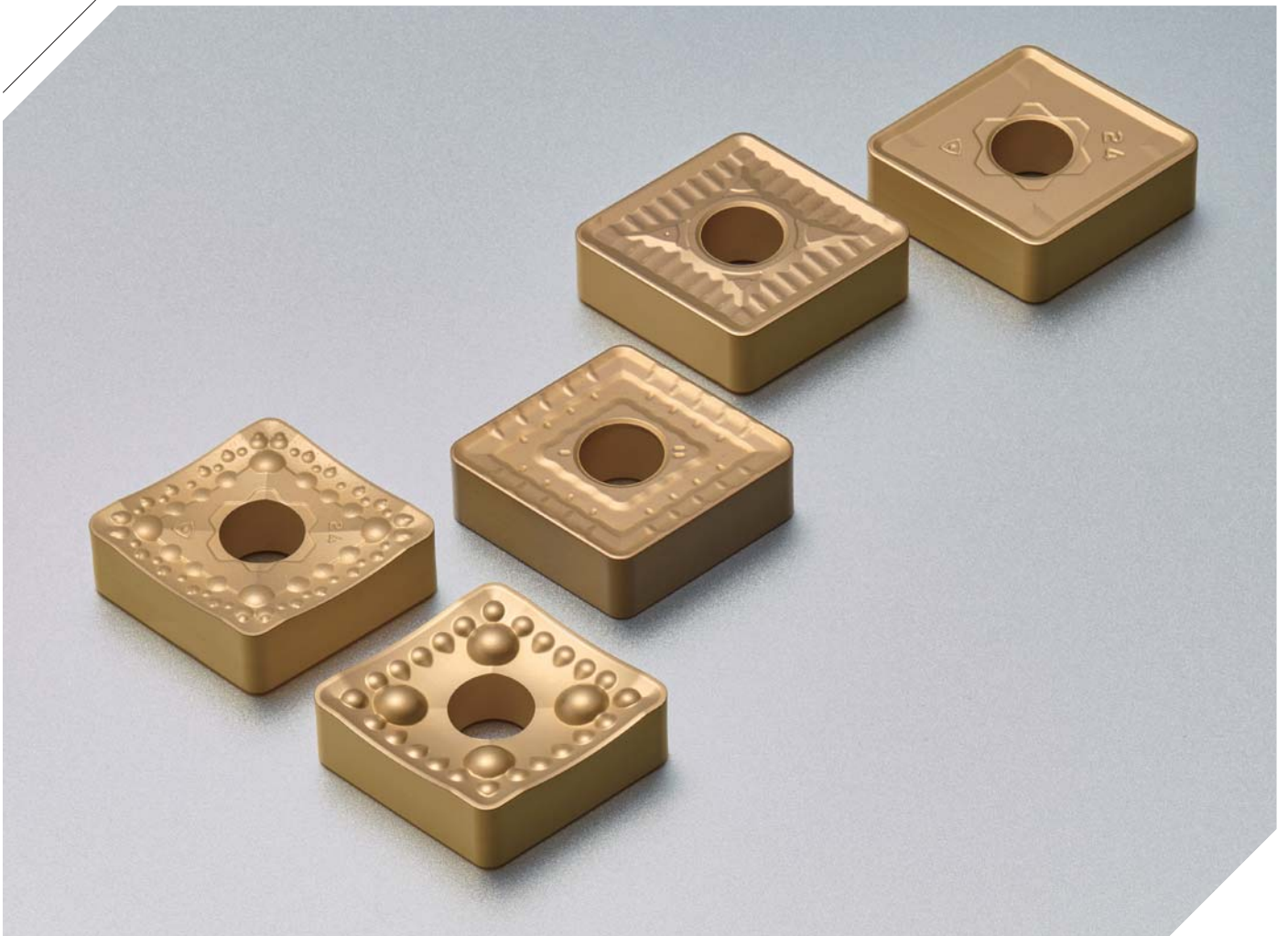


Heavy Turning Inserts

Chip breaker: HP, HL, HG, HV, HX / Grade: NC515H, NC520H, NC525H

- For various heavy turning as wind power, railway, power generation and shipbuilding industries, etc.
- Long tool life and good chip evacuation due to special designed chip breaker and optimal grade



Heavy Turning Inserts

Components used in Wind power generation, Railway, Power generation and Ship building have a huge machining diameter and high edge strength is required to deal with a frequent heavy interrupted sections. Good chip evacuation is also necessary for the chips generated by high temperature from high feed and overloaded cutting load.

KORLOY newly launched various chip breakers as HL, HP, HG, HV, HX for medium to roughing of huge workpieces and exclusive grades as NC515H, NC520H and NC525H for heavy turning.

