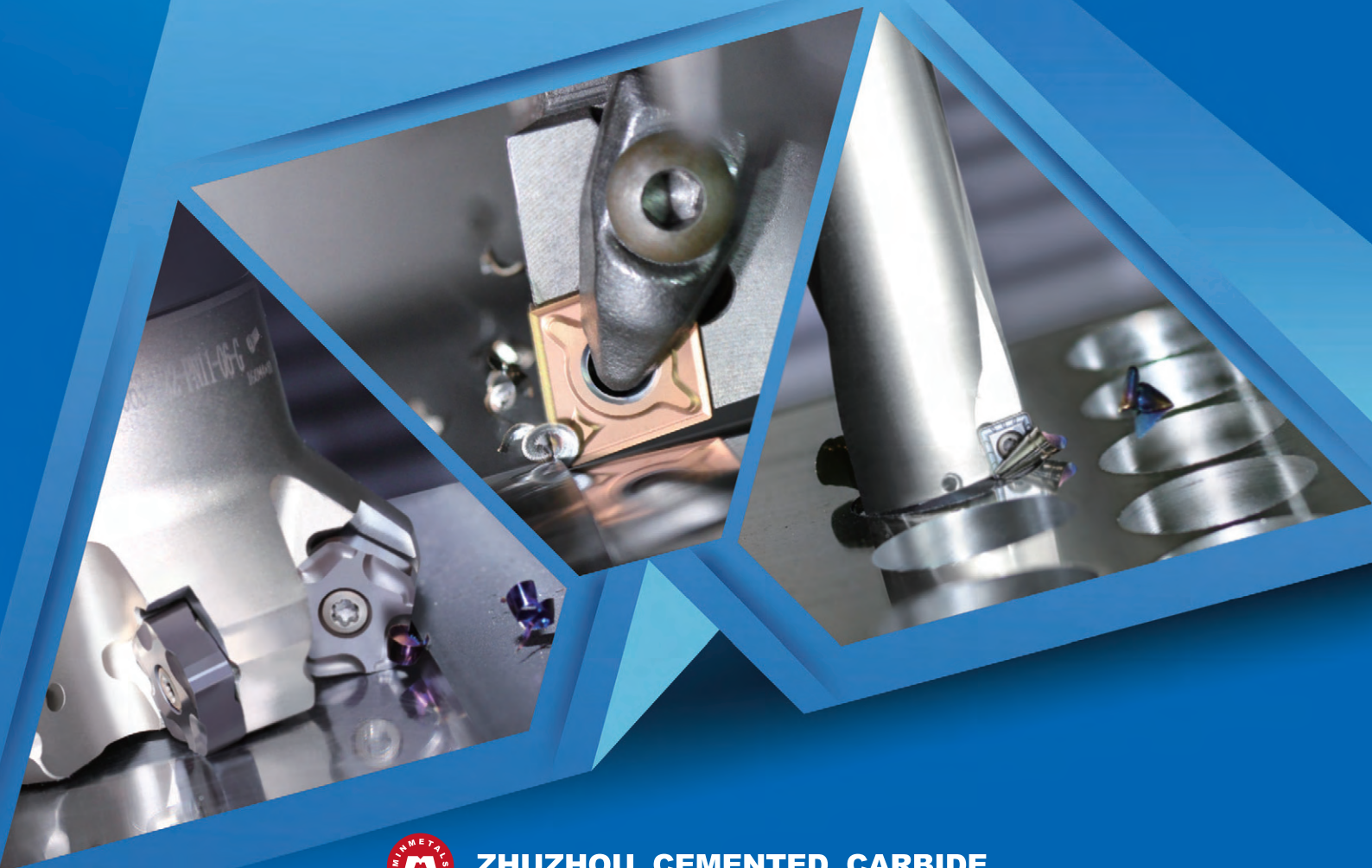


2018-2019

# CUTTING TOOLS

- *Turning Tools*
- *Milling Tools*
- *Boring Tools*



**ZHUZHOU CEMENTED CARBIDE  
CUTTING TOOLS CO., LTD.**

# By using this catalogue, you can get the following information:

- Information on new products.
- Product information: Turning tools, milling tools, boring tools, standard product series of tool holding system, description, basic dimensions, recommended grade and cutting parameters, stock, etc.
- Technical instruction: Tool selection and application, selection of insert chipbreaker and grade, typical machining case, etc.
- General technical information.

To better understand and use this catalogue, please pay more attention to the “how to choose \*\*\*”, “\*\*\* overview” sections in the front of each main catalogue introduction.

## Symbol explanation

- 😊 Good working condition
- 😐 Normal working condition
- 😞 Bad working condition
- ★ Recommended grade (always stock available)
- Available grade (always stock available)
- Make-to-order
- ▲ Stock available      △ Make-to-order
- ◎ Very suitable      ○ Suitable

## Statement

- The product only provides the specifications information based on current productive conditions. We will continuously improve and innovate along with the development of technology.
- The product photos in the catalogue are for demonstration only. Due to different production technologies, product color (such as insert coating color, tool surface color) might be different from the colors shown in this catalogue. It would be advisable to refer to the real product.
- Please note that in the catalogue, the minimum ordering quantity of common inserts and ceramic insert is 10 pcs, and the minimum ordering quantity of CBN & PCD inserts is 2 pcs.
- The stock may change because new product or new grade is released.

### How to select general turning inserts

**Turning inserts list**

- Turning inserts listed according to shape
- Sequence of listed inserts
  - Negative inserts (with hole – without hole)
  - Positive inserts (with hole – without hole)
- Sequence of listed chipbreaker
  - For finishing – For semi-finishing – For roughing – For heavy cutting – Without chipbreaker– Through chipbreaker

**Selecting grade according to workpiece material and working condition**  
 Prior to select grade for insert according to working condition that is suitable for workpiece material.

- 😊 Good working condition: machine works well and stably. There are high requirements for dimensional precision of components and quality surface.
- 😐 Normal working condition: machine works normally. There are certain requirements for dimensional precision of components and surface quality.
- 😞 Bad working condition: machine works with bad stability. There are high requirements for metal evaluation rate.

**Main category of products**

Positive or negative inserts

Shape and dimensions  
 L: cutting edge length  
 Ø: diameter of inscribed circle  
 S: Thickness  
 ø: Hole diameter  
 r: Nose radius

Type

Grade

Size

Stock

Illustration of stock

Reference page of tool holders

Application of inserts

Shape

Insert chipbreaker  
 Chipbreaker code

Recommended cutting parameters  
 Chipbreaker selection reference  
 Grade selection reference  
 Insert code key

Machining application	Geometry	Number of teeth	Type	Shape	Size range	Workpiece material										Page					
						P	M	K	N	S	H	High speed steel	Aluminum alloy	Copper alloy	Cast iron		Stainless steel	Pre-hardened steel			
High-performance general milling	Flattened	4	UM-4E	(Unequal pitch)	Ø4.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B248	B395		
			UM-4EL	(Unequal pitch)	Ø4.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B249	B396	
			UM-4EFP	(Unequal pitch)	Ø6.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B250	B397	
		Radius	4	UM-4R	(Unequal pitch)	Ø4.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B251	B399
				UM-4RL	(Unequal pitch)	Ø6.0-Ø16.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B252	B398
				UM-4RFP	(Unequal pitch)	Ø6.0-Ø16.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B253	B401
	Flattened	2	PML-2E	(Sharp)	Ø1.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B254	B402	
			PML-2F	(Sharp)	Ø1.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B255	B403	
			PML-2EL	(Sharp)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B256	B402	
			PML-2FL	(Sharp)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B257	B403	
			PML-2EFP	(Sharp)	Ø6.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B258	B404	
			PML-2EH	(Corner protection)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B259	B405	
		3	PML-3EL-H	(Corner protection)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B260	B405	
			PML-4E-G	(Corner protection)	Ø1.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B261	B406	
			PML-4F-G	(Sharp)	Ø1.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B262	B408	
			PML-4EL-G	(Corner protection)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B263	B406	
			PML-4FL-G	(Sharp)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B264	B409	
			PML-4EX-G	(Corner protection)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B265	B410	
4	PML-4E	(Corner protection)	Ø1.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B266	B411			
	PML-4EL	(Corner protection)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B267	B412			
	PML-4EH	(Corner protection)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B268	B408			
	PML-4EL-H	(Corner protection)	Ø3.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B269	B406			
	PML-4EFP	(Corner protection)	Ø6.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B270	B413			
	PML-4EL-H	(Corner protection)	Ø6.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B271	B414			
6	PML-6E	(Corner protection)	Ø6.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B272	B415			
	PML-6EL	(Corner protection)	Ø6.0-Ø20.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B273	B416			
Ball nose	2	PML-2B		R0.5-R10.0	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	B274	B417			

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Threading tools	A273-A300

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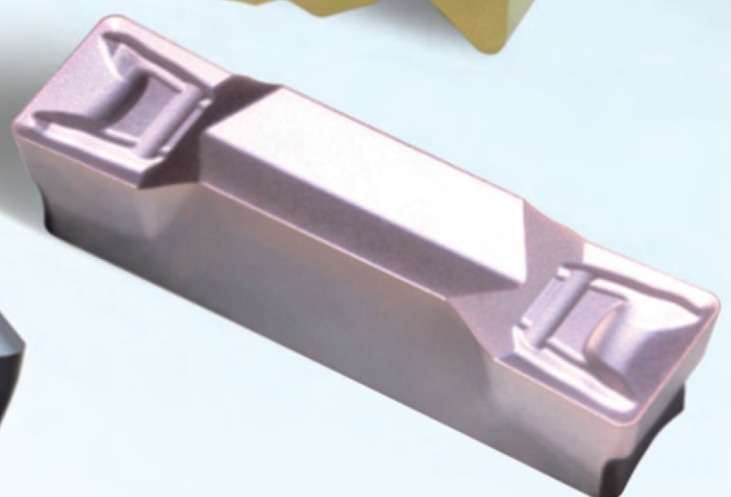
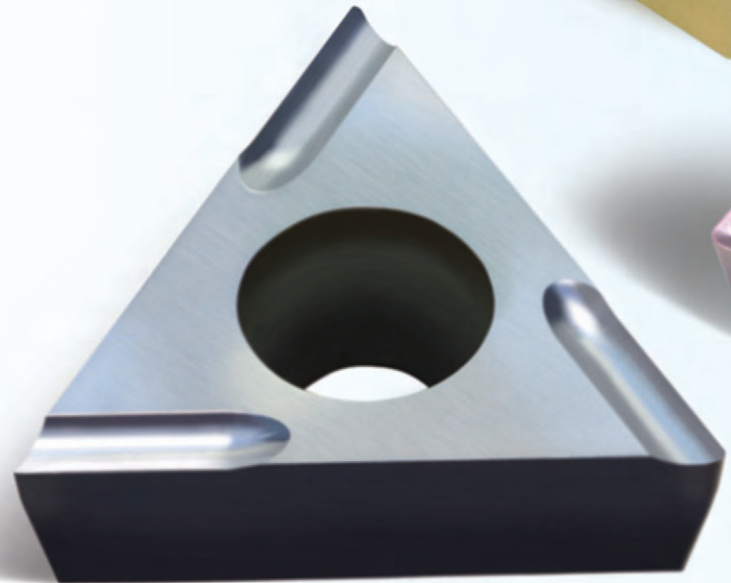
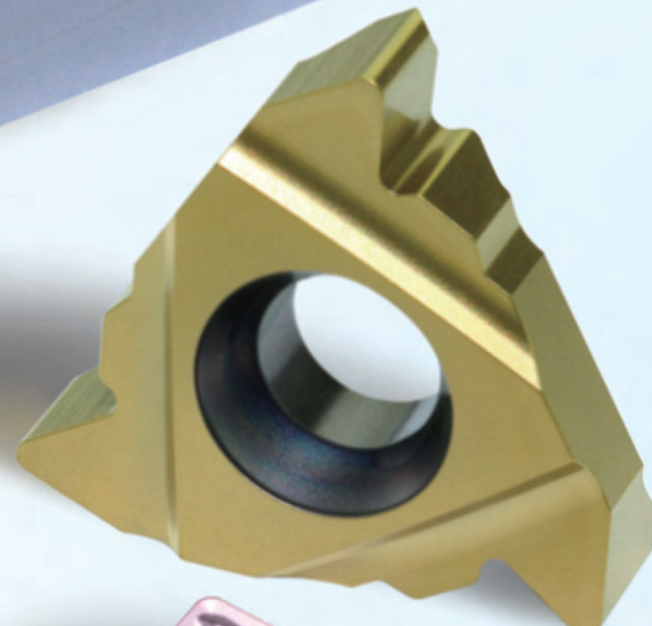
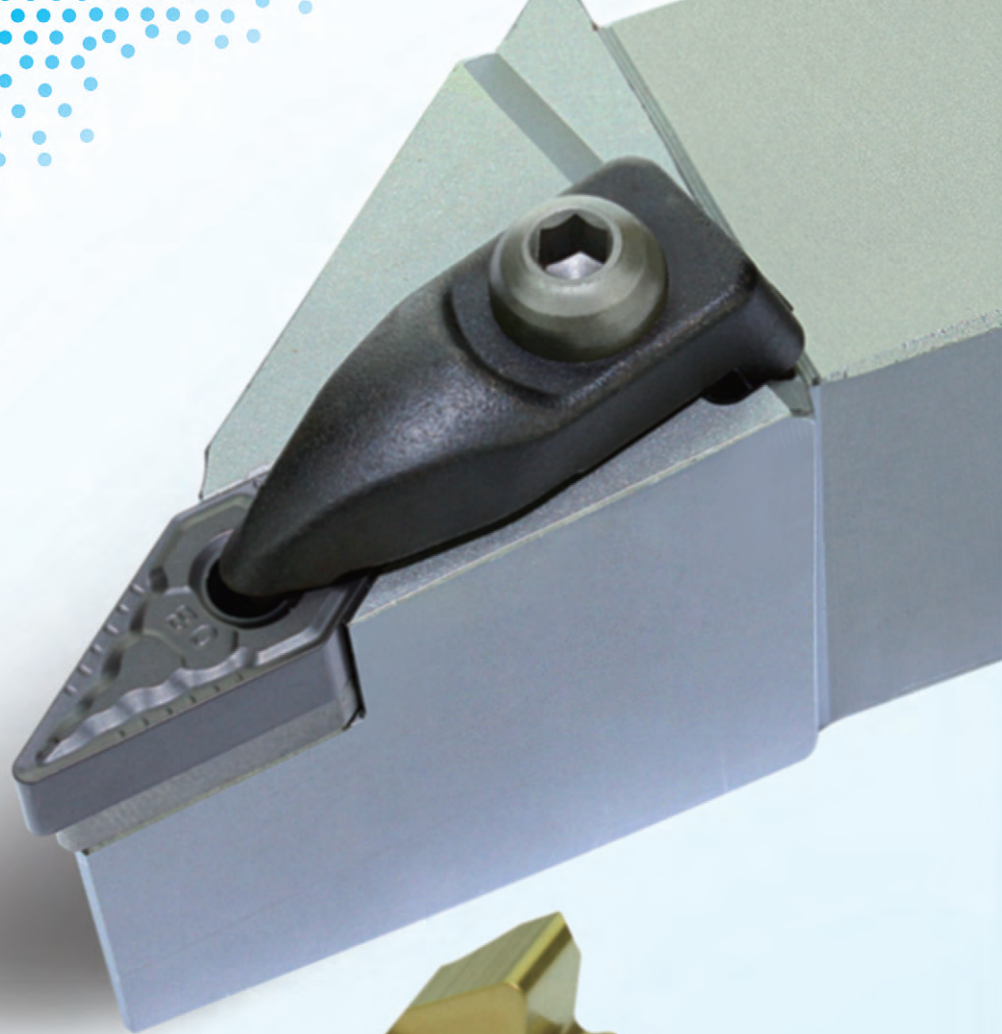
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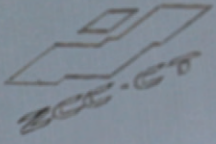
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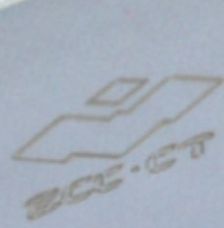






DV JNR2525M16  
40529344

VI6BM CM5\*22C SM5\*8.65XA1 SPR6 C6RA



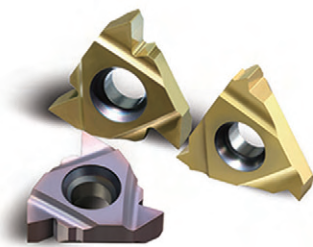
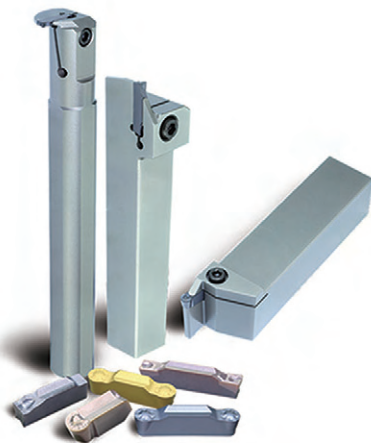
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## Turning Tools

*General turning tools  
Parting and grooving tools  
Threading tools*



# Turning



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## Guide to selecting general turning tools

### Selection A

For roughing						
CNMG-SNR	DNMG-SNR	DNMG-SNR	DNMG-SNR	DNMG-SNR	DNMG-SNR	DNMG-SNR
12,16,19	15	12	16	16	16	08
Page	A58	A65	A72	A78	A82	A86
Negative inserts						
CNMM-LR	DNMM-LR	SNMM-LR	TNMM-LR	CNMG-DR	DNMG-DR	CNMM-ER
12,16,19,25	15	12,16,19,25	16,22	12,16,19	12,16,19,25	12,16,19
Page	A57	A65	A69	A77	A85	A86
DNMG-DR	DNMM-DR	DNMG-ER	DNMM-ER	SNMG-DR	SNMM-DR	SNMG-ER
15	15	15	15	12,15,19	12,15,19,25	12,15,19
Page	A65	A65	A65	A65	A70-71	A71
TNMG-DR	TNMM-DR	TNMG-ER	WNMG-DR			
16,22,27	16,22,27	16,22	08,08			
Page	A75	A76	A76	A86		
For heavy machining						
CNMG-LPR	DNMG-LPR	175-32-23227	175-32-34	175-32-25	175-32-28	
19,25	19,25	19	19	19,30	19	
Page	A59	A72	A88	A88	A88	



