A

GRADES & CHIP BREAKERS

Korloys 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 tempeure and wear resistance. Additionally, the improved post-coating treatment provides superior surface finishes to ensure the highest levels of quality and productivity.

C O N T E N T S

GRADES & BREAKERS

Solid Endmills & Solid Drills Grades

Others (turning/milling/endmills)

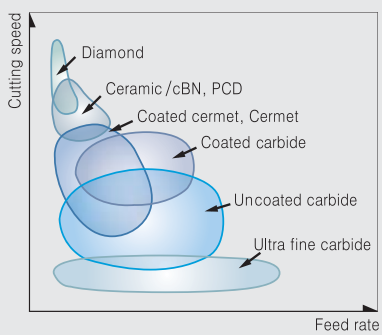
Chip Breakers

Korloy grades system

Cutting Tool

Uncoated carbide	P	Steel	ST05	ST10	ST15	ST20	ST30A	ST30N	ST30	ST40	ST45	ST46
	M	Stainless steel	U10	U20	ST30A	U40						
	K	Cast iron	H02	H01	H05	H10	G10					
	N	Non-ferrous metal	H01									
Coated carbide for turning	P	Steel	NC3010	NC3220	NC3120	NC3030	NC5330	NC500H				
	M	Stainless steel	PC8110	NC9025	PC5300	PC9030						
	K	Cast iron	NC6205	NC6210	NC315K	NC5330	PC5300					
	S	HRSA	PC8110	NC5330	PC5300							
Coated carbide for milling	P	Steel	NC5330	NCM325	PC3600	PC5300	NCM335	PC3545				
	M	Stainless steel	NC5330	PC5300	PC9530	PC3545						
	K	Cast iron	PC8110	PC6510	PC5300	NC5330						
	S	HRSA	PC5300	PC3545								
Coated carbide for Drills, Endmills	Coated	General	PC203F	PC205F	PC210F	PC210A	PC215F	PC220	PC210	PC210C	PC221F	PC230F
	Uncoated	General	H01	FS1	FA1	FA2	FG2	FCC				
Turning Cermet	P	Steel	CN1000	CN2000	CN20	CN30						
	K	Cast iron	CN1000									
Milling Cermet	P	Steel	CC105	CC115	CC125							
Coated cermet	P	Steel	CN2000	CN20	CN30							
cBN	P	Steel	KB320	KB330	KB350	KB360						
	K	Cast iron	KB410	KB350	KB370							
	S	HRSA	KB370									
	H	Hardened steel	KB410	KB420	KB425	DNC250	KB320	KB330	KB370			
PCD	N	Non-ferrous metal	DP90	DP150	DP200							
Diamond Coating	N	Turning	ND1000									
		Milling	ND2000									
		Endmills	ND3000									
DLC Coating	N	Turning	PD1000									
		Milling	PD2000									
		Endmills	PD3000									

Application range



Wear resistance Tool

Ultra fine grain cemented carbide	Z	Ultra fine grain cemented carbide	FS1	FA1	FCC			
Uncoated carbide	V	Wear parts	D1	D2	D3	G5	G6	K20G
	I	Corrosion resistance	IN10	IN20	IN40			

Mining Tool

Uncoated carbide	E	General	GR10	GR20	GR30	GR35	GR40	GR50

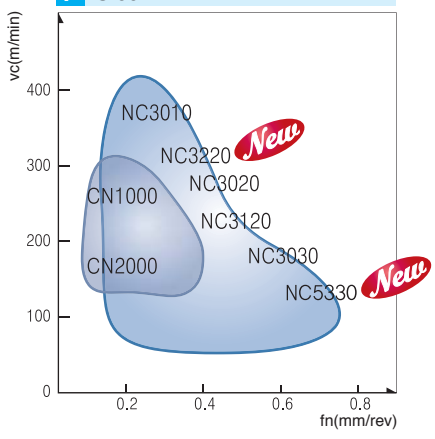
The best way to choose KORLOY turning inserts

Selection system

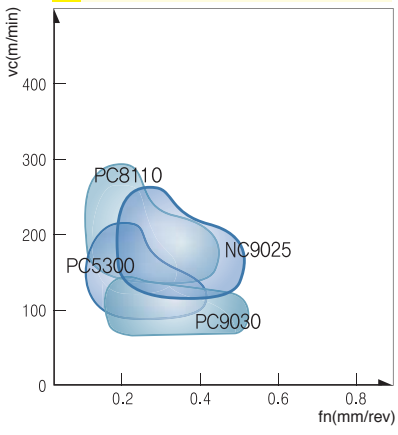
Workpiece	P Steel						M Stainless steel				K Cast iron				N Nonferrous			S HRSA				H Hardened		
ISO	P01	P10	P20	P30	P40	P50	M10	M20	M30	M40	K01	K10	K20	K30	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20
Coated carbide	NC3010						PC8110				NC6205 Neu				ND1000			PC8110				PC8110		
		NC3220 Neu						NC9025				NC6210 Neu			PD1000					NC5330 Neu				
		NC3020							PC5300			NC315K								PC5300				
		NC3120								PC9030			NC5330 Neu											
			NC3030										PC5300											
			NC5330 Neu																					
			NC500H																					
Cermet	CN1000										CN1000													
		CN2000																						
		CN20																						
cBN / PCD											KB350				DP150							KB320		
											KB360											KB330		
Uncoated carbide	ST05						U10				H02				H01							H01		
	ST10							U20			H01													
		ST15							U40		H05													
		ST20									H10													
			ST30N	ST40							G10													
			ST30		ST46																			
					ST45																			

Application range of turning grades

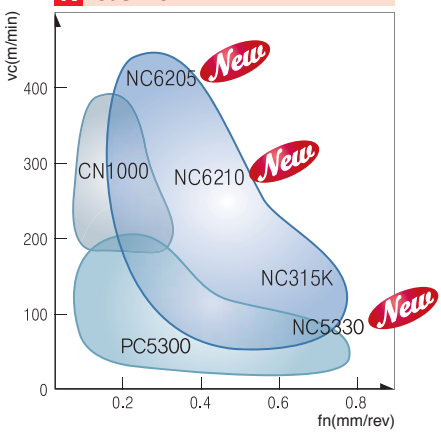
P Steel



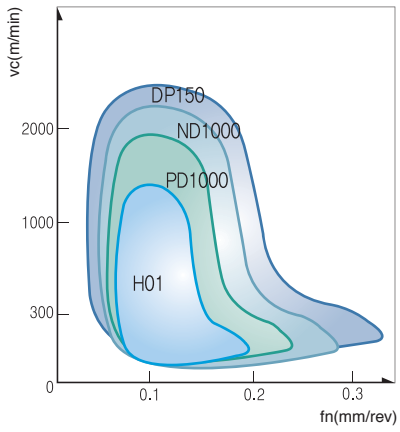
M Stainless steel



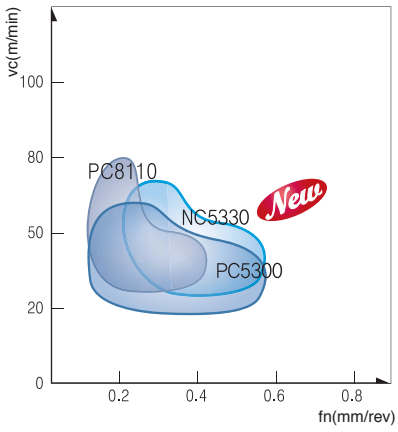
K Cast iron



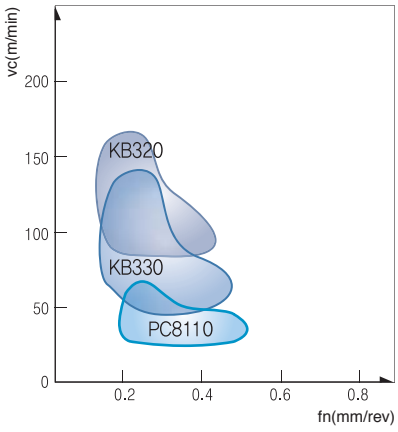
N Non-ferrous metal



S Heat resistant alloy



H Hardened Steel



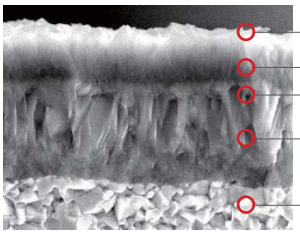
CVD coated Grade

Grade for all applications of steel

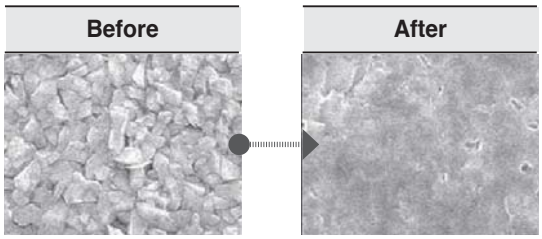
NC3220 New

- NC 3220 covers a wide application range for all kinds of steels (carbon steel, alloy steel, forged steel, rolled steel, tool steel, mild steel, bearing steel and other special steels) in both continuous and interrupted machining.
- New substrate and new coating layer with good wear resistance provides longer tool life preventing plastic deformation in high speed and high temperature machining.
- Improved coating layer with superior adhesion and new surface treatment provides excellent welding resistance and chipping resistance that leads to stability of machining and improvements in productivity .
- Increased lubrication of coating layer improves the surface finish and reduces the cutting load to increase wear resistance.

Coating structure



- TiN layer with good surface roughness and welding resistance
- Al_2O_3 layer with oxidation resistance at high temperature and plastic deformation resistance.
- Bonding layer with excellent chipping resistance due to improving adhesion.
- Fine columnar MT CVD-TiCN with toughness and wear resistance.
- Exclusive substrate material for coating improving wear resistance.

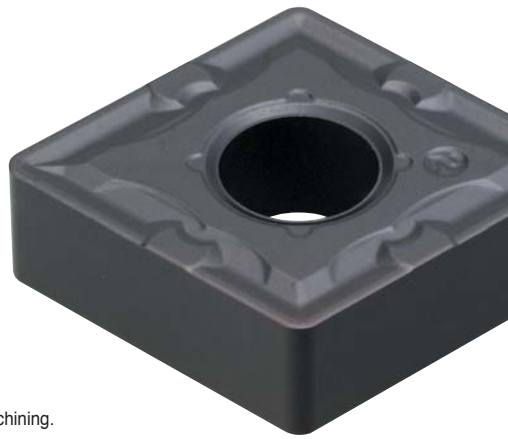


New technology of surface treatment improves welding resistance and stability in machining.

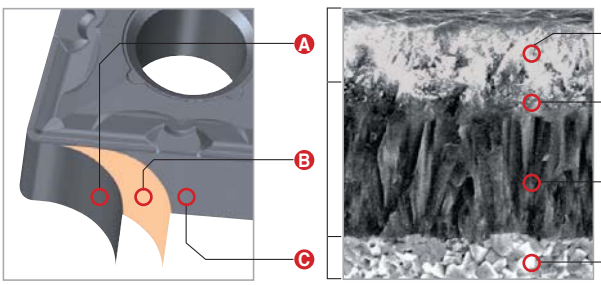
CVD turning grade for Cast iron

NC6205 New NC6210 New

- K-Power coating
- NC6205 - Superior cutting performance in continuous and high speed machining.
- NC6210 - Stable tool life in continuous and interrupted turning

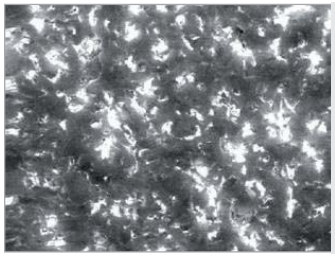


Features



- Al_2O_3 coating layer for good surface finish and wear resistance.
- Special bonding layer for adhesion strength of each layer.
- Fine columnar CVD MT TiCN with improved toughness and hardness
- Exclusive substrate for cast iron machining.

K-Power coating



Outermost layer

Al_2O_3 layer with superior lubrication guarantees wear resistance and chipping resistance in high speed machining.

Bonding layer (between MT-TiCN and Al_2O_3 layer)

Special bonding layer with superb adhesion strength improves flaking resistance and chipping resistance.