Chip breakers for heavy turning provides long tool life and good surface finish due to strong cutting edge and enhanced chip evacuation with specially designed cutting edge and bump suitable for alloy steel and stainless steel cutting of various heavy components industries.

The new line-up of grades for heavy turning is NC515H (P15), NC520H (P20) and NC525H (P25). NC515H (P15) provides good wear resistance, heat resistance and plastic deformation resistance in high speed continuous machining. NC520H (P20) is suitable for medium to high speed and low interrupted cutting due to good wear resistance and chipping resistance. NC525H (P25) is a universal grade with long tool life due to enhanced chipping resistance and toughness in medium to low speed and high interrupted cutting.

The combination of grades and chip breakers with good fracture resistance, heat resistance and high lubrication provides the best solution for high productivity and high efficient machining in heavy component cutting.

» **Wind power, railway, power generation and shipbuilding parts machining**

- Suitable chip breaker for various parts machining

» **Better chip evacuation in various cutting conditions**

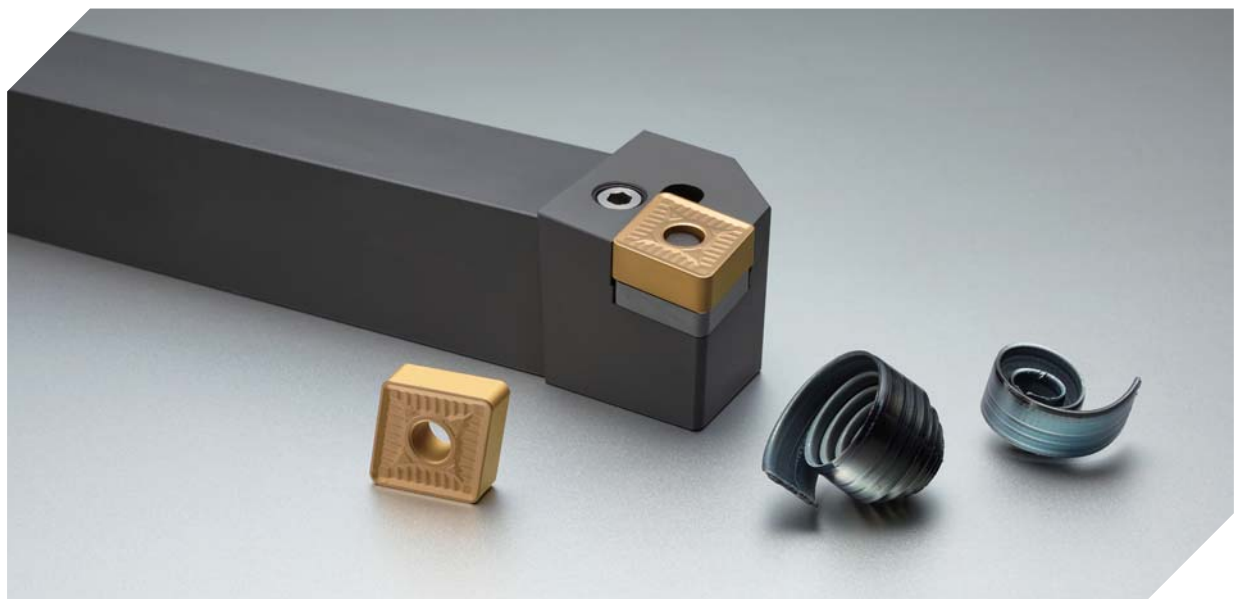
- Special designed bump for various cutting conditions machining

» **Optimal grade line-up for heavy cutting**

- NC515H, NC520H and NC525H series

» **Stable tool life in heavy turning with dry, high speed and high feed cutting conditions**

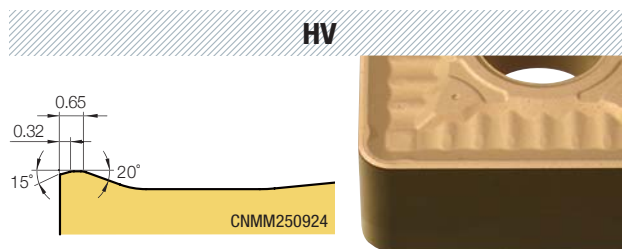
- The combination of optimal substrate and heat resistance coating layer