**CNMG-DR**  
cutting edge length 12,16,19  
Page A58



**Step 1: I want to order inserts**  
•Shape, •Size, •Chipbreaker

CN (Negative inserts)		Good working condition										Normal working condition										Bad working condition									
Inserts shape	Type	Dimensions(mm)					Coated cemented carbide										Cemented carbide														
		L	LC	S	d	r	W0101	W0102	W0103	W0104	W0105	W0106	W0107	W0108	W0109	W0110	W0111	W0112	W0113	W0114	W0115	W0116	W0117	W0118	W0119	W0120					
DR	CNMG12040-DR	12.9	12.7	4.76	5.16	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMG12042-DR	12.9	12.7	4.76	5.16	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMG12046-DR	12.9	12.7	4.76	5.16	1.6	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMG16068-DR	16.1	15.876	6.35	6.35	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMG16062-DR	16.1	15.876	6.35	6.35	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMG16066-DR	16.1	15.876	6.35	6.35	1.6	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
DR	CNMG19062-DR	19.3	19.06	6.35	7.94	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMG19066-DR	19.3	19.06	6.35	7.94	1.6	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMG19064-DR	19.3	19.06	6.35	7.94	2.4	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMM1204-DR	12.9	12.7	4.76	5.16	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMM1606-DR	16.1	15.876	6.35	6.35	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					
	CNMM1606-DR	16.1	15.876	6.35	6.35	1.6	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●					

Dimensions(mm)				
L	LC	S	d	r
12.9	12.7	4.76	5.16	0.8

**Step 2: Details of inserts**  
•Shape, •Size, •Chipbreaker, •Grade, •Stock  
**Applicable tool holders**  
•Approach angle, Page

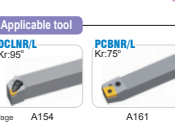
Applicable tool	
DCLR/L Kr:75°	PCBR/L Kr:75°
Page A154	A161

Corresponding tool holders of insert CN		P-type clamping	
<b>PCBR/L Kr:75°</b>			
Type	Stock	Basic dimension(mm)	
R	L	d	L
PCBR/L 2030R12	A	20	125
2525R12	A	25	150
3232R12	A	32	170
2525R16	A	25	150
3232R16	A	32	170
4040R16	A	40	200
4545R16	A	45	225
4545R20	A	45	250
4545R25	A	45	275

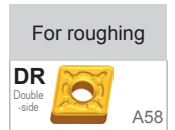
Applicable inserts					
Application	For finishing	For semi-finishing	For roughing	For heavy machining	For cast iron
DF	WGM	DR	DR	DR	DR
WGF	PM	DR	DR	DR	DR
SF	DM	ER	ER	ER	ER
EF	EM	ER	ER	ER	ER
NF	NM	SNR	SNR	SNR	SNR
LA	LA	LA	LA	LA	LA



**Applicable tool**  
DCLR/L Kr:75° Page A154  
PCBR/L Kr:75° A161



**Step 3: Selecting tool holder**  
•Tool holder type, Size, •Stock  
•Operation genre, •Applicable inserts



**For roughing**  
DR Double-side A58

**Step 4: Return to locate inserts**

General turning  
Guide to selecting turning tools



## Guide to selecting general turning tools

### Selection B

**D-type clamping system**

DCLNR/L, DCLNR, DSNR/L, DSNR, DVVNR, DVJNR/L, DVJNR/L

**P-type clamping system**

PCBNR/L, PCLNR/L, PDJNR/L, PNNR/L, PSNR/L, PSDNR, PSKNR/L

PSNR/L, PTFNR/L, PTFNR/L, PFGNR/L, PHLNR/L

**S-type clamping system**

SCAR/L, SCLCR/L, SBACR/L, SBJCR/L, SDNCR, SVJBR/L, SVABR/L

SVVBR, SVVCR, SVJCR/L, SSBCLR, SBDCH, SSKCR/L, SSSCLR



**Step 1: I want to order tool holders**

- Approach angle, • Clamping system

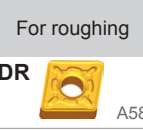
**Corresponding tool holders of insert CN**

**PCBNR/L**  $Rr175^\circ$

Type	Stock		Basic dimension(mm)						Screw	Shim	Wrench	Lever	Shim pin
	R	L	s	b	L	h	e						
PCBNR/L	2020K12	A	20	20	125	20	17	32	LEM8+21	C12AP	WHDL	L4	SP4
	2020M12	A	20	20	125	20	22	32					
	3230P12	A	32	32	170	32	27	32					
PCBNR/L	2020M16	A	20	20	150	20	22	38	LEM8+25	C16AP	WHDL	L5	SP5
	3230P16	A	32	32	170	32	27	38					
	4040M16	A	40	40	180	40	35	42					
PCBNR/L	3230P19	A	32	32	170	32	27	42	LEM10+27	C18AP	WHDL	L6	SP6
	4040M19	A	40	40	180	40	35	42					
	4040S200	A	40	40	200	40	35	50					
PCBNR/L	4040S200	A	40	40	200	40	35	50	LEM12+36A	C26AP-07	WHDL	L8	SP8
	4040S200	A	40	40	200	40	35	50					

**Applicable inserts**

Application	For finishing		For semi-finishing		For roughing		For heavy roughing		For cast iron roughing	
	DF	WGM	PM	DR	DR	DR	HPR	HPR	HPR	HPR
WGF	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4
SF	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4
EP	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4
NP	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4	AS4



**Step 2: Details of tool holder**

- Tool holder type, Size, • Operation genre
- Applicable inserts

**CN Negative inserts**

Steel, Cast iron, Non-ferrous metal, Heat resistant alloy

Inserts shape	Type	Dimensions(mm)					Coated cemented carbide												Cemented carbide	
		L	l	C	S	d	VC1010	VC1015	VC1020	VC1025	VC1030	VC1035	VC1040	VC1045	VC1050	VC1055	VC1060	VC1065		
DR	CNM012040S-DR	12.9	12.7	4.76	5.16	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	
	CNM012041S-DR	12.9	12.7	4.76	5.16	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	
	CNM012041S-DR	12.9	12.7	4.76	5.16	1.6	●	●	●	●	●	●	●	●	●	●	●	●	●	
	CNM016060S-DR	16.1	15.875	6.35	6.75	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CNM016061S-DR	16.1	15.875	6.35	6.75	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●
DR	CNM016061S-DR	16.1	15.875	6.35	6.75	1.6	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CNM019090S-DR	19.3	19.05	8.35	7.94	0.8	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CNM019091S-DR	19.3	19.05	8.35	7.94	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CNM019091S-DR	19.3	19.05	8.35	7.94	1.6	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CNM019092S-DR	19.3	19.05	8.35	7.94	2.4	●	●	●	●	●	●	●	●	●	●	●	●	●	●
DR	CNM012041S-DR	12.9	12.7	4.76	5.16	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CNM016061S-DR	16.1	15.875	6.35	6.75	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CNM019091S-DR	19.3	19.05	8.35	7.94	1.2	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CNM019091S-DR	19.3	19.05	8.35	7.94	1.6	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	CNM019092S-DR	19.3	19.05	8.35	7.94	2.4	●	●	●	●	●	●	●	●	●	●	●	●	●	●

**Applicable tool**

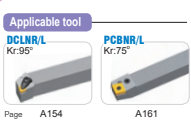
DCLNR/L  $Kr150^\circ$ , PCBNR/L  $Kr175^\circ$ , PCLNR/L  $Kr150^\circ$ , PCLNR/L  $Kr150^\circ$

**Dimensions(mm)**

L	l	C	S	d	r
12.9	12.7	4.76	5.16	0.8	

**Step 3: Details of insert**

- Shape, • Size, • Chipbreaker, • Grade, • Stock
- Applicable tool holders**
- Approach angle, • Page



**Step 4: Return to locate tool holder**

## Guide to selecting parting and grooving tools

General turning

Guide to selecting turning tools

### Parting and grooving tools



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**External parting, grooving and turning tools**

Type	Stock	Basic dimensions(mm)				Applicable inserts	Screw	Wrench			
		φ	L	H	W						
QEAD	1212RL07	A	12	12	125	12.18	1.5	7	ZD4001SC21	GS70-85 MS-16	WYHDL
	1212RL12	A	12	12	125	12.15	1.5	12	ZD4001SC21		
	1616RL07	A	16	16	125	16.15	1.5	7	ZD4001SC21		
	1616RL12	A	16	16	125	16.15	1.5	12	ZD4001SC21		
	2020RL07	A	20	20	125	20.15	1.5	7	ZD4001SC21		
QEBD	2020RL12	A	20	20	125	20.15	1.5	12	ZD4001SC21	GS70-85 MS-16	WYHDL
	1212RL07	A	12	12	125	12.18	2	7	ZB3002C21		
	1212RL10	A	12	12	125	12.18	2	10	ZB3002C21		
	1212RL14	A	12	12	125	12.18	2	14	ZB3002C21		
	1616RL07	A	16	16	125	16.16	2	7	ZB3002C21		
QEED	1616RL10	A	16	16	125	16.16	2	10	ZB3002C21	GS70-85 MS-20	WYHDL
	1616RL14	A	16	16	125	16.16	2	14	ZB3002C21		
	2020RL07	A	20	20	150	20.16	2	7	ZB3002C21		
	2020RL10	A	20	20	150	20.16	2	10	ZB3002C21		
	2020RL14	A	20	20	150	20.16	2	14	ZB3002C21		
QEFD	1616RL07	A	16	16	125	16.16	2.5	7	ZB3002C21	GS70-85 MS-20	WYHDL
	1616RL10	A	16	16	125	16.16	2.5	10	ZB3002C21		
	1616RL14	A	16	16	125	16.16	2.5	14	ZB3002C21		
	2020RL07	A	20	20	150	20.16	2.5	7	ZB3002C21		
	2020RL10	A	20	20	150	20.16	2.5	10	ZB3002C21		
QEGD	2020RL14	A	20	20	150	20.16	2.5	14	ZB3002C21	GS70-85 MS-20	WYHDL
	2020RL17	A	20	20	150	20.16	2.5	17	ZB3002C21		
	2020RL19	A	20	20	150	20.16	2.5	19	ZB3002C21		
	2020RL22	A	20	20	150	20.16	2.5	22	ZB3002C21		
	2020RL25	A	20	20	150	20.16	2.5	25	ZB3002C21		

### Parting inserts

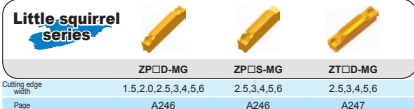
Type	Basic dimensions(mm)			Grade				
	φ	R <sub>1</sub> (r)	Chipbreaker	CVD Coating		PVD Coating		Coated Carbide
				YBC151	YBC251	YBC205	YBC302	VD101
ZPA01502-MG	1.5	0.2	12	□	□	★	□	□
ZPD0202-MG	2.0	0.2	14	□	□	★	□	□
ZPE0202-MG	2.5	0.2	17	□	□	★	★	□
ZPF0302-MG	3.0	0.2	19	□	□	★	□	□
ZPG0402-MG	4.0	0.2	22	□	□	★	□	□
ZPH0502-MG	5.0	0.3	22	□	□	★	□	□
ZPI0602-MG	6.0	0.4	22	□	□	★	□	□
ZPJ0802-MG	8.0	0.4	22	□	□	★	□	□
ZPK0902-MG	9.0	0.3	22	□	□	★	□	□
ZPL1002-MG	10.0	0.2	22	□	□	★	□	□
ZPM1202-MG	12.0	0.2	22	□	□	★	□	□
ZPN1502-MG	15.0	0.3	22	□	□	★	□	□
ZPO1802-MG	18.0	0.4	22	□	□	★	□	□
ZPP2002-MG	20.0	0.4	22	□	□	★	□	□
ZPS2502-MG	25.0	0.3	22	□	□	★	□	□
ZPT3002-MG	30.0	0.3	22	□	□	★	□	□
ZPV3502-MG	35.0	0.3	22	□	□	★	□	□
ZPW4002-MG	40.0	0.3	22	□	□	★	□	□
ZPX4502-MG	45.0	0.3	22	□	□	★	□	□
ZPY5002-MG	50.0	0.3	22	□	□	★	□	□
ZPZ6002-MG	60.0	0.4	22	□	□	★	□	□

**1** Selection of tool holder type

**2** Tool holder type, Size and applicable inserts

**3** Insert type, Chip-breaker, Size and grade

### Parting and grooving inserts



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**Parting inserts**

Type	Basic dimensions(mm)			Grade				
	φ	R <sub>1</sub> (r)	Chipbreaker	CVD Coating		PVD Coating		Coated Carbide
				YBC151	YBC251	YBC205	YBC302	VD101
ZPA01502-MG	1.5	0.2	12	□	□	★	□	□
ZPD0202-MG	2.0	0.2	14	□	□	★	□	□
ZPE0202-MG	2.5	0.2	17	□	□	★	★	□
ZPF0302-MG	3.0	0.2	19	□	□	★	□	□
ZPG0402-MG	4.0	0.2	22	□	□	★	□	□
ZPH0502-MG	5.0	0.3	22	□	□	★	□	□
ZPI0602-MG	6.0	0.4	22	□	□	★	□	□
ZPJ0802-MG	8.0	0.4	22	□	□	★	□	□
ZPK0902-MG	9.0	0.3	22	□	□	★	□	□
ZPL1002-MG	10.0	0.2	22	□	□	★	□	□
ZPM1202-MG	12.0	0.2	22	□	□	★	□	□
ZPN1502-MG	15.0	0.3	22	□	□	★	□	□
ZPO1802-MG	18.0	0.4	22	□	□	★	□	□
ZPP2002-MG	20.0	0.4	22	□	□	★	□	□
ZPS2502-MG	25.0	0.3	22	□	□	★	□	□
ZPT3002-MG	30.0	0.3	22	□	□	★	□	□
ZPV3502-MG	35.0	0.3	22	□	□	★	□	□
ZPW4002-MG	40.0	0.3	22	□	□	★	□	□
ZPX4502-MG	45.0	0.3	22	□	□	★	□	□
ZPY5002-MG	50.0	0.3	22	□	□	★	□	□
ZPZ6002-MG	60.0	0.4	22	□	□	★	□	□

**1** Selecting insert type

**2** Insert type, Chip-breaker, Size and grade

## Guide of selecting threading tools

### Threading tools

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### External threading tools

Type	Stock	a	b	c	L	R	Applicable inserts	Inserts screw	Slot	Shim piece	Wrench
1616R16	▲	16	16	16	100	20	Z16ER16C30	ISO M3.5x1.1T1	M16 CEMAN	SAK40C	WT10P
2020R16	▲	20	20	20	125	25					
2525R16	▲	25	25	25	150	30					
3220P16	▲	32	32	25	170	30					
3220P16	▲	32	32	25	170	40					
3220P32	▲	32	32	25	150	30					
3220P32	▲	32	32	25	170	40					
4040S22	▲	40	40	40	200	50					
1616L16	▲	16	16	16	100	20	Z16EL16C30	ISO M3.5x1.1T1	M16 CEMAN	SAK40C	WT10P
2020L16	▲	20	20	20	125	25					
2525L16	▲	25	25	25	150	30					
3220P16	▲	32	32	25	170	30					
3220P32	▲	32	32	25	150	30					
3220P32	▲	32	32	25	170	40					
4040S22	▲	40	40	40	200	50					

### ISO metric thread (with end)

ISO 965-1980 DIN 13  
GB/T 197-2003 Tolerance class: 6g/6H

Type	The right hand tools	The left hand tools	Pitch	S	ØI.C	ad	Recommended coating grade
Z16ER0.8S0	Z16EL0.8S0		0.50	3.52	5.525	4.0	★ □
Z16ER0.75S0	Z16EL0.75S0		0.75	3.52	5.525	4.0	★ □
Z16ER1.0S0	Z16EL1.0S0		1.00	3.52	5.525	4.0	★ □
Z16ER1.25S0	Z16EL1.25S0		1.25	3.52	5.525	4.0	★ □
Z16ER1.5S0	Z16EL1.5S0		1.50	3.52	5.525	4.0	★ □
Z16ER1.75S0	Z16EL1.75S0		1.75	3.52	5.525	4.0	★ □
Z16ER2.0S0	Z16EL2.0S0		2.00	3.52	5.525	4.0	★ □
Z16ER2.5S0	Z16EL2.5S0		2.50	3.52	5.525	4.0	★ □
Z16ER3.0S0	Z16EL3.0S0		3.00	3.52	5.525	4.0	★ □
Z22ER4.0S0	Z22EL4.0S0		4.00	4.65	12.7	5.0	★ □
Z22ER4.5S0	Z22EL4.5S0		4.50	4.65	12.7	5.0	★ □
Z22ER5.0S0	Z22EL5.0S0		5.00	4.65	12.7	5.0	★ □
Z22ER6.0S0	Z22EL6.0S0		6.00	4.65	12.7	5.0	★ □

**1** Selection of tool holder type

**2** Tool holder type, Size and applicable inserts

**3** Insert type, Chip-breaker, Size and grade

### Threading inserts

Right hand type shown

	External thread	Internal thread	External thread	Internal thread
Pitch	0.5-6	0.5-6	0.5-5	0.5-5
Number of pitch				
Page	A280	A281	A282	A282

### ISO metric thread (with end)

ISO 965-1980 DIN 13  
GB/T 197-2003 Tolerance class: 6g/6H

Type	The right hand tools	The left hand tools	Pitch	S	ØI.C	ad	Recommended coating grade
Z16ER0.8S0	Z16EL0.8S0		0.50	3.52	5.525	4.0	★ □
Z16ER0.75S0	Z16EL0.75S0		0.75	3.52	5.525	4.0	★ □
Z16ER1.0S0	Z16EL1.0S0		1.00	3.52	5.525	4.0	★ □
Z16ER1.25S0	Z16EL1.25S0		1.25	3.52	5.525	4.0	★ □
Z16ER1.5S0	Z16EL1.5S0		1.50	3.52	5.525	4.0	★ □
Z16ER1.75S0	Z16EL1.75S0		1.75	3.52	5.525	4.0	★ □
Z16ER2.0S0	Z16EL2.0S0		2.00	3.52	5.525	4.0	★ □
Z16ER2.5S0	Z16EL2.5S0		2.50	3.52	5.525	4.0	★ □
Z16ER3.0S0	Z16EL3.0S0		3.00	3.52	5.525	4.0	★ □
Z22ER4.0S0	Z22EL4.0S0		4.00	4.65	12.7	5.0	★ □
Z22ER4.5S0	Z22EL4.5S0		4.50	4.65	12.7	5.0	★ □
Z22ER5.0S0	Z22EL5.0S0		5.00	4.65	12.7	5.0	★ □
Z22ER6.0S0	Z22EL6.0S0		6.00	4.65	12.7	5.0	★ □

