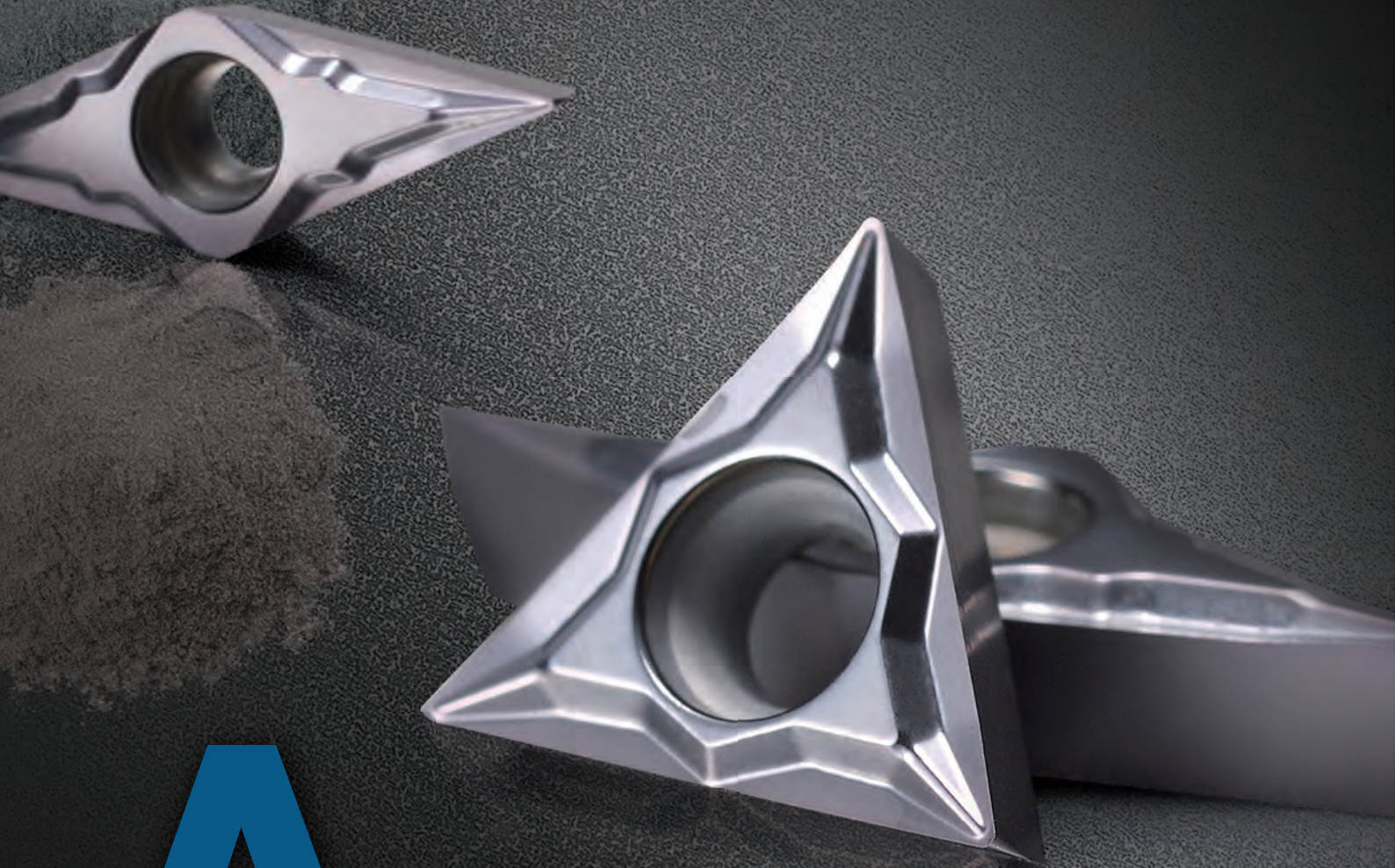


GRADES & CHIP BREAKERS

KORLOY's new grades are designed with optimal substrates for each application and are PVD coated for high temperature, high hardness and oxidation resistance, or CVD coated for high temperature and wear resistance. Additionally, the improved post-coating treatment provides superior surface finishes to ensure the highest levels of quality and productivity.



A

Grades

A02 KORLOY grades system

Turning Grades

A04 Turning grade selections
A05 CVD coated grades
A10 PVD coated grades
A12 Uncoated Carbide grades
A13 Cermet grades
A15 Coated Cermet grades

Milling Grades

A16 Milling grade selections
A17 CVD coated grades
A18 PVD coated grades
A23 Uncoated Carbide grades
A24 Cermet grades

Solid Endmills & Solid Drills Grades

A25 Solid Endmills grade selections
A26 Solid Endmills grades
A27 Solid Drills grade selections
A28 Solid Drills grades

Others (Turning/Milling/Endmills)

A29 Diamond coated grades
A30 DLC coated grades
A31 cBN inserts grades
A36 PCD inserts grades

Chip Breakers

A37 Chip Breaker for Turning
A42 Chip Breaker for Milling
A49 Chip Breaker for Drilling

Grades system

➤ Cutting tool

Uncoated carbide	P	Steel	ST10	ST20	ST30A
	M	Stainless steel	U20		
	K	Cast iron	H01	H05	G10
	S	Titanium alloy	H01	H05	
	N	Aluminum ally/Copper ally	H01	H05	
	H	Hardened steel	H01		

Coated carbide for turning	P	Steel	NC3215	NC3225	NC3120	NC3030	NC5330	PC5300	PC5400	PC3035			
	M	Stainless steel	PC8105	PC8110	PC8115	PC8120	NC9115	NC9125	NC5330	NC9135	PC5300	PC9030	PC5400
	K	Cast iron	NC6310	NC6315	NC5330	PC5300	PC5400						
	S	Heat resistant alloy	PC8105	PC8110	PC8115	PC8120	NC9125	NC9135	PC5300	PC5400			
	N	Non-ferrous metal	ND3000	PD1005	PD1010								
	H	Hardened steel	PC8105	PC8110	PC8115								

Multi-functional	P	Steel	NC3210	NC3225	NC3030	NC5330	PC3035
	M	Stainless steel	PC9030	PC5300			
	K	Cast iron	NC6315	PC5300			
	S	Heat resistant alloy	PC8110	PC5300			
	N	Non-ferrous metal	H01	H05			
	H	Hardened steel	PC8110	PC5300			

Coated carbide for milling	P	Steel	NC5330	NCM535	PC3700	PC5300	PC5400	NCM545
	M	Stainless steel	NC5330	PC5300	PC9530	PC5400	PC9540	
	K	Cast iron	PC6510	NC5330	NCM535	PC5300	PC5400	NCM545
	S	Heat resistant alloy	PC5300	PC5400	PC9540			
	N	Non-ferrous metal	ND3000	PD1005	PD1010			
	H	Hardened steel	PC2005	PC2010	PC2015	PC210F	PC2505	PC2510

Coated carbide for drills, endmills	P	Steel	PC3700	PC5300	PC5335	PC9530	PC9540	NC5330	NCM535
	M	Stainless steel	PC5300	PC5335	PC9530	PC9540			
	K	Cast iron	PC6510	PC5300					
	S	Heat resistant alloy	PC5300	PC9530	PC9540				
	N	Non-ferrous metal	H01						



Grades system

➤ Cutting tool

Turning cermet	P	Steel	CN1500	CN2500
	K	Cast iron	CN1500	CN2500

Coated carbide for turning cermet	P	Steel	CC1500	CC2500
	K	Cast iron	CC1500	CC2500

Milling cermet	P	Steel	CN2500	CN30
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Solid endmills	P M K	Steel	PC203F	PC215F	PC303S	PC310U	PC315E	PC320	PC320S
	S	Heat resistant alloy	PC320	PC320S	SL				
	H	Hardened steel	PC203F	PC303S	PC310U				
	N	Non-ferrous metal	ND3000	ND2100	PD1005	PD1010	PC210C	H01	H05S