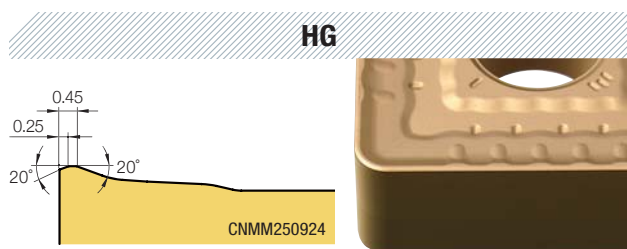
✓ Heavy chip breaker features



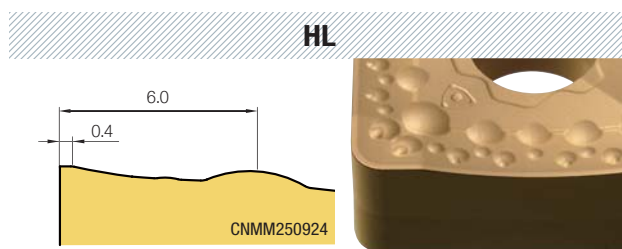
- Suitable for high interrupted machining due to strong cutting edge
- Increased tool life by smooth chip evacuation in high cutting condition



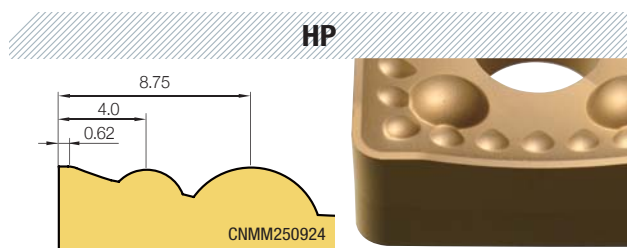
- 1st recommended chip breaker in vertical lathe machining
- Longer tool life in high feed cutting from improved chip flow reducing wear on the minor cutting edge



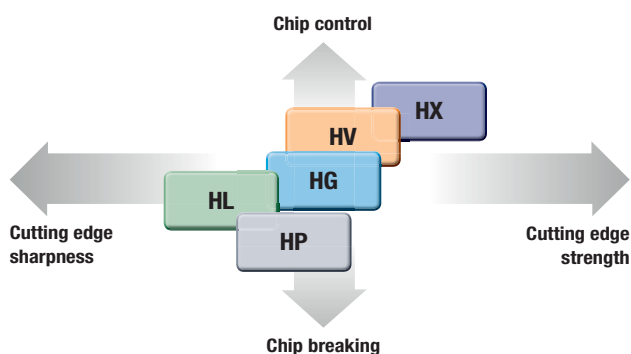
- Suitable for general horizontal lathe machining due to nicked cutting edge and low cutting resistance
- Good chip evacuation from chip flow in high feed condition



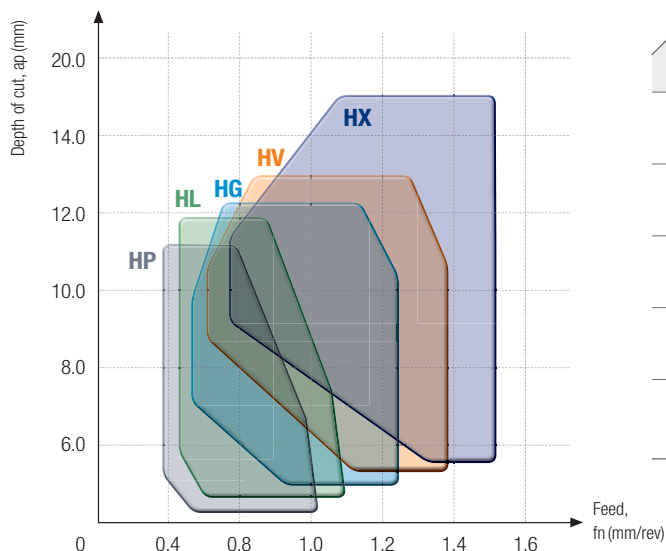
- For Stainless steel and low carbon steel machining with low cutting resistance and cutting edge
- Lower cutting resistance and good chip control in various cutting conditions



- Suitable for Stainless steel and low carbon steel machining due to sharp cutting edge
- Recommended chip breaker for excellent chip control cutting by main rounded point bump and assisting bumps