**1** Selecting insert category

**2** Insert type, Chip-breaker, Size and grade

## Cemented carbide and cermet inserts

<b>For finishing</b>							
	<b>DNEG-NGF</b>	<b>VNEG-NGF</b>	<b>CNMG-DF</b>	<b>CNMG-SF</b>	<b>CNMG-EF</b>	<b>CNEG-NF</b>	<b>DNMG-DF</b>
	15	16	09,12	09,12	09,12	12	11,15
Page	A62	A81	A54	A54	A54	A55	A61

<b>DNMG-SF</b>	<b>DNMG-EF</b>	<b>DNEG-NF</b>	<b>SNMG-DF</b>	<b>SNMG-EF</b>	<b>SNMG-SF</b>	<b>TNMG-DF</b>	<b>TNMG-SF</b>
11,15	11,15	15	09,12	09,12,15	09,12,15	16,22	11,16,22
Page	A62	A62	A67	A67	A67	A75	A75

<b>TNMG-EF</b>	<b>VNMG-DF</b>	<b>VNMG-EF</b>	<b>VNEG-NF</b>	<b>VNMG-SF</b>	<b>WNMG-DF</b>	<b>WNMG-SF</b>	<b>WNMG-EF</b>
11,16,22	16	16	16	16	06,08	06,08	06,08
Page	A76	A81	A81	A81	A83	A83	A84

	<b>Wiper</b>	<b>For finishing</b>				
<b>WNEG-NF</b>			<b>CNMG-WGF</b>	<b>DNMX-WGF</b>	<b>TNMX-WGF</b>	<b>WNMG-WGF</b>
08			12	11,15	16	06,08
Page	A84		A54	A61	A75	A83

<b>For semi-finishing</b>					<b>For semi-finishing</b>	
	<b>CNMG-WGM</b>	<b>DNMX-WGM</b>	<b>TNMX-WGM</b>	<b>WNMG-WGM</b>		<b>CNMG-PM</b>
	12	15	16	06,08		09,12,16,19
Page	A55	A63	A76	A84		A55

<b>CNMG-DM</b>	<b>CNMG-EM</b>	<b>CNMG-NM</b>	<b>DNMG-PM</b>	<b>DNMG-DM</b>	<b>DNMG-EM</b>	<b>DNMG-NM</b>	<b>SNMG-PM</b>
09,12,16,19	12,16	12	11,15	11,15	11,15	15	09,12,15,19
Page	A56	A57	A63	A64	A64	A64	A68

<b>SNMG-DM</b>	<b>SNMG-EM</b>	<b>SNMG-NM</b>	<b>TNMG-PM</b>	<b>TNMG-DM</b>	<b>TNMG-EM</b>	<b>VNMG-PM</b>	<b>VNMG-DM</b>
09,12,15,19	12,15	12	11,16,22	11,16,22	16,22	16	16
Page	A68	A69	A76	A77	A77	A82	A82

General turning






Turning inserts overview

Negative inserts


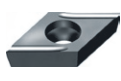

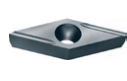
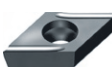
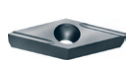
									
<b>VNMG-EM</b>	<b>VNMG-NM</b>	<b>WVMG-PM</b>	<b>WVMG-DM</b>	<b>WVMG-EM</b>	<b>WVMG-NM</b>				
Cutting edge length	16	16	06,08	06,08	06,08	08			
Page	A82	A82	A85	A85	A85	A86			
<b>For roughing</b>									
									
	<b>CNMG-SNR</b>	<b>DNMG-SNR</b>	<b>SNMG-SNR</b>	<b>TNMG-SNR</b>	<b>VNMG-SNR</b>	<b>WVMG-SNR</b>			
Cutting edge length	12,16,19	15	12	16	16	08			
Page	A58	A65	A72	A78	A82	A86			
									
	<b>CNMM-LR</b>	<b>DNMM-LR</b>	<b>SNMM-LR</b>	<b>TNMM-LR</b>	<b>CNMG-DR</b>	<b>CNMM-DR</b>	<b>CNMG-ER</b>	<b>CNMM-ER</b>	
Cutting edge length	12,16,19,25	15	12,15,19,25	16,22	12,16,19	12,16,19,25	12,16,19	25	
Page	A57	A65	A69	A77	A58	A58	A58	A58	
									
	<b>DNMG-DR</b>	<b>DNMM-DR</b>	<b>DNMG-ER</b>	<b>DNMM-ER</b>	<b>SNMG-DR</b>	<b>SNMM-DR</b>	<b>SNMG-ER</b>	<b>SNMM-ER</b>	
Cutting edge length	15	15	15	15	12,15,19	12,15,19,25	12,15,19	25	
Page	A65	A65	A65	A65	A70	A70-71	A71	A72	
									
	<b>TNMG-DR</b>	<b>TNMM-DR</b>	<b>TNMG-ER</b>	<b>WVMG-DR</b>					
Cutting edge length	16,22,27	16,22,27	16,22	06,08					
Page	A78	A78	A78	A86					
<b>For heavy machining</b>									
									
	<b>CNMM-HPR</b>	<b>SNMM-HPR</b>			<b>175.32-22/227</b>	<b>175.32-24</b>	<b>175.32-25</b>	<b>175.32-28</b>	
Cutting edge length	19,25	19,25			19	19,30	19	19	
Page	A59	A72			A88	A88	A88	A88	
<b>For profiling</b>									
				<b>All round</b>					
			<b>KNUX</b>				<b>CNMG</b>	<b>CNMM</b>	<b>DNMG</b>
			Cutting edge length				12,16,19	12,19	15,19
			Page				A60	A60	A66
									
	<b>SNMG</b>	<b>SNMM</b>	<b>TNMG</b>	<b>TNMM</b>	<b>VNMG</b>				
Cutting edge length	09,12,15,19,25	09,12,19,25	11,16,22,27,33	16,22,27	16				
Page	A73	A73-74	A79	A80	A82				


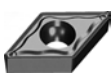




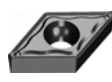

Negative inserts



**Without chipbreaker**

					
	<b>CNMA</b>	<b>DNMA</b>	<b>SNMA</b>	<b>TNMA</b>	<b>WNMA</b>
Cutting edge length	12,16,19	11,15	09,12,15,19	16,22,27	06,08
Page	A59	A66	A74	A80	A86

**For extra finishing** **-USF**


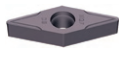



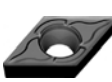

						
	<b>CCGT-USF</b>	<b>DCGT-USF</b>	<b>TCGT-USF</b>	<b>VCGT-USF</b>	<b>DPGT-USF</b>	<b>VPGT-USF</b>
Cutting edge length	09	07,11	11	08,11	07,11	08,11
Page	A89	A93	A100	A105	A111	A114









								
	<b>CCGT-SF</b>	<b>DCGT-SF</b>	<b>TCGT-SF</b>	<b>VCGT-SF</b>	<b>VBGT-SF</b>	<b>CPGT-SF</b>	<b>DPGT-SF</b>	<b>TBGH-L</b>
Cutting edge length	06,09	07,11	06,09,11	11	11	06,09	07,11	06
Page	A89	A93	A100	A105	A108	A110	A111	A113

		
	<b>TPGT-SF</b>	<b>TPGH-L</b>
Cutting edge length	09,11	09,11
Page	A113	A113



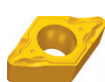
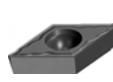



Positive inserts

**For finishing**

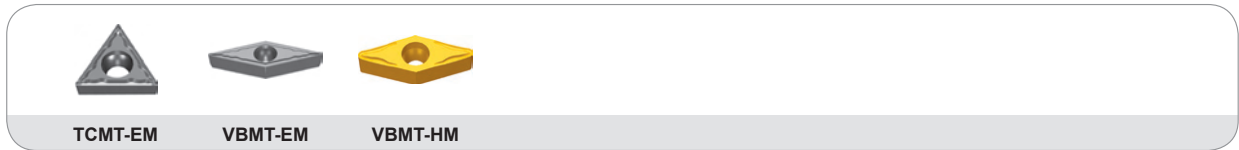
							
	<b>VCGT-NGF</b>	<b>VBET-NGF</b>	<b>CCMT-HF</b>	<b>CCMT-EF</b>	<b>DCMT-HF</b>	<b>DCMT-EF</b>	<b>SCMT-HF</b>
Cutting edge length	16	16	06,09,12	06,09,12	07,11	07,11	09
Page	A105	A108	A89	A90	A93	A94	A98

								
	<b>SCMT-EF</b>	<b>TCMT-HF</b>	<b>TCMT-EF</b>	<b>VCGT-HF</b>	<b>VCGT-NF</b>	<b>VBMT-EF</b>	<b>VBMT-HF</b>	<b>VBET-NF</b>
Cutting edge length	09	06,09,11,16	09,11,16	11	16	11,16	11	16
Page	A98	A101	A102	A105	A105	A108	A108	A108

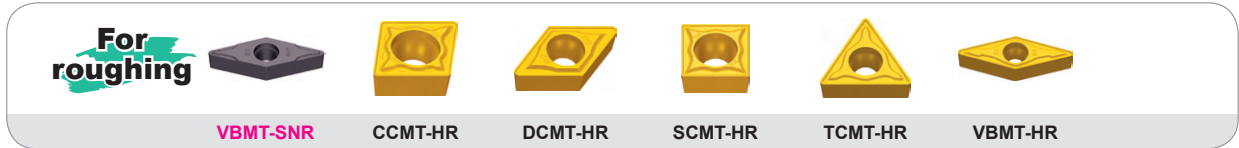
**For semi-finishing**

							
	<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>
Cutting edge length	06,09,12	06,09,12	07,11	07,11	09,12	09,12	09,11,16
Page	A90	A90	A94	A94	A98	A98	A103

Positive inserts



	TCMT-EM	VBMT-EM	VBMT-HM
Cutting edge length	09,11,16	11	16
Page	A102	A109	A109



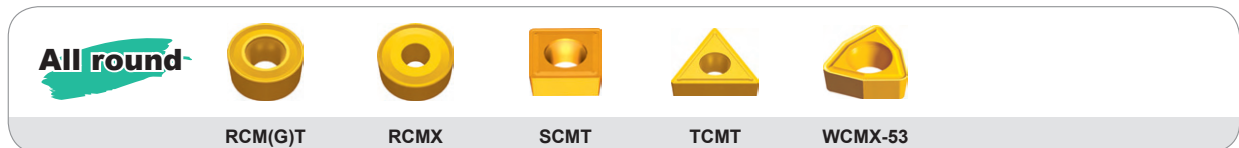
	VBMT-SNR	CCMT-HR	DCMT-HR	SCMT-HR	TCMT-HR	VBMT-HR
Cutting edge length	16	06,09,12	11	09,12	09,11,16,22	16
Page	A109	A91	A95	A99	A103	A109



	CCGX-LC	DCGX-LC	SCGX-LC	TCGX-LC	VCGX-LC
Cutting edge length	06,09,12	07,11	09,12	09,11,16	11,16,22
Page	A91	A95	A99	A103	A106



	CCGX-LH	DCGX-LH	RCGX-LH	SCGX-LH	TCGX-LH	VCGX-LH
Cutting edge length	06,09,12	07,11	08	09,12	09,11,16	11,16,22
Page	A91-92	A95	A96	A99	A104	A106



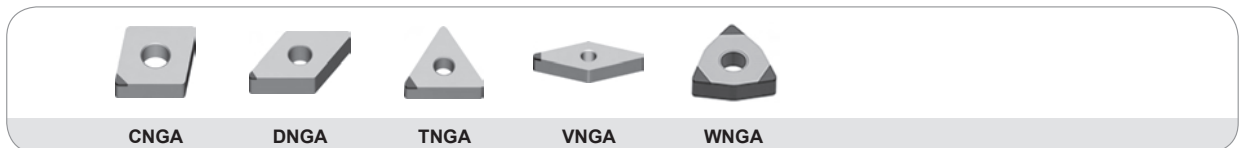
	RCM(GT)	RCMX	SCMT	TCMT	WCMX-53
Cutting edge length	08,10,12,16	08,10,12,16,20,25,32	09,12	22	04,06,08
Page	A96	A97	A99	A104	A107



	CCMW	DCMW	SCMW	TCMW	SPMW
Cutting edge length	06,09,12	07,11	06,09,12	11,16,22	09,12
Page	A92	A95	A99	A104	A112

Negative inserts

New PCBN&PCD inserts



	CNGA	DNGA	TNGA	VNGA	WNGA
Cutting edge length	12	15	16	16	08
Page	A121	A123	A126	A127	A128

**Negative inserts**

**PCBN inserts turning case**



	CNGN	DNGN	SNGN	RNGN
Cutting edge length	12	11	12,15	09,12,15
Page	A122	A124	A125	A129

**Positive inserts**



	CCGW	CCMX	DCGW	DCMX	TCGW	TCMX	VBGW	VBMX
Cutting edge width	06,09,12	06,09,12	07,11	07,11	09,11,16	09,11,16	16	16
Page	A130	A131	A132	A132	A133	A134	A135	A135



	VCGW	VCMX
Cutting edge width	16	16
Page	A136	A136

**Ceramic inserts**



	RCGN	RPGN
Cutting edge width	09,12	09,12
Page	A140	A140



Parting and grooving inserts

Little squirrel series

	ZP□D-MG	ZP□S-MG	ZT□D-MG	ZT□D-MM	ZT□S-MG	ZT□D-EG
Cutting edge width	1.5,2.0,2.5,3,4,5,6	2.5,3,4,5,6	2.5,3,4,5,6	1.5,2,3,4,5,6,8	5,6	1-2.4(tailor-made)
Page	A246	A246	A247	A247	A247	A248

	ZT□D-EG	ZIMF-NM	ZIMF-SM	ZR□D-MG	ZR□D-NM	ZR□D-EG	ZIGQ-NM
Cutting edge width	2.4-6.5(tailor-made)	3,4,5,6	3,4,5,6	2.5,3,4,5,6	3,4,5,6	3,4,5,6	3,4,5,6
Page	A248	A249	A249	A250	A250	A250	A251

				<b>Supplemental series</b>	
	ZIGQ-NF	ZR□D-LH	ZILD-LC		ZQMX-1E
Cutting edge width	3,4,5,6	6,8	8		3,125,4,125,5,125,6,4,7,05
Page	A251	A252	A252		A253

New

Threading inserts

Right hand type shown	ISO metric thread		General pitch thread		Whitworth thread	
	External thread	Internal thread	External thread	Internal thread	External thread	Internal thread
Pitch/ Number of pitch	0.5~6	0.5~6	0.5~5	0.5~5	8~19	8~19
Page	A280	A281	A282	A282	A283	A283

Right hand type shown	Unified thread		British Standard pipe thread		American standard pipe thread	
	External thread	Internal thread	External thread	Internal thread	External thread	Internal thread
Pitch/ Number of pitch	8~24	8~24	11~28	11~28	8~27	8~27
Page	A284	A284	A285	A285	A286	A286



General turning








Turning inserts overview

## Tool holders for external turning






### D-type clamping system

<b>DCLNR/L</b>	<b>DDJNR/L</b>	<b>DSBNR/L</b>	<b>DTGNR/L</b>	<b>DVVNN</b>	<b>DVJNR/L</b>	<b>DWLNR/L</b>
						
Approach angle <b>95°</b>	<b>93°</b>	<b>75°</b>	<b>91°</b>	<b>72°30'</b>	<b>93°</b>	<b>95°</b>
Page <b>A154</b>	<b>A155</b>	<b>A156</b>	<b>A157</b>	<b>A158</b>	<b>A159</b>	<b>A160</b>








### P-type clamping system

<b>PCBNR/L</b>	<b>PCLNR/L</b>	<b>PDJNR/L</b>	<b>PDPNN</b>	<b>PSBNR/L</b>	<b>PSDNN</b>	<b>PSKNR/L</b>
						
Approach angle <b>75°</b>	<b>95°</b>	<b>93°</b>	<b>62°30'</b>	<b>75°</b>	<b>45°</b>	<b>75°</b>
Page <b>A161</b>	<b>A162</b>	<b>A163</b>	<b>A164</b>	<b>A165</b>	<b>A166</b>	<b>A167</b>








  

<b>PSSNR/L</b>	<b>PTFNR/L</b>	<b>PTTNR/L</b>	<b>PTGNR/L</b>	<b>PWLNR/L</b>
				
Approach angle <b>45°</b>	<b>90°</b>	<b>60°</b>	<b>90°</b>	<b>95°</b>
Page <b>A168</b>	<b>A169</b>	<b>A170</b>	<b>A171</b>	<b>A172</b>








### S-type clamping system

<b>SCACR/L</b>	<b>SCLCR/L</b>	<b>SDACR/L</b>	<b>SDJCR/L</b>	<b>SDNCN</b>	<b>SVJBR/L</b>	<b>SVABR/L</b>
						
Approach angle <b>90°</b>	<b>95°</b>	<b>90°</b>	<b>93°</b>	<b>62°30'</b>	<b>93°</b>	<b>90°</b>
Page <b>A173</b>	<b>A174</b>	<b>A175</b>	<b>A176</b>	<b>A177</b>	<b>A178</b>	<b>A179</b>

<b>SVVBN</b>	<b>SVVCN</b>	<b>SVJCR/L</b>	<b>SSBCR/L</b>	<b>SSDCN</b>	<b>SSKCR/L</b>	<b>SSSCR/L</b>
						
Approach angle <b>72°30'</b>	<b>72°30'</b>	<b>93°</b>	<b>75°</b>	<b>45°</b>	<b>75°</b>	<b>45°</b>
Page <b>A180</b>	<b>A181</b>	<b>A182</b>	<b>A183</b>	<b>A184</b>	<b>A185</b>	<b>A186</b>

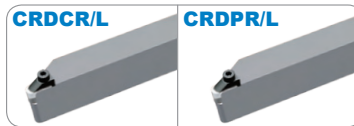
<b>STACR/L</b>	<b>STFCR/L</b>	<b>STGCR/L</b>	<b>STECR/L</b>	<b>SWACR/L</b>	<b>SRDCN</b>	<b>SRGCR/L</b>
						
Approach angle <b>90°</b>	<b>90°</b>	<b>91°</b>	<b>60°</b>	<b>90°</b>		
Page <b>A187</b>	<b>A187</b>	<b>A188</b>	<b>A189</b>	<b>A190</b>	<b>A191</b>	<b>A192</b>