Solid drills	P M K	Steel	PC325U	PC215G	PC315G	PC230F
	S	Heat resistant alloy	PC325T			
	N	Non-ferrous metal	FG2	FA1	ND2100	

cBN	K	Cast iron	DBN500	DBN700A			
	S	Heat resistant alloy	DBN700				
	H	Hardened steel	DB1000	DB2000	DBNX20	DBN250	DBN350

Coated cBN	H	Hardened steel	DNC100	DNC250	DNC350	DNC400
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PCD	N	Non-ferrous metal	DP90	DP150	DP200
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➤ Wear resistance tool

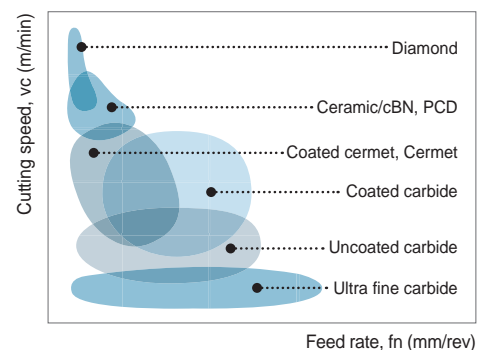
Ultra fine grain cemented carbide	Z	Ultra fine grain cemented carbide	FS1	FA1	FCC
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Uncoated carbide	V	Wear parts	D1	D2	D3	G5
	I	Corrosion resistance	IN10	IN20	IN40	

➤ Mining tool

Uncoated carbide	E	General	GR10	GR20	GR30	GR35	GR40
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➤ Application range



Feed rate, fn (mm/rev)

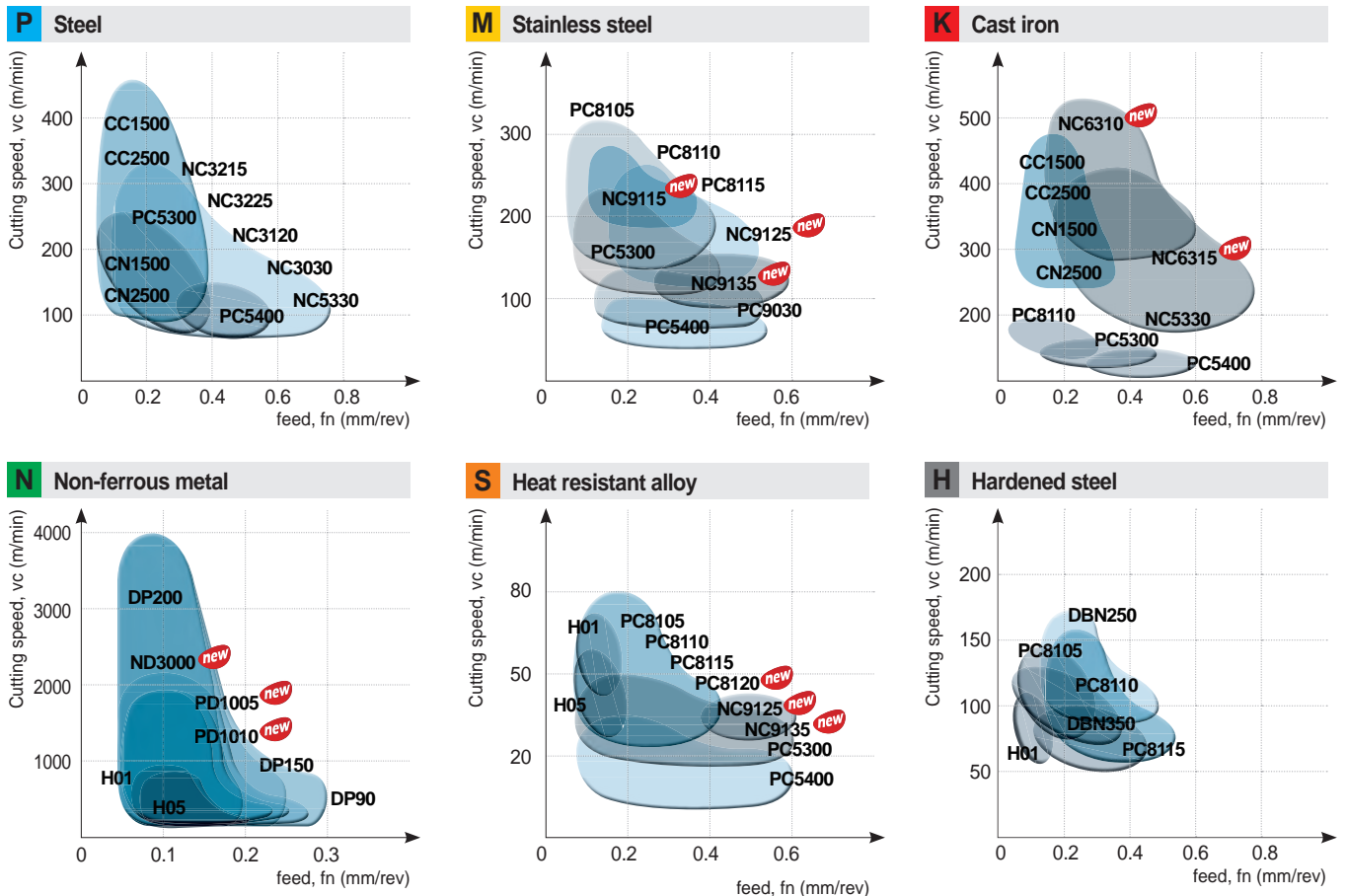


Turning grade selections

Selection system

Workpiece	P Steel					M Stainless steel				K Cast iron				S HRSA				N Nonferrous			H Hardened							
ISO	P01	P10	P20	P30	P40	P50	M10	M20	M30	M40	K01	K10	K20	K30	S01	S10	S20	S30	N01	N10	N20	N30	H01	H10	H20	H30		
Coated carbide			NC3215				PC8105				NC6310 <i>new</i>				PC8105				ND3000 <i>new</i>							PC8105		
			NC3225				PC8110					NC6315			PC8110						PD1005 <i>new</i>					PC8110		
			NC3120				PC8115								PC8115												PC8115	
			NC3030				NC9115 <i>new</i>						NC5330			PC8120 <i>new</i>						PD1010 <i>new</i>				PC8115		
			NC5330				NC9125 <i>new</i>						PC5300			NC9125 <i>new</i>											PC8115	
			PC5300				NC9135 <i>new</i>								PC5300													
			PC5400				PC5300								PC5400													
							PC9030																					
							PC5400																					
Cermets		CC1500											CC1500															
		CC2500										CC2500																
		CN1500										CN1500																
		CN2500										CN2500																
cBN / PCD												DBN700			DB7000					DP90						DNC100		
												DBN800								DP150						DNC250		
												DBN500								DP200						DNC400		
																										DNC350		
Uncoated carbide		ST10											H01		H01					H01						H01		
			ST20										H05								H05							
			ST30A																									
							U20																					

