials, like steel and cast iron etc.</p>
	<b>EM</b>	<b>M</b>			<p><b>Recommended chip-breaker for semi-finishing ISO M materials</b> M-class tolerance; higher toughness on cutting edge than EF chipbreaker for higher feed and depth of cut.</p>



### Introduction of chip-breakers

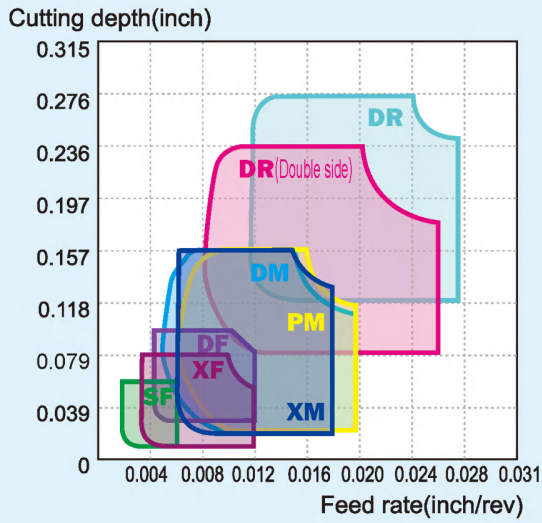
Positive inserts with a hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Chipbreaker profile	Feature/Shape of insert
For roughing	<b>HR</b> 	<b>M</b>			<b>General chip-breaker for roughing</b> M-class tolerance; suitable for both boring and o.d. roughing materials as steel, stainless steel and cast iron etc. 
	<b>SNR</b> 	<b>M</b>			<b>Recommended chip-breaker for ISO S material high-efficiency roughing</b> M-level accuracy, for inner hole roughing of S materials. 
For AI machining	<b>LC</b> 	<b>G</b>			<b>Unique chip-breaker for machining AL and AL alloy</b> G-class tolerance, large rake angle and large clearance angle combine for positive cutting action, with good chip control. 
	<b>LH</b> 	<b>G</b>			<b>Unique chip-breaker for machining AL alloy</b> G-class tolerance, big rake angle and surface polishing, prevents built-up edge, allowing for high surface workpiece quality and long tool life. 
Super hard inserts	<b>Without chipbreaker (flat top)</b> 	<b>G</b>			<b>For nonferrous metals and materials with high hardness</b> G-class tolerance; for machining nonferrous metals and materials with high hardness by soldering PCBN and PCD material to cemented carbide substrate. 

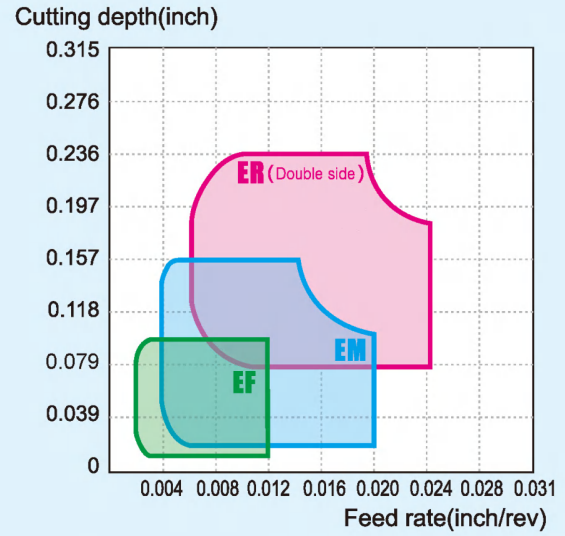
A

### Main chip breaking range reference for general turning inserts

#### Negative inserts

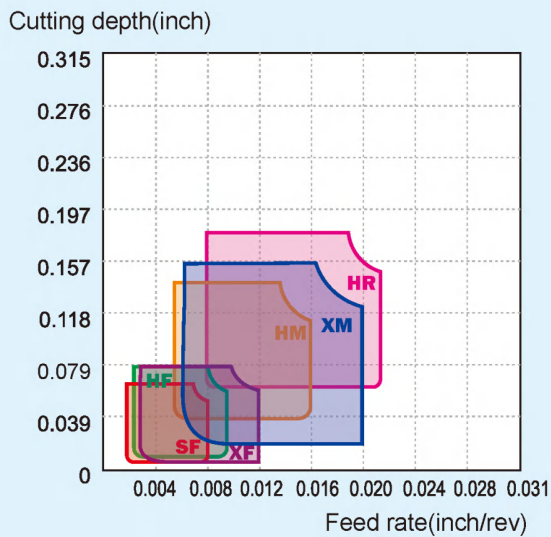


▶ Workpiece material: 45# steel

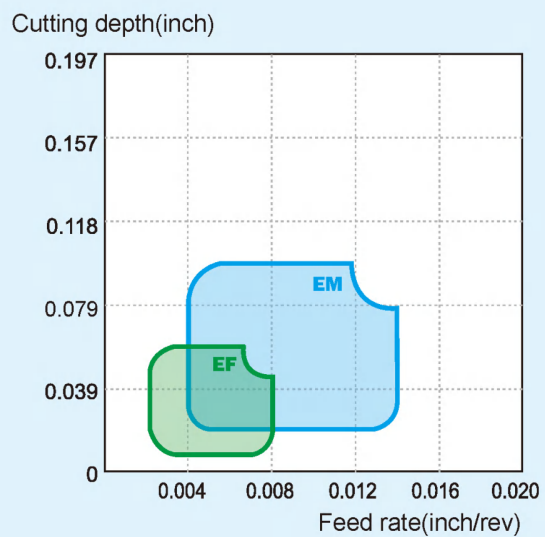


▶ Workpiece material: stainless steel (Austenitic 321)