Selection system

Workpiece		Machining types	Recommended grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	Continuous cutting	NC3010	300 (200~400)	P01	
					P10	NC3010
					P15	
			NC3220 New	280 (150~380)	P20	NC3220 New
		Interrupted cutting	NC3120	250 (150~350)		NC3120
			NC3030	200 (150~250)	P30	NC3030
			NC5330 New	190 (100~230)	P35	NC5330 New
			NC500H	100 (50~150)	P40	NC500H
M	Stainless steel	Continuous cutting	NC9025	140 (80~220)	M30	
		Interrupted cutting			M40	NC9025
K	Cast iron	Continuous cutting	NC6205 New	270 (150~300)	K05	NC6205 New
			NC6210 New	350 (250~450)	K10	NC6210 New
		Interrupted cutting	NC315K	200 (150~250)	K20	NC315K
			NC5330	180 (130~230)	K30	NC5330 New
S	HRSA	Continuous cutting	NC5330	40 (20~60)	S20	NC5330 New
		Continuous cutting			S30	

The features of CVD turning grades

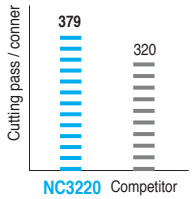
CVD Coated grades	ISO	Features
NC3010	P05 ~ P15	• High speed cutting for steel • Combining excellent wear resistance substrate with chipping and heat resistance Al_2O_3 increased stability • MT-TiCN + Al_2O_3 + TiN
NC3220 New	P15 ~ P25	• For medium machining of steel • Universal grade combining substrate with wear resistance and toughness and Al2O3 coating with oxidation resistance and fracture resistance • Special treatment on the outermost layer • MT-TiCN + Al_2O_3 + TiN
NC3120	P15 ~ P25	• Medium to roughing for steel • Combining excellent fracture resistance substrate with chipping resistance and heat resistance Al_2O_3 increased stability • MT-TiCN + TiC + Al_2O_3
NC3030	P25 ~ P35	• For general cutting, interrupted cutting and roughing operations in steel and stainless steel • Combining excellent fracture resistance substrate with chipping resistance and heat resistance Al_2O_3 increased stability in wide ranges of cutting conditions • MT-TiCN + TiC + Al_2O_3 + TiN
NC5330 New	P30~P40 M25~M35 K15~K25 S15~S25	• stainless Steel/General Cutting for Mild Steel & Forging Steel • MT-TiCN + Al_2O_3 + TiN
NC9025	M25 ~ M35	• stainless Steel/General Cutting for Mild Steel & Forging Steel • MT-TiCN + Al_2O_3 + TiN
NC500H	P25 ~ P35	• Heavy interrupted cutting for steel • Plastic deformation and fracture resistance substrate with chipping resistance and heat resistance Al_2O_3 increased stability in wide ranges of cutting conditions • MT-TiCN + TiC + Al_2O_3 + TiN
NC6205 New	K01 ~ K10	• General cutting for gray cast iron and ductile cast iron • High hardness substrate and improved adhesion of thick Al_2O_3 show superior wear resistance • MT-TiCN + Al_2O_3
NC6210 New	K05 ~ K15	• General cutting for gray cast iron and ductile cast iron • Tough substrate and improved adhesion of thick Al_2O_3 show superior wear resistance • MT-TiCN + Al_2O_3
NC315K	K10 ~ K20	• Interrupted cutting and high-efficiency machining for cast iron • Tough substrate and improved adhesion of thick Al_2O_3 show superior wear resistance • MT-TiCN + Al_2O_3 + TiN

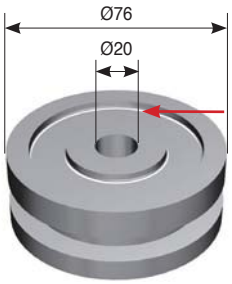
Cutting performance (NC3220)

New

P Alloy Steel (SCR420H, hot forging)

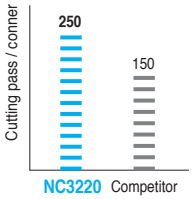
- **Cutting condition** vc(m/min) = 360~430
  fn(mm/rev) = 0.2
  ap(mm) = 1.2~1.5
  (external machining/facing)
  wet
- **Designation** **INSERT** CNMG120408-VB
  HOLDOR PCLNR2525-M12
- **Test result**

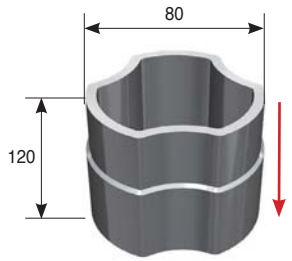




P Carbon Steel(S48C, cold forging)

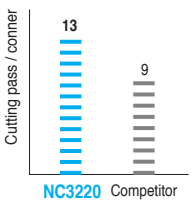
- **Cutting condition** vc(m/min) = 280
  fn(mm/rev) = 0.2~0.25
  ap(mm) = 1
  dry
- **Designation** **INSERT** CNMG120412-VB
  HOLDOR PCLNR2525-M12
- **Test result**

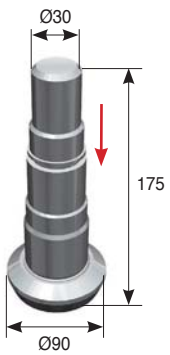




P Alloy Steel (SCM420H, hot forging)

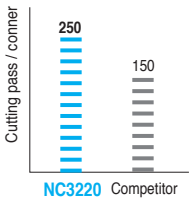
- **Cutting condition** vc(m/min) = 80~500
  fn(mm/rev) = 0.15~0.3
  (External machining/facing /grooving/taping)
  ap(mm) = 0.7~1.5
  wet
- **Designation** **INSERT** DNMG150608-VB
  HOLDOR PDLNR2525-M15
- **Test result**

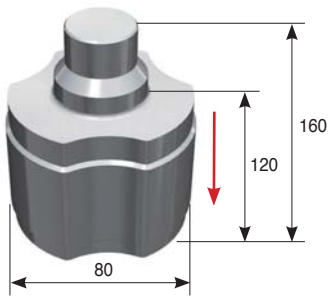




P Carbon Steel(S53C, cold forging)

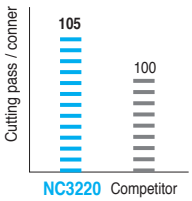
- **Cutting condition** vc(m/min) = 280
  fn(mm/rev) = 0.2~0.25
  (External machining / internal machining)
  ap(mm) = 1
  dry
- **Designation** **INSERT** DNMG150608-VB
  HOLDOR PDLNR2525-M15
- **Test result**

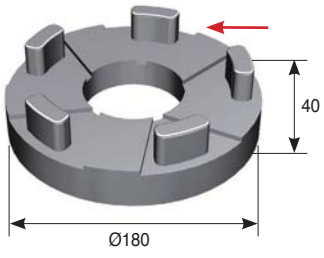




P Alloy Steel (SCR series, cold forging)

- **Cutting condition** vc(m/min) = 314
  fn(mm/rev) = 0.25
  (external machining/facing)
  ap(mm) = 1
  wet
- **Designation** **INSERT** CNMG120408-VM
  HOLDOR PCLNR2525-M12
- **Test result**



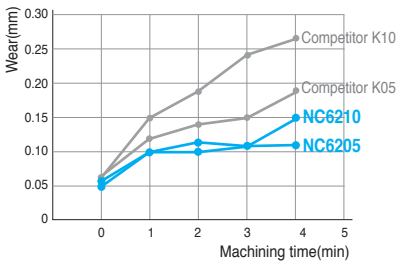


Cutting performance (NC6205 / NC6210)

New

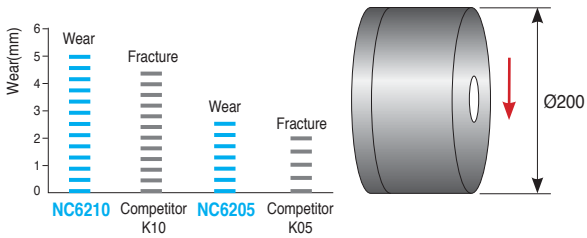
K Gray cast iron(GC250), in high speed machining

- **Cutting condition** vc(m/min) = 600
  fn(mm/rev) = 0.30
  ap(mm) = 1.5
  dry
  Continuous external machining
- **Designation** **INSERT** CNMA120408
  (NC6205, NC6210)
  HOLDER DCLNL3232-P12
- **Test result**



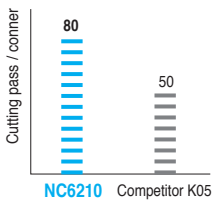
K Ductile cast iron(GCD600), in interrupted machining

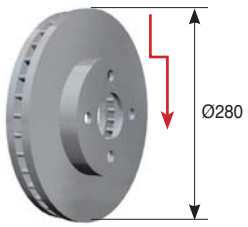
- **Cutting condition** vc(m/min) = 120
  fn(mm/rev) = 0.30
  ap(mm) = 1.5
  wet
  Interrupted facing
- **Designation** **INSERT** CNMA120408
  (NC6205, NC6210)
  HOLDER DCLNL3232-P12
- **Test result**



K Gray cast iron(GC250), Blake Disc

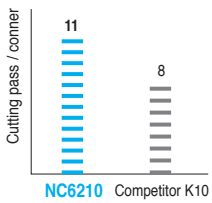
- **Cutting condition** vc(m/min) = 390
  fn(mm/rev) = 0.25
  ap(mm) = 2.0
  wet
- **Designation** **INSERT** CNMG120412-VK(NC6210)
  HOLDER PCLNR2525-M12
- **Test result**

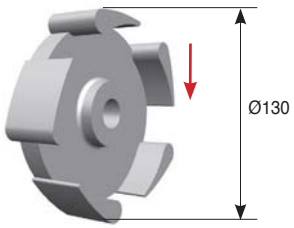




K Gray cast iron(GC250), Nipple

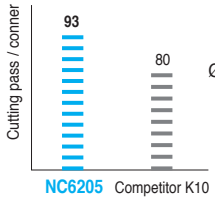
- **Cutting condition** vc(m/min) = 350
  fn(mm/rev) = 0.25
  ap(mm) = 0.7
  wet
- **Designation** **INSERT** CNMG120408-VK(NC6210)
  HOLDER ADNM5100R
- **Test result**

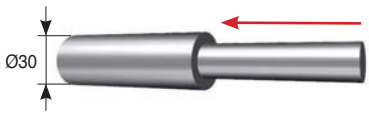




K Ductile cast iron(GCD550), Shaft

- **Cutting condition** vc(m/min) = 120
  fn(mm/rev) = 0.28
  ap(mm) = 2.0
  wet
- **Designation** **INSERT** WNMG080412-VK(NC6205)
  HOLDER DWLNL2525-M08
- **Test result**





PVD coating Grade

PVD Coated grade for stainless steel and HRSA.

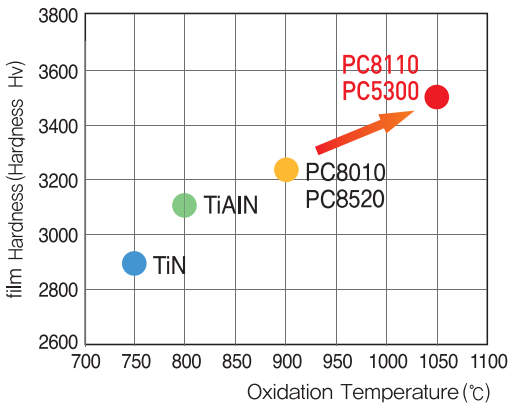
PC8110

- 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
- PC8110 provides high productivity during machining HRSA material in high speed, high feed cutting conditions

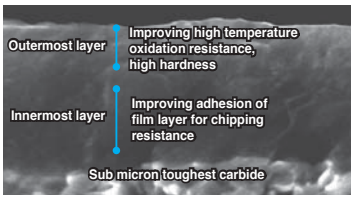
PVD turning grade for stainless steel and HRSA

PC5300

- High efficiency during machining of carbon steel / cast iron / stainless steel / HRSA
- Stable machining due to specific carbide substrate with strong toughness and high hardness that reduces fracture by chipping
- Excellent wear resistance due to special PVD coating film with oxidation resistance, thermal stability, and surface smoothness



Coating structure



Latest PVD coating technology developed by KORLOY
New concept of coating with high temperature oxidation resistance and high hardness

Selection system

Workpiece		Machining types	Recommended grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	Continuous cutting	PC5300	150(120~220)	P30	PC5300
		Interrupted cutting			P40	
M	Stainless steel	Continuous cutting	PC8110	200(150~250)	M10	PC8110
			PC5300	170(120~220)	M20	
		Interrupted cutting			M30	PC5300
			PC9030	120(50~180)	M40	PC9030
S	HRSA	Continuous cutting	PC8110	60(40~90)	S10	PC8110
		Interrupted cutting	PC5300	50(30~70)	S20	
					S30	PC5300

The features of PVD coated grades

PVD Coated grades	ISO	Features
PC9030	M30~M40	• 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
PC8110	M10~M20 S10~S20	• High speed and continuous machining for stainless & HRSA • High chipping and welding resistance longer tool life • New TiAℓN coating and ultra fine grain substrate adopted
PC5300	P30~P40 M20~M30 K20~K25 S20~S30	• 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

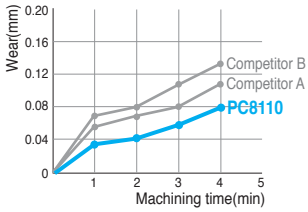
Cutting performance (PC8110 / PC5300)