Application range of turning grades



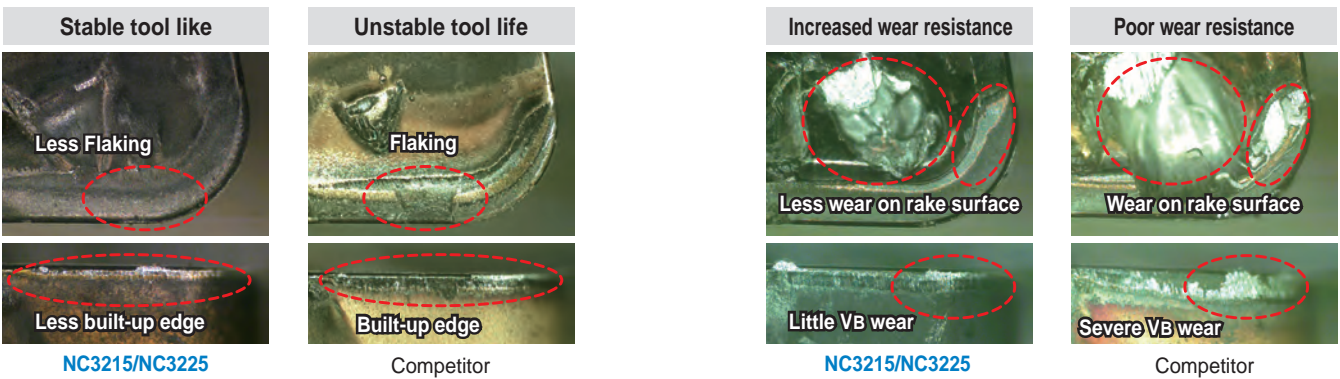
CVD coated grades

NC3215/NC3225

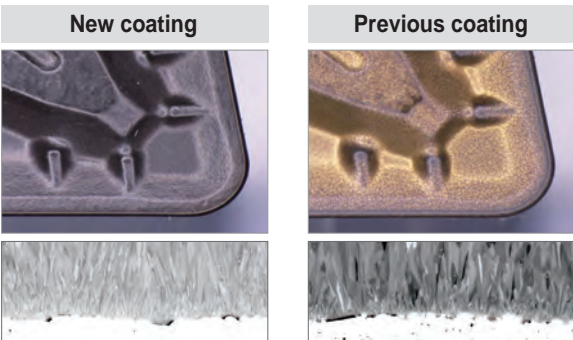
- Universal grade especially for machining forged automobile components and bearing steel both in continuous and interrupted cutting
- Available for all kinds of steels - carbon steel, alloy steel, rolled steel, tool steel, mild steel, bearing steel and other special kinds of steel
- New coating technology increases welding resistance and chipping resistance, which leads to longer tool life.

Features

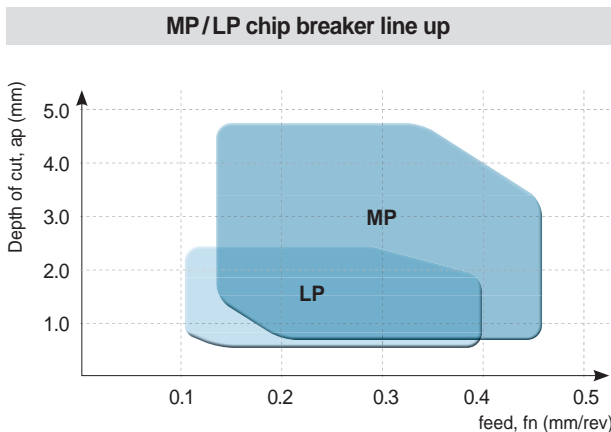
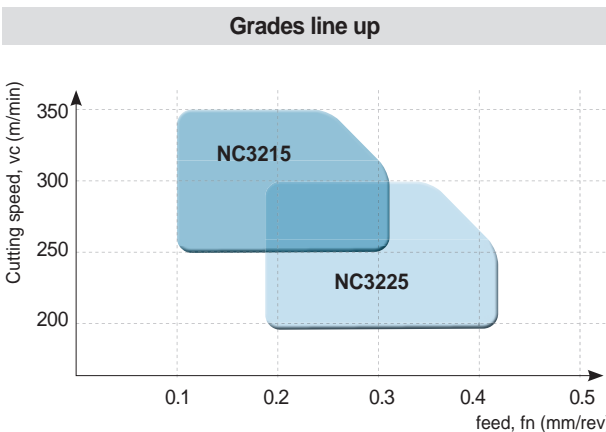
- Stable tool life
→ Higher production stability
- Longer tool life & Higher removal rate
→ High cutting conditions and shorter cutting time available
- Ideal combination of a grade and chip breakers
→ Prolongs tool life
→ Wide applications ranging from roughing to finishing



• Disperse cutting force → Reduce chipping → Increase tool life → Improved productivity



Application range



CVD coated grades

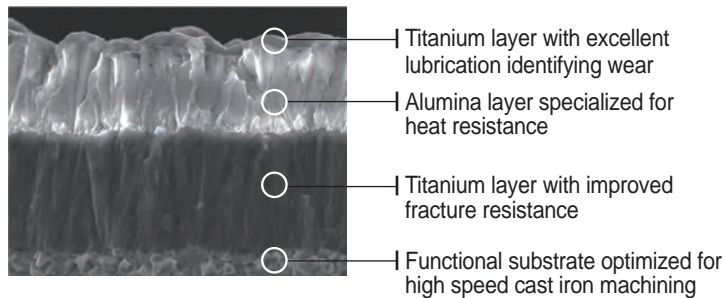
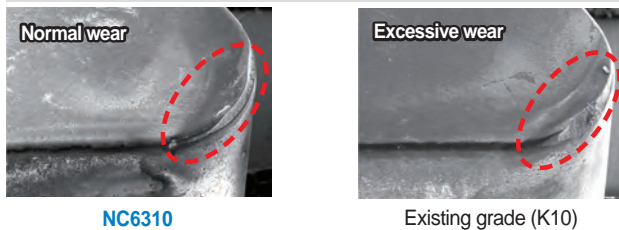
CVD coated grade for high efficiency and quality turning of cast iron

NC6310 **new** / NC6315 **new**

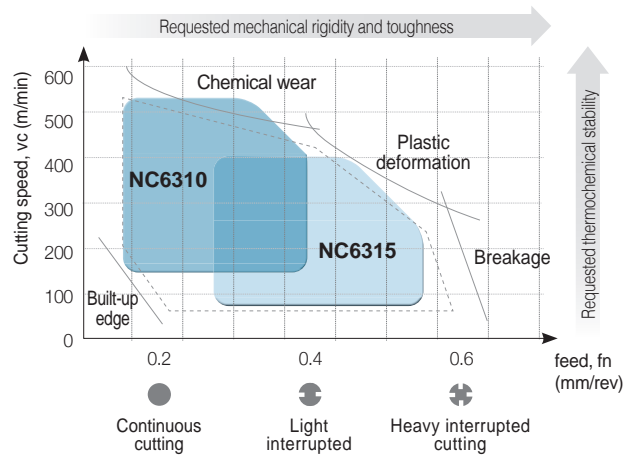
- CVD coating with improved wear resistance and chipping resistance.
- Solutions for the most common issues in cast iron machining: Preventing excessive wear on rake and flank surfaces of insert, chipping and burr

Features of NC6310

Normal wear on rake surface and nose radius

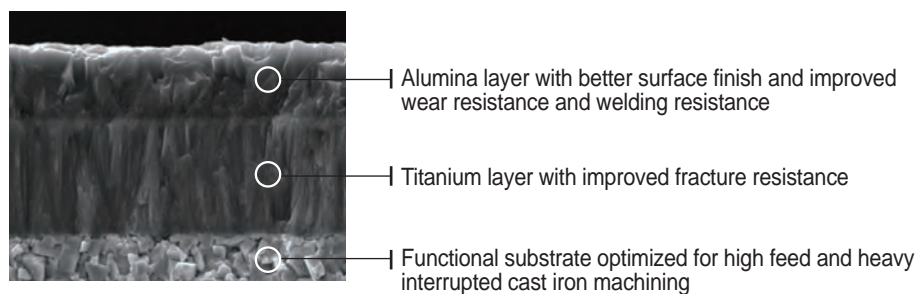
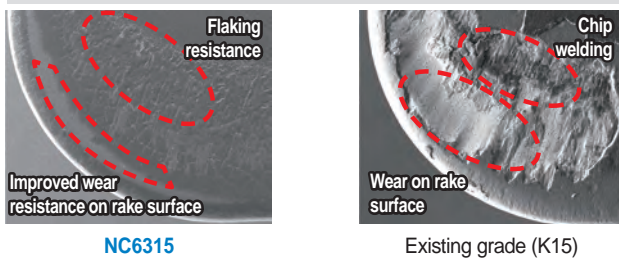