#### Positive inserts



▶ Workpiece material: 45# steel



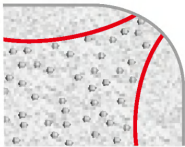
▶ Workpiece material: stainless steel (Austenitic 321)

Second generation of **YBC**

# BLACK DIAMOND INSERTS

## Achieving both higher cutting speed and longer tool life

Perfect unification of toughness and anti-plastic deformation. Specially designed cutting edge with "skeleton" realizes perfect unification of toughness and anti-plastic deformation.



Roughness of insert surface is improved after special treatment on surface, which effectively reduces cutting forces, prevents workpiece adhering to surface of inserts and improves operation stability of inserts.

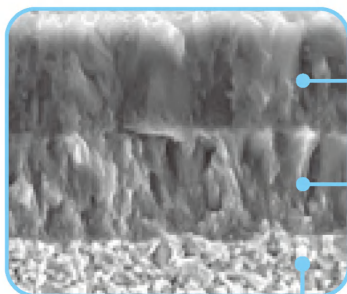


Before surface treatment



After surface treatment

The perfect combination of fibrous TiCN and fine grain  $Al_2O_3$  obviously improves abrasion resistance and anti-breakage of inserts.



$Al_2O_3$

TiCN

Cemented carbide substrate

### YBC152

Thick TiCN and thick  $Al_2O_3$  coatings improve the impact toughness and abrasion resistance, which makes it suitable for finishing and semi-finishing of steel at high speed. Cutting speed can increase by more than 25%, while the tool life can increase by more than 30% at the same cutting speed.

### YBC252

Comprising of thick TiCN and thick  $Al_2O_3$  coatings, the grade has high capability against plastic deformation and good hardness of cutting edge. It is preferred grade for machining of steel from finishing to roughing. Under the same cutting conditions, the cutting speed can be increased by more than 25%, while the tool life can be 30% longer under the same cutting speed.

### YBC352

Thickness TiCN and  $Al_2O_3$  coating, with strongest toughness and plastic deformation resistance, the ideal grade for high efficient steel rough machining under the bad condition.

#### Test comparison of inserts abrasion

Workpiece material : 45# steel

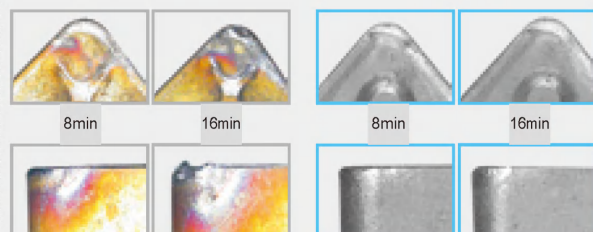
Inserts: CNMG432-DM

Cutting parameters:  $V_c=1300$ (SFPM)

$a_p=0.04$ (inch),  $f_n=0.008$ (inch/r)

Grade from other company

YBC152



Coated Cemented Carbide CVD

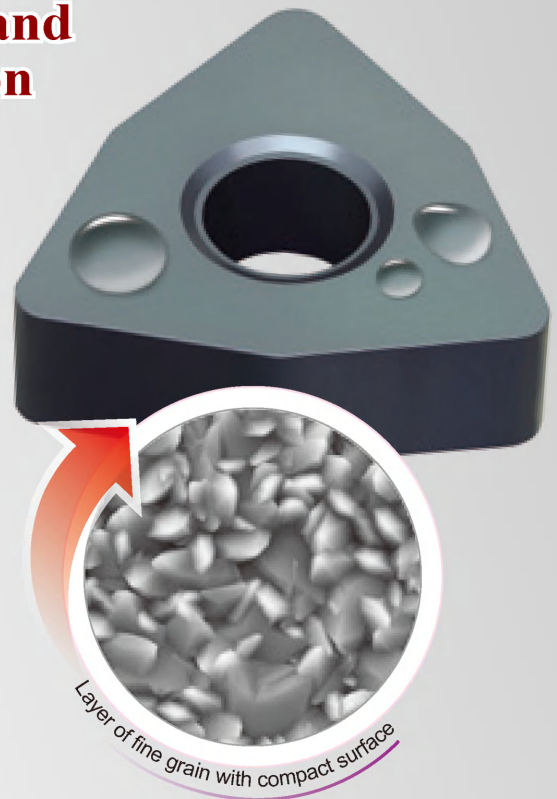
# BLACK DIAMOND INSERTS **YBD**

## First choice for high-efficiency and highspeed machining of cast iron

- The combination of thick coating and substrate with good hardness and impact resistance gives the inserts excellent impact resistance and stability under high temperature, and improves wear resistance of inserts. Inserts also satisfy the requirements of high speed and high feed rate when machining cast iron.
- The appearance of shining full black is easily identified.

### Significant results

- Working efficiency has been improved. Both the coating and the substrate are suitable for machining cast iron at high speed and high feed rate. Cutting speed can be increased by 30% to 40%.
- Cost is reduced as tool life is increased by 40%-50%.
- High machining stability.