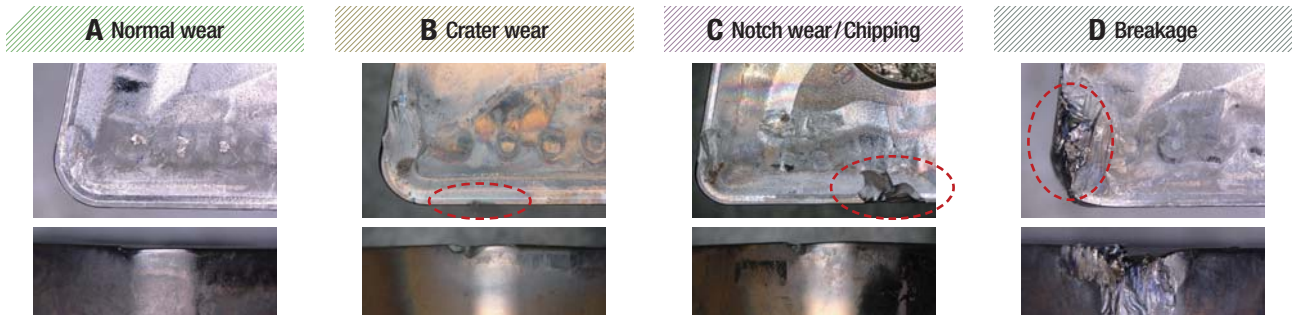
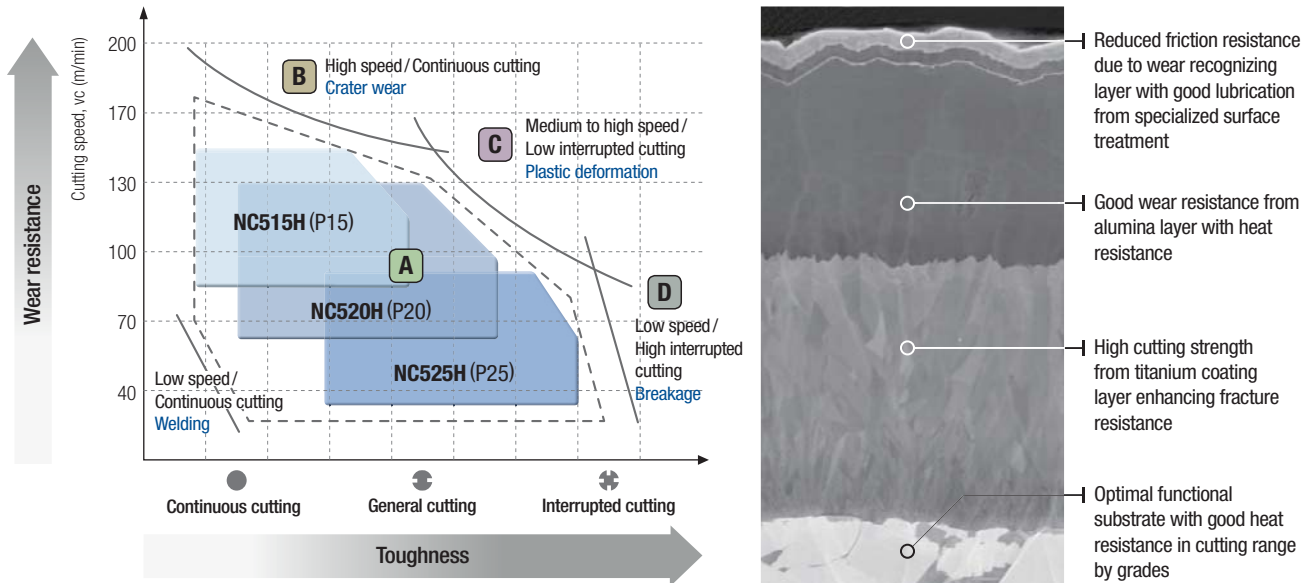


✓ Application range



Application range	Chip breaker	ap (mm)	fn (mm/rev)
High interrupted roughing	HX	4.5 ~ 18.0	0.6 ~ 1.5
Vertical lathe flange roughing	HV	4.0 ~ 13.0	0.5 ~ 1.4
Horizontal lathe shaft roughing	HG	3.0 ~ 13.0	0.4 ~ 1.2
Medium cutting for surface finish	HL	2.5 ~ 12.0	0.4 ~ 1.1
Good chip evacuation medium cutting and roughing	HP	2.5 ~ 11.0	0.4 ~ 1.0

✓ Heavy grade features



✓ Application range

Grade	ISO	Features
NC515H	P15	Good wear resistance grade from applying suitable coating layer on substrate in high speed and continuous cutting
NC520H	P20	Optimal grade for chipping resistance and heat resistance cutting in cutting conditions with medium to high speed and medium feed
NC525H	P25	Grade for general use due applying high feed substrate in cutting conditions with medium speed and medium to high feed

Workpiece	Grade	Wear resistance/ toughness	ISO					Recommended cutting conditions (m/min)
			P05	P10	P20	P30	P40	
P (Heavy)	NC515H	Wear resistance ↑ ↓ Toughness		NC515H				80~170
	NC520H			NC520H				70~150
	NC525H				NC525H			