Recommended machining range for each grade

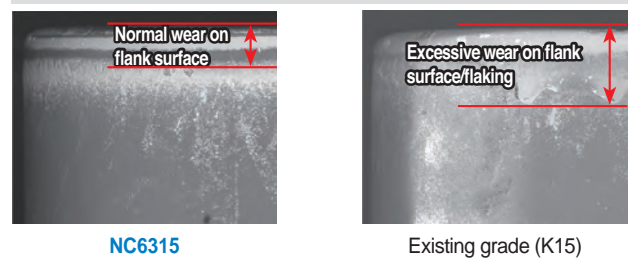


Features of NC6315

Improved flaking resistance and wear resistance on rake surface



Normal wear on flank surface



CVD coated grades

Turning grades for stainless steel

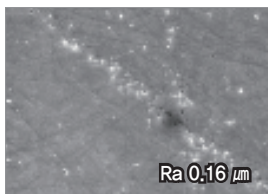
NC9115 **new** / NC9125 **new** / NC9135 **new**

- Optimized for reducing built-up edges, notch wear, plastic deformation and burrs, and for machining stainless steel
- Ideal combination of a grade and MM/RM chip breakers for stable tool life and wide applications ranging from roughing to finishing
- Stable tool life even at high speeds, feeds and depth of cuts (for STS316, vc over 150 m/min available), shortening cutting time
- Excellent versatility responding to workpiece change, covering the austenite, the martensite and the ferrite
- NC9115 is for P20 class, mild steel and forged steel machining.

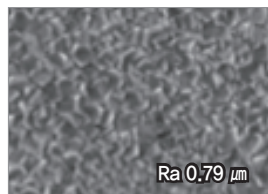
Features

- Improved surface finish thanks to the new lubricative CVD coating

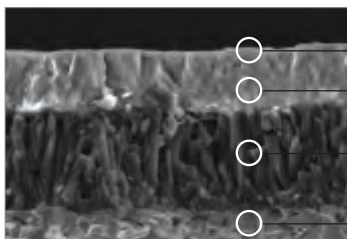
Lubricative coating layer to prevent built-up edge



NC9100 Series



Existing coating

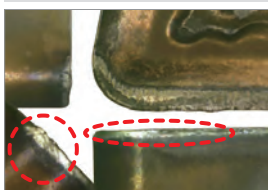


- Top coat with improved welding resistance
- Alumina coating layer for high speed cutting
- Titanium coating layer with stronger resistance to chipping
- Tough substrate optimized for continuous cutting and both light & heavy interruption

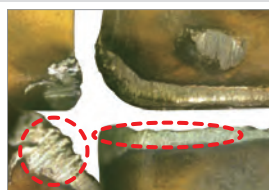
- Lubricative coating layers → Improves welding resistance

- Coated layers of stronger chipping resistance and the substrate of high toughness → Inhibits notch wear creation

Inhibited built-up edge and blade damage

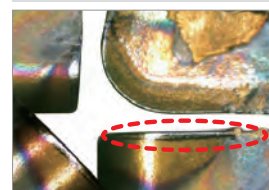


NC9125 (M25)

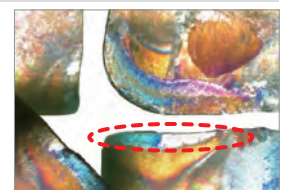


Competitor (M25)

Inhibited wear on notch and relief surface



NC9135 (M35)

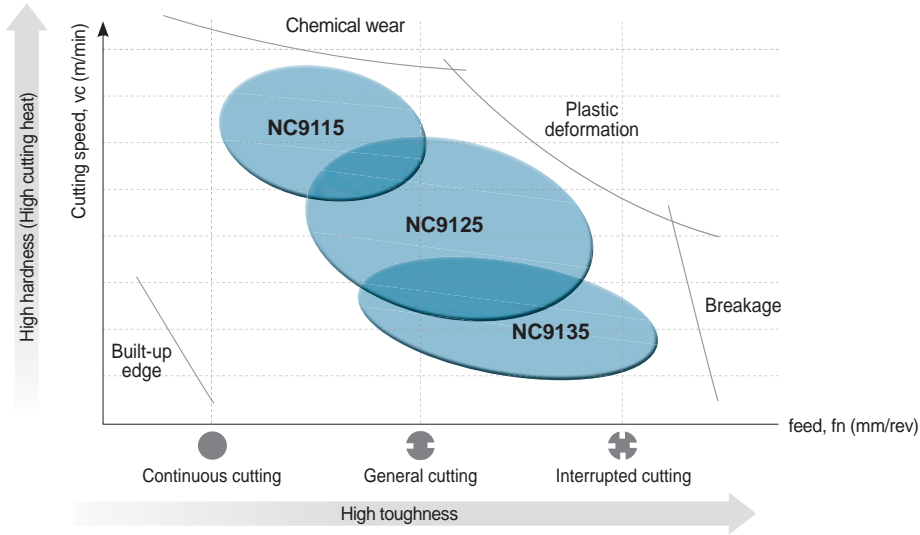


Competitor (M35)



CVD coated grades

Grades line up



Recommended grade and chip breaker per stainless steel type

[Austenitic stainless steel]

Grade	Cutting speed (m/min)				
	50	100	150	200	250
NC9115				160	220
NC9125			150	200	
NC9135		100	150		

[Duplex stainless steel]

Grade	Cutting speed (m/min)				
	50	100	150	200	250
NC9115			120	160	
NC9125		100	140		
NC9135		60	100		

[Ferritic / Martensitic stainless steel]

Grade	Cutting speed (m/min)				
	50	100	150	200	250
NC9115			150		250
NC9125			120	220	
NC9135		100	150		

[Precipitation hardened (PH) stainless steel]

Grade	Cutting speed (m/min)				
	50	100	150	200	250
NC9115		50	110		
NC9125		40	110		
NC9135		30	100		



Selection system of CVD coated grade

Workpiece	Machining types	Recommended grade	Recommended cutting speed (m/min)	ISO	Application range
P Steel	Continuous cutting	NC3215	295 (170~420)	P10	
	Interrupted cutting	NC3225	260 (150~370)	P15	← NC3215
		NC3120	260 (120~370)	P20	← NC3225
		NC3030	205 (120~290)	P30	← NC3120
		NC5330	185 (110~260)	P35	← NC3030
M Stainless steel	Continuous cutting	NC9115 ^{new}	240 (220~260)	M10	← NC9115 ^{new}
		NC9125 ^{new}	210 (190~230)	M20	← NC9125 ^{new}
	Interrupted cutting	NC9135 ^{new}	180 (160~200)	M30	← NC9125 ^{new}
				M40	← NC9135 ^{new}
K Cast iron	Continuous cutting	NC6310 ^{new}	380 (300~500)	K10	← NC6310 ^{new}
	Interrupted cutting	NC6315	280 (200~400)	K20	← NC6315
		NC5330	190 (110~270)	K30	← NC5330
S HRSA	Continuous cutting	NC9125 ^{new}	40 (20~60)	S10	← NC9125 ^{new}
	Interrupted cutting	NC9135 ^{new}		S20	← NC9135 ^{new}