Layer of fine grain with compact surface

### YBD052

CVD coated grade, which is characterized by super fine grain and smooth surface, is the combination of hard substrate and coating (extra thick  $\text{Al}_2\text{O}_3$  + thick TiCN ). The grade is optimized for best wear resistance when machining gray cast iron at high speed under dry condition.

### YBD102

CVD coated grade, which is the combination of hard substrate and coating (thick  $\text{Al}_2\text{O}_3$  + thick TiCN ), shows excellent wear resistance and impact resistance when machining nodular cast iron at high speed.

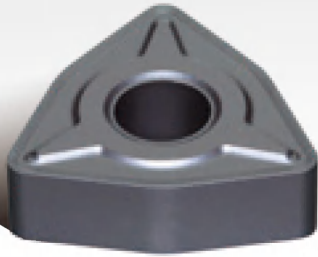
### YBD152

CVD coated grade, which is the combination of hard substrate and coating (medium thick  $\text{Al}_2\text{O}_3$  + thick TiCN), has good flaking resistance. It is suitable for turning of cast iron at high speed, and light intermittent cutting can be supported even at moderate speed. It is also suitable for milling of cast iron.

### YBD252

CVD coated grade, which is the combination of hard substrate and coating (medium thick  $\text{Al}_2\text{O}_3$  + thick TiCN), achieves the balance between wear resistance and toughness. It is suitable for wet milling of cast iron, which requires toughness (such as nodular cast iron) at moderate or low speed. It is also suitable for intermittent turning.

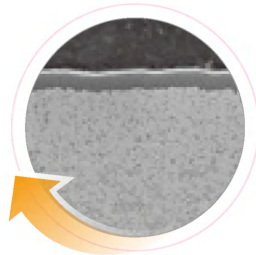
## YBM153



Best choice for roughing of stainless steel with high-speed under good working condition

### Coating

- ✓ CVD coating with advanced ultra-fine grain coating technology, greatly improves wear resistance of inserts.
- ✓ Thanks to special treatment on transition layer, multi-layer coating are combined firmly.
- ✓ The exceptionally smooth coating surface and good low friction ability can reduce the occurrence of built-up edges.



## YBM253

Ideal grade for turning of stainless steel with high cutting depth and high feed rate under bad working condition



### Coating

- ✓ Ultra-fine grain coating technology provides better wear resistance and toughness.
- ✓ Improved remain internal stress design ensures good toughness and anti-cracking performance.
- ✓ Polishing treatment on coating surface makes it suitable for cutting adhesive materials.

# Main grades and applications

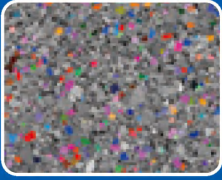
## YNG151

TiCN based cermets, of which the grains are refined with a special process with more even grain size. The combination of cemented carbide hard phase and the binder phase is even more strengthened, further improving the wear resistance and lifetime of the inserts. They are suitable for the finishing and super finishing of steel, stainless steel and cast iron.

## YNG151C

TiCN based cermets+Nano PVD coating, of which the surface is specially pre-treated with an even and smooth surface. The friction coefficient of the workpiece in relation to the insert is reduced, causing good chip flow, increased wear resistance, and prolonged lifetime of insert. They are suitable for the finishing and fine finishing of steel materials, stainless steel and cast iron.

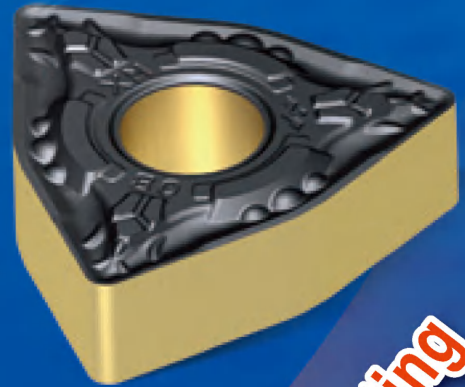
### New cemented carbide matrix



The composition and microstructure optimized by thermodynamic and kinetic theoretical models have significantly improved the product's resistance against plastic deformation and wear under high temperature.

Grain adjustment technology and the cubic phase grains being finer and more evenly distributed have optimized the insert's performance under high temperature. The coupling change of the bonding property and solid solution gradient have enhanced the strength of the cutting edge.

# YBC103



### Fine-grained columnar structure $Al_2O_3$ ultra-thick coating technology



Outstanding high temperature performance and wear resistance, two-color marking layer and ultra-smooth  $Al_2O_3$  coating rake face account for the improved smoothness and uniformity of the cutting edge and the enhanced surface processing quality.

### Hydrogen peroxide gradient transition layer technology

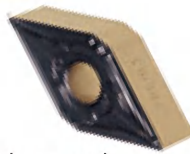


The hydrogen peroxide gradient transition layer adopts PCN technology, which produces fine and dense coating grains, and therefore further improves its high temperature performance and oxidation resistance of the insert.

**A new generation of high performance CVD coating**  
 With improved cutting edge's strength, wear resistance and high temperature oxidation resistance, YBC series of coating grades work efficiently in steel processing.