- Applying special surface treatment for reducing cutting resistance and welding
- Applying high toughness and heat resistance substrate

Recommended cutting conditions (HX, HV, HG)

Workpiece				Specific cutting force Kc1 (N/mm ²)	Brinell hardness (HB)	Grade			C/B			
ISO	Workpiece materials	ISO (DIN)	AISI			Wear resistance ← • → Toughness			Roughing ← • → Medium cutting			
						High speed and continuous cutting	Medium speed and low interrupted cutting	Medium to low speed and medium to low interrupted cutting	Roughing	Medium to roughing	Medium cutting	
						NC515H	NC520H	NC525H	HX	HV	HG	
						vc (m/min)			fn (mm/rev)			
P	Carbon steel	Low carbon steel C = 0.15%	C15E4 C15M2	1015	1500	125	115	105	95	1.35	1.25	1.05
							125	115	105	1.05	0.95	0.85
							140	130	120	0.75	0.70	0.65
		Medium carbon steel C = 0.35%	C35 C35E4 C35M2	1045	1600	150	110	100	90	1.30	1.20	1.00
							120	110	100	1.00	0.90	0.80
							135	125	115	0.70	0.65	0.60
	High carbon steel C = 0.7%	C60 C60E4 C55M2	1060	1700	180~250	105	95	85	1.25	1.15	0.95	
						115	105	95	0.95	0.85	0.75	
						130	120	110	0.65	0.60	0.55	
	Alloy steel	Chrome steel	20Cr4 20CrS4	5015	1800	200~275	100	90	80	1.20	1.10	0.90
							110	100	90	0.90	0.80	0.70
							125	115	105	0.60	0.55	0.50
		Chromium Molybdenum steel	42CrMo4 42CrMoS4	4140	2250	220~325	90	80	70	1.15	1.05	0.85
							100	90	80	0.85	0.75	0.65
							110	100	90	0.55	0.50	0.45
	Cast steel	High alloy cast steel	(G-X120Mn12)	-	1800	160~200	100	90	80	1.20	1.10	0.90
							110	100	90	0.90	0.80	0.70
							125	115	105	0.60	0.55	0.50

- Please refer to page 3 for various depth of cut depending on heavy chip breaker and refer to page 6 for chip breaker selection guide
- Please refer to page 7 for heavy grade selection guide

Recommended cutting conditions (HL, HP)

Workpiece				Specific cutting force Kc1 (N/mm ²)	Brinell hardness (HB)	Grade			C/B		
ISO	Workpiece materials	ISO (DIN)	AISI			Wear resistance ← • → Toughness			Medium to finish cutting		
						High speed and continuous cutting	Medium speed and low interrupted cutting	Medium to low speed and medium to low interrupted cutting	Cutting performance	Chip control	
						NC515H	NC520H	NC525H	HL	HP	
						vc (m/min)			fn (mm/rev)		
P	Carbon steel	Low carbon steel C = 0.15%	C15E4 C15M2	1015	1500	125	125	115	105	0.90	0.85
							135	125	115	0.75	0.70
							140	130	120	0.50	0.45
		Medium carbon steel C = 0.35%	C35 C35E4 C35M2	1045	1600	150	120	110	100	0.90	0.85
							130	120	110	0.75	0.70
							135	125	115	0.50	0.45
	High carbon steel C = 0.7%	C60 C60E4 C55M2	1060	1700	180~250	115	105	95	0.90	0.85	
						125	115	105	0.75	0.70	
						130	120	110	0.50	0.45	
	Alloy steel	Chrome steel	20Cr4 20CrS4	5015	1800	200~275	110	100	90	0.85	0.80
							120	110	100	0.70	0.65
							125	115	105	0.45	0.40
		Chromium Molybdenum steel	42CrMo4 42CrMoS4	4140	2250	220~325	100	90	80	0.85	0.80
							110	100	90	0.70	0.65
							120	110	100	0.45	0.40
	Cast steel	High alloy cast steel	(G-X120Mn12)	-	1800	160~200	110	100	90	0.85	0.80
							120	110	100	0.70	0.65
							125	115	105	0.45	0.40

- Please refer to page 3 for various depth of cut depending on heavy chip breaker and refer to page 6 for chip breaker selection guide
- Please refer to page 7 for heavy grade selection guide

✓ Heavy insert selection guide

—○— HX —○— HV —○— HG —○— HL —○— HP



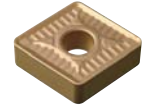
HX *New*

- Recommended in high feed and high depth of cut machining due to strong cutting edge
- Longer tool life from smooth chip flow even in tough cutting conditions