The features of CVD coated grades

CVD Coated grades	ISO	Features
NC3215	P10~P15	<ul style="list-style-type: none"> Continuous machining of general steel and forged steel at high speed Substrate with excellent thermal crack/plastic deformation resistance, coating with improved chipping resistance for continuous machining • MT-TiCN + Al₂O₃ + TiN
NC3225	P20~P25	<ul style="list-style-type: none"> Universal grade for general steel and forged steel 1st recommended grade for general machining with the use of high toughness substrate and coating layer with improved welding/chipping resistance • MT-TiCN + Al₂O₃ + TiN
NC3120	P20~P25	<ul style="list-style-type: none"> Medium to roughing for steel Combining excellent fracture resistance substrate with chipping resistance and heat resistance Al₂O₃ increased stability MT-TiCN + TiC + Al₂O₃
NC3030	P25~P35	<ul style="list-style-type: none"> Medium to low speed machining of steel and interrupted roughing Harmony between substrate with excellent wear/fracture resistance and Al₂O₃ film with excellent thermal/chipping resistance Increased stability in wide ranges of cutting conditions • MT-TiCN + TiC + Al₂O₃ + TiN
NC5330	P30~P35 M25~M35 K15~K25 S15~S25	<ul style="list-style-type: none"> Stainless Steel - General cutting for mild steel & forging steel Excellent cutting performance in hard to cut materials which are vulnerable to built up edge, due to the high tough substrate with improved fracture resistance and the coated layers MT-TiCN + Al₂O₃ + TiN
NC9115 ^{new}	M10~M20	<ul style="list-style-type: none"> High speed cutting for ferritic and martensitic stainless steels MT-TiCN + Al₂O₃ + TiN
NC9125 ^{new}	M20~M30	<ul style="list-style-type: none"> General cutting of stainless steel and heat resistant alloys MT-TiCN + Al₂O₃ + TiN
NC9135 ^{new}	M30~M40	<ul style="list-style-type: none"> Interrupted cutting of stainless steel and heat resistant alloys MT-TiCN + Al₂O₃ + TiN
NC6310 ^{new}	K01~K10	<ul style="list-style-type: none"> High speed and continuous cutting of grey cast iron Increased tool life due to coating layer with high wear resistance MT-TiCN + Al₂O₃ + TiN
NC6315	K10~K20	<ul style="list-style-type: none"> Universal grade for ductile and gray cast Iron Excellent performance thanks to the alumina (Al₂O₃) coating's improved grip on the tough substrate MT-TiCN + Al₂O₃



PVD coated grades

Turning grade for heat resistant alloy and stainless steel

PC8105

- Micro grain carbide minimizes chipping of cutting edge due to enhanced edge strength
- Latest PVD coating technology with high hardness and high temperature oxidation resistance
- Excellent tool life when finishing heat resistant alloys and stainless steels at high speeds

PC8115

- Ultra fine matrix technology increases wear resistance and chipping resistance.
- PVD coating technology with high hardness and oxidation resistance at high temperature
- Strong cutting edge and excellent chipping resistance guarantees stable machining
- Long tool life when machining heat resistant alloy and stainless steel at middle to low speed and medium cutting to roughing

PC8110

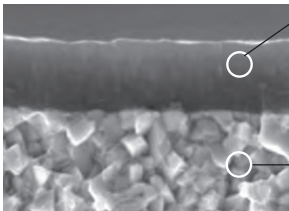
- Substrate with superior wear resistance and plastic deformation resistance at high temperature
- PVD coating technology with high hardness and oxidation resistance at high temperature
- Long tool life when machining heat resistant alloy and stainless steel at high speed

PC8120 new

- Control technology for uniform ultra-fine substrate increases wear resistance and chipping resistance.
- The new PVD dioxide film enhances oxidation resistance and heating resistance.
- Special technology of coating surface treatment prevents chipping and realizes stable machining.

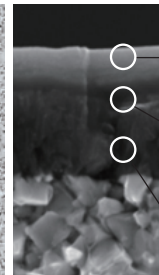
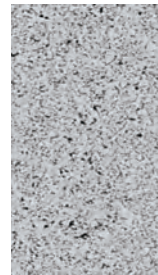
Features

Features of PC8105/10/15 series



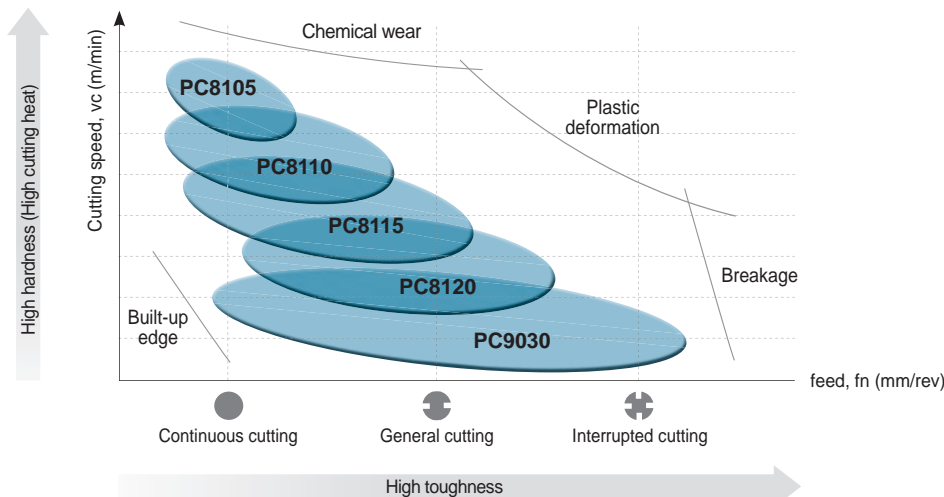
- It prevents wear at a high temperature to apply excellent surface roughness and coating with oxidation resistance and high hardness
- It improves wear resistance to equalize submicron matrix, secure stability between corners and improve chipping- and wear resistance

PC8120



- PVD multi-layer → Reducing cracks
- PVD oxidation layer → Good oxidation resistance and heating resistance
- PVD nitride → Good wear resistance

Grades line up



Selection system of PVD coated grade

Workpiece	Machining types	Recommended grade	Recommended cutting speed (m/min)	ISO	Application range	
P Steel	Continuous cutting	PC5300	175 (100~250)	P30	PC5300	
	Interrupted cutting		145 (80~120)	P40		PC5400
M Stainless steel	Continuous cutting	PC5400	125 (80~160)	P50	PC8105	
		PC8105	175 (120~230)	M01		PC8110
		PC8110	160 (110~210)	M10		
	Interrupted cutting	PC8115/8120 ^{new}	150 (100~200)	M20	PC8115	PC8120 ^{new}
		PC5300	135 (80~190)	M30	PC5300	PC9030
		PC9030	130 (80~180)	M40	PC5400	
K Cast iron	Continuous cutting	PC8110	135 (95~180)	K10	PC8110	
				K20	PC5300	
	Interrupted cutting	PC5300	105 (75~140)	K30	PC5400	
		PC5400	90 (65~120)	K40		
S Heat resistant alloy	Continuous cutting	PC8105	55 (40~70)	S01	PC8105	
		PC8110	50 (35~65)	S10	PC8110	
		PC8115/8120 ^{new}	45 (30~60)	S20	PC8115	PC8120 ^{new}
	Interrupted cutting	PC5300	40 (20~60)	S30	PC5300	
		PC5400	35 (20~50)	S40	PC5400	
H Hardened	Interrupted cutting	PC8105	110 (80~140)	H01	PC8105	
		PC8110	100 (70~130)	H05	PC8110	
		PC8115	90 (65~115)	H10	PC8115	