S Inconel 718

■ **Cutting condition** vc(m/min) = 60
fn(mm/rev) = 0.2
ap(mm) = 2
wet
(4min machining)

■ **Designation** INSERT CNMG120408-HS
HOLDER DCLNL2525-M12

■ **Test result**



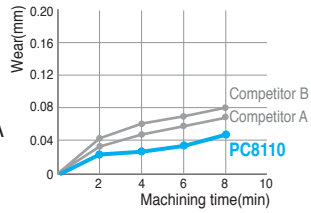
PC8110 Competitor A Competitor B

S Titanium

■ **Cutting condition** vc(m/min) = 70
fn(mm/rev) = 0.2
ap(mm) = 1
wet
(8min machining)

■ **Designation** INSERT CNMG120408-HA
HOLDER PCLNR2525-M12

■ **Test result**



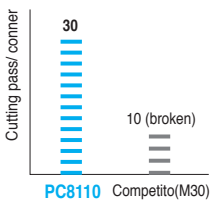
PC8110 Competitor A Competitor B

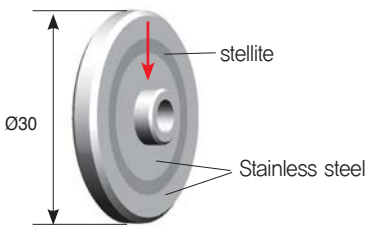
M S Stainless steel(stellite welded)

■ **Cutting condition** vc(m/min) = 60
fn(mm/rev) = 0.2
ap(mm) = 2
wet

■ **Designation** INSERT CNMG120408-GS
HOLDER DCLNL2525-M12

■ **Test result**



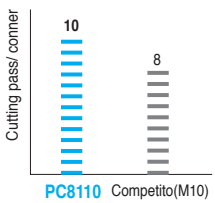


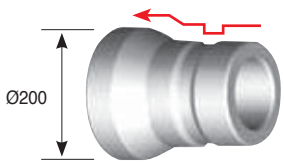
S Inconel 625

■ **Cutting condition** vc(m/min) = 60
fn(mm/rev) = 0.2
ap(mm) = 2
wet

■ **Designation** INSERT DNMG150608-HS
HOLDER DDLNL2525-M15

■ **Test result**



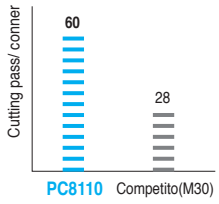


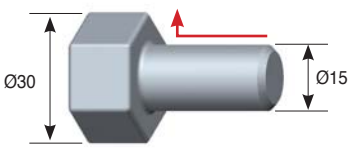
M Stainless steel (STS304)

■ **Cutting condition** vc(m/min) = 282
fn(mm/rev) = 0.2
ap(mm) = 3
wet

■ **Designation** INSERT CNMG120408-HS
HOLDER DCLNL2525-M12

■ **Test result**



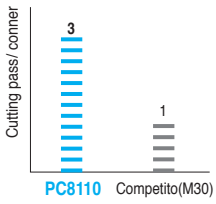


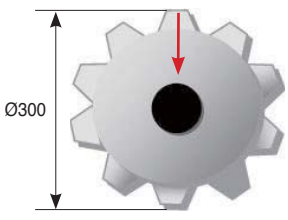
M Stainless steel (STS316)

■ **Cutting condition** vc(m/min) = 120
fn(mm/rev) = 0.2
ap(mm) = 0.5~1.5
wet

■ **Designation** INSERT SNMG120408-GS
HOLDER DSBNL2525-M12

■ **Test result**





KORLOY Uncoated Carbide Grades

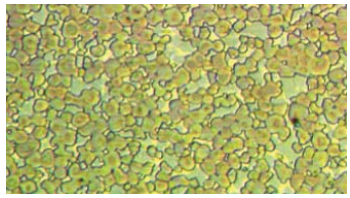
Features

▶ Korloy's uncoated cemented carbides are designed to optimize machining with uniform quality. Furthermore, Korloy's cemented carbides are manufactured with the highest quality tungsten carbides, cobalt, and refractory carbides (TiC,TaC) to produce superior toughness and wear resistance

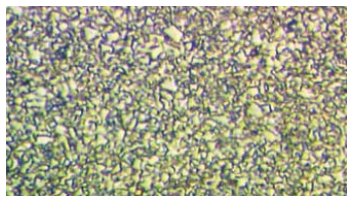
Advantages

▶ P.M.K cemented carbide can be applied for various workpiece
▶ Excellent thermal crack resistance makes it possible to machine in wet cutting conditions
▶ Fine grain and minimizing chemical affinity to workpiece Specially designed by Korloy
▶ High toughness and low cutting force

[Microstructure]



P



K

Selection system

Workpiece		Recommended grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	ST10	150 (100 ~ 200)	P10	ST10
		ST15	140 (90 ~ 190)	P20	ST15
		ST20	130 (70 ~ 180)	P30	ST20
		ST30A	130 (70 ~ 180)		ST30A
K	Cast iron	H02	150 (100 ~ 200)	K01	H02
		H01, H05	140 (100 ~ 200)	K10	H01
		H10, G10	130 (90 ~ 190)	K20	H05
	Alloyed aluminum	H01	500 (300 ~ 800)		H10
	Alloyed copper	H01	200 (150 ~ 300)	K30	G10

Main application

ISO	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

Properties of Uncoated Carbide

ISO	Grade	Hardness (H_RA)	TRS (kgf/mm²)	Young's modulus (10^3kgf/mm²)	Thermal expansion coefficient(10^{-6}/℃)	Thermal conductivity (cal/cm·sec·℃)
P	ST05	92.7	140	-	-	-
	ST10	92.1	175	48	6.2	25
	ST20	91.9	200	56	5.2	45
	ST30A	91.3	230	53	5.2	-
M	U10	92.4	170	47	-	-
	U20	91.1	210	-	-	88
	ST30A	91.3	230	53	5.2	-
	A40	89.2	270	-	-	-
K	H02	93.2	185	61	4.4	105
	H01	92.9	210	66	4.7	109
	G10	90.9	250	63	-	105

GPa = 102kg/mm², 1W/mk = 2.39×10^{-3}cal/cm·sec·°C

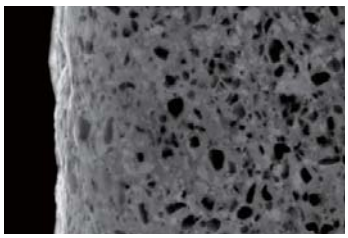
Cermet Grade

For steel, cast iron, other sintering alloy steel(P10, K10)
Continuous cutting exclusive cermet

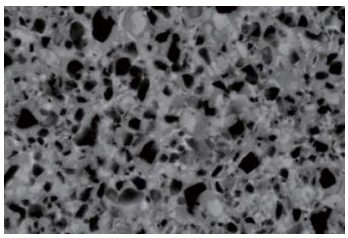
CN1000

- Functionally gradient cermet materialization leads excellent quality on both non-grinding and grinding inserts
- Due to increase of plastic deformation resistance, it maintains superior wear resistance and precision on workpiece dimension over long period usage with wet and dry cutting conditions
- Improved adhesion wear resistance on upper part and cutting edge, reduces tool s cutting load and makes surface finishing smooth after machining
- New cermet grade for finishing of cast iron, carbon steel, alloy steel, and other sintered steels

[Microstructure of Ticn-based cermets]



Surface



Core

Selection system

Workpiece		Machining types	Recommended grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	Continuous cutting	**CN1000**	280 (150 ~ 400)	P10	CN1000
		Interrupted cutting	**CN20**	210 (120 ~ 300)	P20	CN20
			CN2000			CN2000
K	Cast iron	Finishing	**CN1000**	280 (150 ~ 400)	K01	CN1000
					K10	

The features of KORLOY main cermet grade

Cermet	ISO	Features
CN1000	P05 ~ P15 / K05 ~ K10	• High hardness cermet for steel, cast iron, sintered metal • Functionally gradient material cermet as a next generation cermet
CN2000	P10 ~ P20	• Wide ranges from finishing to roughing in steel machining • Functionally gradient material cermet as a next generation cermet
CN20	P10 ~ P20	• For general turning and milling for steel • General purpose grade provided with both wear resistance and toughness

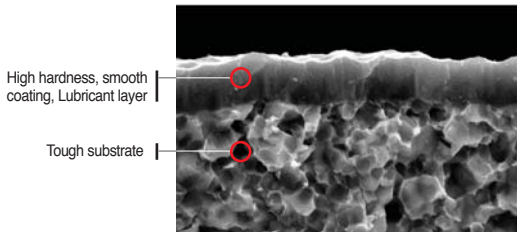
Properties of cermet

ISO	Grade	Hardness	TRS	Specific Gravity
P	**CN1000**	< 1900	< 180	6.5~7.5
	CN2000	< 1800	< 210	6.8~7.0
	CN20	< 1600	< 220	6.7~7.0
K	**CN1000**	< 1900	< 180	6.5~7.5

KORLOY Coated Cermet Grades

Features

- Impact resistance and superior toughness substrate prevents chipping and fracture at the initial stage ensuring longer tool life
- Lubricant coating layer improves chip flow and reduces insert load



Selection system

Workpiece		Machining types	Recommended grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	Continuous cutting	**CC105**	350 (250 ~ 450)	P05	CC105
		Interrupted cutting	**CC115**	280 (230 ~ 400)	P10	CC115
			CC125	230 (150 ~ 300)	P20	CC125

The features of KORLOY coated cermet grade

Coated cermet	ISO	Features
CC105	P01 ~ P10	• PVD coated Cermet • Light cutting for steel and cast iron in high speed machining • Optimized for precision boring
CC115	P10 ~ P20	• PVD coated Cermet • Light cutting for steel and cast iron in medium or high speed machining • Dry and wet cutting are available
CC125	P15 ~ P25	• PVD coated Cermet • High toughness cermet for milling

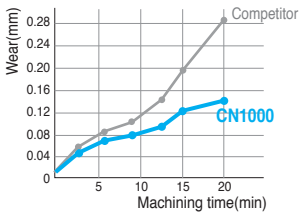
Cutting performance(CN1000)

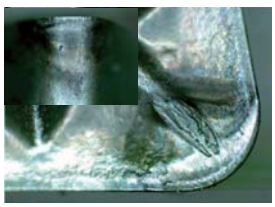
P Carbon steel (SM45C)

■ **Cutting condition** vc(m/min) = 400
fn(mm/rev) = 0.2
ap(mm) = 1.0
wet
(20min machining)

■ **Designation** INSERT CNMG120408-VG
HOLDER PCLNL2525-M12

■ **Test result**




CN1000

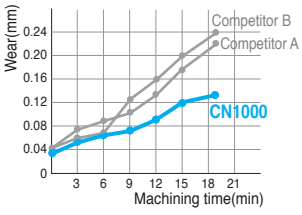

Competitor

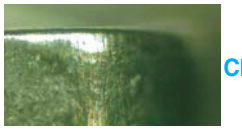
K Cast iron(GC250)

■ **Cutting condition** vc(m/min) = 300
fn(mm/rev) = 0.2
ap(mm) = 1.0
wet
(21min machining)

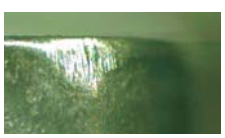
■ **Designation** INSERT CNMG120408-B25
HOLDER PCLNR3232-P12

■ **Test result**




CN1000


Competitor A

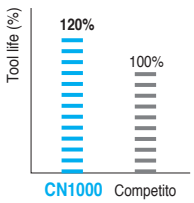

Competitor B

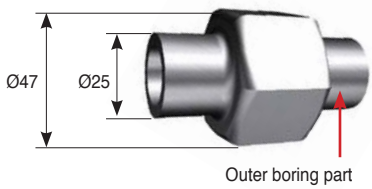
P Carbon steel (SM45C)

■ **Cutting condition** vc(m/min) = 250
fn(mm/rev) = 0.1
ap(mm) = 0.2
wet

■ **Designation** INSERT VNMG160404-VG
HOLDER MVQNR2525-M16

■ **Test result**



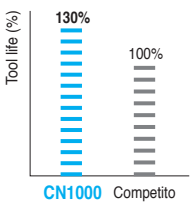


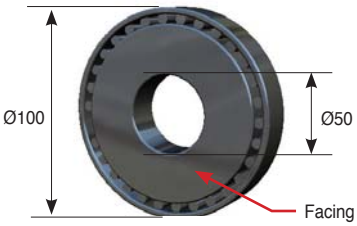
P Alloy steel (SCM420H)