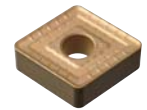
HV *New*

- 1st recommended chip breaker in vertical machining
- Longer tool life in high feed machining due to improved chip flow and reduced wear on the minor cutting edge



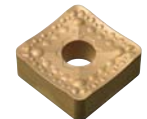
HG *New*

- Recommended in general cutting (in horizontal lathe) by nick-designed cutting edge and reduced cutting resistance
- Better chip evacuation due to improved chip flow in high feed cutting



HL *New*

- Recommended in low carbon steel and stainless steel cutting due to sharp cutting edge with low cutting resistance
- Better chip evacuation and low cutting resistance in various cutting conditions



HP *New*

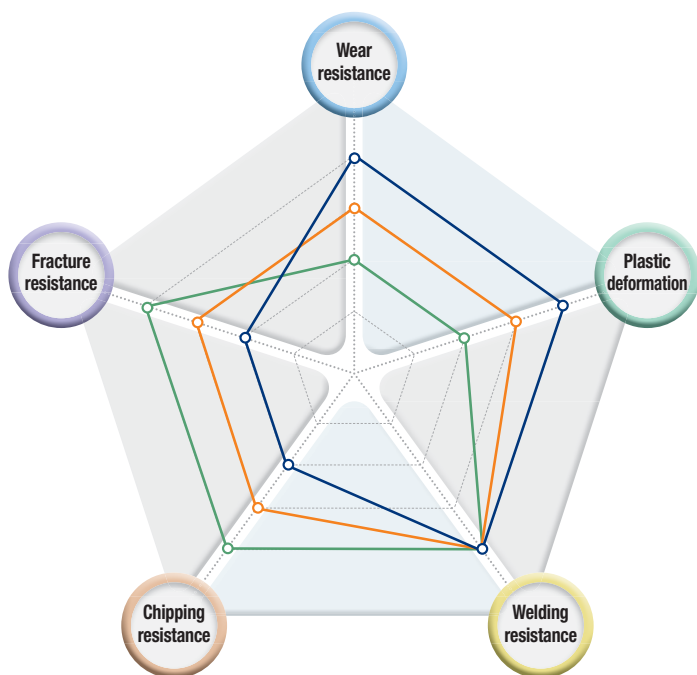
- Recommended in low carbon steel and stainless steel cutting due to sharp cutting edge with low cutting resistance
- Recommended chip breaker for excellent chip control cutting by main rounded point bump and assisting bumps



Cutting range	Chip breaker	Cutting edge strength (Interrupted cutting)	Chip breaking	High feed (Productivity)	Chip flow	Cutting resistance (Continuous cutting)
High interrupted roughing	HX <i>New</i>	★★★★★	★	★★★★★	★★★	★
Vertical lathe flange roughing	HV <i>New</i>	★★★	★★	★★★	★★★★★	★★
Horizontal lathe shaft roughing	HG <i>New</i>	★★★	★★★★	★★	★★★	★★★
Medium cutting for surface finish	HL <i>New</i>	★	★★★★	★	★★★	★★★★★
Good chip evacuation medium cutting and roughing	HP <i>New</i>	★	★★★★★	★	★	★★★

✓ Heavy grade selection guide

—○— NC515H —○— NC520H —○— NC525H



NC515H ^{New}

- Optimal grade for high speed and continuous heavy cutting
- Longer tool life due to good wear resistance, heat resistance and plastic deformation resistance in high speed and dry cutting

NC520H ^{New}

- Optimal grade for medium to high speed and low interrupted heavy cutting
- High productivity from good wear resistance and chipping resistance in medium to high speed and low interrupted cutting

NC525H ^{New}

- Suitable grade for medium to low speed and high interrupted heavy cutting
- Long tool life and general use due to good chipping resistance and toughness in medium to low speed and high interrupted cutting

Series	Grade	Wear resistance	Plastic deformation	Welding resistance	Chipping resistance	Fracture resistance
P15	NC515H ^{New}	★★★★★	★★★★★	★★★★★	★★	★★
P20	NC520H ^{New}	★★★	★★★	★★★★★	★★★	★★★
P25	NC525H ^{New}	★★	★★	★★★★★	★★★★★	★★★★★

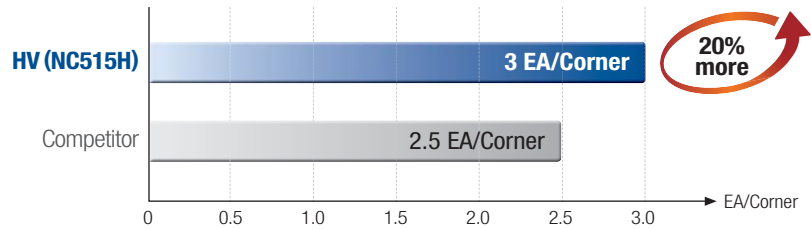
Application examples

Carbon steel (C45)