The features of PVD coated grades

PVD Coated grades	ISO	Features
PC8105	M05~M15 S01~S10 H01~H05	<ul style="list-style-type: none"> For high speed and continuous finishing of hard-to-cut materials and STS Excellent cutting performance with high wear resistance and oxidation resistance Ultra fine substrate and the new TiAlN coating layer
PC8110	M10~M20 K10~K20 S05~S15 H05~H10	<ul style="list-style-type: none"> For high speed and continuous medium cutting of hard-to-cut materials and STS Excellent tool life with high wear/plastic deformation resistance at high temperature New TiAlN coating layer and substrate with excellent thermal resistance
PC8115	M15~M25 S10~S20 H10~H15	<ul style="list-style-type: none"> For medium to low speed and medium to rough cutting of hard-to-cut materials and STS Excellent tool life with high wear resistance and chipping resistance Ultra fine substrate and the new TiAlN coating layer
PC8120 ^{new}	M15~M25 S10~S20	<ul style="list-style-type: none"> For hard-to-cut materials and STS roughing Applied ultra-fine substrate and new PVD oxidation layer Better chipping resistance and fracture resistance than PC8115
PC5300	P30~P40 M20~M30 K20~K25 S15~S25	<ul style="list-style-type: none"> Universal grade for stainless, HRSA, steel and interrupted cast iron machining High chipping and welding resistance for longer tool life New TiAlN coating and ultra fine grain substrate adopted
PC9030	M25~M35	<ul style="list-style-type: none"> Medium, roughing and heavy interrupted cutting for stainless steel TiAlN coating and ultra fine grain substrate adopted High chipping and welding resistance for stable machining
PC5400	P35~P45 M30~M40 K30~K35 S25~S35	<ul style="list-style-type: none"> For medium cutting for hard-to-cut materials, stainless steel, steel, and cast iron at medium or low speed Stable machinability with chipping resistance, fracture resistance and welding resistance Ultra fine substrate with high toughness and new AlCrN layer



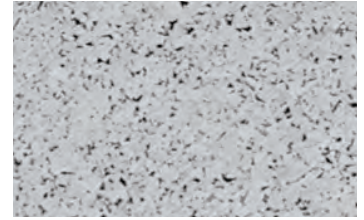
A Turning Grades

Uncoated carbide grades

Uncoated carbide grades for turning application of titanium

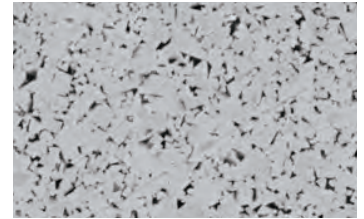
H01

- Increased wear resistance and chipping resistance with the use of ultra fine substrate
- Improved welding resistance and chipping resistance with the use of special surface treatment and sharp cutting edge of VP chip breaker
- Excellent tool life when finishing titanium alloy at high speed

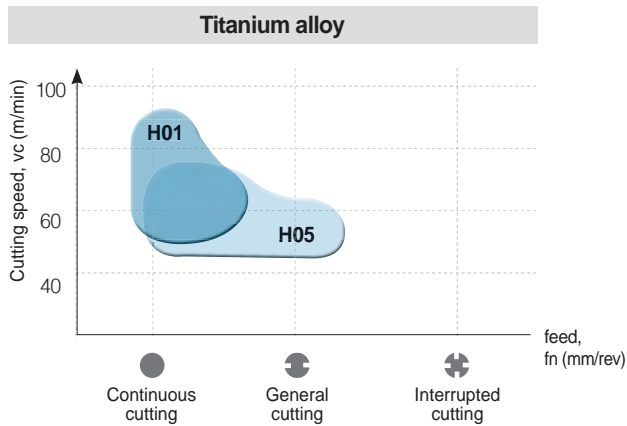


H05

- The 1st recommended grade for machining titanium alloy in a variety of cutting conditions
- Improved welding resistance and chipping resistance with the use of special surface treatment and sharp cutting edge of VP chip breaker
- Ideal for medium cutting of titanium alloy



Grades line up



Selection system of uncoated carbide grades

Workpiece	Recommended grade	Recommended cutting speed (m/min)	ISO	Application range
P Steel	ST10	110 (70~140)	P10	← ST10
	ST20	80 (50~110)	P20	← ST20
	ST30A	70 (40~90)	P30	← ST30A
M Stainless steel	U20	70 (40~90)	M25	← U20
K Cast iron	H01	105 (60~140)	K01	← H01
	H05	105 (60~140)	K10	← H05
	G10	90 (50~120)	K20	← G10
N Aluminum alloy Copper alloys	H01	600 (450~750)	N10	← H01
	H05	425 (320~530)	N20	← H05
S Titanium alloy	H01	55 (40~70)	S01	← H01
	H05	50 (35~65)	S10	← H05
H High hardness steel	H01	80 (55~105)	H10	← H01

Main composition and application range

Workpiece	Composition	Features	Workpiece
P	WC-TiC-TaC-Co	Heat resistance, excellent plastic deformation resistance	Carbon steel, Alloy steel, Stainless steel
M	WC-TiC-TaC-Co	General tools stable heat resistance with strength	Carbon steel, Alloy steel, Stainless steel, Cast steel
K	WC-Co	High strength and superior wear resistance	Cast iron, Non-ferrous metal, Plastic, etc
S	WC-Co	Excellent wear resistance and chipping resistance	Titanium alloy



🔍 The physical properties of uncoated carbide grades

Workpiece	Grade	Hardness (HRA)	TRS (kgf/mm ²)	Young's modulus (10 ³ kgf/mm ²)	Thermal expansion coefficient (10 ⁻⁶ /°C)	Thermal conductivity (cal/cm · sec·°C)
P	ST10	92.1	175	48	6.2	25
	ST20	91.9	200	56	5.2	45
	ST30A	91.3	230	53	5.2	-
M	U20	91.1	210	-	-	88
	ST30A	91.3	230	53	5.2	-
K	H01	92.9	210	66	4.7	109
	G10	90.9	250	63	-	105
S	H01	92.9	210	66	4.7	109
	H05	91.8	250	-	-	-

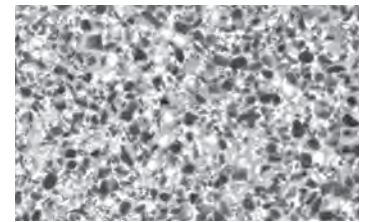
1KPa = 102kgf/m², 1w/mk = 2.39×10⁻³cal/cm·sec·°C

Cermets grades

Solution for turning application of steel

CN1500

- For continuous machining of cold/hot forged steel and Sintered ferrous alloy at high speed and low depth of cut
- Excellent wear resistance and crater resistance
- Improved surface roughness acquired by optimized cutting edges



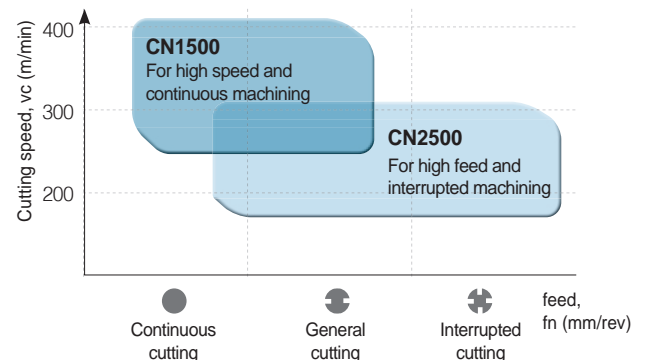
CN2500

- For high interrupted machining of cold/hot forged steel and Sintered ferrous alloy at high feed and high depth of cut
- Excellent resistance against chipping, fracture and thermal crack
- Improved surface roughness acquired by optimized cutting edges

🔍 Recommended cutting condition

Division	Workpiece	Grade	Recommended cutting speed (m/min)		
			Minimum	Recommended	Maximum
Turning	SM10C, SS440	CN1500	150	270	400
		CN2500	130	240	350
	SM45C	CN1500	150	250	350
		CN2500	130	220	300
	SCM440, Sintered Fe ferrous alloy	CN1500	120	220	300
		CN2500	100	200	250