■ **Cutting condition** vc(m/min) = 250
fn(mm/rev) = 0.18
ap(mm) = 0.5
wet

■ **Designation** INSERT DCMT11T304-C25
HOLDER SDJCR2020-K11

■ **Test result**



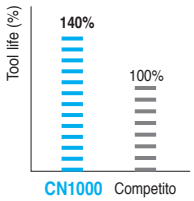


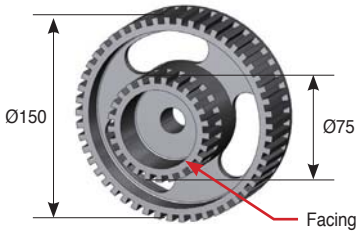
P Sintered ferrous metals

■ **Cutting condition** vc(m/min) = 338
fn(mm/rev) = 0.2
ap(mm) = 0.5
wet

■ **Designation** INSERT CNMG120408-B25
HOLDER PCLNR3232-P12

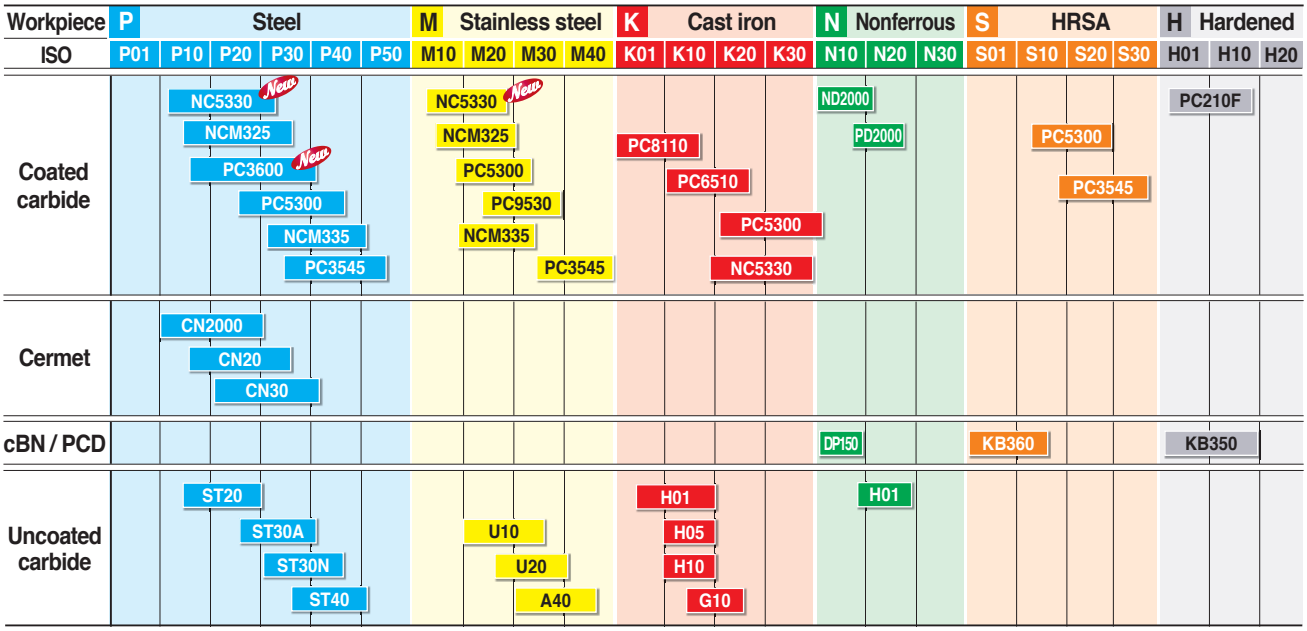
■ **Test result**



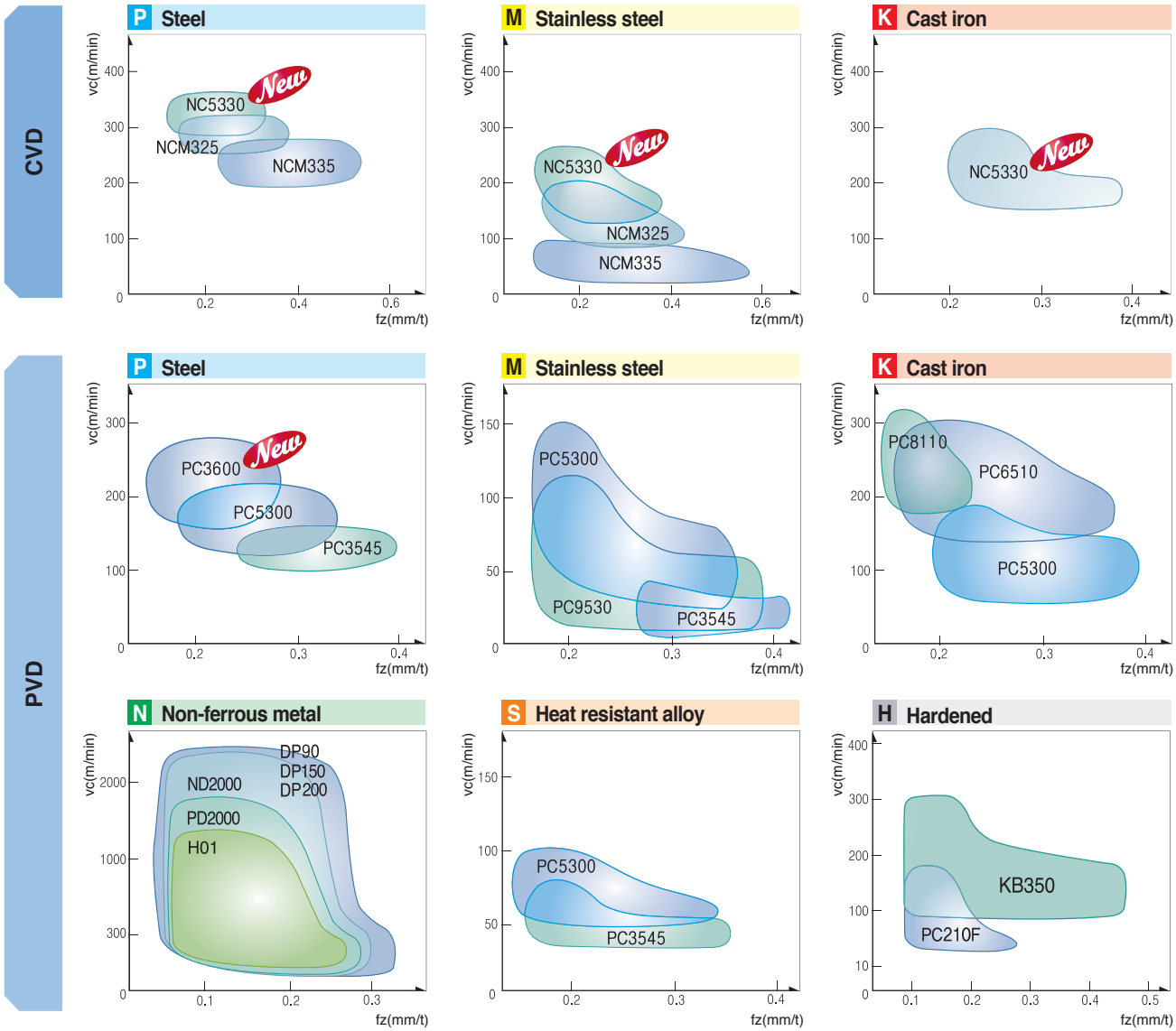


The best way to choose KORLOY Milling inserts

Selection system



Application range of Milling grades



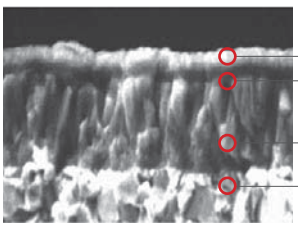
CVD Coated grade

CVD Coated grade for stainless steel and soft steel

NC5330

- Tough carbide, smooth coating for improved tool life
- Built-up-edge resistance, notch wear resistance, and the toughness have been improved
- Outstanding performance for stainless steel machining
- Excellent for machining sticky, soft steels, and forged steels
- Superior tool life for machining hard to cut material such as inconel and stellite

Coating structure



- TiN film : Smooth surface roughness and superior anti built-up-edge
- Fine columnar TiCN film : Optimimal toughness and hardness
- Toughest dedicated carbide substrate employed
- $A\ell_2O_3$ film : Excellent oxidation resistance

Selection system

Workpiece		Machining types	Recommended grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	Continuous cutting	NC5330 New	270(220~320)	P15	NC5330 New
					P20	
		Continuous cutting	NCM325	250(150~300)	P25	NCM325
					P30	
		Interrupted cutting	NCM335	230(120~280)	P35	NCM335
					P40	
M	Stainless steel	Continuous cutting	NC5330 New	200(150~250)	M10	NC5330 New
					M20	
		Continuous cutting	NCM325	180(140~230)	M30	NCM325
		Interrupted cutting	NCM335	170(120~210)	M40	NCM335
K	Cast iron	Continuous cutting	NC5330 New	170(130~220)	K20	NC5330 New
					K30	

The features of CVD Milling grades

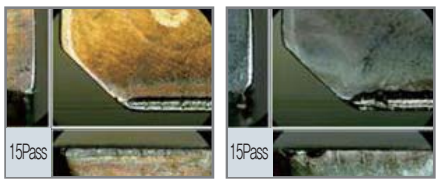
CVD Coated grades	ISO	Features
NC5330 New	P15 ~ P25 M10 ~ M20 K10 ~ K20	• For high speed milling of steel and stainless steel • Superior wear resistance and chipping resistance grade for steel and stainless steel • MT-TiCN + $A\ell_2O_3$ + TiN
NCM325	P20 ~ P30 M20 ~ M30	• For high speed milling of steel and stainless steel • Optimized grade for steel & stainless steel by employing proper substrate and hard coating • MT-TiCN + $A\ell_2O_3$ + TiN
NCM335	P30 ~ P40 M30 ~ M40	• For interrupted and rough milling of steel and stainless steel • Toughest substrate with hard coating provides stable cutting and tool life for severe interrupted cutting • MT-TiCN + $A\ell_2O_3$ + TiN

Cutting performance(NC5330)

New

P Alloy steel (SCM440)

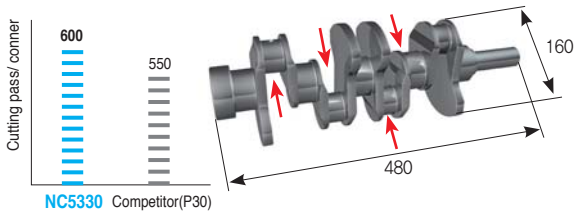
- **Cutting condition** vc(m/min) = 250
  fz(mm/t) = 0.30
  ap(mm) = 2.0
  dry
- **Designation** **INSERT** SDKN1504AESN-SU
  CUTTER ADNM5125R
- **Test result**



NC5330 Competitor

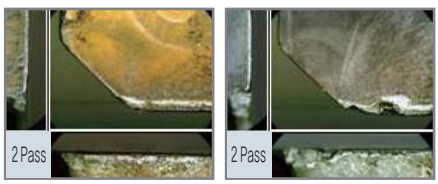
P Alloy steel (SCM440H)

- **Cutting condition** vc(m/min) = 130
  fz(mm/t) = 0.30
  ap(mm) = 3.5
  dry
- **Designation** **INSERT** HS004072
- **Test result**



P Stainless steel (STS304)

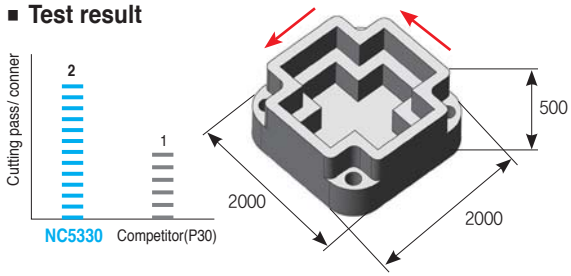
- **Cutting condition** vc(m/min) = 150
  fz(mm/t) = 0.25
  ap(mm) = 2.0
  dry
- **Designation** **INSERT** SDKN1504AESN-SU
  CUTTER ADNM5125R
- **Test result**



NC5330 Competitor

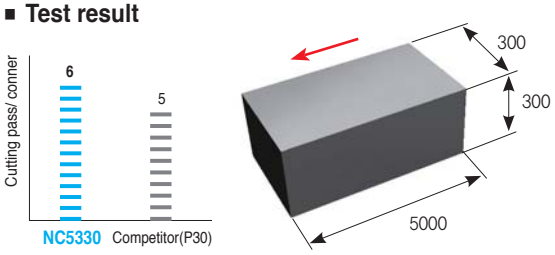
K Ductile cast iron (GCD500)

- **Cutting condition** vc(m/min) = 200
  fz(mm/t) = 0.20
  ap(mm) = 5.0
  dry
- **Designation** **INSERT** SDKN1504AESN–SU
  CUTTER ADNM5100R
- **Test result**