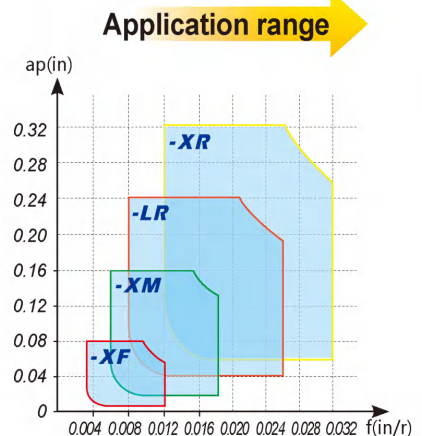
### -XF Chip-breaker for finishing

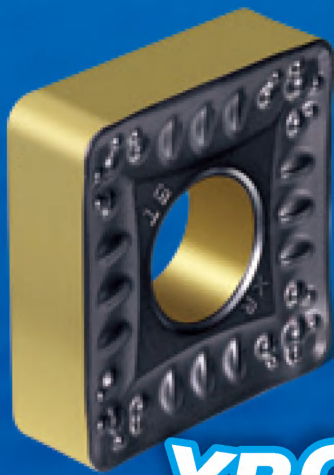
- Curved edge inclination ensures the strength of the cutting edge and reduces cutting resistance.
- The full-curved structure improves its versatility.
- Moreover, the special chip-breaker design ensures improved chip control performance within the finishing range.



### -XM Chip-breaker for semi-finishing

- With the specially designed cutting-edge structure to ensure its sharpness and strength, the newly designed chip-breaker geometry, and innovative coating grades, the cutting edge is superior in its strength and wear resistance.
- Its performance is both stable and efficient.

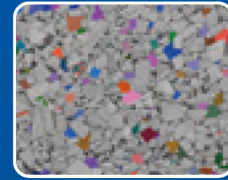




# YBC203

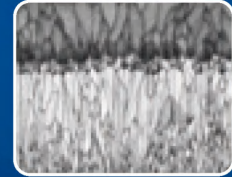
## New cemented carbide matrix

The new matrix adopts a new organizational structure and sintering technology, which refines the alloy structure, strengthens the bonding phase, and makes the structure more uniform and the control more precise. As a result, this technology significantly improves its machining efficiency and its resistance against plastic deformation and oxidation under high temperature.

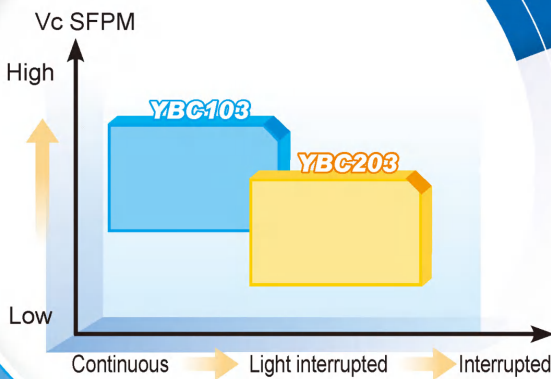


## A new generation of ultra-fine grain coating

Ultra-fine grain coating provides outstanding high temperature performance and wear resistance. The two-color marking layer and ultra-smooth  $Al_2O_3$  coating rake face improve the smoothness and uniformity of the cutting edge and enhance the quality of surface processing.



### Application range



### Applications

Workpiece: Bearing  
 Workpiece material: GCr15  
 Hardness of material: HRC30  
 Insert: DNMG441-XF/YBC103  
 Cutting parameters:  $V_c=870$  SFPM,  
 $a_p=0.02\sim0.03$ in,  
 $f=0.01$ in/r  
 Coolant: Without



## New Chip-breakers for Turning Steel

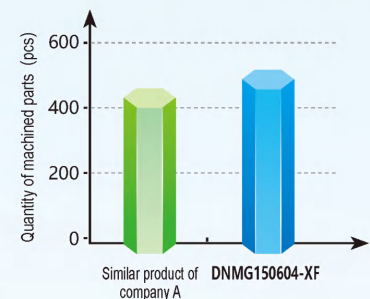
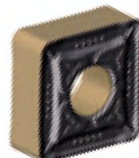
### XR Chip-breaker for roughing

- M-class chip-breaker with sharp cutting edge and inclination design has low cutting resistance and excellent chips control, which makes it ideal for light-load roughing.



### LR Chip-breaker for roughing

- M-class double-sided chip-breaker adopts variable edge design to effectively reduce cutting force and improve chip control, which makes it ideal for light-load roughing.



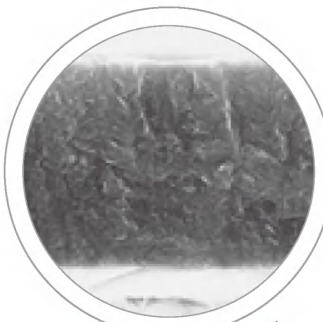
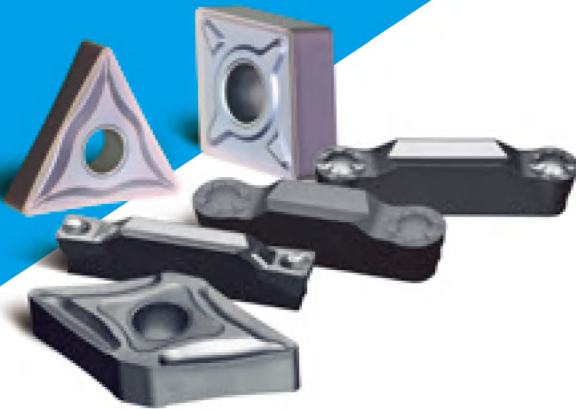
**Conclusion:** The insert proved to be superior to the similar products by A company in both efficiency and quality of the finished surface.

