

CP Chip Breaker

**Turning negative insert for steel machining
(with strong cutting edge for medium to finishing)**

- Good fracture resistance and chipping resistance even in heavy interruption due to strong cutting edge
- Stable machining and high productivity from good chip evacuation in high feed machining



Turning negative insert for steel machining

(with strong cutting edge for medium to finishing)

CP Chip Breaker (Negative)

Machining of bearing parts generally used in automobile and general machinery industries requires toughness of cutting edge due to interrupted cutting condition and their high hardness. In addition, in deep grooving, tangled chips rolling up and scratching the workpieces causes the automatic machining inconsistent.

KORLOY's newly launched CP chip breaker enhanced chip evacuation, chip breaking and strength of cutting edge in interrupted turning.

The **CP chip breaker** applied the strengthened land to protect cutting edge and adopted 2-stepped back chip breaker with side rake angle and continuous bumps ensuring longer tool life by preventing chattering in high feed cutting. With its excellent chip evacuation and chip breaking performances, it realizes convenience in the automatic machining.

The combination of CP chip breaker realizing high feed machining with high toughness and chip evacuation and NC3215P/NC3225P enhancing wear resistance and chipping resistance provides the best solution realizing efficiency and high productivity in automobile parts machining.

» Machining automobile hub bearing and bearing parts

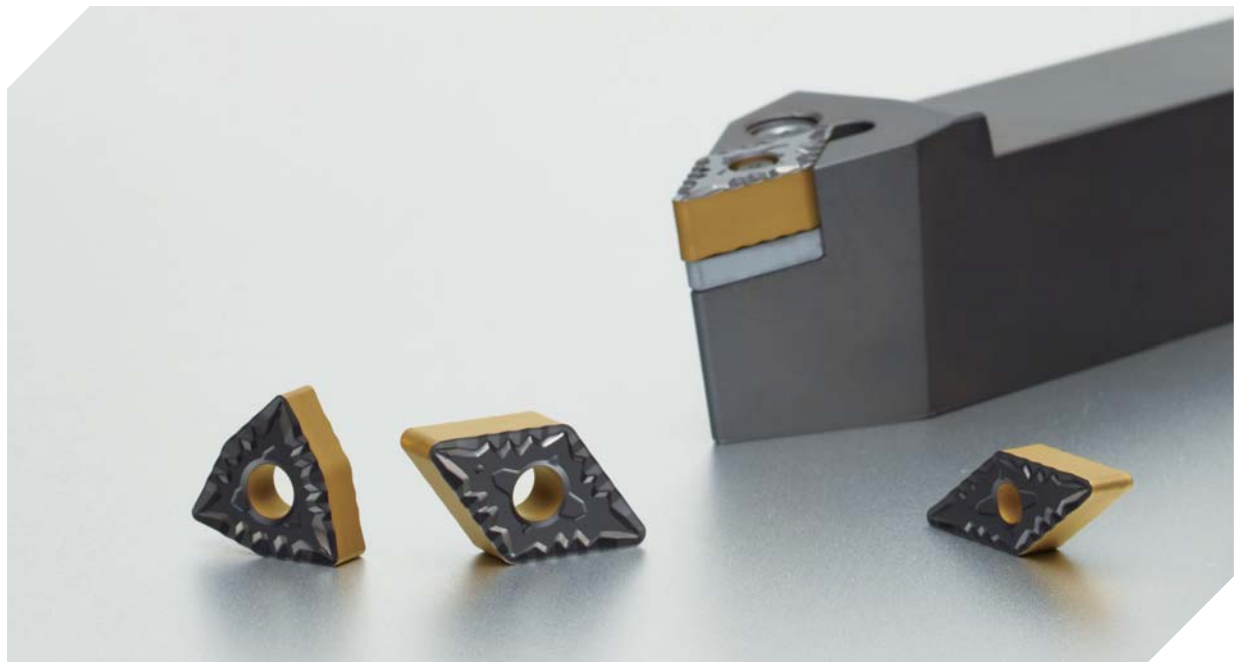
- Enhanced chipping resistance in interrupted machining