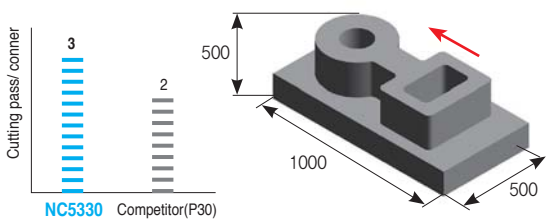
P Carbon steel (SM45C)

- **Cutting condition** vc(m/min) = 275
  fz(mm/t) = 0.13
  ap(mm) = 7.0
  wet
- **Designation** **INSERT** TNMX2710AZNR-NM
  CUTTER PBAM5125R-M
- **Test result**



K Gray cast iron(GC400)

- **Cutting condition** vc(m/min) = 355
  fz(mm/t) = 0.16
  ap(mm) = 5.0
  dry
- **Designation** **INSERT** SPKN1504EDSR-SU
  CUTTER ADNM5100R
- **Test result**



PVD coating Grade

PVD new grade for steel milling

PC3600(SU/MU) New

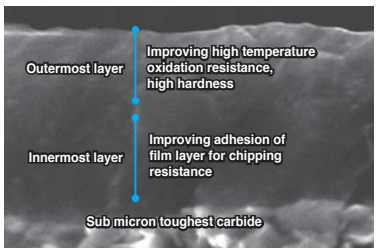
- Coating layer with high hardness and oxidation resistance at high temperature ensures stable tool life.
- Superior wear resistance and impact resistance in high speed machining of P grade materials

Universal PVD Grade

PC5300

- High efficiency during machining for carbon steel / cast iron / stainless steel / HRSA
- Stable machining due to specific carbide substrate with strong toughness and high hardness that restrains fracture by chipping
- Excellent wear resistance due to special coating film with oxidation resistance, thermal stability, and surface smoothness

Coating structure



Latest PVD coating technology developed by KORLOY
New concept of coating equipped with high temperature oxidation resistance and high hardness

Selection system

Workpiece		Machining types	Recommended grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	Continuous cutting	PC3600 New	200 (150~250)	P20	PC3600 New
					P30	PC5300
		Interrupted cutting	PC5300	120 (100~150)	P40	PC3545
			PC3545		P50	
M	Stainless steel	Continuous cutting	PC5300	120 (100~150)	M20	PC5300
			PC9530	130 (50~200)	M30	PC9530
		Interrupted cutting	PC3545	120 (100~150)	M40	
K	Cast iron	Continuous cutting	PC8110	250 (200~400)	K01	PC8110
			PC6510	200 (150~250)	K05	PC6510
		Interrupted cutting	PC5300	165 (120~210)	K10	PC5300
					K20	
S	HSRA	Continuous cutting	PC5300	70(40~100)	S20	PC5300
		Interrupted cutting	PC3545	50(30~70)	S30	PC3545
H	High hardness steel	Continuous cutting	PC210F	250(150~300)	H01	PC210F
					H10	

The features of PVD coated grades

PVD Coated grades	ISO	Features
PC3600 New	P20 ~ P30	• Milling grade for medium and roughing of steel • New coating layer with superior wear resistance and oxidation resistance with high toughness substrate • TiAlN / New coating • Grooving, Cutting, Milling
PC3545	P35 ~ P45	• Medium and rough milling for steel. • Enhanced chipping resistant substrate. • K-Gold coating
PC5300	P30~P40 S20~S25 M20~M30 K10~K20	• Superior universal grade for steel, cast iron, hard to cut material, stainless steel • New coating and ultra fine grain provide wear resistance and oxidation resistance • For turning, milling, grooving, parting, drilling, and threading
PC8110	K01~K10	• Medium and rough cutting for hard to cut material and stainless steel • Superior wear resistance for finishing cast iron • New coating and ultra fine grain provide wear resistance and oxidation resistance • For turning, milling, grooving, parting
PC6510	K05~K15	• High speed milling grade for cast iron and aluminum. • K-Gold coating
PC9530	M20 ~ M35	• Milling grade for cast iron and aluminum in medium to low cutting speed. • The toughest sub-micron substrate provides excellent cutting performance at high feed. • TiAlN coating • For milling, drilling
PC210F	H01~H10	• High speed milling grade for hardened steel , cast iron, and stainless steel(ILaser Mill) • New coating and ultra fine grain provide wear resistance and oxidation resistance • Endmilling

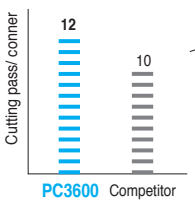
Cutting performance (PC3600) New

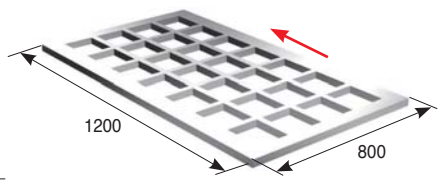
P SS41

■ **Cutting condition** vc(m/min) = 216
fz(mm/t) = 0.39
ap(mm) = 1.0
dry

■ **Designation** **INSERT** TPKN2204PDSR-SU
CUTTER PPN4125R

■ **Test result**



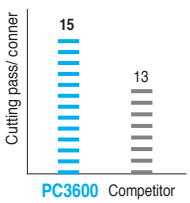


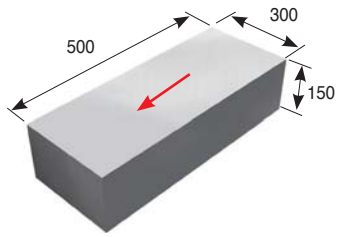
P SCM415

■ **Cutting condition** vc(m/min) = 228
fz(mm/t) = 0.15
ap(mm) = 1.0
dry

■ **Designation** **INSERT** SDKN1504AESN-SU
CUTTER ADN5315R

■ **Test result**



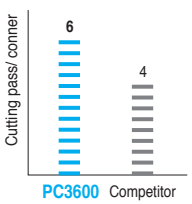


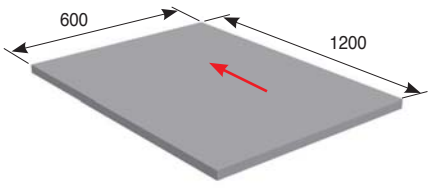
P SM45C

■ **Cutting condition** vc(m/min) = 306
fz(mm/t) = 0.13
ap(mm) = 2.0
dry

■ **Designation** **INSERT** SDKN1203AESN-SU
CUTTER ADN4315R

■ **Test result**



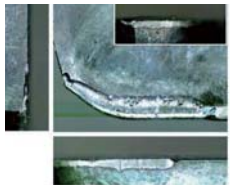


P STD11

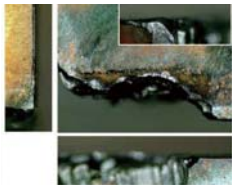
■ **Cutting condition** vc(m/min) = 200
fz(mm/t) = 0.2
ap(mm) = 2.0
dry

■ **Designation** **INSERT** SPKN1504EDSR–SU
CUTTER EPN5160R

■ **Test result (340min machining)**



PC3600



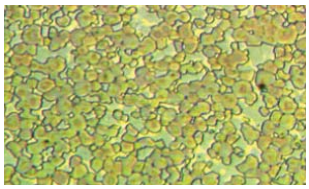
Competitor

Cemented Carbide Grades

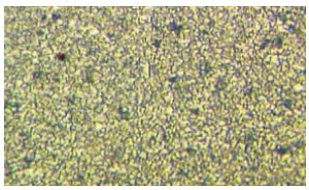
Features

▶ Due to Korloys advanced sintering technology, our uncoated carbide grades have a fine alloy structure which is necessary to get superior quality from a uncoated cutting tool

[Microstructure]



P



K

Advantages

▶ Consist of P,M,K carbide grades and can be used in all kinds of workpiece
▶ Excellent quality at machining with coolant, due to the superior thermal crack resistance of the carbide
▶ Due to the special design of carbides, it has fine micro structure and low affinity with workpiece
▶ It has excellent toughness and produces lower cutting loads

Selection system

Workpiece		Grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	ST30A	130 (70 ~ 180)	P30	ST30A
K	Cast iron	H01, H05	150 (100 ~ 200)	K01	
		H10, G10	140 (90 ~ 190)	K10	H01
	Aluminum alloy	H01	500 (300 ~ 800)	K20	H05
	Copper alloys	H01	200 (150 ~ 300)	K30	G10

Main composition and application range

ISO	Composition	Features	Workpiece
P	WC-TiC-TaC-Co	Excellent thermal shock resistance and plastic deformation resistance	Carbon steel, Alloy steel, Stainless steel
M	WC-TiC-TaC-Co	General grades with thermal shock resistance and hardness	Carbon steel, Alloy steel, Stainless steel, Cast steel
K	WC-Co	High hardness and superior wear resistance	Cast iron, Non-ferrous metal, Non metal

The physical properties of grades

ISO	Grade	Hardness (H_RA)	TRS (kgf/mm²)	Young's modulus (10^3kgf/mm²)	Thermal expansion coefficient(10^{-6}/℃)	Thermal conductivity (cal/cm · sec · ℃)
P	ST05	92.7	140	-	-	-
	ST10	92.1	175	48	6.2	25
	ST20	91.9	200	56	5.2	45
	ST30A	91.3	230	53	5.2	-
M	U10	92.4	170	47	-	-
	U20	91.1	210	-	-	88
	ST30A	91.3	230	53	5.2	-
	U40	89.2	270	-	-	-
K	H02	93.2	185	61	4.4	105
	H01	92.9	210	66	4.7	109
	G10	90.9	250	63	-	105

1Gpa = 102kg/m², 1w/m·k = 2.39×10^{-3} cal/cm·sec·°C

Milling Cermet Grades

Features

- ▶ High hardness substrate ensures long tool life in high speed milling.
- ▶ High toughness cutting edge ensures long tool life even in high impact machining.
- ▶ Chemically stable substrate provides excellent surface finish of the workpiece.

• Application range

Wide application range: carbon steel(from soft steel to high carbon steel), alloy steel, hardened steel(especially KP4M, NAK80), tool steel(STD61 and others)

Selection system

Workpiece		Machining types	Grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	Continuous cutting	**CN2000**	250 (200 ~ 300)	P10 ~ P20	CN2000
		Continuous cutting	**CN20**	180 (130 ~ 230)	P15 ~ P25	CN20
		Interrupted cutting	**CN30**	150 (100 ~ 200)	P20 ~ P30	CN30

The features of main cermet grades

Cermet Grade	ISO	Features
CN2000	P10 ~ P20	• Universal grade from finishing to roughing of steel • Functionally Gradient Material
CN20	P15 ~ P25	• For general turning and milling of steel • Universal cermet with wear resistance and toughnes
CN30	P20 ~ P30	• For milling of steel • Cermet with high toughness

The physical properties of grades

ISO	Grade	Hardness(Hv)	TRS(kgf/mm^2)	SG(g·cm^{-3})
P	**CN2000**	< 1800	210 <	6.8~7.0
	CN20	< 1600	220 <	6.7~7.0
	CN30	< 1500	240 <	7.0~7.3

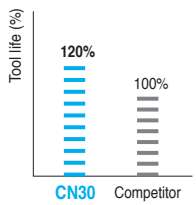
Cutting performance

P STD11, NAK80, SM45C, KP4M

■ **Cutting condition** vc(m/min) = 120~150
fz(mm/t) = 0.07~0.13
ap(mm) = 2.0
dry

■ **Designation** **INSERT** SDCN42MT
CUTTER ADN4315R

■ **Test result**

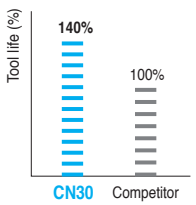


P SM55C, KP4M

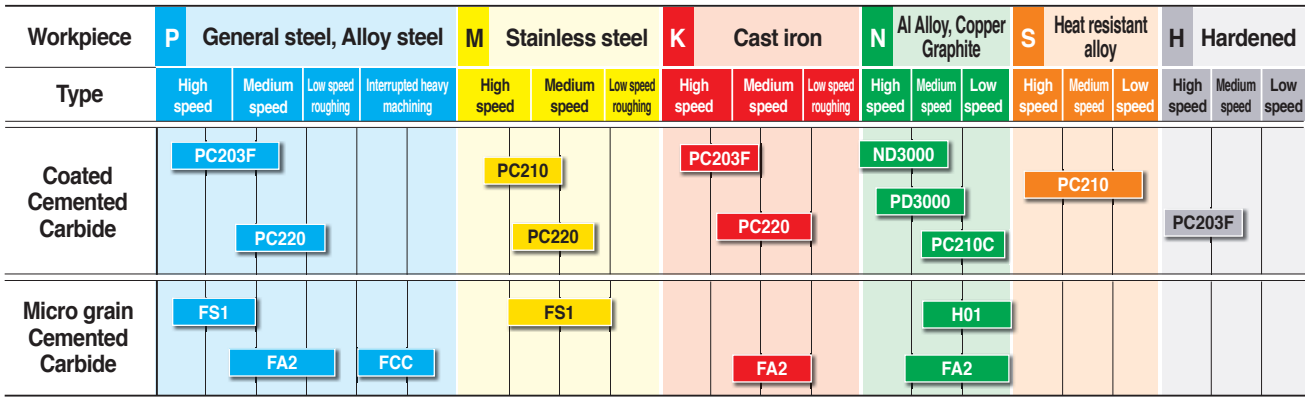
■ **Cutting condition** vc(m/min) = 230
fz(mm/t) = 0.1~0.15
ap(mm) = 1.0
dry