# At the Cutting Edge of Grade and Coating Technology

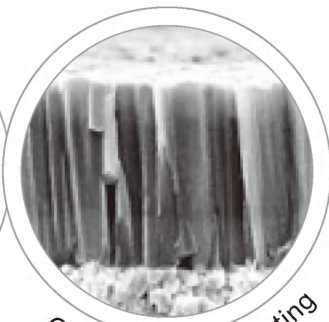
For parting, grooving and the machining of difficult to machine materials.

## Nano structure nc-TiAlN coating grade

- ✔ Smooth coating surface results in less friction and easier chip flow.
- ✔ Special Nano structure coating ensures higher toughness, hardness, and bonding to substrate.
- ✔ Thermal and chemical stability of coating allow cutting edges to remain reliable throughout cut.



nc-TiAlN coating



Common TiAlN coating

### ▶ YBG102

The combination of nc-TiAlN coating and fine grain substrate makes it suitable for turning of various materials and finishing and semi-finishing of high-temperature alloys.

### ▶ YBG202

Nc-TiAlN coating and ultra-fine grain substrate makes it suitable for finishing and semi-finishing of various materials and turning of super alloy.

### ▶ YBG105

#### Finishing and semi-finishing for materials difficult to cut PVD coated grade

PVD coated grade, new TiAlN based multilayer coating, has higher wear resistance and Anti-thermal-oxidation ability. It is suitable for finishing and semi-finishing turning of various materials difficult to cut, such as high temperature alloy, heat resistant alloy, etc.

### ▶ YBG205

#### PVD coating grade for finishing of stainless steel

**Suitable for relatively small workpieces which require high surface smoothness.**

Superfine TiAlN nano coating added with wear-resistant and heat-resistant rare elements has high hardness and excellent heat-resistance, providing effective protection for the cutting edge. Special coating technology ensures stronger combination of coating and substrate. It is suitable for extra finishing of stainless steel.

### ▶ YBG212

Nc-TiAlN coating combined with super tough substrate which made of super fine grain. It's suitable for finishing and roughing materials which are hard to be machined.

### ▶ YBS103

#### Turning grade for Ni-based S material

Fine wear resistance, and good capability against built-up edge and heat resistance. Suitable for turning of Ni-based materials.

### ▶ YBM215

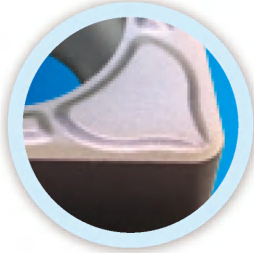
#### PVD coating of multiple layer nanometer

Improved capability of grade's wear resistance and anti-high temperature increases the strength between grade and substrate and the tool stability. This grade is very suitable for turning for stainless steel.



# -EF -EM -ER

Specially designed for machining intensively adhesive and high-plasticity materials such as stainless steel, etc.



**-EF**

Rake angle and inclined angle are specially designed for intensively adhesive stainless steel and high-plasticity materials which are hard to be machined. Sharp cutting edge enables it to cut lightly and easily and achieve good surface quality by well controlling chip breaking. It is especially suitable for finishing these kinds of materials.

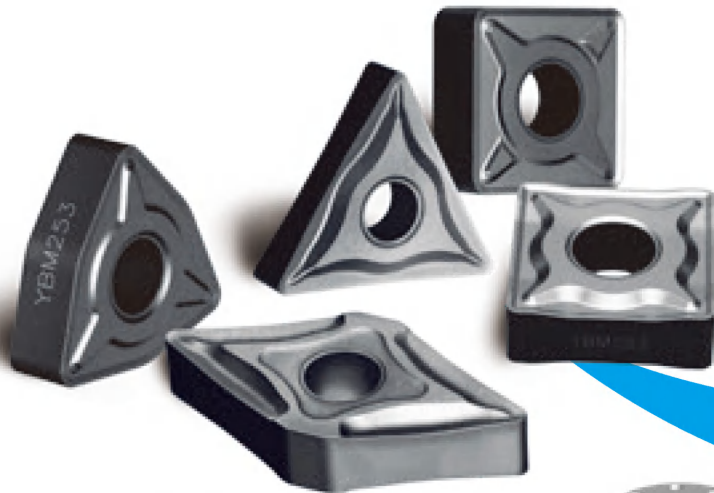


**-EM**

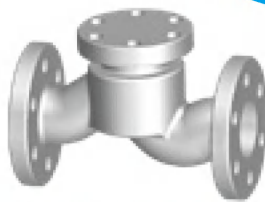
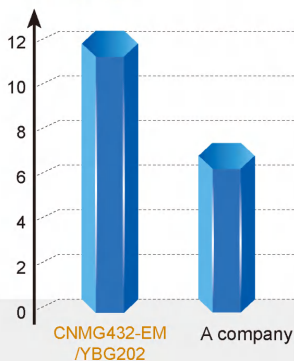
Inserts meet the requirements of machining intensively adhesive materials. Impact resistance of cutting edge is improved in addition to sharpness, which makes it suitable for semi-finishing and intermittent machining of adhesive materials such as austenitic stainless steel, etc.