Workpiece Wind power flange

Cutting conditions $vc(m/min) = 130$, $fn(mm/rev) = 0.7$, $ap(mm) = 14$, dry

Tools **Insert** SNMM250724-HV **Holder** PSBNL4040-S25, PSKNL4040-S25

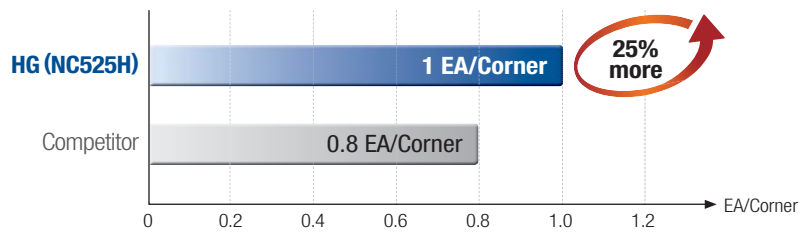


Alloy steel (42CrMo4)

Workpiece Pressure vessel in power generation industry

Cutting conditions $vc(m/min) = 140$, $fn(mm/rev) = 1.0$, $ap(mm) = 8\sim 10$, dry

Tools **Insert** CNMM250924-HG **Holder** PCLNL4040-S25

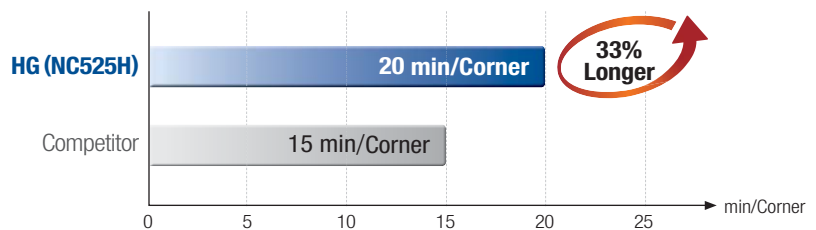
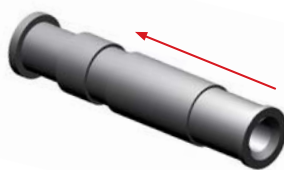


Alloy steel (20Cr4)

Workpiece Shaft

Cutting conditions $vc(m/min) = 113$, $fn(mm/rev) = 0.9$, $ap(mm) = 8\sim 10$, dry

Tools **Insert** SNMM250924-HG **Holder** PSBNR4040-S25

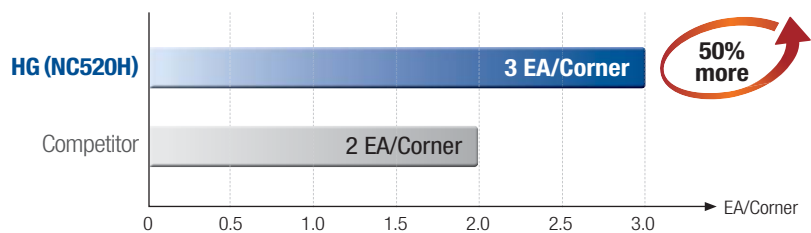


Carbon steel (C45)


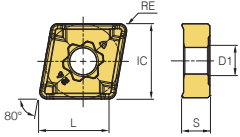

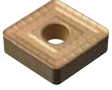
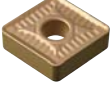


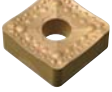



Workpiece Wind power flange

Cutting conditions $vc(m/min) = 119$, $fn(mm/rev) = 0.8$, $ap(mm) = 10\sim 12$, dry