■ **Designation** **INSERT** SDCN42MT
CUTTER ADN4315R

■ **Test result**



Selection system



Selection system

Workpiece		Recommended grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	PC203F(H-Max)	130~260	P01	PC203F (H-Max)
				P10	
		PC220(I-Max)	80~150	P20	PC220 (I-Max)
				P30	
M	Stainless steel	PC210	80~150	M10	PC210
				M20	
K	Cast iron	PC203F(H-Max)	130~260	K01	PC203F (H-Max)
				K10	
		PC220(I-Max)	80~150	K20	PC220 (I-Max)
				K30	
S	HRSA	PC210	50~100	S15	PC210
				S25	
N	Nonferrous	ND3000(D-Max)	150~250	N01	ND3000(D-Max)
		PD3000	150~250	N10	PD3000
		PC210C(C-Max)	150~250	N20	PC210C(C-Max)

The features of PVD coated grades

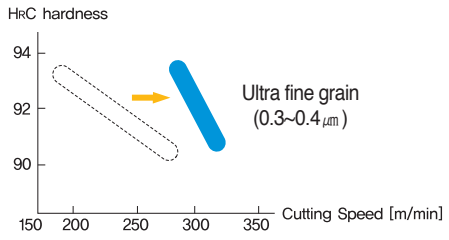
PVD Coated grades	ISO	Features
PC203F (H-Max)	P01~P10 K01~K10	• Suitable for high speed cutting of steel • Combination of tough ultra fine grain substrate and PVD coating provide superior wear resistance and chipping resistance • New concept of coating equipped with high • temperature oxidation resistance and high hardness
PC210	M10~S20 S15~S25	• Suitable for medium/low speed cutting of steel, stainless steel and super alloy • Ultra fine grain with coating provide superior tool life in high speed cutting
PC210C (C-Max)	N10~N20	• Medium to high speed machining of copper • Excellent combination of chipping resistance substrate and K-Silver coating file having wear resistance, good lubrication
PC220 (I-Max)	P15~P35 K15~K35	• General cutting for steel • Combination ultra fine grain and hard coating provide wear resistance and chip welding resistance. • Superior new coating to better chipping resistance and wear resistance

Ultra fine grain cemented carbide

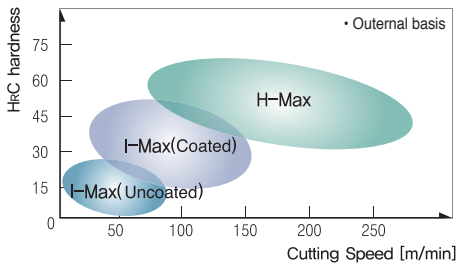
Features

▶ Ultra fine grade has better toughness than general cemented carbide with same hardness.These properties allow it to replace High Speed Steel

▶ This is achieved through a high oxidation temperature(1200 °C) with high hardness, and provides superior performance for high speed cutting and dry cutting



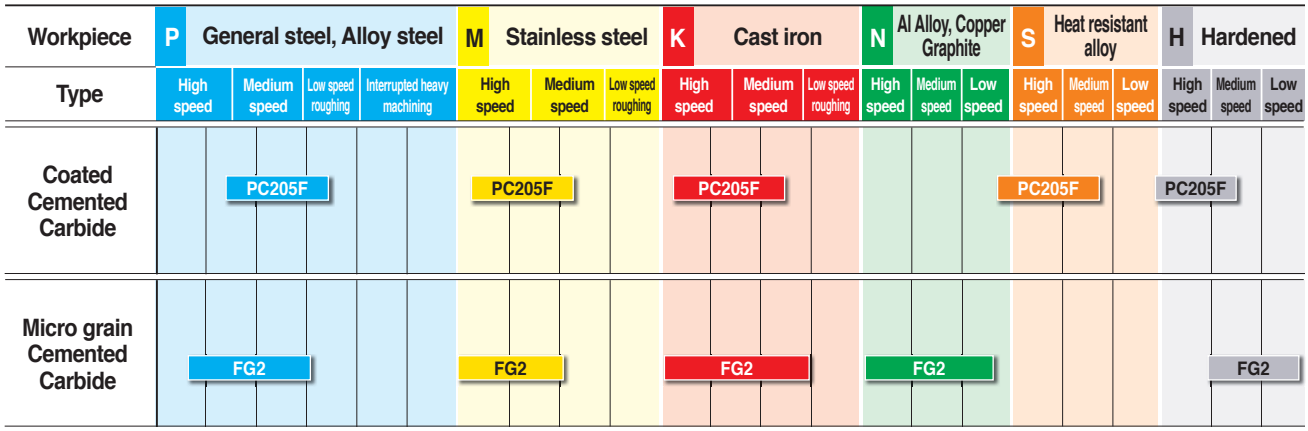
• Increasing TRS, Cutting speed by applying ultra fine grain



Features of Korloy endmills

Index	Features
H-Max (for high speed, high hardened steel)	• New design for hardened steel cutting (over H RC53). Special sphere tool geometry provides increased tool life and allows higher speeds and feed operations • Combination TialN hard coating with suitable substrate increases tool life
I-Max (Coated, General machining)	• Superior wear resistance and chipping resistance by applying ultra fine grain and Korloy's exclusive PVD layer • Available for various machining from roughing to finishing
I-Max (Carbide endmills)	• Suitable for all milling types such as jig and molding with various designation • Multi purpose machining possible(shouldering, slotting)
Hard to cut machining, stainless steel	• Sharp cutting edge and high rake angle with streamline chip pocket shows good cutting performance in stainless steel machining where work hardening is a problem.
Carbide endmills for aluminum alloy (SSEA, SSBEA)	• Suitable for high speed machining in aluminum and other non-ferrous materials • Can accomplish excellent surface finishing, superior chip removal in high feed rate
Micro endmills (MSE/MSBE)	• Small size endmills, for various micro machining, has been strengthened in the neck for protection against fracture at high speeds
Rib endmills	• Suitable for hardened steel at high speed cutting(H RC65) • For various machining like auto-motor, mobile phone and semi-conductor device mold and die provide high productivity, high efficiency at high speed
C-Max	• Excellent combination of chipping resistant substrate and CrN coating film having wear resistance and chipping resistance
D-Max	• Optimum coated property with fine diamond particle in nonferrous metal machining as graphi increasing tool life and good surface roughness through improved edge geometry • Available to cutting application in intermittent cutting condition and high precision machining as well

Selection system



Selection system

Workpiece		Recommended grade	Recommended cutting speed(m/min)	ISO	Application range
P	Steel	PC205F	130~250	P01	PC205F
				P10	
				P20	
				P30	
M	Stainless steel	PC205F	80~180	M01	PC205F
				M10	
				M20	
				M30	
K	Cast iron	PC205F	130~250	K01	PC205F
				K10	
				K20	
				K30	
S	HRSA	PC205F	80~130	S01	PC205F
				S10	
				S20	
				S30	

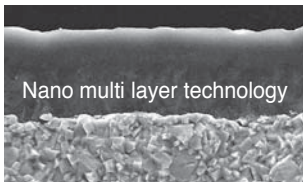
The features of PVD coated grades

PVD Coated grades	ISO	Features
PC205F	P15~P30 M15~M30 K15~K30 S15~S25	• Solid drill(under Ø20) for steel, stainless steel and super alloy • Superior wear resistance and chipping resistance with ultra fine grain

Diamond Coated Grades

Features

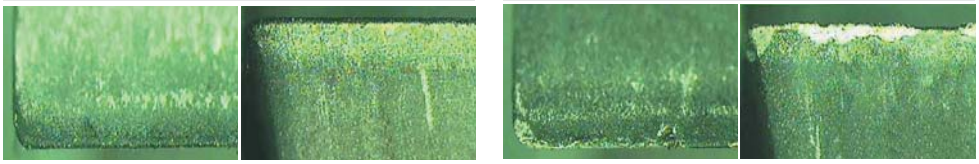
- ▶ Increased tool life of up to 150% due to Korloy Nano technology
- ▶ The nano-size (~100nm) of diamond particles decreases the friction co-ef ficient Less friction leads to better chip flow
- ▶ Due to the minimized built-up on the cutting edge, machined surfaces retain a better finish



ND1000/ND2000 coating structure

Cutting Performance of ND2000

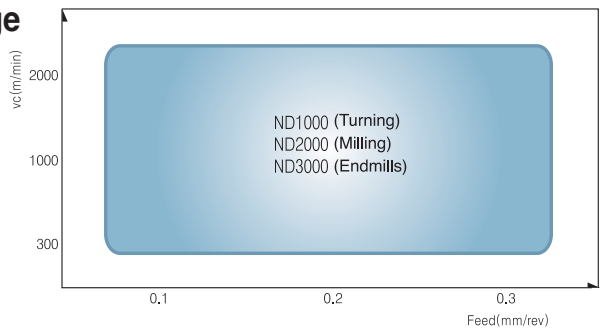
ND2000 | ND200

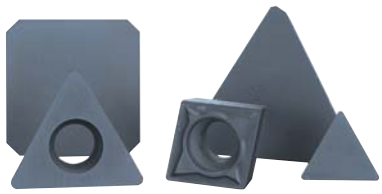


(APKT1604PDFR-MA, AMS3063S)

- Cutting length : 10m
- Workpiece : AC8A
- Speed(vc) : 950m/min
- Depth of cut(ap) : 5mm
- Feed(fz) : 0.15mm/t
- Coolant : Dry

Application range





ND Series

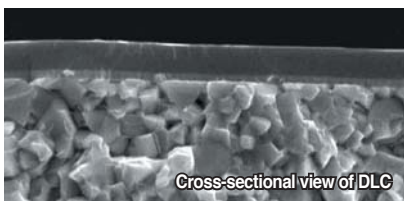
Available Products

• AR Chip breaker • AK Chip breaker • Insert for Aluminum machining

DLC Coated Grades

Features

- ▶ Hardness of film is up to Hv 7000, tool life is 3~6times of cemented carbide cutting tool
- ▶ Good surface finish can be acquired due to the lubrication effect that led from low friction co-efficient (<0.1)
- ▶ Suitable for non-ferrous material machining

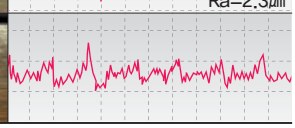


Application

▶ For aluminum, carbon, plastic, wood / Insert, drill, end-mill

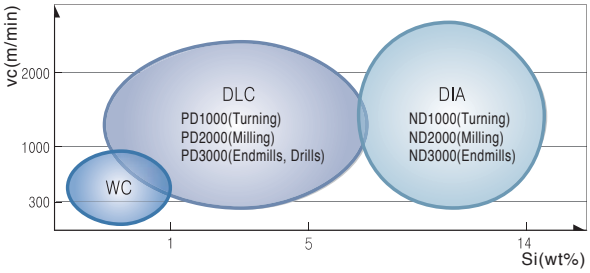
Cutting performance

(built- up edge / surface finish, FMACM3100R)

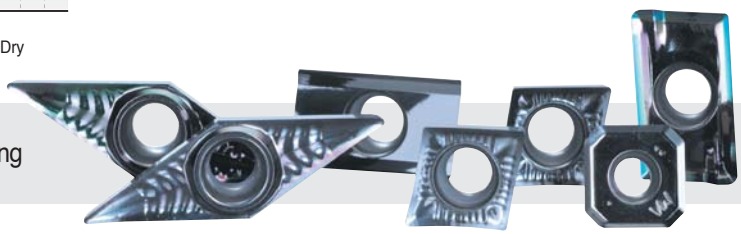
Grade \ View	Top face	Major cutting edge	Surface finish of workpiece
Uncoated			
DLC			

• Workpiece : AC2B
• Cutting length : 12m • Cutting condition : vc=1500m/min, fz=0.15mm/t, ap=2mm, Dry