» Improved chip evacuation in deep machining

- Better chip evacuation out of the workpiece due to side rake angle

» High productivity

- Stable tool life in high feed machining



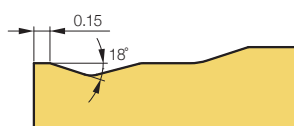
✓ Chip breaker features

CP Chip breaker (for medium to finishing)

- Chip breaker with strong cutting edge for heavy interruption in the range of medium to finishing
- Effective chip control in the range from low depth of cut to high depth of cut due to 2-stepped back angle
- Stable chip evacuation and breaking long chip in deep cutting by side rake angle and continuous bumps

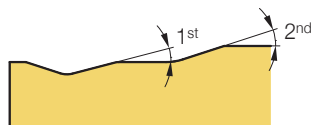
Flat land

- Strong cutting edge in interrupted roughing
- Keeping the balance between continuous cutting and interrupted cutting
- Expanded versatility



2-stepped back side

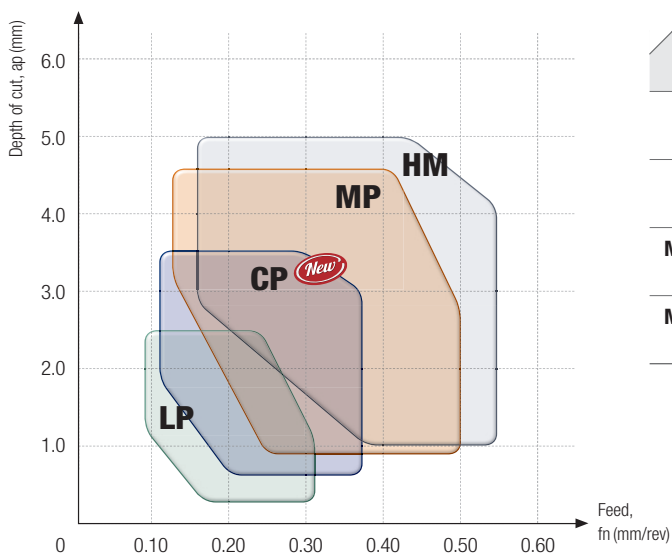
- Better chip control in low depth of cut machining
- Improved chip evacuation in high feed machining
- Expanded versatility by 2-stepped rake angle



Side rake angle + continuous bumps

- Enhanced surface finish
- Improved chip evacuation
- Breaking long chips

✓ Application range

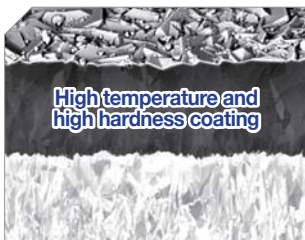


Machining	Chip breaker	ap (mm)	fn (mm/rev)
Medium cutting (toughness)	HM	1.0 ~ 5.0	0.20 ~ 0.55
Medium cutting (finishing)	MP	0.8 ~ 4.5	0.15 ~ 0.50
Medium to finishing (toughness)	CP <i>New</i>	0.5 ~ 3.5	0.12 ~ 0.35
Medium to finishing (finishing)	LP	0.3 ~ 2.5	0.10 ~ 0.30