**-ER**

Specially designed double rake angle with wide land achieves balance between edge security and sharpness, and effectively reduces cutting resistance and wear on groove.



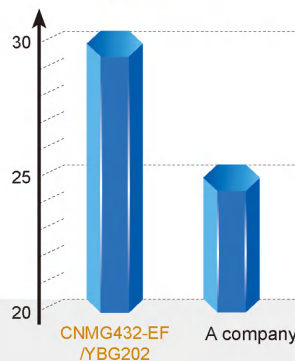
Number of machined parts / Cutting edge



Machining external of valve

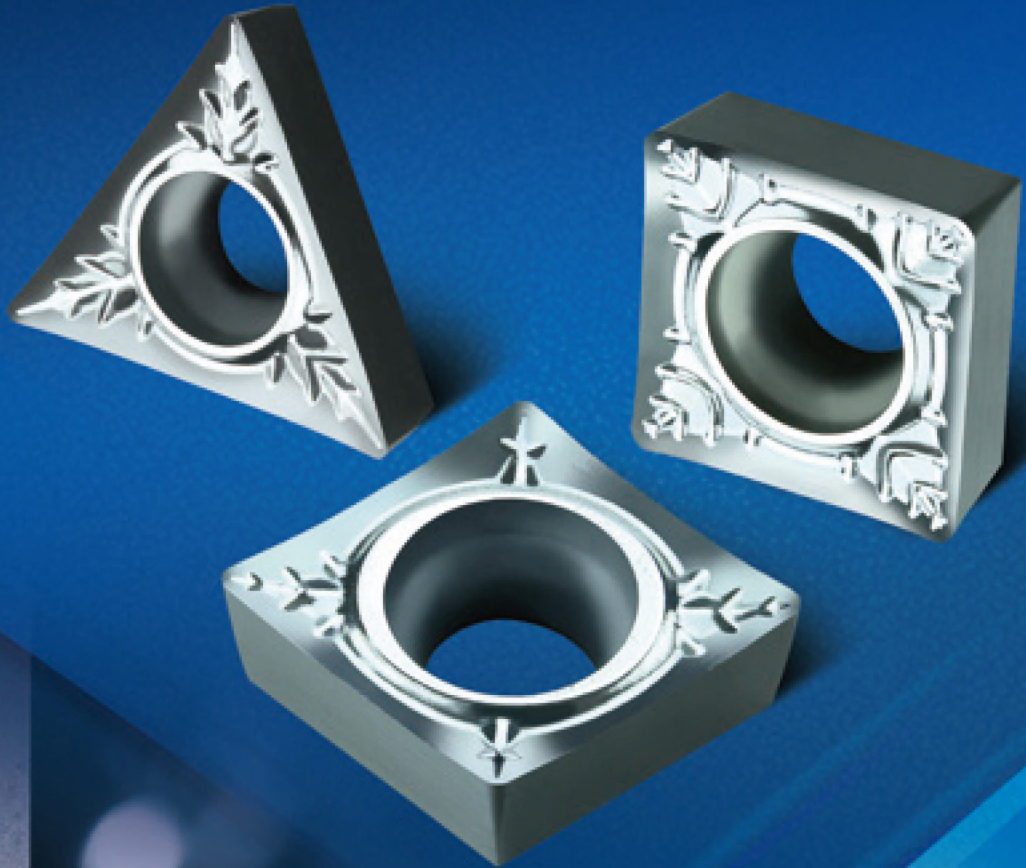
Machining end surface of valve (intermittent machining)  
 Workpiece diameter: 5.3in  
 Rotating speed: 350 rpm  
 Feed rate: 0.01in/r  
 Cutting depth: 0.059in

Number of machined parts / Cutting edge



Machining external of valve  
 Workpiece diameter: 3.5in  
 Rotating speed: 635rpm  
 Feed rate: 0.006in/r  
 Cutting depth: 0.039in

**-LC** *New-generation  
chip-breaker for AI machining*

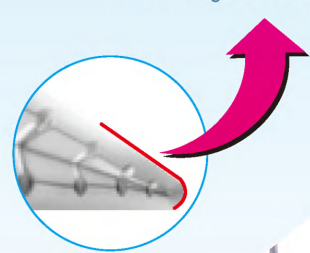
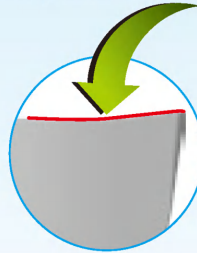


# -LC New-generation chip-breaker for aluminum

- LC inserts are designed with a special chipbreaker. Large rake angle and clearance angle allow for sharper cutting edge, ensuring smoother cutting, while controlling chips.
- A polished rake face reduces friction and adhesion to cutting tool. Chips are allowed to flow freely across rake face and improve the quality of the workpiece finish.
- G-class precision tolerance of insert permits higher accuracy of surface finish and better repeatability when insert is indexed. Machining vibration is reduced also.