Application range



Leader of DLC coated cutting tool for aluminum machining

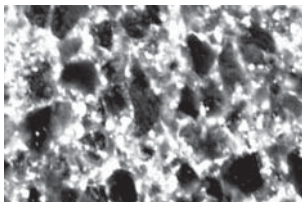


Brand new cBN insert

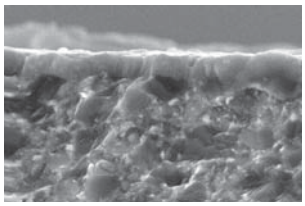
Coated Multi-Cornered cBN

DNC250

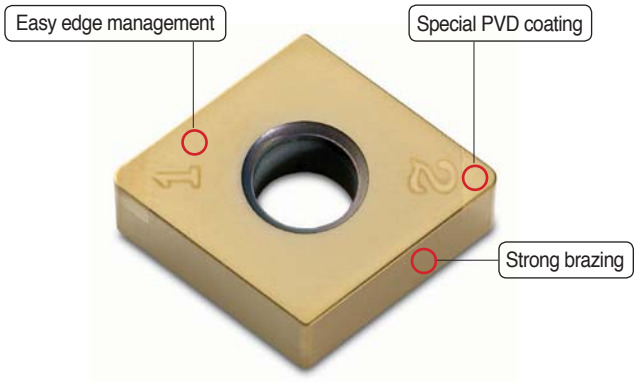
- Stable and long tool life
- Cost effective by multi-cornered one-use insert



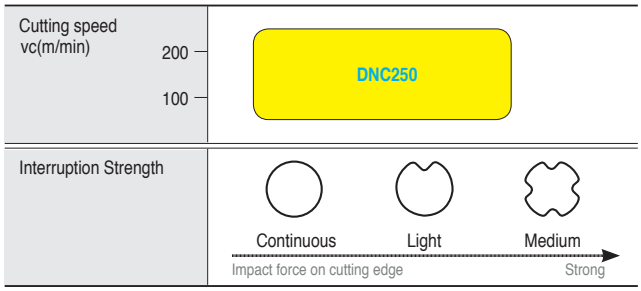
- Black Position : cBN
- White Position : paste



- New technology K-Gold PVD Coated
- Lubricant film
- Enhance wear Resistance



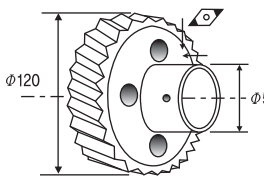
Application range



Recommended Cutting Condition

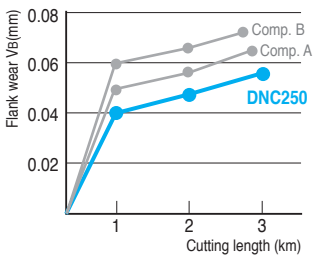
Cutting speed vc(m/min)	120 ~ 220
feed fn(mm/rev)	0.05 ~ 0.3
D.O.C ap(mm)	0.05 ~ 0.3

Application Example



- **Cutting condition** : vc(m/min)=90, fn(mm/rev)=0.15, ap(mm)=0.15, wet, Light interruption cutting
- **Workpiece** : Gear, SCM415(HRC58~60)
- **INSERT** : 2NU-CNGA120408

Cutting performance Continuous

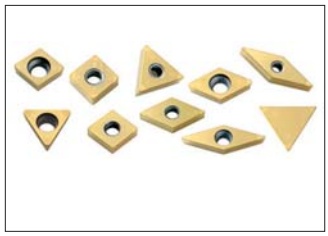


- **Cutting condition** : vc(m/min)=90, fn(mm/rev)=0.15, ap(mm)=0.15, wet, Light interruption cutting
- **Workpiece** : Gear, SCM415(HRC58~60)
- **INSERT** : 2NU-CNGA120408

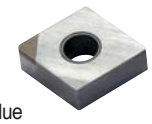
Features of cBN Grade

Type	Grade	Applications	Features
Uncoated	KB410	High speed continuous cutting of hardened steel	Best wear resistance grade and suitable for high speed continuous cutting
	KB420	High efficiency cutting of hardened steel	Binder with high heat resistance improve tool life during high speed machining
	KB425	High speed interrupted cutting of hardened steel	Superior fracture resistance and suitable for high speed interrupted hard turning
	KB320	Continuous cutting and interrupted cutting of hardened steel	Micro grain cBN with ceramic binder improve fracture resistance and wear resistance
	KB210	High speed continuous and intemupted cutting of hardened steel	Superior fracture resistance for hign interrupted hard turning
	KB335	Interrupted cutting of hardened steel	Micro grain cBN with higher fracture resistance and wear resistance
	KB350	High speed precision machining of cast iron (GC/GCD)	High fracture resistance and wear resistance
	KB370	High speed machining of cast iron and Exotic alloys	The highest hardness and toughness acquire good performance for difficult-to-cut material and cast iron
Coated	DNC250	High efficiency and interrupted cutting of hardened steel	Excellent wear resistance, Cost effective by multi-cornered one-use insert

Type of cBN insert

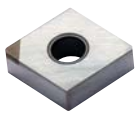
Regrinding type	One use type	Multi edge type	cBN Coated Multi-Cornered cBN
			

- Long tool life
- Excellent wear resistance, High hardness
- Saved tool cost due to the regrinding insert 3~4 time



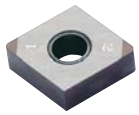
CNMA120408

- Economical price
- Cost down
- Simple tool management
- Various line-up
- Stable machining and long tool life due to strong brazing technology



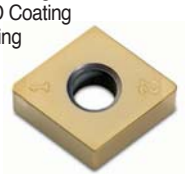
NU CNMA120408

- Insert with several brazed cBN
- Price per edge is more reasonable compare to normal single cornered, one-used type
- Wide application of continuous to interrupted machining



4NU CNGA120408

- Easy Edge Management
- Specail PVD Coating
- Strong Brazing

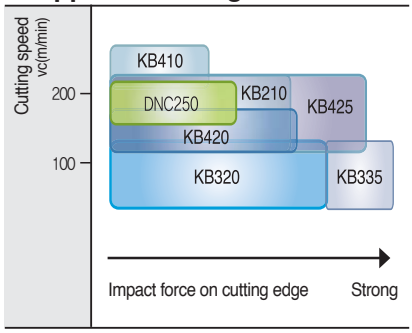


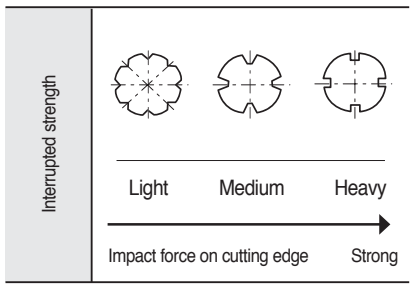
For general hardened steel machining

• Recommended cutting condition

Grade	Cutting Speed, vc(m/min) (50 – 100 (120) – 150 – 200 – 250)	feed fn(mm/rev) (0 – 0.1 – 0.2 – 0.3) / D.O.C ap(mm) (0 – 0.1 – 0.2 – 0.3 – 0.4 – 0.5)
KB410	150 – 200	fn 0.03 – 0.13 ap 0.03 – 0.2
KB420	120 – 150	fn 0.03 – 0.3 ap 0.03 – 0.5
KB425	150 – 200	fn 0.03 – 0.3 ap 0.03 – 0.5
KB320	80 – 120	fn 0.03 – 0.2 ap 0.03 – 0.3
KB210	150 – 200	fn 0.03 – 0.2 ap 0.03 – 0.3
KB335	80 – 110	fn 0.03 – 0.2 ap 0.03 – 0.3
DNC250	120 – 220	fn 0.05 – 0.3 ap 0.05 – 0.3

• Application range



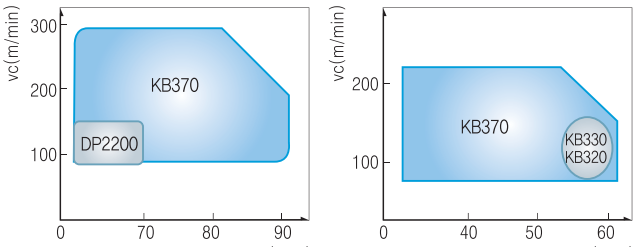


For valve seat ring (VSR)

division	Gasoline VSR material	Diesel VSR material
Plunge machining	KB370 KB330	KB370 KB330
Traverse machining	KB370 KB350	KB370 KB350
Hardness(HV)	Low ← HV300 → High	Low ← HV300 → High

For sintered component machining

General sintered alloy	High density/ Hardened sintered alloy

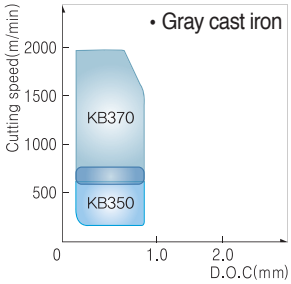


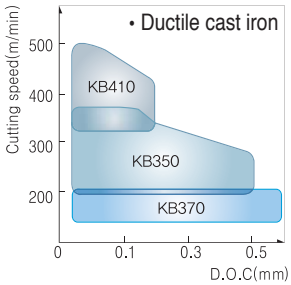
cBN for cast iron

• Recommended cutting condition

division	Workpiece		Cutting speed, vc(m/min)	fn (mm/rev)	ap (mm)
	Material	Grade	100 1000 2000		
Turning	Gray cast iron	KB370	500 — 2000	0.1~0.5	≤ 1.0
		KB350	200 — 700	0.1~0.5	≤ 1.0
	Alloyed cast iron	KB370	200 — 800	0.1~0.4	≤ 0.5
	Ductile cast iron	KB370	80 — 200	0.1~0.4	≤ 0.6
		KB350	100 — 350	0.1~0.4	≤ 0.5
		KB410	250 — 500	0.1~0.4	≤ 0.5
Milling	Gray cast iron	KB370	800 — 2000	0.1~0.5	≤ 0.5

• Application range





Technical information for PCD insert

Features

KORLOY PCD products are manufactured by using high quality PCD tips under ultra high temperatures and pressure. The PCD tip is welded on the qualified KORLOY carbide insert
KORLOY high quality PCD products meet a wide range of application needs in turning, milling, and endmills.

- ▶ Excellent tool life for aluminum alloy and copper alloy
- ▶ Excellent tool life for Ceramic, high-Si aluminum and rock or stone
- ▶ Excellent tool life for rubber, carbon, graphite and wood

PCD Grade

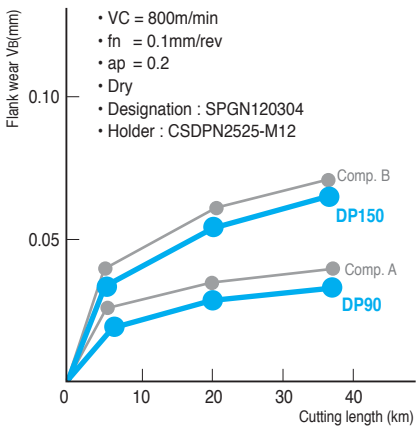
Grade	Features	Application	Grain size(㎛)	Hardness(Hv)	TRS(kgf/㎟)
DP90	Coarse diamond grain has been used to get excellent wear resistance enough to machine cemented-carbide, high Si aluminum alloy	Cemented carbide Ceramic roughing High Si aluminum alloy Rock, Stone	50	10,000~12,000	110
DP150	By use of fine diamond grain having good bonding property, it is suitable for machining of non-ferrous metal, graphite	High Si aluminum alloy Copper, Bronze alloy Rubber, Wood, Carbon	5	10,000~12,000	200
DP200	By use of ultra fine diamond grain, it is possible to make sharp cutting edge. Thus it is appropriate grade to machine non-ferrous material	Plastic Wood Precise finishing of aluminum	0.5	8,000~10,000	220

Recommended cutting condition

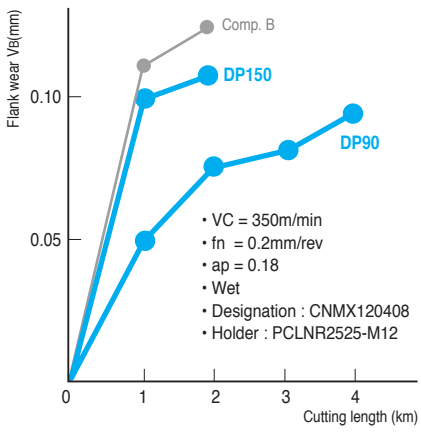
Workpiece	Cutting speed (m/min)	Feed (mm/rev)	Depth of cut (mm)	Recommended grade	
				1st	2nd
Aluminum alloy (4%~8% Si)	1000 ~ 3000	0.1 ~ 0.6	~ 3	DP150	DP200
Aluminum alloy (9%~14% Si)	600 ~ 2500	0.1 ~ 0.5	~ 3	DP150	DP200
Aluminum alloy (15%~18% Si)	300 ~ 700	0.1 ~ 0.4	~ 3	DP150	DP200
Copper, Bronze alloy	~ 1000	0.05 ~ 0.2	~ 3	DP150	DP200
Reinforced plastic	~ 1000	0.1 ~ 0.3	~ 2	DP150	DP200
Wood	~ 4000	0.1 ~ 0.4	-	DP150	DP200
Cemented carbide	10 ~ 30	~ 0.2	~ 0.5	DP90	DP150