Tools **Insert** SNMM250924-HG **Holder** PSBNL4040-S25, PCLNR4040-S25



 Stock items

Picture	Designation	Coated			Dimensions(mm)					Cutting condition		Geometries
		NC515H	NC520H	NC525H	L	IC	S	RE	D1	fn (mm/rev)	ap (mm)	
	CNMM 190612-HP				19.344	19.05	6.35	1.2	7.93	0.30~0.80	2.5~9.0	
	190616-HP			●	19.344	19.05	6.35	1.6	7.93	0.35~0.85	2.5~9.0	
	190624-HP				19.344	19.05	6.35	2.4	7.93	0.40~0.90	2.5~9.0	
	250924-HP	●			25.792	25.4	7.94	2.4	9.12	0.40~1.00	2.5~11.0	
	CNMM 190612-HL				19.344	19.05	6.35	1.2	7.93	0.30~0.85	3.0~10.0	
	190616-HL			●	19.344	19.05	6.35	1.6	7.93	0.35~0.90	3.0~10.0	
	190624-HL				19.344	19.05	6.35	2.4	7.93	0.40~1.00	3.0~10.0	
	250924-HL				25.792	25.4	7.94	2.4	9.12	0.40~1.10	2.5~12.0	
	CNMM 190612-HG				19.344	19.05	6.35	1.2	7.93	0.30~0.90	3.0~10.0	
	190616-HG	●			19.344	19.05	6.35	1.6	7.93	0.35~0.95	3.0~10.0	
	190624-HG				19.344	19.05	6.35	2.4	7.93	0.40~1.00	3.0~10.0	
	250924-HG	●	●	●	25.792	25.4	7.94	2.4	9.12	0.40~1.20	3.5~13.0	
	250932-HG			●	25.792	25.4	7.94	3.2	9.12	0.50~1.20	3.5~13.0	
	CNMM 190616-HV				19.344	19.05	6.35	1.6	7.93	0.45~1.05	4.0~11.0	
	190624-HV				19.344	19.05	6.35	2.4	7.93	0.50~1.10	4.0~11.0	
	250924-HV				25.792	25.4	7.94	2.4	9.12	0.50~1.40	4.0~15.0	
	CNMM 190616-HX				19.344	19.05	6.35	1.6	7.93	0.55~1.10	4.5~15.0	
	190624-HX				19.344	19.05	6.35	2.4	7.93	0.60~1.20	4.5~15.0	
	250924-HX			●	25.792	25.4	7.94	2.4	9.12	0.60~1.50	4.5~18.0	
	SNMM 190612-HP				19.05	19.05	6.35	1.2	7.93	0.30~0.80	2.5~9.0	
	190616-HP				19.05	19.05	6.35	1.6	7.93	0.35~0.85	2.5~9.0	
	190624-HP				19.05	19.05	6.35	2.4	7.93	0.40~0.90	2.5~9.0	
	250924-HP				25.4	25.4	7.94	2.4	9.12	0.40~1.00	2.5~11.0	
	SNMM 190612-HL				19.05	19.05	6.35	1.2	7.93	0.30~0.85	3.0~10.0	
	190616-HL				19.05	19.05	6.35	1.6	7.93	0.35~0.90	3.0~10.0	
	190624-HL				19.05	19.05	6.35	2.4	7.93	0.40~1.00	3.0~10.0	
	250924-HL				25.4	25.4	7.94	2.4	9.12	0.40~1.10	2.5~12.0	
	SNMM 190612-HG			●	19.05	19.05	6.35	1.2	7.93	0.30~0.90	3.0~10.0	
	190616-HG				19.05	19.05	6.35	1.6	7.93	0.35~0.95	3.0~10.0	
	190624-HG				19.05	19.05	6.35	2.4	7.93	0.40~1.00	3.0~10.0	
	250924-HG	●	●	●	25.4	25.4	7.94	2.4	9.12	0.40~1.20	3.5~13.0	
	250932-HG			●	25.4	25.4	7.94	3.2	9.12	0.50~1.20	3.5~13.0	
	SNMM 190616-HV				19.05	19.05	6.35	1.6	7.93	0.45~1.05	4.0~11.0	
	190624-HV				19.05	19.05	6.35	2.4	7.93	0.50~1.10	4.0~11.0	
	250724-HV			●	25.4	25.4	6.35	2.4	9.12	0.50~1.40	4.0~15.0	
	250924-HV			●	25.4	25.4	7.94	2.4	9.12	0.50~1.40	4.0~15.0	
	SNMM 190616-HX				19.05	19.05	6.35	1.6	7.93	0.55~1.10	4.5~15.0	
	190624-HX				19.05	19.05	6.35	2.4	7.93	0.60~1.20	4.5~15.0	
	250924-HX				25.4	25.4	7.94	2.4	9.12	0.60~1.50	4.5~18.0	

●: Stock item

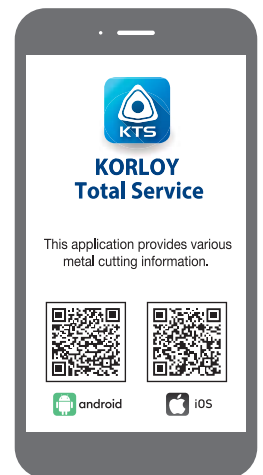
⚠ For the safe metalcutting

- 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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