Recommended cutting conditions

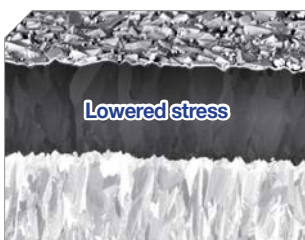
Workpiece				Specific cutting force Kc1 (N/mm ²)	Brinell hardness (HB)	Wear resistance ← • → Toughness			Medium to finishing		
ISO	Workpiece materials	ISO	AISI			High speed and continuous cutting	Medium speed and continuous/interrupted cutting	Low speed and high interrupted cutting			C/B
						Grade			CP		
						NC3215P	NC3225P	NC3235	vc (m/min)	fn (mm/rev)	ap (mm)
P	Unalloyed steel	C=0.10~0.25%	C25	1025	1500	125	245	190	125	0.35	0.5 ~ 3.5
							305	265	215	0.20	
							365	335	285	0.12	
		C=0.25~0.55%	C35	1035	1600	150	200	150	100	0.35	
							270	230	190	0.20	
							350	300	250	0.12	
		C=0.55~0.80%	C45	1045	1700	170	185	130	95	0.35	
							245	205	175	0.20	
							320	275	225	0.12	
	Low-alloy steel ≤ 5%	Non-hardened	42CrMo4	4140	1700	180	195	140	100	0.35	
							255	205	175	0.20	
							310	275	215	0.12	
		Hardened and tempered	-	4145	2050	350	145	90	65	0.35	
							200	145	115	0.20	
	240	200	150	0.12							
	High-alloy steel <5%	Annealed	-	D2	1950	200	155	115	65	0.35	
							220	180	130	0.20	
							280	240	190	0.12	
		Hardened tool steel	X40CrMoV5-1	H13	3000	352	115	85	55	0.35	
							175	135	95	0.20	
235	180	130	0.12								
Steel castings	Low-alloy (alloying elements ≤5%)	-	A148 (ASTM)	1600	200	130	95	60	0.35		
						175	140	100	0.20		
						220	185	135	0.12		
	Manganese steel 12~14% Mn	X120Mn13	3401	2900	250	70	40	30	0.35		
						90	60	45	0.20		
110	75	60	0.12								

Grade features



NC3215P

- High temperature and high hardness coating with good wear resistance
 - For hot/cold forging steel and bearing steel continuous/interrupted cutting
- New coating technology → Enhanced wear resistance, welding resistance and long tool life
- Improved surface finish by special treatment after applying coating → higher lubrication



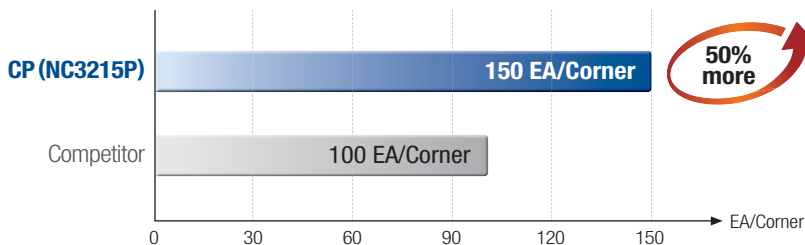
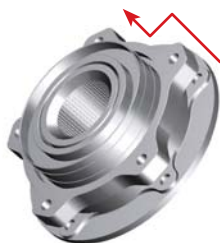
NC3225P

- Less chipping and higher productivity due to lowered stress
 - For continuous/interrupted machining of general steels, forging steels of automobile parts and bearing steels
- Stable cutting edge → Good welding resistance and chipping resistance
- Improved surface finish by special treatment after applying coating → higher lubrication

Application examples

Carbon steel (C55)

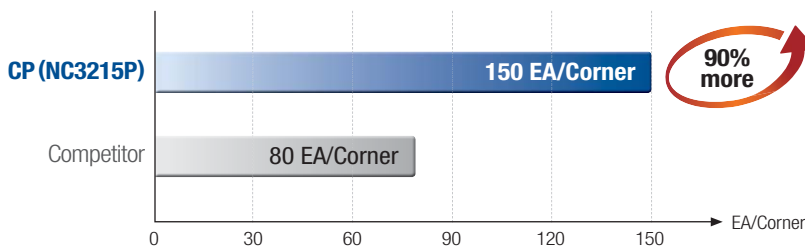
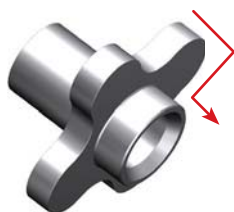
Workpiece	Hub bearing	
Cutting conditions	n (rpm) = 615, vc (m/min) = 280, fn (mm/rev) = 0.35, ap (mm) = 0.8, wet	
Tools	Insert DNMG150412-CP (NC3215P)	Holder PDJNL2525-M15



- Flat land ensures stable machining without insert fracture in interrupted cutting.
- NC3215P coating realizes long tool life in high speed machining.