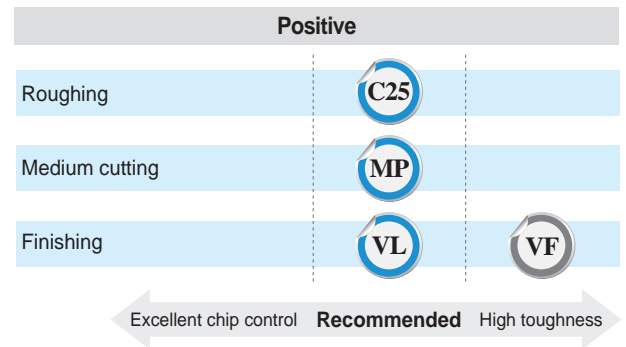
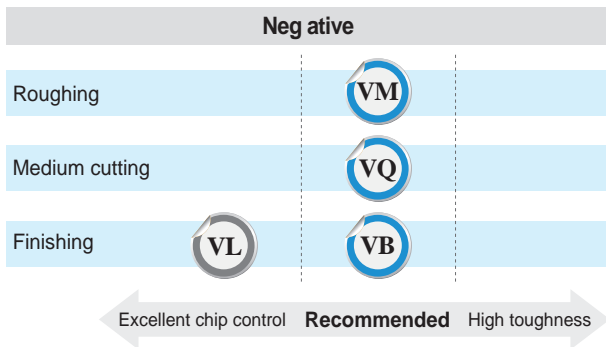
🔍 Grades line up



A Turning Grades

Cermet grades

Chip breakers line up



Selection system of cermet grades

Workpiece	Machining types	Recommended grade	Recommended cutting speed (m/min)	ISO	Application range
P	Steel	Continuous cutting	250 (150~350)	P10	
		Interrupted cutting	220 (130~300)	P20	
				P30	

Comparison of chip breakers

Insert types	Machining types	Application range	Chip breakers				
			KORLOY	Competitor A	Competitor B	Competitor C	Competitor D
Nega type	Continuous cutting	For machining mild steel with enhanced chip control	VL	FA	GP	TF	FA
	General cutting	For low interrupted cutting with stronger cutting edges than VG chip breaker	VB	FG	XP CQ	TSF TS	LU SE
	General cutting	For medium cutting to finishing at low interruption	VQ	MC	HQ	AS, ZM	SU
	Interrupted cutting	For medium cutting to roughing at high interruption	VM	MT	HS	TM	GU
Posi type	Continuous cutting	For machining mild steel with enhanced chip control	VL	FA	GP	PF	FP
	Continuous cutting	Enhanced chip control when machining internal diameter with stronger cutting edges than VL chip breaker	VF	FG-PC	HQ	PS	LU
	General cutting	For medium cutting to finishing at low interruption	MP	FG	HQ	PS	LU
	Interrupted cutting	For medium cutting to roughing at high interruption	C25	MT	GK	24	SC



Coated cermet grades

Coated cermet for machining carbon steel, alloy steel and sintered ferrous components

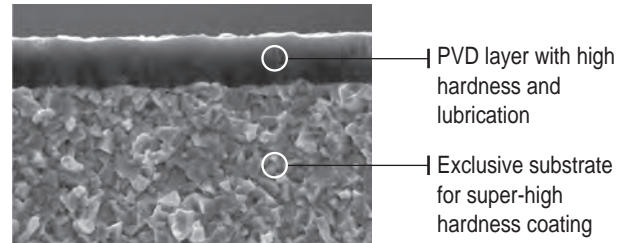
CC1500 **new**

- Maximized resistance to built-up edge and oxidation in continuous cutting at high speeds and low depth of cuts
- Superior wear resistance vs. existing tools in continuous cutting of carbon steel and alloy steel

CC2500 **new**

- Maximized resistance to built-up edge and oxidation in interrupted cutting at high feeds and high depth of cuts
- Superior impact resistance vs. existing tools in interrupted cutting of carbon steel and alloy steel

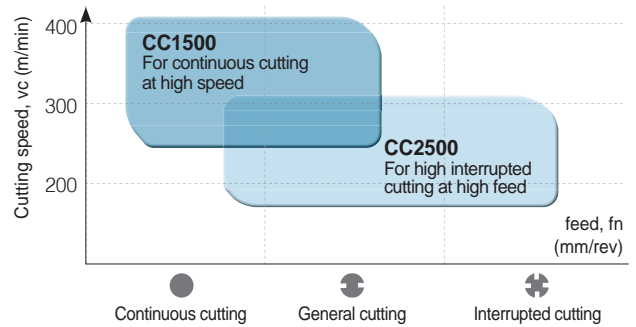
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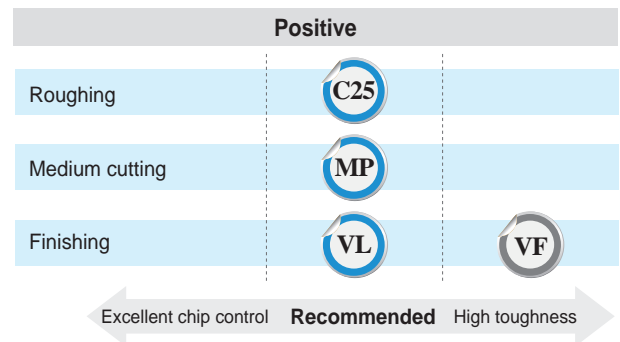
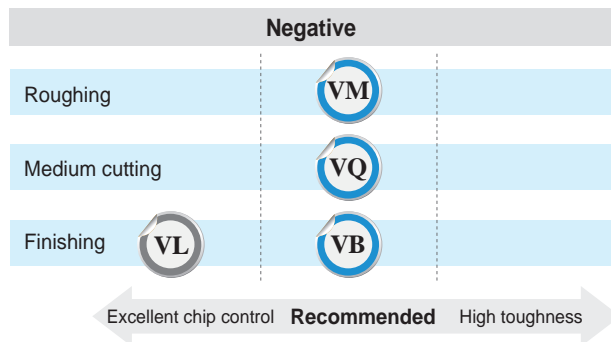
Recommended cutting condition

Division	Workpiece	Grade	Recommended cutting speed (m/min)		
			Minimum	Recommended	Maximum
Turning	SM10C, SS440	CC1500	200	350	450
		CC2500	180	290	400
	SM45C	CC1500	200	300	400
		CC2500	180	270	350
	SCM440, Sintered Fe ferrous alloy	CC1500	180	270	350
		CC2500	150	250	300

Grades line up



Chip breakers line up



Selection system of coated cermet grades

Workpiece	Machining types	Recommended grade	Recommended cutting speed (m/min)	ISO	Application range
P Steel	Continuous cutting	CC1500	325 (200~450)	P10	CC1500
	Interrupted cutting	CC2500	265 (180~350)	P20, P30	CC2500
K Cast iron	Continuous cutting	CC1500	270 (180~350)	K10	CC1500
	Interrupted cutting	CC2500	250 (150~300)	K20	CC2500

The features of coated cermet grade

Coated cermet	ISO	Features
CC1500	P10~P20 / K05~K15	• PVD coated Cermet • Light cutting for steel and cast iron in high speed machining • Optimized for precision boring
CC2500	P20~P30 / K10~K20	• PVD coated Cermet • Light cutting for steel and cast iron in medium or high speed machining • Dry and wet cutting are available



Chip breaker for turning

Geometry	Cutting edge	Application range											Features												
		feed rate f_n (mm/rev)																							
		0.04	0.063	0.10	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4.0		6.3											
depth of cut a_p (mm)																									
											0.1	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10.0	11.6	13		
VL						0.10-0.35																		For Finishing	<ul style="list-style-type: none"> Stable chip control in high toughness material; low carbon steel, pipe steel & steel plates Improved chip control for facing, copy machining and better surface finish
VB						0.15-0.45																		For Finishing	<ul style="list-style-type: none"> Improved chip control for smaller depth of cuts Excellent chip control in copying, corner R machining
VF						0.05-0.35																		For Finishing	<ul style="list-style-type: none"> Good chip control quality on varied depth of cut Excellent cutting edge strength has been acquired due to the special chip-breaker
VC						0.12-0.45																		For Medium to finish cutting	<ul style="list-style-type: none"> Stable chip control in copying and internal machining with various depths of cut
VQ						0.10-0.40																		For Medium to finish cutting	<ul style="list-style-type: none"> Medium to finishing cutting edges offer improved edge hardness Increased chip control in low depth of cut cutting range For cermet
VM						0.10-0.50																		For Medium cutting	<ul style="list-style-type: none"> Wide available chip control range from medium-finishing to medium-roughing Suitable chip breaker for CNC machining
VH																								For Heavy duty cutting	<ul style="list-style-type: none"> Designed specifically for heavy machining Specialized chip breaker for the heavy industries like Ship building, Power plant industry
VT																								For Heavy duty cutting	<ul style="list-style-type: none"> Designed specifically for heavy machining Specialized chip breaker for the heavy industries like Ship building, Power plant industry