Cutting performance

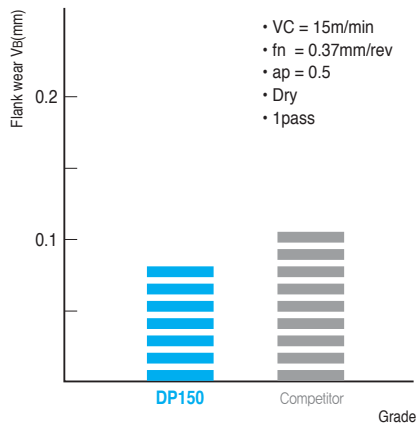
Continuous cutting test(Workpiece:Al-25%Si)



Interrupted cutting test(Workpiece:Al-20%Si)



Cutting test of cemented carbide



KORLOY Chip Breaker For Turning

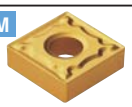
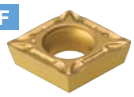
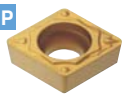
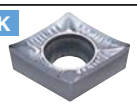
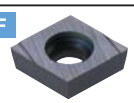
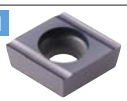
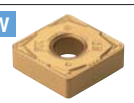
	Geometry	Cutting edge	Application range	Features
V Series	VG		0.1~0.35 0.5~2.5	**For finishing** • Ensures stable chip flow even at very small depth of cut • Suitable for copying
	VQ		0.1~0.4 1.0~3.0	**For Medium to Finish Cutting** • Strong cutting edge makes excellent cutting performance at interrupted cutting
	VL		0.1~0.35 0.2~1.5	**For Medium cutting** • 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
	VF		0.05~0.35 0.5~2.0	**For Finishing** • Good chip control quality on varied depth of cut • Excellent cutting edge strength has been acquired due to the special chip-breaker
	VB		0.15~0.45 0.5~2.0	**For Finishing** • Improved chip control for smaller depth of cuts • Excellent chip control in copying, corner R machining
	VC		0.5~3.5 0.15~4.5	**For medium finishing** • Stable chip control in copying and internal machining with various depths of cut
	VM		0.1~0.5 1.0~5.0	**For Medium cutting** • Wide available chip control range from medium-finishing to medium-roughing • Suitable chip breaker for CNC machining
	VK		0.15~0.5 1.0~5.0	**For Medium to Roughing of Milling** • Optimal for high speed machining and interrupted machining
	VH		0.7~1.4 6.0~15.0	**For Heavy duty cutting** • Designed specifically for heavy machining • Specialized chip breaker for the heavy industries like Ship building, Power plant industry
	VT		0.75~1.6 7.0~17.0	**For Heavy duty cutting** • Designed specifically for heavy machining • Specialized chip breaker for the heavy industries like Ship building, Power plant industry
	VP1		0.07~0.20 0.10~1.5	**For Finishing** • High positive cutting edge • Reduced chip contract minimizes temperature to improve tool life
	VP2		0.10~0.40 0.50~4.5	**For medium finishing** • Stable chip control and high machinability in copying with various depths of cut
	VP3		0.12~0.5 0.50~5.0	**For medium machining** • 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
H Series	HU		0.03~0.25 0.1~1.5	**For Ultra-fine Finishing, Finishing** • Suitable for a machining need fine surface finish and a machining generate low cutting force due to sharp cutting edge design. • Specially designed chip breaker ensure stable chip control at ultra fine finishing condition.
	HR		0.25~0.65 2.5~7.0	**For Roughing** • Excellent chip control at deep depth of cut and fast feed rate • Strong cutting edge makes excellent cutting performance at intermittent cutting
	HA		0.03~0.3 0 .5~2.5	**For Light-alloy, Stainless-steel machining** • Sharp cutting edge generates low cutting force • Specially designed tough main cutting edge • Suitable for cutting of low carbon steel, stainless steel, aluminum

Application range — feed rate (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

Application range — depth of cut (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

Notice : Application ranges are based on main cutting material

KORLOY Chip Breaker For Turning

		Geometry	Cutting edge	Application range	Features
H Series	HS			0.1~0.4 1.0~4.0	**For Medium cutting of Stainless steel** • Exclusive design for stainless steel cutting provide longer tool life • Wear resistance have been reinforced through high rake angle of chip breaker land
G Series	GM			0.1~0.5 0.7~4.0	**For Medium to Light cutting** • Excellent chip control at general cutting conditions • Strong cutting edge strength provides good performance at intermittent and fast feed cutting
	GR			0.3~0.8 3.0~8.0	**For Medium to Roughing** • Suitable for deep depth of cut and high feed cutting of steel and cast iron • Suitable for intermittent cutting
	GH			0.3~1.3 3.0~11.0	**For Heavy duty cutting** • Suitable for heavy duty cutting due to strong cutting edge • Wide chip control range with low cutting force
	GS			0.15~0.5 1.5~5.5	**For Medium to Roughing of Stainless-steel** • Exclusive chip breaker for stainless steel
B Series	B25			0.5~1.0 4.0~10.0	**For General cutting** • Suitable for general cutting condition cutting
V-posi Series	VF			0.05~0.25 0.1~1.5	**For Finishing** • Improved surface finish and size accuracy due to stable inner boring
	VL			0.2~2.0 0.05~0.2	**For Finishing** • Superior chip control in low carbon steel, pipes, and steel plates
H-posi Series	HFP			0.05~0.25 0.1~1.5	**For Finishing** • Excellent chip control at shallow depth of cut and low feed rate • Excellent surface finish of work piece due to reduced cutting force • Suitable for fine boring
	HMP			0.02~0.4 0.5~3.5	**For Medium cutting** • Excellent chip control at wide range of cutting conditions • Suitable for stainless steel cutting
C Series	C25			0.1~0.35 1.0~3.0	**For Medium cutting** • Suitable for interrupted cutting and cast iron machining • Good surface finish due to low cutting force • Suitable for both boring and outer diameter turning
AL Series	AK			0.03~0.4 0.1~4.0	**For Aluminum cutting** • High rake angle and low resistance cutting edge secures long tool life in continuous cutting of aluminum turning • High speed of finishing operation
	AR			0.05~0.5 0.5~4.0	**For Aluminum cutting** • High stability of cutting edge secures great performance in high speed and interrupted machining • High speed of medium and interrupted operation
Auto tool Series	KF			0.01~0.12 0.01~1.0	**For Finishing** • 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** • Improved chip control makes tool life long and better machining
Wiper tool Series	LW			0.15~0.6 1.0~5.0	**For Medium cutting(Wiper)** • Guarantees excellent surface roughness and good chip controls at high feed machining
	VW			0.15~0.5 0.5~3.5	**For Finishing(Wiper)** • Improved surface roughness at shallow depth of cut and high feed due to strong cutting edge

Notice : Application ranges are based on main cutting material

KORLOY Chip Breaker For Milling

	Geometry	Cutting edge	Application range	Features
MX Series	MX		0.1~0.3 / 1.0~5.0	**For General Milling** • Possible to increase productivity through increase feed and depth • Excellent heat resistance due to the special chip breaker design of top face of insert
Futur Mill Series	MF		0.05~0.2 / 0.5~`5.0	**For Finishing of Milling** • Special design for light cutting of gummy materials like stainless steel and hard to machine material provide fine surface finish and longer tool life
	MM		0.05~0.3 / 1.0~5.0	**For Medium cutting of Milling** • Chip breaker design to cover general cutting condition provides wide available application range • Ground type and as sintered type is available
	MR		0.05~0.35 / 1.5~5.0	**For Roughing of Milling** • Strongest cutting edge strength provide stable tool life even in case of severe cutting with heavy intermittent and heavy roughing
	MA		0.1~0.35 / 0.5~5.0	**For Aluminum** • Suitable design for aluminum machining like sharp cutting edge, mirror face of insert top which prevent built-up-edge, provide excellent cutting performance
RichMill Series-RM8	MA		0.05~0.35 / 0.3~6.0	**For Aluminum** • Sharp cutting edge and buffed top face show excellent chip flow and welding resistance in aluminum machining
	MF		0.05~0.35 / 0.3~6.0	**For Finishing of Milling** • Low cutting force chip breaker design ensures longer tool life and excellent machining in difficult-to-cut material and light machining
	MM		0.1~0.4 / 0.5~6.0	**For Medium to Roughing of Milling** • Suitable geometry design for general milling has wider ranges of machining
RichMill Series-RM4	MA		0.05~0.25 / 0.3~14.0	**For Aluminum Milling** • Sharp cutting edge design ensures low cutting resistance and excellent machining in difficult- tocut materials, aluminum and light machining
	MF		0.05~0.3 / 0.5~14.0	**For Finishing of Milling** • Low cutting force chip breaker design ensures longer tool life and excellent machining in difficult-to-cut material and light machining
	MM		0.05~0.3 / 1.0~14.0	**For Medium to Roughing of Milling** • Suitable geometry design for general milling has wider ranges of machining
RichMill Series-RMT	MF		0.05~0.2 / 0.5~5.0	**For Finishing of Milling** • Low cutting force chip breaker design ensures longer tool life and excellent machining in difficult-to-cut material and light machining
	MM		0.05~0.3 / 0.5~8.0	**For Medium to Roughing of Milling** • Suitable geometry design for general milling has wider ranges of machining
RichMill Series-RM16	MA		0.05~0.3 / 0.3~5.5	**For Aluminum cutting** • Sharp cutting edge design ensures low cutting resistance and excellent machining in difficult- tocut materials, aluminum and light machining
	MF		0.05~0.4 / 0.3~5.5	**For Finishing of Milling** • Low cutting force chip breaker design ensures longer tool life and excellent machining in difficult-to-cut material and light machining
	MM		0.1~0.45 / 0.5~5.5	**For Medium to Roughing of Milling** • Suitable geometry design for general milling has wider ranges of machining
	W		0.05~0.3 / 0.3~2.0	**For Finishing of Milling (Wiper)** • Wiper insert provides improved surface roughness due to special cutting edge

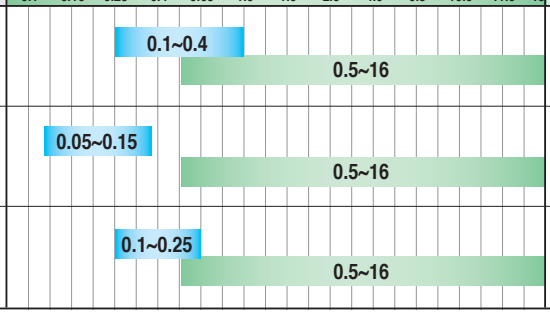
Application range

feed rate (mm/t): 0.04 0.063 0.10 0.16 0.25 0.4 0.63 1.0 1.6 2.5 4.0 6.3

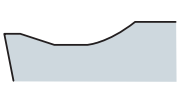
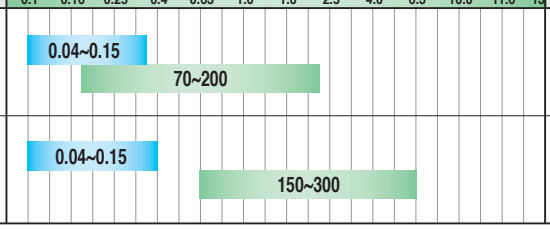
depth of cut (mm): 0.1 0.16 0.25 0.4 0.63 1.0 1.6 2.5 4.0 6.3 10.0 11.6 13

Notice : Application ranges are based on main cutting material

KORLOY Chip Breaker For Milling

	Geometry	Cutting edge	Application range	Features
Alpha Mill Series	MA			**For Aluminum** • Sharp cutting edge and buffed top face show excellent chip flow and welding resistance in aluminum machining
	MF			**For Finishing of Milling** • Low cutting force chip breaker design ensures longer tool life and excellent machining in difficult-to-cut material and light machining
	MM			**For Medium to Roughing of Milling** • Suitable geometry design for general milling has wider ranges of machining

KORLOY Chip Breaker For Drilling

	Geometry	Cutting edge	Application range	Features
King-Drill Series	PD			**General steel** • Chip breaker for King Drill ensures optimal chip control in general drilling and high performance in stainless steel and cast iron machining.
	ND			**Non-ferrous metals** • Chip breaker with sharp and polished cutting edge for aluminum and non-ferrous metals. Machining with King Drill ensures good chip flow and resistance to chip welding.

Notice : Application ranges are based on main cutting material