Forging steel [20Cr4 (H)]

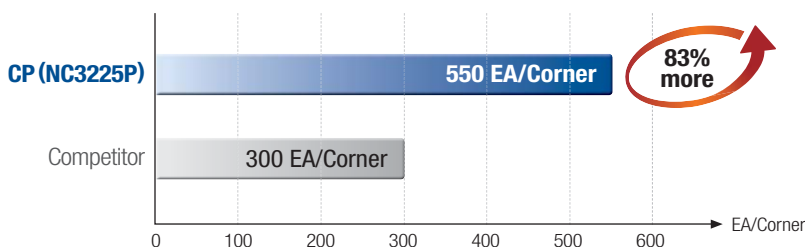
Workpiece	Hub bearing	
Cutting conditions	n (rpm) = 300 ~ 460, vc (m/min) = 180 ~ 250, fn (mm/rev) = 0.2 ~ 0.35, ap (mm) = 1.0 ~ 2.5, wet	
Tools	Insert DNMG150612-CP (NC3215P)	Holder PDJNR2525-M15



- Flat land ensures stable machining without insert fracture in interrupted cutting and increases chip evacuation in high feed machining.
- NC3215P coating realizes long tool life (higher chipping resistance) in unstable cutting condition with low cutting speed.

Forging steel [20Cr4 (H)]

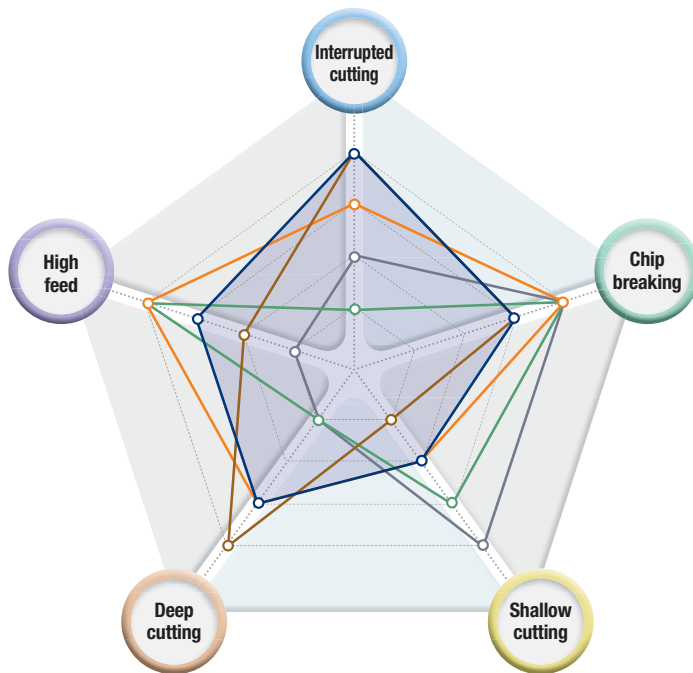
Workpiece	Cage	
Cutting conditions	n (rpm) = 740, vc (m/min) = 350, fn (mm/rev) = 0.15, ap (mm) = 0.8, wet	
Tools	Insert CNMG120408-CP (NC3225P)	Holder PCLNR2525-M12



- 2-stepped back part ensures stable automation and regularly curled chip in low depth of cut cutting of R.
- NC3225P coating realizes long tool life in high speed machining.

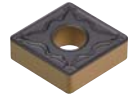
✔ Negative chip breaker selection guide

—○— HM —○— MP —○— CP —○— LP —○— VC



HM

- Chip control in various cutting condition due to unique tripod designed chip breaker
- Stable tool life in interrupted machining from strong cutting edge



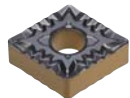
MP

- High productivity from enhanced chip control in various cutting condition
- Stable tool life due to low cutting load in high speed and high feed machining



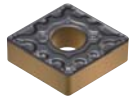
CP *New*

- Recommended for interrupted machining due to flat land
- Better chip control in low depth of cut machining and chip evacuation in high feed machining due to 2-stepped back part of insert