**C-type clamping system**



Approach angle	<b>93°</b>	<b>63°</b>
Page	A193	A194

**Turning tool holders for ceramic inserts**



Approach angle		
Page	A195	A195

**Turning tool holders for internal machining**

**P-type clamping system**



Approach angle	<b>95°</b>	<b>62°30'</b>	<b>93°</b>	<b>75°</b>	<b>90°</b>	<b>95°</b>
Page	A202	A203	A204	A205	A206	A207

**S-type clamping system**



Approach angle	<b>95°</b>	<b>107°30'</b>	<b>93°</b>	<b>95°</b>	<b>75°</b>	<b>90°</b>	<b>107°30'</b>
Page	A208	A209	A210	A211	A212	A213	A214



Approach angle	<b>93°</b>	<b>107°30'</b>	<b>93°</b>	<b>95°</b>	<b>107°30'</b>	<b>93°</b>	<b>93°</b>
Page	A215	A216	A217	A218	A219	A220	A221

General turning

Turning tools overview



Approach angle	90°	95°
Page	A222	A223

### Damping tool holders



Approach angle	95°	107°30'	93°	93°	107°30'	93°
Page	A225	A226	A227	A228	A229	A229

### Parting and grooving tools



Page	A256-A257	A257	A258	A258	A259	A259	A260-A261
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Page	A262-A265	A266-A267	A268	A268	A270
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### Threading tools



Page	A288	A289
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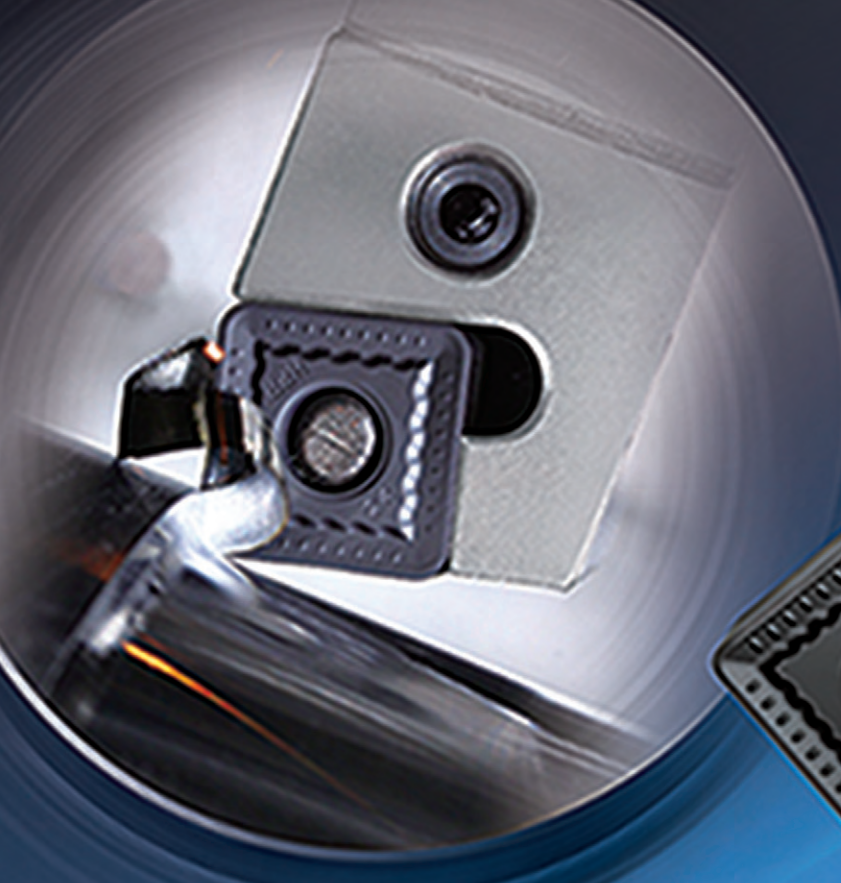


**-WGM**

# Wiper



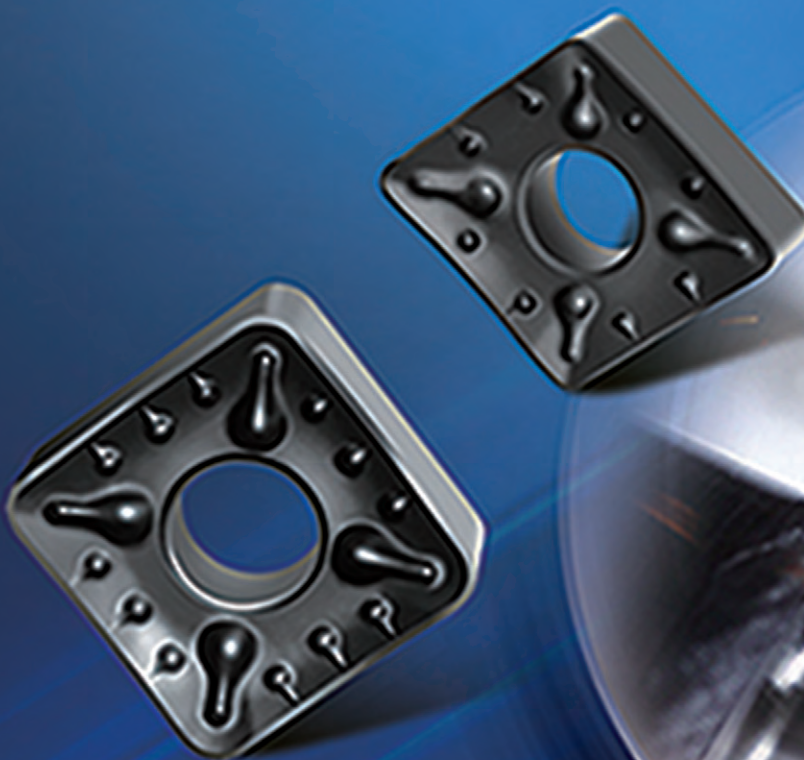
**-WGF**



**-HPR**

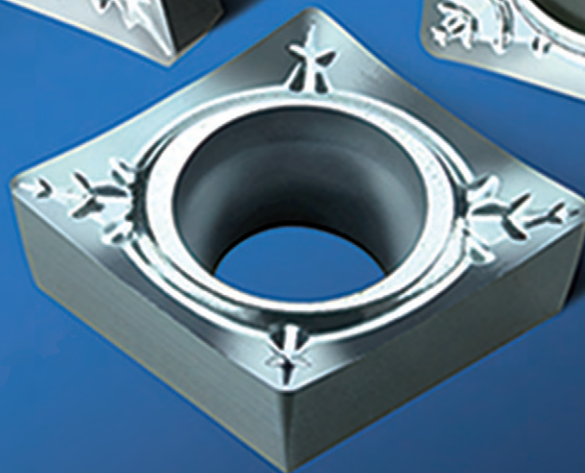
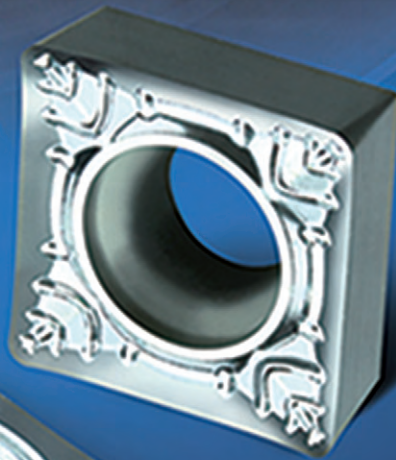
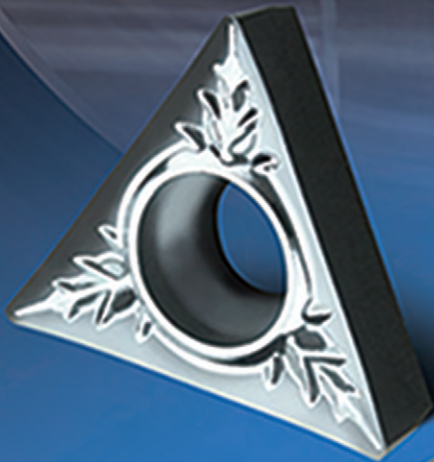
**New Generation of  
Roughing Chipbreaker**

**-LR**





**-LC** chipbreaker  
for Al machining



New product  
for turning



**YBM153**

Grade for stainless  
steel machining

Best choice for cutting stainless  
steel with high speed under good  
working condition



ISO	General turning								Threading	Parting and grooving		
	Code	Coating		Cermet	Coated cermet	Ceramic	Cemented carbide	PCBN	PCD	Coating	Cemented carbide	
		CVD	PVD							PVD		CVD
<b>P</b> Steel	01											
	10	YBC151								YBG202		YBG205
	20	YBC251	YBC152							YBG203		YBG302
	30	YBC252								YBC251		
	40	YBC351	YBC352									
<b>M</b> Stainless steel	01											
	10	YBM151	YBM153							YBG202		YBG205
	20	YBM251								YBG203		YBG302
	30	YBM253										
	40											
<b>K</b> Cast iron	01											
	10	YBD052	YBD102							YBG202		YBG205
	20	YBD152								YBG203		YBG302
	30	YBD252										YD201
	40											
<b>N</b> Non ferrous metal	01											
	10											
	20						YD101		YCD011	YBG202		YD201
	30									YBG203		
	40											
<b>S</b> Heat resistant alloy & Ti alloy	01											
	10						YD101					
	20									YBG202		YBG102
	30									YBG203		YBG105
	40											YBG302
<b>H</b> Super hard material	01											
	10											
	20											
	30									YBG202		YD201
	40									YBG203		

General turning

Recommended grade overview for turning inserts








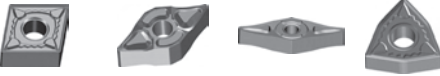

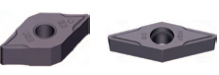









# TURNING









## General turning inserts

<b>A22-A26</b>	<b>General turning inserts overview</b>
<b>A27-A49</b>	<b>Application instruction of general turning inserts</b>
<b>A50-A140</b>	<b>General turning inserts</b>
A50-A51	General turning inserts code key
A52-A53	Metric-Inch comparison table for general turning inserts
A54-A114	Cemented carbide and cermet inserts
A54-A88	Negative inserts
A89-A114	Positive inserts
A115-A137	PCBN&PCD inserts
A116-A117	PCBN&PCD inserts code key
A118-A120	PCBN&PCD inserts overview
A121-A137	PCBN&PCD inserts
A138-A140	Ceramic inserts
A138-A139	Ceramic inserts code key
A140	Ceramic inserts









### Negative inserts with hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
For finishing	<b>SF</b> 	<b>M</b>	$ap=0.05\sim 1(\text{mm})$ $fn=0.05\sim 0.35(\text{mm/r})$	<b>Recommended chipbreaker for finishing of P-type materials</b> Double-sided chipbreaker with M-level tolerance has outstanding performance in finishing, achieving good surface quality. 
	<b>DF</b> 	<b>M</b>	$ap=0.3\sim 2(\text{mm})$ $fn=0.05\sim 0.35(\text{mm/r})$	<b>Recommended chipbreaker for finishing of M-type materials</b> Double-sided chipbreaker with M-level tolerance has sharp edges, which can effectively cut off stainless steel and avoid adhering and surface hardening, achieving high surface quality. 
	<b>EF</b> 	<b>M</b>	$ap=0.05\sim 1(\text{mm})$ $fn=0.05\sim 0.3(\text{mm/r})$	<b>Recommended chipbreaker for finishing of S-type materials</b> Double-sided chipbreaker with M-level tolerance can prevent wear and hardening to achieve high machining precision and good surface quality. 
	<b>NF</b> 	<b>E</b>	$ap=0.1\sim 1(\text{mm})$ $fn=0.05\sim 0.3(\text{mm/r})$	<b>Recommended chipbreaker for finishing of S-type materials</b> Double-sided chipbreaker with E-level tolerance can prevent wear and hardening to achieve high machining precision and good surface quality. 
	<b>NGF</b> 	<b>E</b>	$ap=0.1\sim 1(\text{mm})$ $fn=0.05\sim 0.3(\text{mm/r})$	<b>Recommended chipbreaker for finishing of 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. 
	Wiper	<b>WGF</b> 	<b>M</b>	$ap=0.5\sim 3.0(\text{mm})$ $fn=0.05\sim 0.5(\text{mm/r})$
For semi-finishing	<b>DM</b> 	<b>M</b>	$ap=1.5\sim 5(\text{mm})$ $fn=0.15\sim 0.5(\text{mm/r})$	<b>Recommended chipbreaker for semi-finishing of P-type materials</b> Double-sided chipbreaker with M-level tolerance produces small cutting forces and has large chip breaking range, which ensures good performance for machining highly adhesive alloy steel. 
	<b>PM</b> 	<b>M</b>	$ap=1.5\sim 5(\text{mm})$ $fn=0.15\sim 0.5(\text{mm/r})$	<b>Recommended chipbreaker for semi-finishing of P-type materials</b> Double-sided chipbreaker with M-level tolerance has higher strength of cutting edge than chipbreaker DM. It is suitable for semi-finishing under unstable working conditions as well as machining cast iron with small cutting forces. 
	<b>NM</b> 	<b>M</b>	$ap=0.1\sim 1.5(\text{mm})$ $fn=0.05\sim 0.3(\text{mm/r})$	<b>Recommended chipbreaker for semi-finishing of S-type materials</b> Double-sided chipbreaker with M-class tolerance keeps high precision after inserts are turned, with good capability to prevent wear and hardening to achieve higher machining efficiency than chipbreaker NF. 






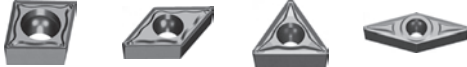




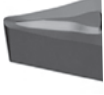







### Negative inserts with hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert	
For semi-finishing	<b>WGM</b>	M	$ap=1.0\sim5.0(\text{mm})$ $fn=0.15\sim0.80(\text{mm/r})$	<b>Wiper chipbreaker for semi-finishing</b> Double-sided chipbreaker with M-level tolerance, semi-finishing chipbreaker with wiper designed, perfect combination of good wiper result and sturdy cutting edge structure, which perfectly mee 	
	<b>EM</b>			$ap=0.5\sim1.5(\text{mm})$ $fn=0.1\sim0.3(\text{mm/r})$	<b>Recommended chipbreaker for semi-finishing of M-type materials</b> Double-sided chipbreaker with M-level tolerance can solve the processing problems such as chip breaking and adhering of stainless steel, achieving higher machining efficiency than chipbreaker EF. 
	All round			$ap=1.5\sim5(\text{mm})$ $fn=0.2\sim0.5(\text{mm/r})$	<b>From semi-finishing to roughing of P-type, M-type, K-type materials</b> Double-sided chipbreaker with M-level tolerance has good cutting edge strength and wide application. 
Light-load roughing	<b>DR</b> Double-side	M	$ap=3\sim12(\text{mm})$ $fn=0.3\sim0.8(\text{mm/r})$	<b>Recommended chipbreaker for light roughing of P-type and K-type materials</b> Double-sided chipbreaker with M-level tolerance is the first choice for light roughing, can achieve high evacuation rate and efficiency of cutting edge. 	
	<b>LR</b> Single-side			$ap=3\sim15(\text{mm})$ $fn=0.3\sim1.0(\text{mm/r})$	<b>Recommended chipbreaker for light-load roughing of P-type materials</b> Single-sided general chipbreaker with M-level tolerance, has wide chip breaking range and sharp cutting edge is designed with inclined angle, which enables it to cut lightly and easily and control the chipping flow direction. Chip-loaded-stages can reduce the contact area with chips, so that heat can easily be dissipated. 
For roughing	<b>DR</b> Single-side	M	$ap=3\sim15(\text{mm})$ $fn=0.3\sim0.8(\text{mm/r})$	<b>Recommended chipbreaker for roughing of P-type materials</b> Single-sided chipbreaker with M-level tolerance has high security of cutting edge, which can achieve high feed rate and low cutting forces at great cutting depth and high feed rate. 	
	<b>ER</b> Single/Double side			Double sided $ap=2.5\sim8(\text{mm})$ $fn=0.2\sim0.6(\text{mm/r})$ Single sided $ap=2.5\sim20(\text{mm})$ $fn=0.2\sim1.2(\text{mm/r})$	<b>Recommended chipbreaker for roughing of M-type materials</b> Single / double-sided chipbreaker with M-level tolerance has good capacity of impact-resistance. It is designed to achieve balance between security and sharpness of the cutting edge, and it can achieve high efficiency by preventing the problems of adhering and high cutting heat when roughing stainless steel. 
	<b>SNR</b>	$ap=0.5\sim3(\text{mm})$ $fn=0.05\sim0.3(\text{mm/r})$	<b>Recommended chipbreaker for S-material high efficiency roughing</b> M-level double-sided chipbreaker 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. 		
















### Negative inserts with hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
General turning	<b>HPR</b> Single-side	<b>M</b>	ap=3~17(mm) fn=0.5~1.2(mm/r)	<b>Recommended chipbreaker for heavy-load machining of P-type materials</b> Single-sided chipbreaker with M-level tolerance, strong cutting edge. Multi-stages chipbreaker ensures the flowing of chip and heat dissipation of insert. It is suitable for machining under unstable and relatively bad working condition, especially for external roughing of work piece with a rough oxidized surfaces. 
				
Cast iron machining	Without chipbreaker	<b>M</b>	ap=0.3~12(mm) fn=0.05~0.6(mm/r)	<b>For cast iron machining</b> Double-sided chipbreaker with M-level tolerance has high cutting edge strength. It can overcome inferior factors such as interruption and vibration, etc. when machining cast iron. 
Super hard inserts				
	Without chipbreaker	<b>G</b>	ap=0.05~0.5(mm) fn=0.05~0.3(mm/r)	<b>For machining of non-ferrous metal and high-hardness metal</b> G-level tolerance is the best choice for machining non-ferrous metals and high-hardness material by welding PCBN and PCD material to cemented carbide substrate. 
				
Ceramic inserts	Without chipbreaker	<b>G</b>	ap=0.1~3(mm) fn=0.05~0.4(mm/r)	<b>For roughing of K-, H- high-temperature alloy roughing</b> Sialon Ceramics, V-positioning, solution for high-speed machining of cast iron, hardened steel and superalloy. 
				