Notice: Application ranges are based on main cutting material




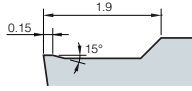

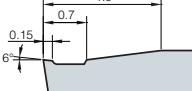

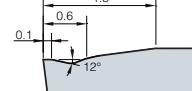

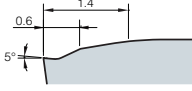

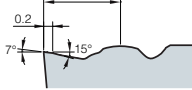

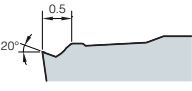
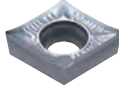
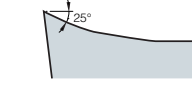
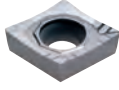
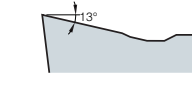
Chip breaker for turning

Geometry	Cutting edge	Application range											Features												
		feed rate f_n (mm/rev)																							
		0.04	0.063	0.10	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4.0		6.3											
depth of cut ap (mm)																									
											0.1	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10.0	11.6	13		
V series	VP1							0.05~0.20																	For Finishing <ul style="list-style-type: none"> High positive cutting edge Reduced contract chip minimizes temperature to improve tool life
	VP2							0.05~0.40						0.5~4.0											For Medium to finish cutting <ul style="list-style-type: none"> Stable chip control and high machinability in copying with various depths of cut
	VP3							0.05~0.45						0.5~4.5											For Medium cutting <ul style="list-style-type: none"> High positive cutting edge with wide land Stable cutting performance in interrupted machining with high toughness Stable machinability and chip control in machining with high depth of cut
	VP4							0.15~0.45						1.0~4.5											For Roughing <ul style="list-style-type: none"> The first recommended chip breaker for inconel cutting High hard and resistant rake angle to prevent notch wear in roughing of rugged surfaces
	VR							0.25~0.55						1.2~7.0											For Roughing <ul style="list-style-type: none"> High feed machining with the combination of wide land and pockets Shallow chip breaker design prevents chip blocking at high feed Decreased wear on major cutting edge due to special treatment on blade
-P series	LP							0.10~0.40					0.5~2.5												For Medium to finish cutting <ul style="list-style-type: none"> Angle land decreases cutting resistance for better surface roughness Special dot design prevents chip blocking by clear chip breaking
	MP							0.15~0.45					0.5~4.5												For Medium cutting <ul style="list-style-type: none"> Increased productivity due to excellent chip control in various conditions Stable tool life by reducing cutting load at high speed and high feed
	CP							0.12~0.35					0.5~3.5												For Medium to finish cutting <ul style="list-style-type: none"> Chip breaker with strong cutting edge in high interrupted finishing and medium cutting Effective chip control in low depth of cut to high depth of cut due to 2-step rear angle

Notice: Application ranges are based on main cutting material



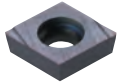
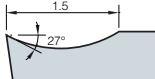

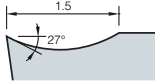

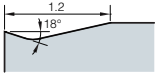
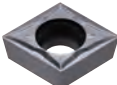

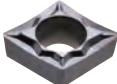
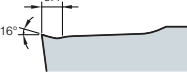

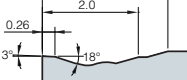

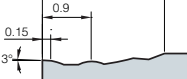
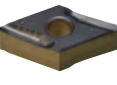


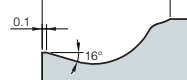
Chip breaker for turning

Geometry	Cutting edge	Application range											Features											
		feed rate f_n (mm/rev)																						
		0.04	0.063	0.10	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4.0		6.3										
depth of cut ap (mm)																								
											0.1	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10.0	11.6	13	
C-Posi series	C25																							For Roughing <ul style="list-style-type: none"> Suitable for interrupted cutting and cast iron machining Good surface finish due to low cutting force Suitable for both boring and outer diameter turning
H-Posi series	HMP																							For Medium cutting <ul style="list-style-type: none"> Excellent chip control at wide range of cutting conditions Machining versatility over a wide range of materials
V-Posi series	VF																							For Finishing <ul style="list-style-type: none"> Improved surface finish and size accuracy due to stable inner boring
V-Posi series	VL																							For Finishing <ul style="list-style-type: none"> Superior chip control in low carbon steel, pipes, and steel plates
P-Posi series	MP																							For Medium cutting <ul style="list-style-type: none"> Sharp cutting edge and wide chip pocket for low cutting load Stable chip control at varying depth of cuts Excellent cutting performance when machining automobile components
AL series	FP																							For Finishing <ul style="list-style-type: none"> For chip control in low depth of cut mild cutting Enhanced surface finish and reduced cutting load
AL series	AK																							For Medium to finish cutting <ul style="list-style-type: none"> Exclusive chip breaker for aluminum and aluminum alloy cutting
AL series	AR																							For Medium to finish cutting <ul style="list-style-type: none"> High stability of cutting edge secures great performance in high speed and interrupted machining High speed of medium and interrupted operation

Notice: Application ranges are based on main cutting material



Chip breaker for turning

Geometry	Cutting edge	Application range													Features	
		feed rate f_n (mm/rev)														
		0.04	0.063	0.10	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4.0	6.3			
		depth of cut ap (mm)														
		0.1	0.16	0.25	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10.0	11.6	13		
Auto tool series	KF			0.01-0.12	0.01-1.0										For Finishing	<ul style="list-style-type: none"> Shallow depth of cut with sharp edge Longer tool life at high speed cutting due to low cutting force Good surface finish
	KM			0.04-0.15	0.05-1.5										For Medium to finish cutting	<ul style="list-style-type: none"> Improved chip control makes tool life long and better machining
	VP1			0.05-0.3	0.5-4.0										For Medium cutting	<ul style="list-style-type: none"> For medium cutting with strong cutting edge For wide range of cutting by optimal width of chip breaker for each cutting depth
	MS			0.03-0.25	0.3-3.0										For medium cutting (for surface roughness)	<ul style="list-style-type: none"> Reduced welding and cutting heat by sharp cutting edge Enhanced chip evacuation in low to high feed cutting
	FS			0.01-0.20	0.1-2.0										For Finishing	<ul style="list-style-type: none"> For various workpiece (P, M, S) cutting Good surface finish and low cutting load due to sharp cutting edge
Wiper series	LW			0.15-0.60	1.0-5.0									For Medium cutting	<ul style="list-style-type: none"> Guarantees excellent surface roughness and good chip controls at high feed machining 	
	VW			0.15-0.50	0.5-3.5									For Medium to finish cutting	<ul style="list-style-type: none"> Improved surface roughness at shallow depth of cut and high feed due to strong cutting edge 	
Shaft series	SR			0.12-0.45	1.0-4.5									For Medium to finish cutting	<ul style="list-style-type: none"> Shallow depth of cut with sharp edge Longer tool life at high speed cutting due to low cutting force Good surface finish 	
	SH			0.15-0.50	1.5-5.0									For Medium cutting	<ul style="list-style-type: none"> Good chip flow increases tool life and machinability. 	

Notice: Application ranges are based on main cutting material