LP

- Better surface finish due to decreased cutting resistance with the inclined land structure
- Prevent chip curling and chip jamming at hard to chip evacuation spot by perfectly breaking chips with its specially designed dot structure



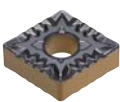
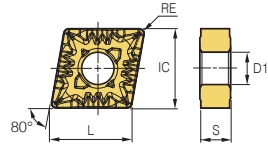

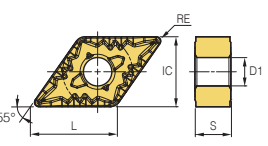

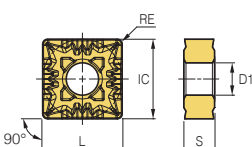

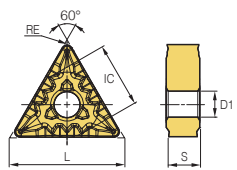

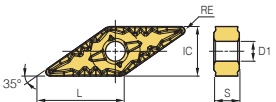
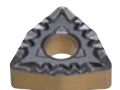
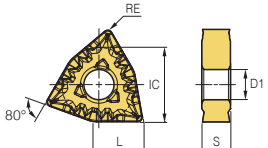
VC

- Stable chip control in copying with various depth of cut, tapering and internal diameter machining



Machining	Chip breaker	Interrupted cutting	Chip breaking	Shallow cutting	Deep cutting	High feed
Medium cutting	HM	★★★★★	★★★	★	★★★★★	★★
	MP	★★★	★★★★★	★★	★★★	★★★★★
Medium to finishing	CP <i>New</i>	★★★★★	★★★	★★	★★★	★★★
	LP	★	★★★★★	★★★	★	★★★★★
	VC	★★	★★★★★	★★★★★	★	★