### Positive inserts with hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
For extra finishing	<b>USF</b> 	<b>G</b>	$ap=0.02\sim 1.5(\text{mm})$ $fn=0.01\sim 0.08(\text{mm/r})$	<b>Precision turning chipbreaker</b> With G-level tolerance, large rake angle, sharp cutting edge, for soft cutting action, this is the first choice for precision turning of small shaft parts. 
	<b>R/L</b> 	<b>G</b>	$ap=0.05\sim 2.5(\text{mm})$ $fn=0.03\sim 0.25(\text{mm/r})$	<b>Recommended chipbreaker for precise boring inserts</b> With G-level tolerance, sharp cutting edge and small nose radius, it can effectively reduce the vibration in machining and is suitable for boring and external turning. 
	<b>SF</b> 	<b>G</b>	$ap=0.05\sim 1(\text{mm})$ $fn=0.05\sim 0.3(\text{mm/r})$	<b>First choice for finishing with high requirements on chipbreaker</b> With G-level tolerance, it is the first choice for precise finishing due to its excellent performance on chip breaking. 
For finishing	<b>HF</b> 	<b>M</b>	$ap=0.1\sim 2(\text{mm})$ $fn=0.05\sim 0.3(\text{mm/r})$	<b>Chipbreaker for finishing with wide application</b> With M-level tolerance, it is suitable for internal and external finishing of various materials such as steel and cast iron. 
	<b>EF</b> 	<b>M</b>	$ap=0.1\sim 2(\text{mm})$ $fn=0.05\sim 0.3(\text{mm/r})$	<b>Recommended chipbreaker for finishing of M-type materials</b> With M-level tolerance, it has sharp cutting edges and is suitable for cutting adhesive materials such as stainless steel, soft steel, etc. 
	<b>NF</b> 	<b>E</b> <b>G</b>	$ap=0.05\sim 1(\text{mm})$ $fn=0.05\sim 0.2(\text{mm/r})$	<b>Recommended chipbreaker for finishing S-type materials</b> With E and G-level tolerance and sharp cutting edges, it is suitable for internal and external finishing of high-temperature alloy materials. 
	<b>NGF</b> 	<b>E</b> <b>G</b>	$ap=0.1\sim 1(\text{mm})$ $fn=0.05\sim 0.3(\text{mm/r})$	<b>Recommended chipbreaker for S-material general finishing</b> E, G grade accuracy, for inner hole finishing of S materials. 
	<b>HM</b> 	<b>M</b>	$ap=1\sim 4(\text{mm})$ $fn=0.2\sim 0.5(\text{mm/r})$	<b>Chipbreaker for semi-finishing with wide application</b> With M-level tolerance, it is suitable for internal and external semi-finishing of materials like steel, cast iron, etc. 
For semi-finishing	<b>EM</b> 	<b>M</b>	$ap=1\sim 4(\text{mm})$ $fn=0.2\sim 0.5(\text{mm/r})$	<b>Recommended chipbreaker for semi-finishing of M-Type materials</b> With M-level tolerance, it has higher hardness of cutting edge than EF and can achieve higher efficiency. 

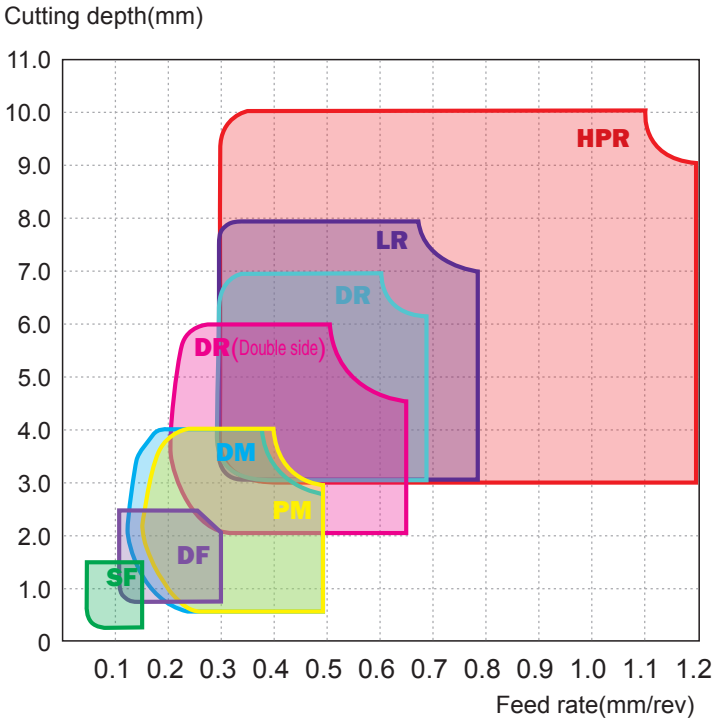
### Positive inserts with hole

Application	Chipbreaker	Precision	Recommended cutting parameters	Feature/Shape of insert
For semi-finishing	All round	M	ap=1~8(mm) fn=0.2~0.6(mm/r)	<b>Recommended chipbreaker for semi-finishing of M-type materials</b> With M-level tolerance, it is suitable for profile machining materials like steel, cast iron, etc. 
				
Cast iron machining	Without chipbreaker	M G	ap=0.3~12(mm) fn= 0.05~0.5(mm/r)	<b>Chipbreaker for machining of cast iron</b> With M- and G- level tolerance, it has high cutting edge strength and is suitable for internal and external machining of cast iron. 
				
For roughing	HR	M	ap=3~7(mm) fn=0.3~0.7(mm/r)	<b>General chipbreaker for roughing</b> With M-level tolerance, it is suitable for both internal and external roughing of materials such as steel, stainless steel, cast iron, etc. 
				
	Special chipbreaker	M	ap=3~10(mm) fn=0.3~1.2(mm/r)	<b>Recommended chipbreaker for heavy machining of P-type materials</b> Single-sided with M-level tolerance, it has good cutting edge strength with high security. It is the first choice for profile roughing. 
				
	SNR	M	ap=0.5-3(mm) fn=0.05-0.3 (mm/r)	<b>Recommended chipbreaker for S-material high-efficiency roughing</b> M-level accuracy, for inner hole roughing of S materials. 
For Al machining	LC	G	ap=0.02~4.8(mm) fn=0.05~0.5(mm/r)	<b>Chipbreaker for machining of Al alloy</b> With G-level tolerance, large rake angle and clearance angle make the cutting edge sharper, ensuring easy and fast cutting while remaining effective chip breaking. 
				
	LH	G	ap=0.1~8(mm) fn=0.1~0.5(mm/r)	<b>Special chipbreaker for machining of Al alloy</b> With G-level tolerance, large rake angle and polishing treatment on surface, it can effectively prevent built-up edge and achieve high workpiece surface quality while maintaining long life. 
				
Super hard inserts	Without chipbreaker	G	ap=0.05~0.5(mm) fn=0.05~0.3(mm/r)	<b>Special chipbreaker for non-ferrous metals and materials with high hardness</b> With G-level tolerance, it is the best choice for machining of non-ferrous metals and materials with high-hardness by welding PCBN and PCD material to cemented carbide substrate. 
				

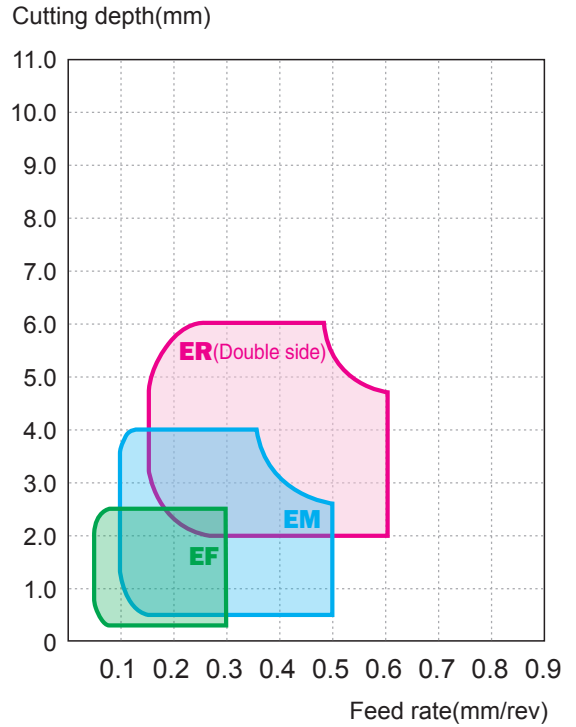


### Chip breaking range reference for general turning inserts

#### Negative inserts

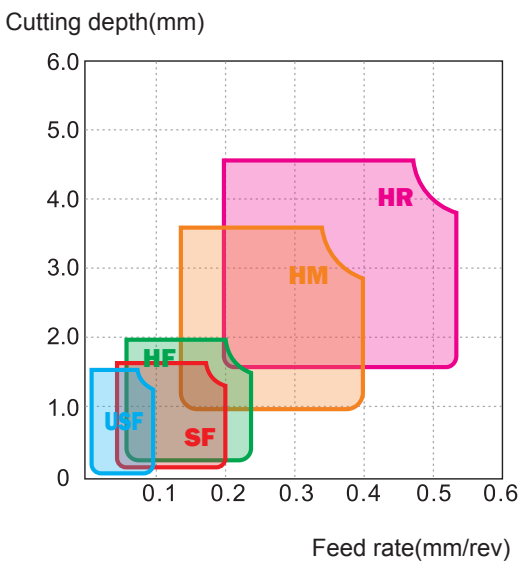


▶ Workpiece material: 45# steel

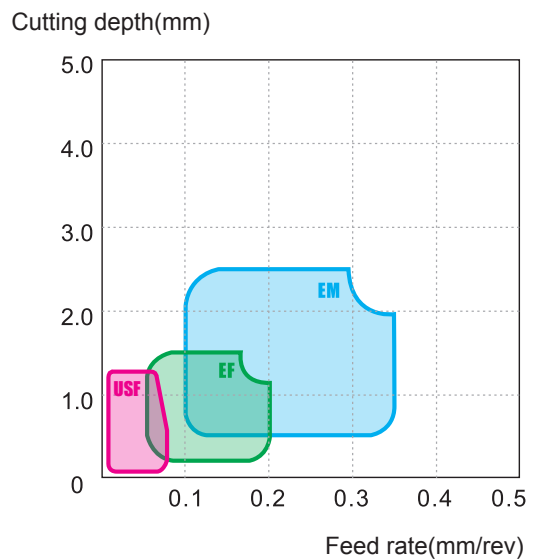


▶ Workpiece material: stainless steel (1Cr18Ni9Ti)

#### Positive inserts



▶ Workpiece material: 45# steel

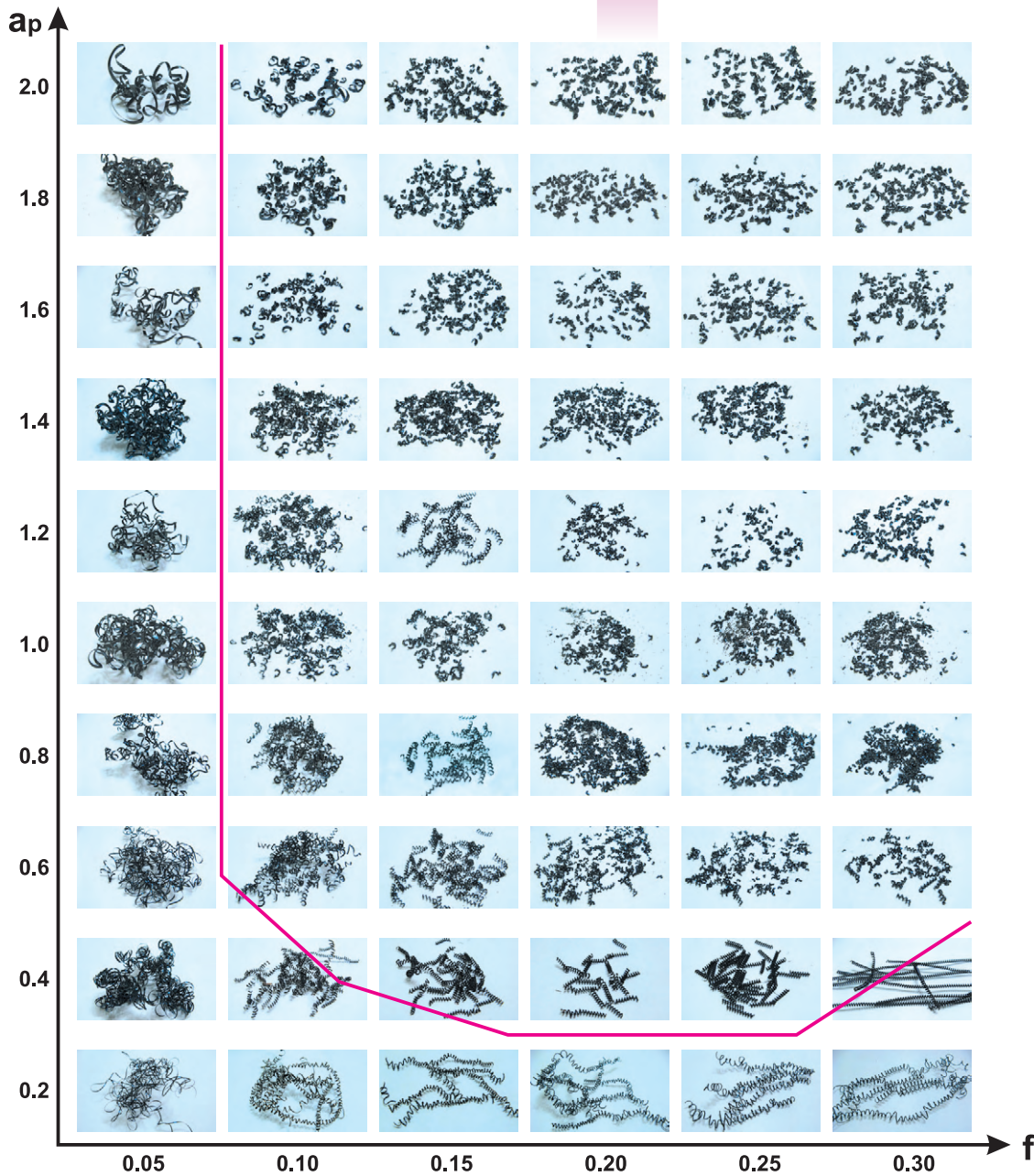
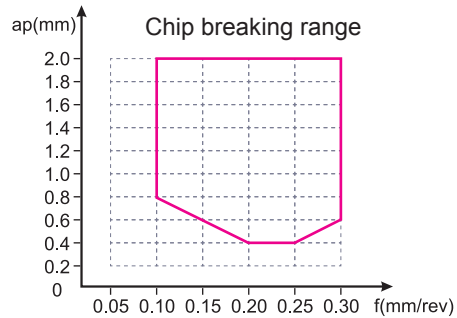


▶ Workpiece material: stainless steel (1Cr18Ni9Ti)

## Cutting test for chip breaking range of general turning inserts

### Case

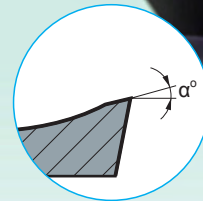
Insert: CNMG120408-DF  
 Toolholder: PCLNL2525M12  
 Workpiece material: 45# steel  
 Cutting speed: 200(m/min)



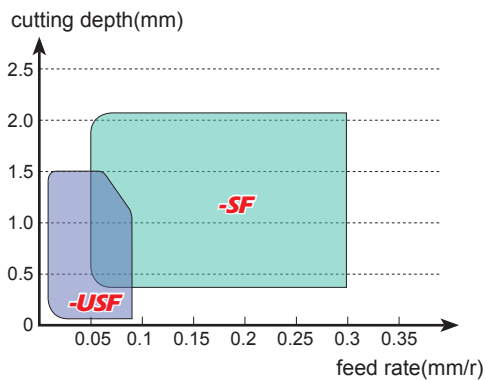
# -USF

## Precision turning chipbreaker

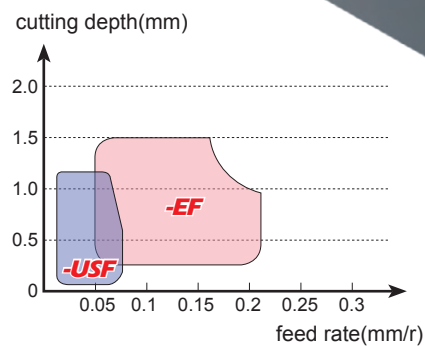
- Effective chip control due to the proper chipbreaker.
- Large rake angle makes cutting easier and faster.
- Nose radius precision controlled within 0.02mm for excellent machining precision.
- Special surface after-treatment for better surface quality.
- High strength screw clamping ensures good repeatability and accuracy .



### Application range of USF chipbreaker



Workpiece material: 42CrMo



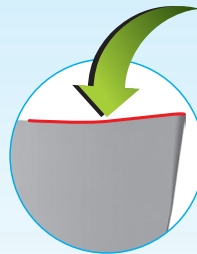
Workpiece material: 1Cr18Ni9Ti

# -LC

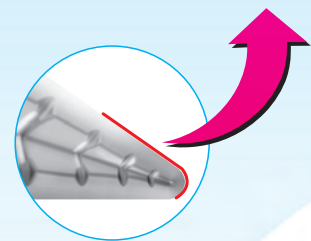
## chipbreaker for aluminum

- LC inserts are designed with a special chipbreaker. Large rake angle and clearance angle make the cutting edge sharper, ensuring easier cutting while remaining effective chip breaking.
- Achieved the mirror rake face after special treatment. Reduced the friction resistance, and stick free. Accordingly, make the chip removal fluently and improve the surface quality and tool life.
- The G-class tolerance of insert, higher Repeated Position Accuracy, at the same time, it can effectively avoid the vibration during the machining process.

Optimized inclined angel makes controlling the chipping flow direction valid.

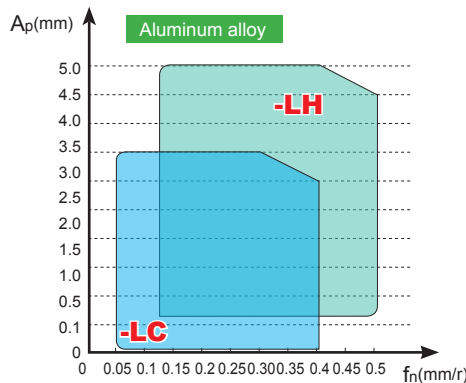
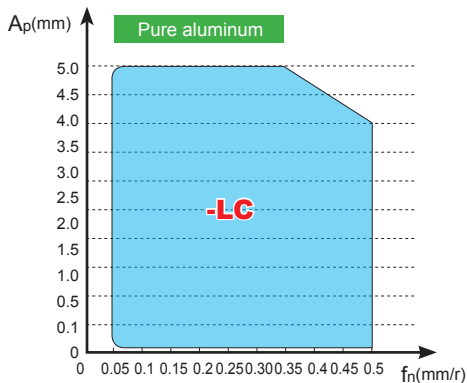


Smooth connection of insert nose and cutting edge makes rake face smoother.