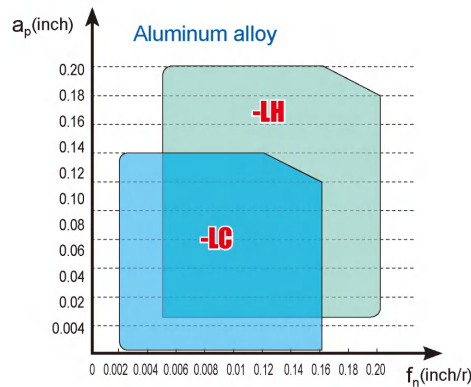
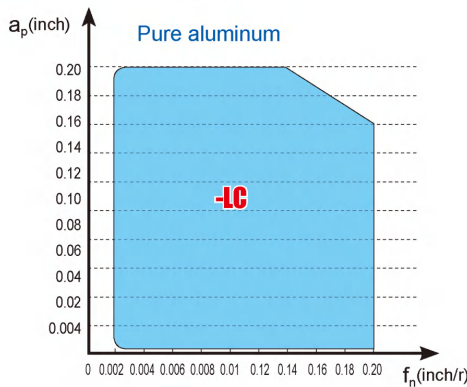
Angular cutting edge improves chip flow and control.

Cutting edge segues from nose to main edge without interruption.







## -LC and -LH chipbreaker characteristics and machining range

- LC chipbreaker can be used in machining of pure Al, while -LH chipbreaker can not.
- LC chipbreaker expand the chip breaking range of Al alloy machining.



### Workpiece material: Pure aluminum

Cutting parameters	V=1148SFPM $A_p=0.008$ inch    F=0.008inch/r	
Chips		
Surface quality		
	<b>-LC chipbreaker</b>	Competitor's tool
	<ul style="list-style-type: none"> <li>-LH chipbreaker is more suitable for machining aluminum alloy with larger cutting depth and higher feed rate.</li> <li>-LC chipbreaker is more suitable for machining aluminum alloy with smaller cutting depth and lower feed rate.</li> </ul>	

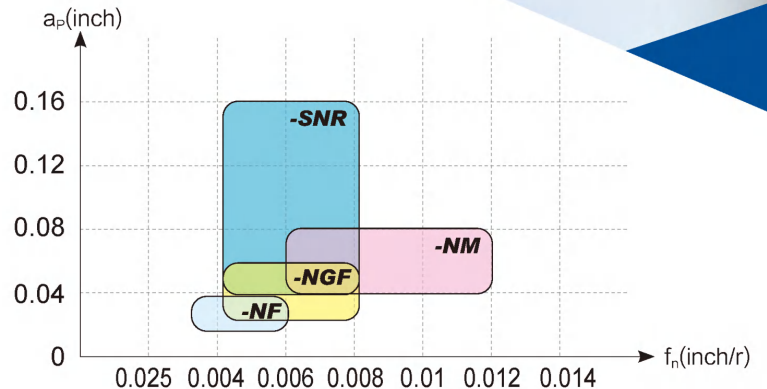
# S- Ni-based Superalloy Machining

## Difficulties Overcome

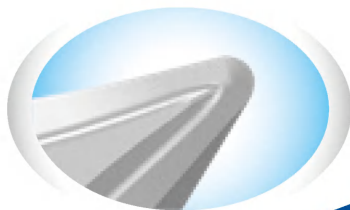
### Features of Ni-based superalloy machining

- High cutting resistance (containing a large amount of alloying elements, severe hardening, great plastic deformation);
- High cutting temperature;
- Severe wear of inserts.

Chipbreaker for machining of Ni-based superalloy should have tough and sharp insert nose, smooth rake face and proper inclination angle.




-NM for semi-finishing      -SNR for high efficiency roughing  
-NF for finishing              -NGF for general finishing



## -SNR

Chip-breaker for roughing with large depth of cut

- Positive rake angle design, sharp cutting edge, low cutting resistance, effectively reducing groove wear;
- Cutting edge with variable rake angles increase cutting edge strength at large depths of cut. Edge strength increases as the depth of cut increases;
- Large slot width combined with unique edge rib design not only provides excellent chip breaking performance but also can effectively improve edge strength.



## **-NGF** Chip-breaker for General Finishing

- Proper inclination angle design, sharp cutting edge, small cutting resistance;
- E-level tolerance of insert, high clamping accuracy, proper chip-breaker width, good chip breaking performance, excellent surface quality;
- Special edge treatment, high wear resistance.