 Stock items

Picture	Designation	Coated		Dimensions (mm)					Cutting condition		Geometries
		NC3215P	NC3225P	L	IC	S	RE	D1	fn (mm/rev)	ap (mm)	
	CNMG	090304-CP		9.672	9.525	3.18	0.4	3.81	0.08~0.30	0.4~3.0	
		090308-CP		9.672	9.525	3.18	0.8	3.81	0.10~0.30	0.4~3.0	
		090404-CP		9.672	9.525	4.76	0.4	3.81	0.08~0.30	0.4~3.0	
		090408-CP		9.672	9.525	4.76	0.8	3.81	0.10~0.30	0.4~3.0	
		120404-CP	● ●	12.896	12.7	4.76	0.4	5.16	0.10~0.35	0.5~3.5	
		120408-CP	● ●	12.896	12.7	4.76	0.8	5.16	0.12~0.35	0.5~3.5	
		120412-CP	● ●	12.896	12.7	4.76	1.2	5.16	0.13~0.35	0.8~3.5	
		160608-CP	● ●	16.12	15.875	6.35	0.8	6.35	0.15~0.40	0.8~4.5	
		160612-CP	● ●	16.12	15.875	6.35	1.2	6.35	0.18~0.40	1.0~4.5	
	DNMG	110404-CP		11.628	9.525	4.76	0.4	3.81	0.08~0.30	0.4~3.0	
		110408-CP		11.628	9.525	4.76	0.8	3.81	0.10~0.30	0.4~3.0	
		110504-CP		11.628	9.525	5.56	0.4	3.81	0.08~0.30	0.4~3.0	
		110508-CP		11.628	9.525	5.56	0.8	3.81	0.10~0.30	0.4~3.0	
		150404-CP	● ●	15.508	12.7	4.76	0.4	5.16	0.10~0.35	0.5~3.5	
		150408-CP	● ●	15.508	12.7	4.76	0.8	5.16	0.12~0.35	0.5~3.5	
		150412-CP	● ●	15.508	12.7	4.76	1.2	5.16	0.13~0.35	0.8~3.5	
		150604-CP	● ●	15.508	12.7	6.35	0.4	5.16	0.10~0.35	0.5~3.5	
		150608-CP	● ●	15.508	12.7	6.35	0.8	5.16	0.12~0.35	0.5~3.5	
		150612-CP	● ●	15.508	12.7	6.35	1.2	5.16	0.13~0.35	0.8~3.5	
	SNMG	090304-CP		9.525	9.525	3.18	0.4	3.81	0.08~0.30	0.4~3.0	
		090308-CP		9.525	9.525	3.18	0.8	3.81	0.10~0.30	0.4~3.0	
		090404-CP		9.525	9.525	4.76	0.4	3.81	0.08~0.30	0.4~3.0	
		090408-CP		9.525	9.525	4.76	0.8	3.81	0.10~0.30	0.4~3.0	
		120404-CP	● ●	12.7	12.7	4.76	0.4	5.16	0.10~0.35	0.5~3.5	
		120408-CP	● ●	12.7	12.7	4.76	0.8	5.16	0.12~0.35	0.5~3.5	
		120412-CP	● ●	12.7	12.7	4.76	1.2	5.16	0.13~0.35	0.8~3.5	
	TNMG	110304-CP		10.999	6.35	3.18	0.4	2.86	0.08~0.26	0.4~2.5	
		110308-CP		10.999	6.35	3.18	0.8	2.86	0.10~0.26	0.4~2.5	
		160404-CP	● ●	16.498	9.525	4.76	0.4	3.81	0.10~0.30	0.5~3.0	
		160408-CP	● ●	16.498	9.525	4.76	0.8	3.81	0.12~0.30	0.5~3.0	
		160412-CP	● ●	16.498	9.525	4.76	1.2	3.81	0.13~0.30	0.8~3.0	
		220408-CP	● ●	21.997	12.7	4.76	0.8	5.16	0.15~0.35	0.8~4.0	
		220412-CP	● ●	21.997	12.7	4.76	1.2	5.16	0.18~0.35	1.0~4.0	
	VNMG	160404-CP	● ●	16.606	9.525	4.76	0.4	3.81	0.10~0.35	0.5~3.0	
		160408-CP	● ●	16.606	9.525	4.76	0.8	3.81	0.12~0.30	0.5~3.0	
		160412-CP	● ●	16.606	9.525	4.76	1.2	3.81	0.13~0.30	0.8~3.0	
	WNMG	060404-CP		6.515	9.525	4.76	0.4	3.81	0.08~0.30	0.4~3.0	
		060408-CP		6.515	9.525	4.76	0.8	3.81	0.10~0.30	0.4~3.0	
		080404-CP	● ●	8.687	12.7	4.76	0.4	5.16	0.10~0.35	0.5~3.5	
		080408-CP	● ●	8.687	12.7	4.76	0.8	5.16	0.12~0.35	0.5~3.5	
		080412-CP	● ●	8.687	12.7	4.76	1.5	5.16	0.13~0.35	0.8~3.5	
		080416-CP	● ●	8.687	12.7	4.76	1.6	5.16	0.14~0.35	0.8~3.5	

● : Stock item

For the safe metalcutting

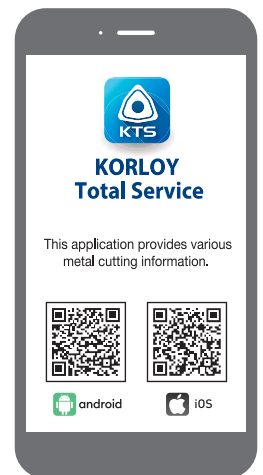
- Use safety supplies such as protective gloves to prevent possible injury while touching the edge of tools.
- Use safety glasses or safety cover to hedge possible dangers. Inappropriate usage or excessive cutting condition may lead tool's breakage or even the fragment's scattering.
- Clamp the workpiece tightly enough to prevent its movement while its machining.
- Properly manage the tool change phase because the inordinately used tool can be easily broken under the excessive cutting load or severe wear, and it may threat the operator's safety.
- Use safety cover because chips evacuated during cutting are hot and sharp and may cause burns and cuts. To remove chips safely, stop machining, put on protective gloves, and use a hook or other tools.
- Prepare for fire prevention measures as the use of the non-water soluble cutting oil may cause fire.
- Use safety cover and other safety supplies because the spare parts or the inserts can be pulled out due to centrifugal force while high speed machining.



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