### -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.

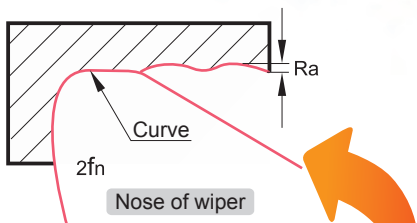


#### Workpiece material: Pure aluminum

Cutting parameters	V=350m/min    Ap=0.2mm    F=0.2mm/r	
Chips		
Surface quality		
	<b>-LC chipbreaker</b>	similar products from overseas manufacturers
	<ul style="list-style-type: none"> <li>-LH chipbreaker is more suitable for machining aluminum alloy in condition of large cutting depth and high feed rate.</li> <li>-LC chipbreaker is more suitable for machining aluminum alloy in condition of small cutting depth and low feed rate.</li> <li>-LC chipbreaker can be used in machining pure aluminum.</li> </ul>	

# -WGF/WGM

## chipbreaker series Turning inserts with wiper



### High efficiency

Roughness remains the same when feed rate is doubled.



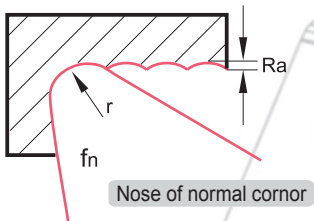
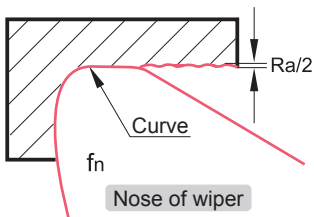
Wiper is assembled by three curves to form a circular arc edge. The nose of wiper provides less profile height on the surface that is formed by the cutting edge, resulting in a smooth turning surface.

Inserts with wiper has high efficiency when used for finish and semi-finish turning. The surface quality remains the same even at double feed rate.

Wiper technique = high machining efficiency + high surface quality

### High quality

Roughness value is reduced to half when feed rate remains the same.



When used for finishing, it can improve roughness of workpiece surface and achieve turning instead of grinding.

When used for semi-finishing, efficiency could be improved by doubling the feed rate, the roughness of workpiece surface remaining the same.

### Guide to use

#### ● Select reasonable approach angle of the tools

Minor angle being close to 0 degree is the reason that inserts with wiper can reduce roughness of the surface, which is determined by the shape of insert and approach angle of the tool holder. Therefore, acceptable roughness of surface is the result of reasonable approach (minor) angle. The finishing function of wiper would be reduced or invalid if unreasonable approach (minor) angle is chosen. For example, the approach angle should be 95° for CNMG / WNMG inserts, while 93° is the best for DNMX.TNMX inserts.

#### ● Be careful with DNMX / TNMX inserts

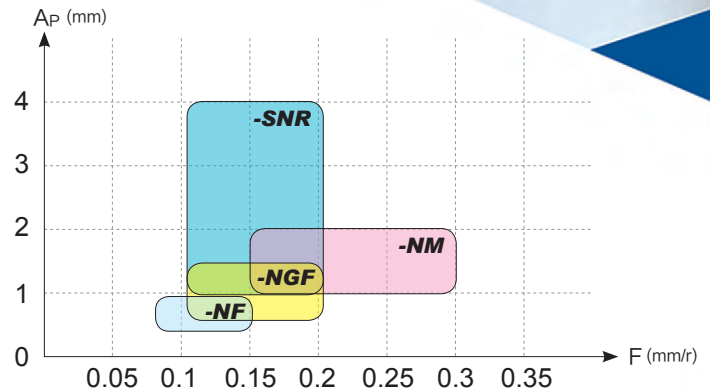
DNMX / TNMX inserts with wiper don't have wide application. It cannot achieve a wiper result when minor angle is not 0 degree, like chamfer and profile surface, and will even cause over-cutting or no-cutting on workpiece, affecting the shape and size precision of workpiece. Please contact technical service regarding these problems.

# S- Ni-based Superalloy Machining Difficulties Overcome

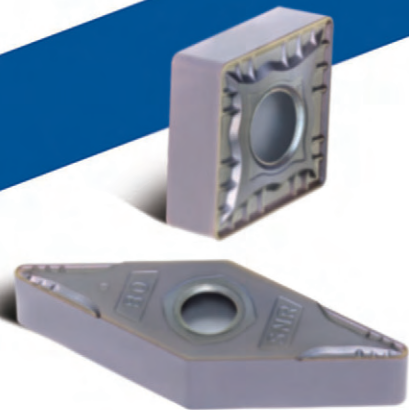
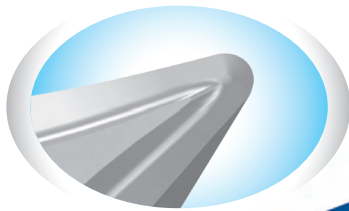
## Features of Ni-based superalloy machining

- 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



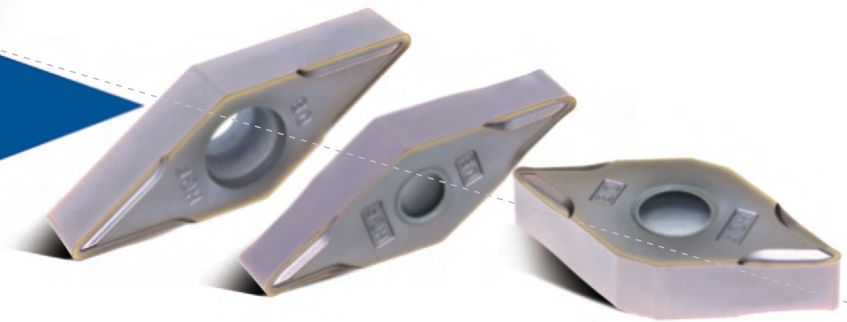
## **-SNR** Chipbreaker for roughing with large depth of cut

- 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.



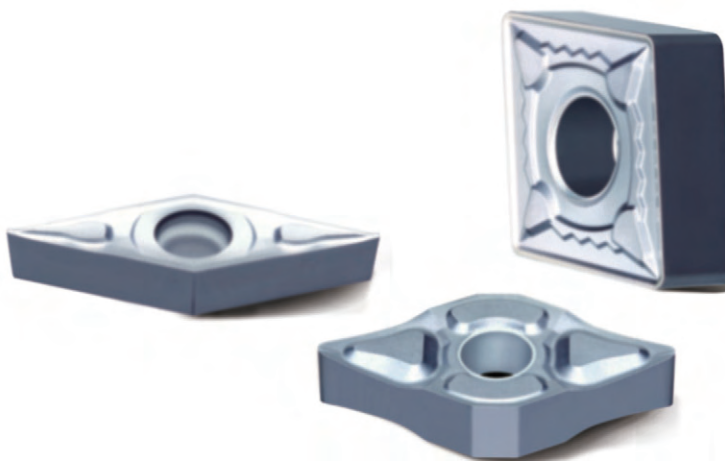
## **-NGF** Chipbreaker for General Finishing

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



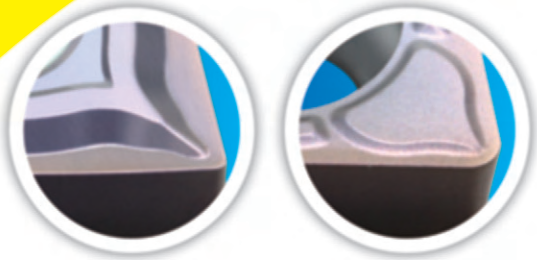
## **-NFINM** Chipbreaker for General Finishing

- -NF chipbreaker 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.



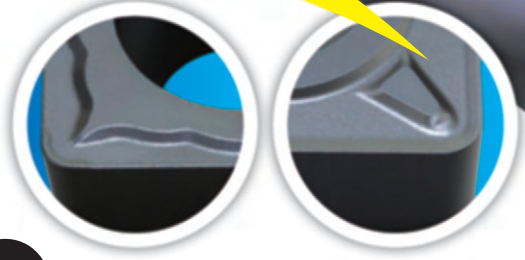
# -EF -EM -ER

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



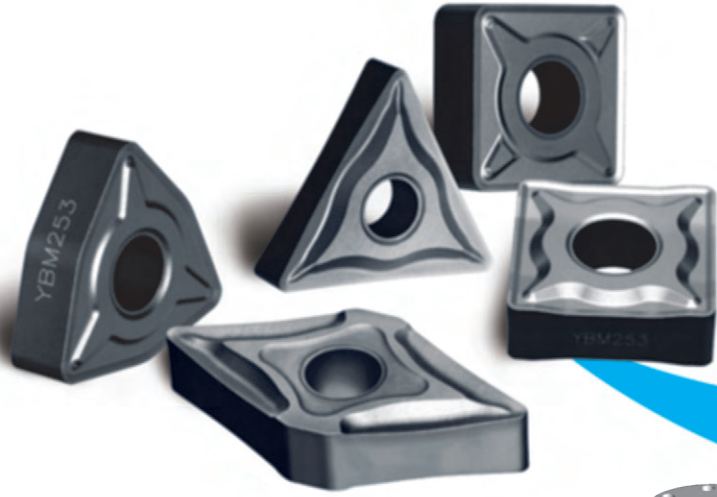
**-EF**

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.

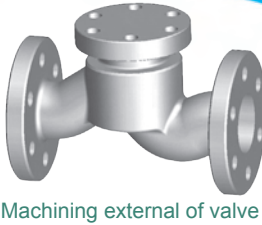
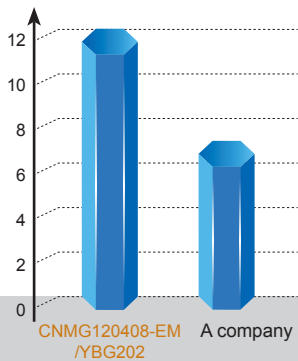


**-ER**

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

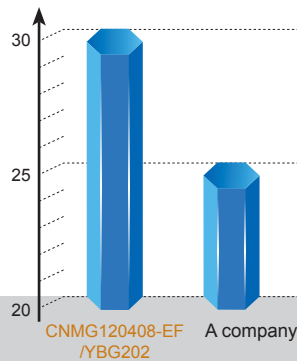


Number of machined parts / Cutting edge



Machining end surface of valve (intermittent machining)  
Workpiece diameter: 135mm  
Rotating speed: 350rpm  
Feed rate: 0.25mm/r  
Cutting depth: 1.5mm

Number of machined parts / Cutting edge



Machining external of valve  
Workpiece diameter: 89mm  
Rotating speed: 635rpm  
Feed rate: 0.15mm/r  
Cutting depth: 1.0mm





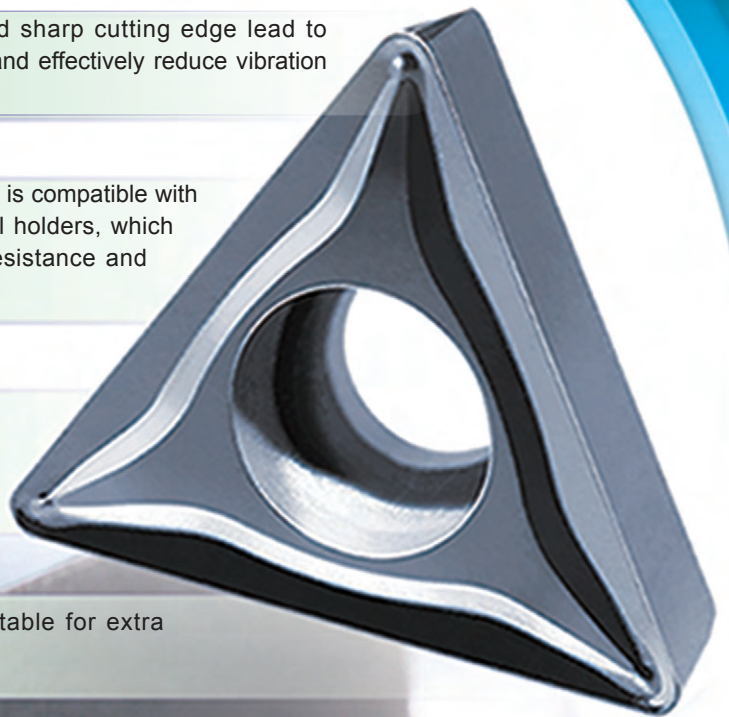
# **-SF** Chipbreaker for finishing

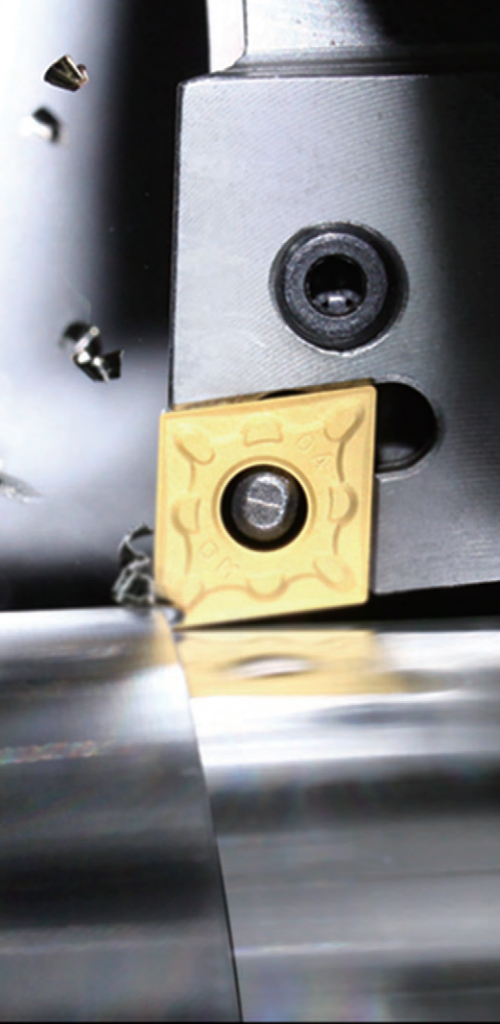
Unique nose design and sharp cutting edge lead to small cutting resistance and effectively reduce vibration of the tool holder.

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.





### **YBC151**

The combination of substrate with excellent wear resistance and coating composed of MT-TiCN, thick layer of Al<sub>2</sub>O<sub>3</sub> and TiN makes it suitable for finishing steel.

### **YBC251**

The substrate with good toughness and high security of cutting edge, in optimal combination with coating composed of MT-TiCN, thick layer of Al<sub>2</sub>O<sub>3</sub> and TiN makes it suitable for steel semi-finishing.

### **YBC351**

The best combination of substrate with high wear resistance and coating composed of MT-Ti (CN), thick Al<sub>2</sub>O<sub>3</sub> layer and TiN makes it suitable for finishing and semi-finishing of cast iron materials.

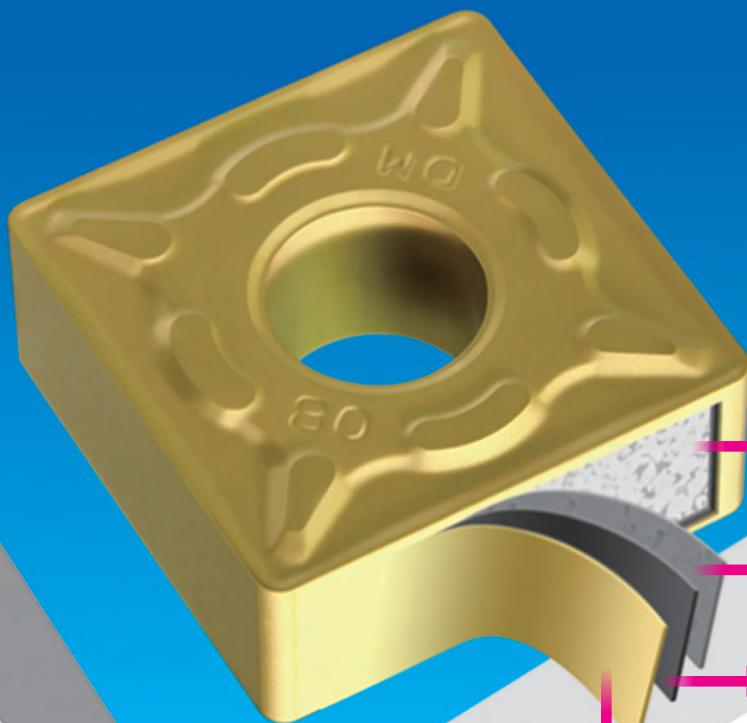
### **YBM151**

Substrate with special structure, in combination with coating composed of TiCN, thin Al<sub>2</sub>O<sub>3</sub> layer and TiN, with excellent resistance against diffusive wear and plastic deformation makes it suitable for finishing, semi-finishing and roughing of stainless steel.

### **YBM251**

Combination of substrate with good toughness and strength and coating composed of TiCN, thin Al<sub>2</sub>O<sub>3</sub> layer and TiN makes it suitable for semi-finishing and roughing of stainless steel.

# Coated Cemented Carbide **CVD**



## **YBC251 Coating**

Thanks to the technology of gradient sintering, impact resistance of cutting edge and wear resistance are improved which lead to improved capability of cutting edge against damage.

Carbide with special crystal structure improves the Red Hardness of substrate and strengthens heat resistance of insert.

TiCN layer acts against abrasion, which leads to the best wear resistance of the flank.

Special structure of Al<sub>2</sub>O<sub>3</sub> deposit layer acts as a thermal barrier and strengthens the capability of substrate against plastic deformation under dry and high-speed cutting conditions.

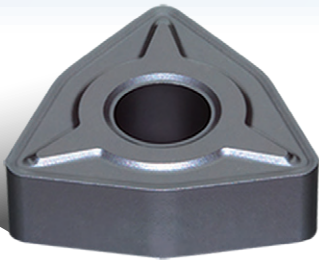
Golden surface of TiN can reduce friction and enable easy distinction of the variety of wear.

# BLACK DIAMOND INSERTS

## Innovation of machining techniques for stainless steel turning



### YBM153



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

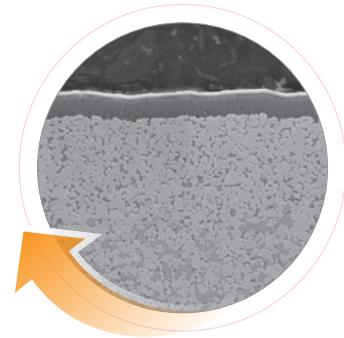


#### Coating

- ✓ 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.