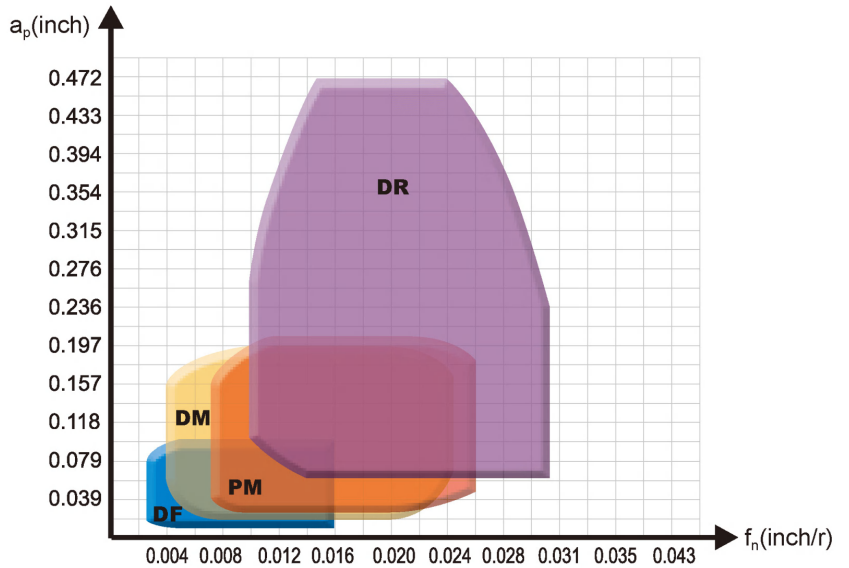
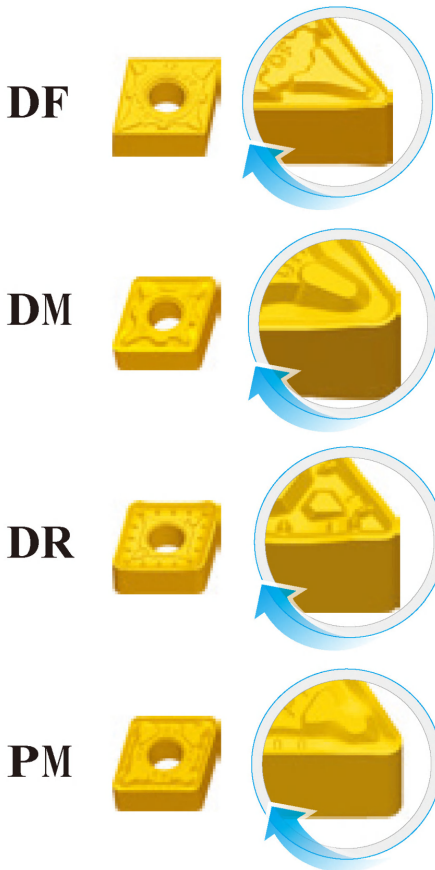
## **-NFINM** Chip-breaker for General Finishing

- -NF chip-breaker has sharp cutting edge, while -NM chipbreaker high cutting edge strength.
- Smooth surface of chipbreaker ensures unobstructed chip flow.
- High wear resistance of cutting edge after special treatment.

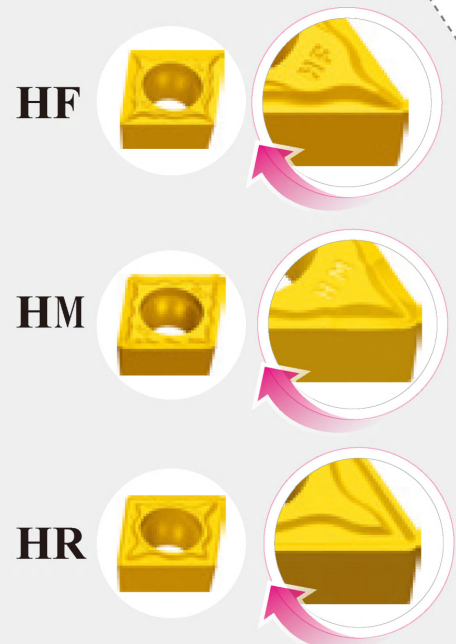
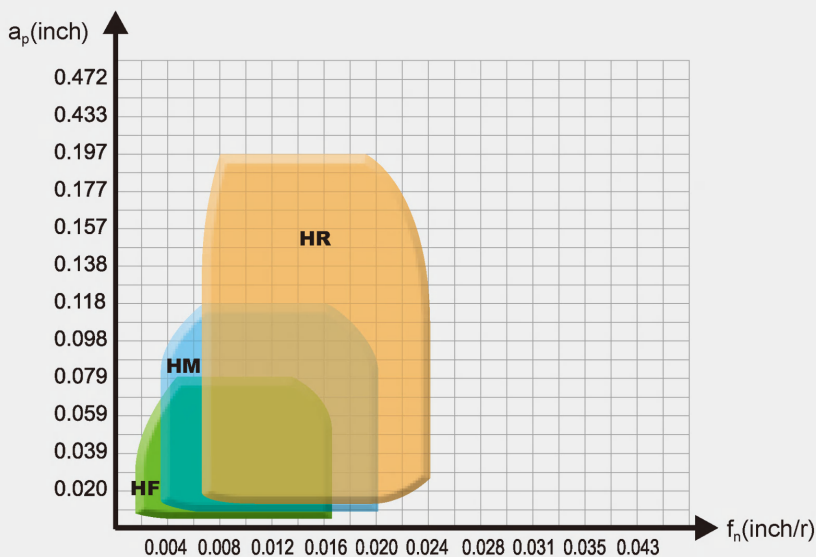


# D series chip-breaker

can be used for machining steel from finishing to roughing



# H series chip-breaker



# -SF

## chip-breaker for finishing

- Unique nose design and sharp cutting edge lead to small cutting resistance and effectively reduce vibration of the tool holder.

- With high re-positioning precision, the insert is compatible with specially developed cemented carbide tool holders, which can increase the capability of vibration resistance and improve machining quality.

- Special treatment on insert's surface can reduce the possibility of chips adhering to the rake face of insert. Good performance of chip breaking and chip flowing ensures improved surface quality of workpiece.

- By adopting excellent grade, it is suitable for extra finishing of various materials.