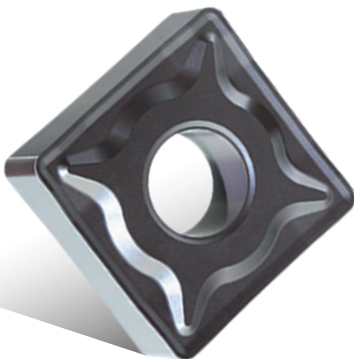
#### Substrate

- ✓ Added with resist high temperature rare element, inserts shows a good capability against plastic deformation and good capability of Red Hardness.
- ✓ Unique manufacturing technology improves high temperature toughness and wear resistance of substrate.



**Application fields** YBM153 is suitable for finishing and semi-finishing of stainless steel with high cutting efficiency under stable working condition. Such as medium-size fluid valve components in petrochemical industry, flange and other parts in auto pipeline, valve and valve body in auto engine systems, ship mechanical parts, aviation hydraulic parts, adapting pieces in IT and semiconductor industry, medium and long-axis in food processing machinery, construction machinery and general machinery.

### YBM253



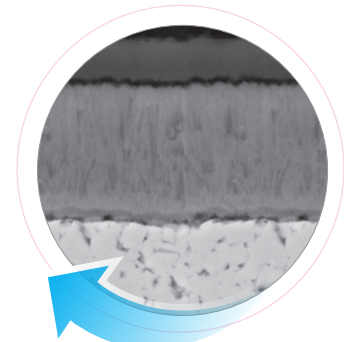
Ideal grade for turning of stainless steel with high cutting depth and high feed rate under bad working condition

#### 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.

#### Substrate

- ✓ With gradient carbide substrate insert has better impact resistance and cutting edge strength.



**Application fields** YBM253 grade is suitable for roughing of heavy stainless steel parts with high cutting depth and high feed rate under the condition with great impact.



Coated Cemented Carbide CVD

# BLACK DIAMOND INSERTS

**Achieving both higher cutting  
speed and longer tool life**

Second generation of



## YBC152

Thick TiCN and thick Al<sub>2</sub>O<sub>3</sub> 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<sub>2</sub>O<sub>3</sub> 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<sub>2</sub>O<sub>3</sub> 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

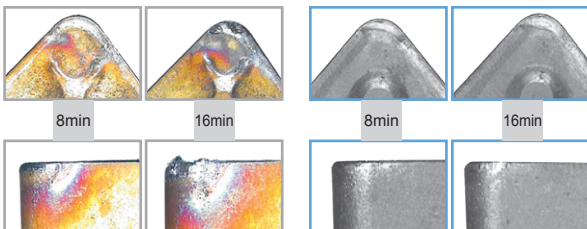
Workpiece material : 45#steel

Inserts: CNMG120408-DM

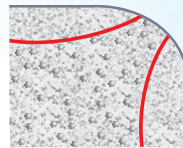
Cutting parameters: Vc=400m/min ap=1mm fn=0.2mm/r

Grade from other company

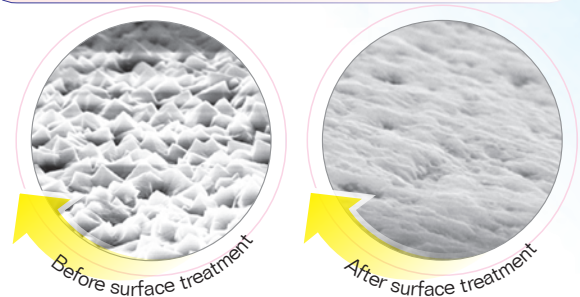
YBC152



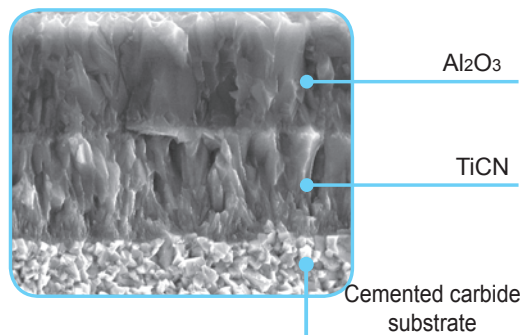
- Perfect unification of toughness and anti-plastic deformation. Specially designed cutting edge with "skeleton" realizes perfect unification of toughness and anti-plastic deformation.



- 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.



- The perfect combination of fibrous TiCN and fine grain Al<sub>2</sub>O<sub>3</sub> obviously improves abrasion resistance and anti-breakage of inserts.



Coated Cemented Carbide CVD

## 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.

## 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.

## 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.

## 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.

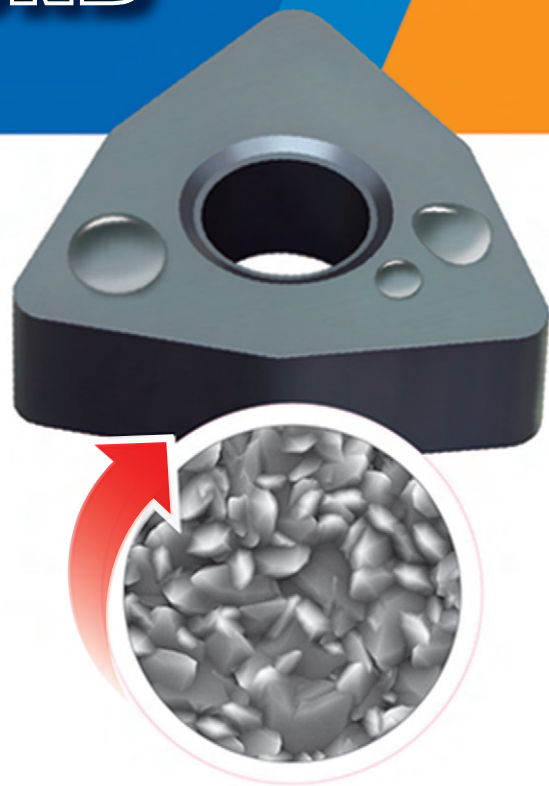
**First choice for high-efficiency  
and high-speed machining of cast iron**

# BLACK DIAMOND INSERTS YBD

- 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

## Recommended combination of grade and chipbreaker

### For machining of P-type materials

Grade	Type
YBC151	DF
YBC152	
YBC251	DM PM
YBC252	
YBC251	DR (Double-side)
YBC252	
YBC351	DR
YBC351	HPR
YBC352	

### For machining of M-type materials

Grade	Type
YBM151	EF
	EM ER
YBM153	EF
	EM
YBM251	EM
	ER
YBM253	EM
	ER

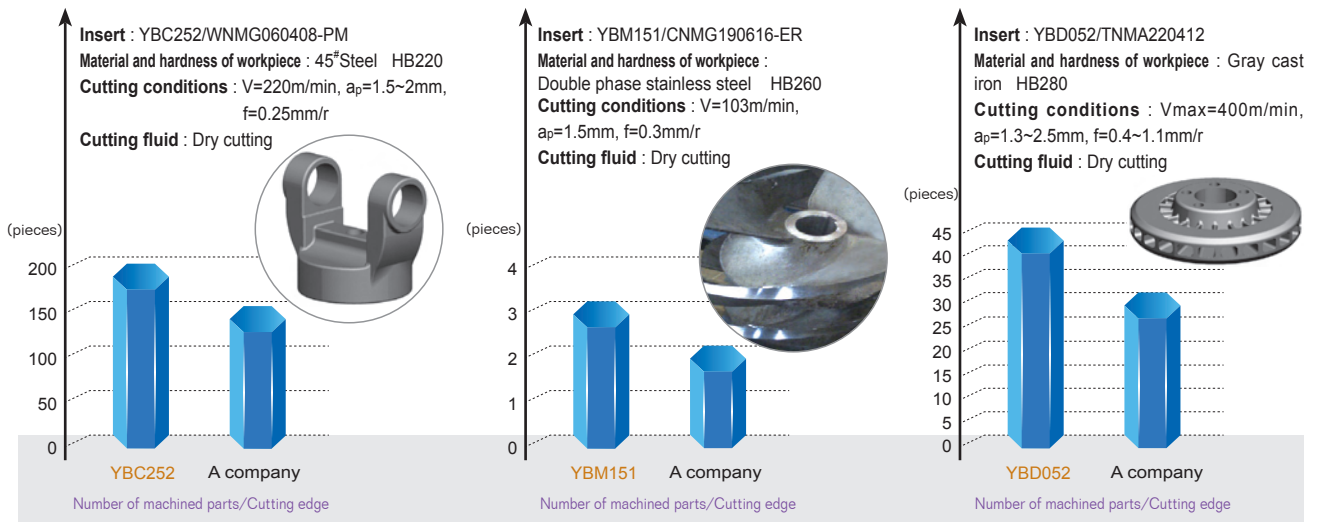
### For machining of K-type materials

Grade	Type
YBD052	Without chipbreaker
	PM
YBD102	Without chipbreaker
	PM
YBD152	Without chipbreaker
YBD252	Without chipbreaker

## Recommended cutting parameters

Workpiece material	Range of machining	Grade	Recommended cutting speed(m/min)
P Steel	For finishing	YBC151	180-460
		YBC152	220-500
	For semi-finishing	YBC251	160-440
		YBC252	180-480
	For roughing	YBC351	130-380
YBC352			
M Stainless steel	For finishing	YBM151	110-280
	For semi-finishing	YBM153	
	For roughing	YBM251	
		YBM253	
K Cast iron	For finishing	YBD052	200-500
		YBD102	200-480
	For semi-finishing	YBD151	180-450
		YBD152	190-450
	For roughing	YBD252	150-380

## Case

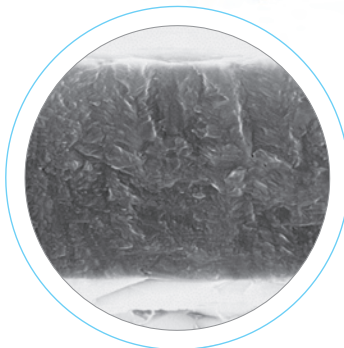
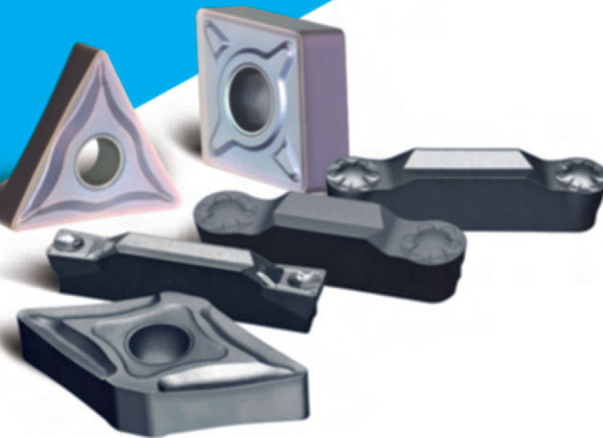


# Coated Cemented Carbide **PVD**

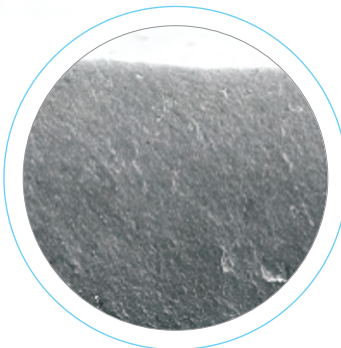
**makes it easy to machine materials which are hard to be machined**

## New nano coating grade

- Special coating techniques make inserts smooth, which leads to low friction and unobstructed chip flow.
- Unique coating with nano structure closely integrates with substrate, ensuring higher hardness and toughness.
- Excellent thermal stability and chemical stability can effectively protect cutting edge.



nc-TiAlN coating(YBG202)



TiAlN base multi-elements coating (YBG105)

High-performance nanostructure coating guarantees good toughness and hardness of inserts. Special coating technology guarantees smooth surface and excellent wear resistance. Outstanding thermal stability and chemical stability effectively protect cutting edge.

### ▶ **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.

### ▶ **YBG302**

The combination of nc-TiAlN coating and tough cemented carbide substrate, which integrates security and wear resistance, makes it suitable for parting and grooving of various materials.

### ▶ **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**

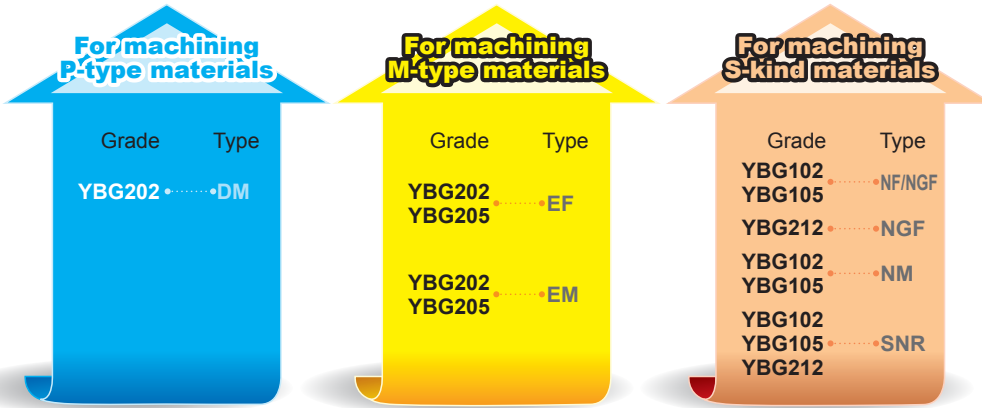
**Suitable for relatively small workpieces which require high surface smoothness.**

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.

## Recommended combination of grade and chipbreaker



## Recommended cutting parameters

Workpiece material	Range of machining	Grade	Recommended cutting speed(m/min)
P Steel	For finishing	YBG102	180-460
	For semi-finishing	YBG202 YBG205	150-380
M Stainless steel	For finishing ~ for semi-finishing	YBG202 YBG205	170-300
S Heat resistant Alloy Ti alloy	For finishing	YBG102	30-90
		YBG105	40-90
		YBG212	30-90
	For semi-finishing	YBG202	20-70
		YBG105	30-70
		YBG212	20-60
For roughing	YBG102	20-40	
	YBG105	30-40	
	YBG212	20-40	

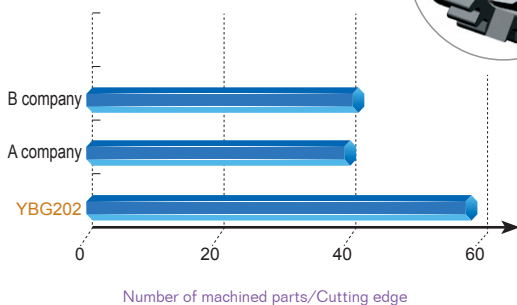
## Case

Insert : YBG202/TNMG120404-EF

Hardness and material of workpiece : 0Cr18Ni9 HB240

Cutting conditions :  $V=200\text{m/min}$ ,  $a_p=1\text{mm}$ ,  
 $f=0.15\text{mm/r}$

Cutting fluid : Dry cutting

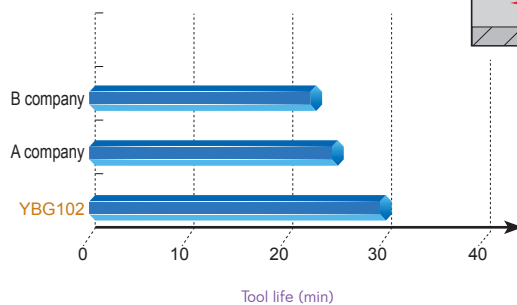
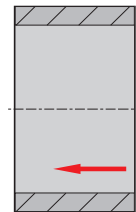


Insert : YBG102/DNEG150404-NF

Hardness and material of workpiece :

High temperature alloy Inconel 718 HRC $\geq$ 39  
Cutting conditions :  $V_c=80\text{m/min}$ ,  $a_p=0.3\text{mm}$ ,  
 $f=0.15\text{mm/r}$

Cutting fluid : Dry cutting





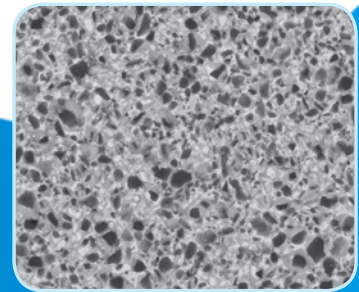
# Cermet & Coated Cermet

The chemical stability between Ti(CN) base cermet inserts and workpieces is relatively high, which reduces the friction and temperature of the cutting edge during cutting, preventing mutual diffusion of atoms of the workpiece material and the inserts, and improving resistance to bonding abrasion. Therefore, Ti(CN) base cermet shows good capability of Red Hardness and resistance to crater wear. It is an optimal material for high-speed finishing and semi-finishing of steel. High temperature strength of cermet is higher than that of WC-Co, and toughness better than that of Al<sub>2</sub>O<sub>3</sub> and Si<sub>3</sub>N<sub>4</sub> ceramic. This fulfils the application blank of WC-base cemented carbide and Al<sub>2</sub>O<sub>3</sub> and Si<sub>3</sub>N<sub>4</sub> ceramic from finishing to semi-finishing at high speed.

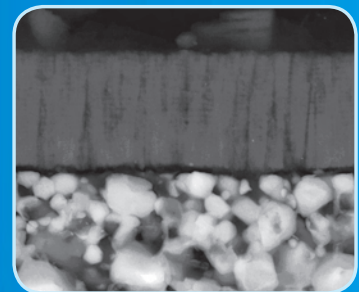
## Product features

**Scientifically designed structure ensures good material performance and long tool life. Refined production management assures the stability of product quality.**

- Symmetrical fine grain organization, together with the control of symmetrical organization and toric phase structure, improves the strength and hardness of cermet.
- Intensified bonding phase and well-designed grain boundary improve the high temperature capacity, heat conductivity and thermal vibration resistance.
- Coating of Physical Vapor Deposition (PVD) is applied to cermet substrate with high toughness, so that the grade has high hardness and toughness with wide-range application.



Substrate of cermet grade of YNG151 (homogenized ultra-fine structure)



PVD coating organization structure of cermet

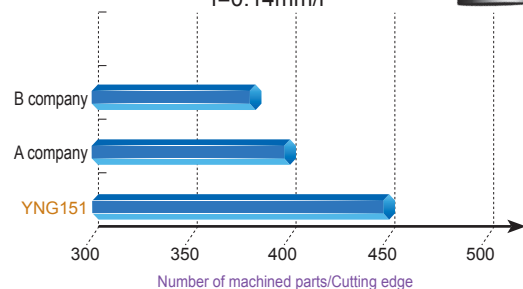
## Recommended cutting parameters

Workpiece material	Range of machining	Grade	Recommended cutting speed(m/min)
P Steel	For finishing	YNG151	260-550
		YNG151C	260-580
M Stainless steel		YNG151	170-330
		YNG151C	160-350
K Cast iron		YNG151	250-400
		YNG151C	270-420

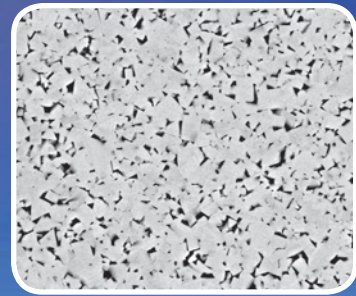
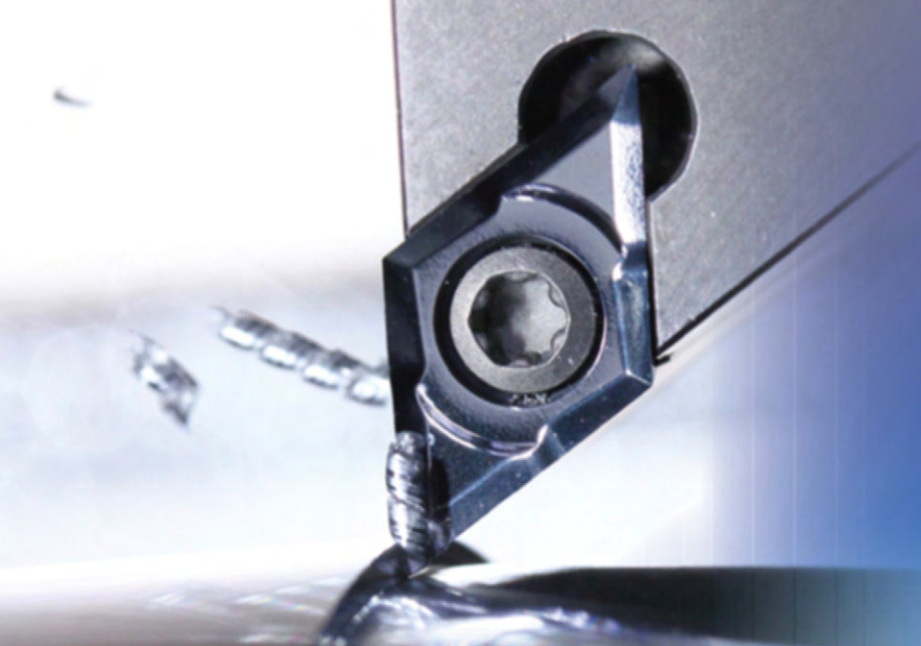
## Case

Insert: YNG151/CNMG120404-SF  
 Hardness and material of workpiece:  
 20CrMnTi HB180-223  
 Cutting parameters:  $v=220\text{m/min}$

$a_p=0.5\sim 1.0\text{mm}$   
 $f=0.14\text{mm/r}$



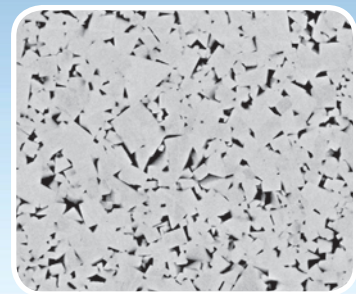
**Outstanding chip breaking Good surface quality**



Substrate of YD101: the combination of cemented carbide phase WC of fine grain and bonding phase Co

# Cemented Carbide Grade

**Uncoated cemented carbide grade is widely used for machining of non-ferrous metal, high temperature alloy, etc. It is economical and can be universally applied.**



Substrate of YD201: the combination of cemented carbide phase WC of middle grain and bonding phase Co

## Recommended cutting parameters

Workpiece material	Range of machining	Grade	Recommended cutting speed(m/min)
<b>P</b> Steel	For finishing	YC10	130-360
	For roughing	YC40	80-300
<b>K</b> Cast iron	For finishing	YD051	100-170
	For semi-finishing ~ For roughing	YD201	60-130
<b>N</b> Non-ferrous metal	For finishing ~ for semi-finishing	YD101	110-1750
<b>S</b> Heat resistant Alloy Ti alloy	For finishing	YD101	20-50

## Case

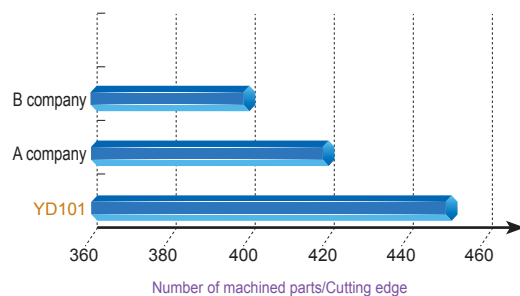
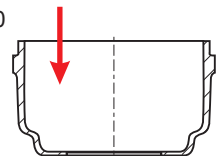
Insert: YD101/CCGX09T304-LH

Workpiece material: ZL105 HB70

Cutting parameters:  $v=400\text{m/min}$

$a_p=1\text{mm}$

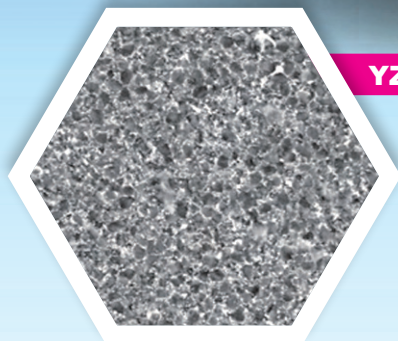
$f=0.3\text{mm/r}$



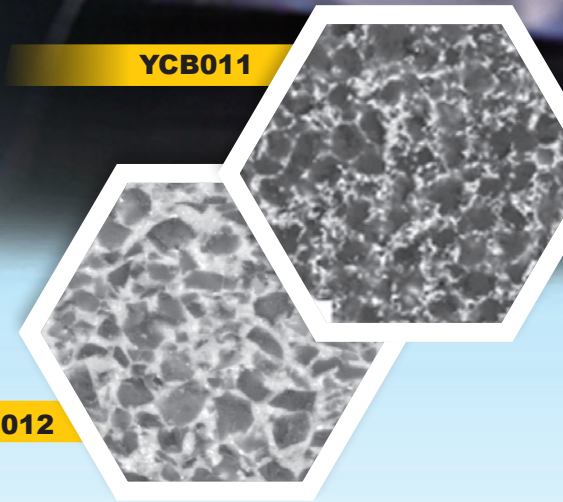
**Workpiece has high surface quality and high dimensional precision.**

# Polycrystalline Cubic Boron Nitride **PCBN**

PCBN is a synthesis of CBN powder and special binder under ultra-high pressure and high temperature conditions. PCBN has high hardness, high thermal stability and high chemical inertness, mainly suited to machining in hardened steel with hardness above HRC45 (eg carbon tool steel, bearing steel and die steel, etc.) , gray cast iron, high hardness cast iron, Ni-based, Co-based, and Fe-based superalloy.



**YZB221**



**YCB011**

**YCB012**

► **YCB012** **H** Super hard material

Low CBN content, high wear resistance and thermal stability, suitable for continuous ~ light interrupted cutting of hardened steel.

► **YCB011** **K** Cast iron

High CBN content, high wear resistance and strength, suitable for cutting cast iron materials, strong interrupted cutting in hardened steel.

► **YZB221** **K** Cast iron

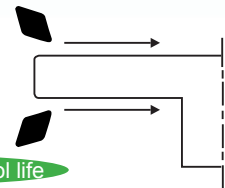
High CBN content, high wear resistance and impact resistance, good versatility, suitable for cutting cast iron materials.

## Application and machining Parameter Guidelines:

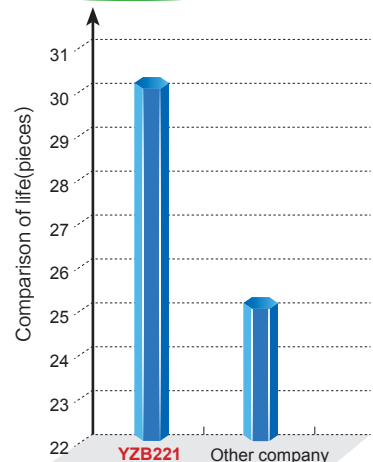
Workpiece material	Grade	Speed(m/min)	Feed(mm/r)	Depth of Cut(mm)
Cast iron	Grey cast iron	<b>YCB011</b>	800 ( 500–1500 )	0.3(0.1–0.5)
		<b>YZB221</b>	1000 ( 500–1500 )	0.4(0.1–1)
	High hardness Cast iron	<b>YCB011</b>	500 ( 300–800 )	0.2(0.1–0.4)
		<b>YZB221</b>	600 ( 300–800 )	0.4(0.1–0.8)
Hardened steel	<b>YCB012</b>	150 ( 100–250 )	0.15(0.03–0.3)	≤0.5

## Case

Workpiece: Brake disc  
 Workpiece Material: Cast Iron (HB180)  
 Insert grade: YZB221/grade of other company  
 Insert specification: DNGA150408-2  
 Operation: Wet machining  
 Cutting data:  $V_c=550\text{m/min}$ ,  $f_n=0.2\text{mm/rev}$   
 $a_p=0.1\text{mm}$

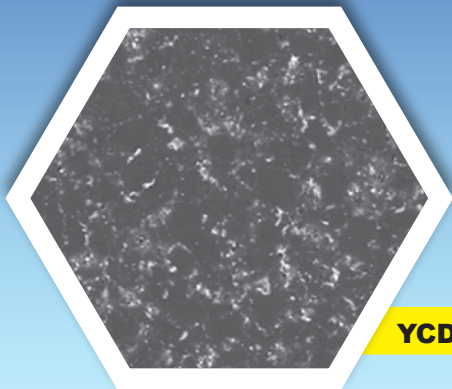


### Comparison of tool life

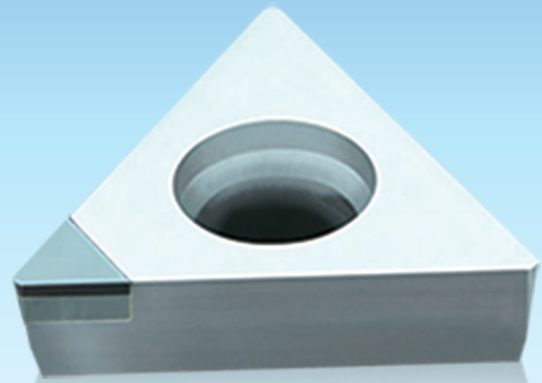


# Polycrystalline PCD Diamond

PCD has high hardness, excellent abrasion resistance, thermal conductivity, low coefficient of friction, suitable for cutting in non-ferrous metal and their alloys (such as: Cu, Al, Mg, etc.), non-metallic materials, and composite materials (such as: MMC, ceramics, reinforced plastics, etc.).



**YCD011**



## ▶ YCD011 N Non-ferrous materials

- ◆ Medium-grained diamond PCD material with a good balance between wear resistance and toughness;
- ◆ Good versatility;
- ◆ Suitable for high-speed machining of non-ferrous metals such as aluminum alloy, copper, magnesium and their alloys with medium and low silicon content;
- ◆ Suitable for high speed machining of glass fiber and plastics;
- ◆ For use in machining of carbide and ceramics.

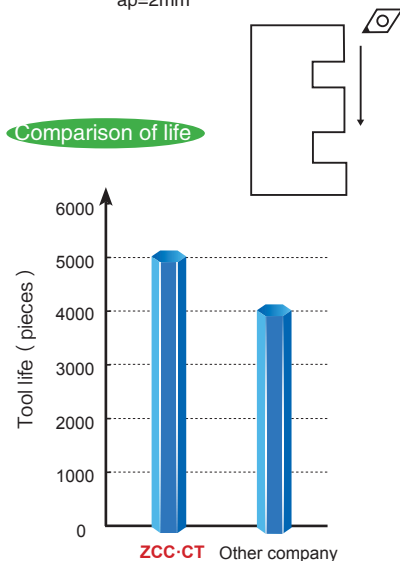
### Application and machining Parameter Guidelines:

Workpiece material	Speed(m/min)	Feed(mm/r)	Depth of Cut(mm)
Pure aluminum	1000(200-1500)	0.2 ( 0.02-0.6 )	≤ 2
Aluminum alloy (Si content ≤12%)	800(200-1500)	0.2 ( 0.02-0.5 )	
Aluminum alloy (Si content >12%)	600(200-1500)	0.2 ( 0.02-0.4 )	
Copper, magnesium and their alloy	700(200-1200)	0.2 ( 0.02-0.4 )	≤ 1.5
Reinforced plastic	600(100-1000)	0.2 ( 0.1-0.3 )	
Glass fiber material	500(100-800)	0.15 ( 0.1-0.3 )	

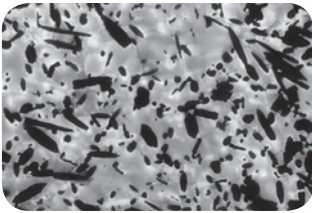
### Case

Workpiece: MOTO CYLINDER HEAD  
 Workpiece Material: Aluminum alloy (HB250)  
 Insert grade: YCD011/grade of other company  
 Insert specification: DCGW11T304  
 Operation: Wet machining  
 Cutting data:  $V_c=1000\text{m/min}$ ,  $f_n=0.35\text{mm/rev}$   
 $a_p=2\text{mm}$

#### Comparison of life



# Ceramic Grade



## CN3100

α-sialon/β-sialon matrix, the latest developed Siloxane sialon.

Applications: With excellent wear resistance, fracture toughness and thermal shock resistance, for use in general machining to finishing in high temperature alloy parts. Compared with SiC/Al<sub>2</sub>O<sub>3</sub> whisker ceramic material, it has better resistance to breakage at the depth of cut.

### Physical properties

Grade	Density(g/cm <sup>3</sup> )	HardnessHv(GPa)	Flexural strength(MPa)	Fracture toughness (MPa m <sup>1/2</sup> )
<b>CN3100</b>	3.34	1720	≥900	7.5

### Recommended cutting data

Grade	Workpiece material	Operation	Cutting speed (m/min)	Feed rate(mm/r)	Depth of cut (mm)
<b>CN3100</b>	Nickel high temperature alloy	For roughing	150-260	0.1-0.3	<5

### Case

Workpiece material: GH4169  
 Insert specification: RPGN090700T01020-V  
 Cutting data: V=200 m/min, ap=1 mm,  
 f=0.1 (mm/r)

Workpiece shape and process: Figure 1, four working procedures, two blades and four cutting edges in the figure finish the milling of turbine disk section, and the wear resistance is excellent.

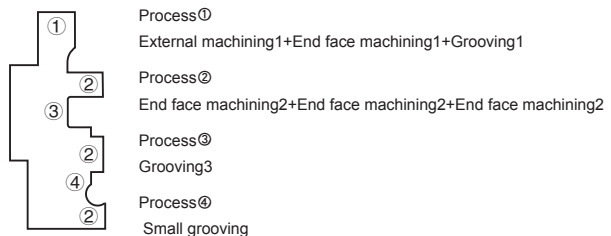


Figure 1

Table of correctional coefficient between material hardness and cutting speed

Workpiece material	Theoretical Hardness	Correctional coefficient between hardness of materials and cutting speed									
		Hardness decrease ← Hardness difference(Measured value – Theoretical value) → Hardness increase									
		-60	-40	-20	0	+20	+40	+60	+80	+100	
<b>P</b>	HB180	1.42	1.24	1.11	1.0	0.91	0.84	0.77	0.72	0.67	
<b>M</b>	HB180	1.44	1.25	1.11	1.0	0.91	0.84	0.78	0.73	0.68	
<b>K</b>	Grey cast iron	HB220	1.21	1.13	1.06	1.0	0.95	0.90	0.86	0.82	0.79
	Nodular cast iron	HB250	1.33	1.21	1.09	1.0	0.91	0.84	0.75	0.70	0.65
<b>N</b>	HB75			1.05	1.0	0.95					
<b>S</b>	HB350			1.12	1.0	0.89					
Rockwell hardness HRC			-6	-3	0	+3	+6	+9			
<b>H</b>	HRC60		1.10	1.02	1.0	0.96	0.93	0.90			

Actual Cutting Speed = Recommended Cutting Speed × Correctional Coefficient of Cutting Speed

● Please find recommended cutting parameters on insert packing box.

Example: If the material you are going to machine is normal alloy steel, whose theoretical hardness is HB180, and the selected insert is CNMG120404-DF/YBC151, then the recommended cutting speed is  $V=150\text{m/min}$ . If the hardness measured value of the material is HB220, then the hardness difference value is  $220-180=+40$ . Correctional coefficient found in the table is 0.84. Therefore, the actual applicable cutting speed is  $V_c=250 \times 0.84=210\text{m/min}$ .

### Correctional coefficient table between tool life and cutting speed

Tool life Insert materials	Correctional coefficient between tool life and cutting speed					
	10 minutes	15 minutes (Standard life)	30 minutes	45 minutes	60 minutes	90 minutes
YBC151	1.12	1.00	0.82	0.73	0.67	0.60
YBC251	1.11	1.00	0.84	0.76	0.71	0.64
YBC351	1.11	1.00	0.84	0.76	0.70	0.63
YBC152	1.25	1.00	0.68	0.54	0.46	0.37
YBC252	1.55	1.00	0.47	0.30	0.22	0.14
YBM151	1.28	1.00	0.66	0.52	0.43	0.34
YBM153	1.32	1.00	0.64	0.48	0.37	0.31
YBM251	1.19	1.00	0.75	0.63	0.56	0.47
YBM253	1.22	1.00	0.73	0.61	0.54	0.45
YBG202	1.10	1.00	0.85	0.77	0.72	0.66
YBG205	1.15	1.00	0.82	0.74	0.69	0.64
YBD052	1.22	1.00	0.80	0.65	0.60	0.55
YBD102	1.20	1.00	0.75	0.62	0.58	0.50
YBD151	1.20	1.00	0.74	0.63	0.55	0.47
YBD152	1.11	1.00	0.70	0.60	0.50	0.40
YBG105	1.28	1.00	0.79	0.72	0.63	0.58
YBG212	1.25	1.00	0.75	0.70	0.60	0.50

Actual cutting speed = Recommended cutting speed × Correctional coefficient of cutting speed

Example: If the material you are going to machine is normal alloy steel, and the selected insert is CNMG120404-DF/YBC151, then the recommended cutting speed is  $V=250\text{m/min}$  (standard life is 15 minutes). If you expect the tool life to reach 60 minutes, the correctional coefficient found in the table is 0.67, then the applicable cutting speed is  $V_c=250 \times 0.67=167.5\text{m/min}$ .