

THE NEW VALUE FRONTIER



CBN Inserts  
for Machining Hardened Material

H Chipbreaker  
Series

CBN Inserts for Machining Hardened Material

# H Chipbreaker Series



Unique Molded Chipbreaker Provides Excellent Chip Control when Machining Hardened Material

Excellent Chip Control with Molded Chipbreaker

3 Chipbreaker Styles for a Wide Range of Machining Applications

KBN05M Insert Grade with Superior Oxidation Resistance and Wear Resistance

Small D.O.C., for Hardened Steel Finishing



HH Chipbreaker  
(55HRC~)



HL Chipbreaker  
(~55HRC)

1st  
Recommendation

Large D.O.C., for Removing the Carburized Layer



HD Chipbreaker



# H Chipbreaker Series

Unique Molded Chipbreaker Provides Excellent Chip Control when Machining Hardened Material  
3 Chipbreaker Styles for a Wide Range of Machining Applications

## 1 Excellent Chip Control with Molded Chipbreaker

Molded chipbreaker delivers excellent chip control and low cutting force with edge preparation and sharp cutting performance

Chip Control Comparison (Internal Evaluation)



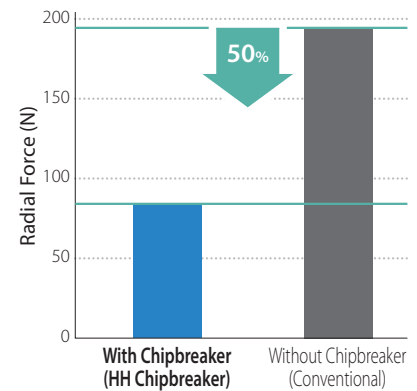
With Chipbreaker  
(HH Chipbreaker)



Without Chipbreaker  
(Conventional)

Cutting Conditions:  $V_c = 150$  m/min,  $a_p = 0.2$  mm,  $f = 0.15$  mm/rev, 60HRC, Wet, CN\*\*120408 Type after 21min Workpiece: SCM415, 60HRC




Cutting Force Comparison (Internal Evaluation)



Cutting Conditions:  $V_c = 150$  m/min,  $a_p = 0.2$  mm,  $f = 0.15$  mm/rev, Wet, CN\*\*120408 Type Workpiece: SCM415, 60HRC

## 2 3 Chipbreaker Styles for a Wide Range of Machining Applications

Various applications and cutting conditions are possible with 3 unique chipbreaker designs

Chipbreaker	Application	Recommended Cutting Range
<b>HH</b>  1st Recommendation	Hardened Steel Finishing 55HRC or more	Small D.O.C. ( $a_p = 0.1 \sim 0.3$ mm)
<b>HL</b> 	Hardened Steel Finishing 55HRC or less	
<b>HD</b> 	Removing the Carburized Layer (From Carburized Layer to Unhardened Layer)	Large D.O.C. ( $a_p = 0.3 \sim 0.7$ mm)

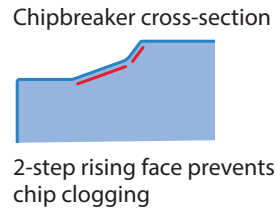
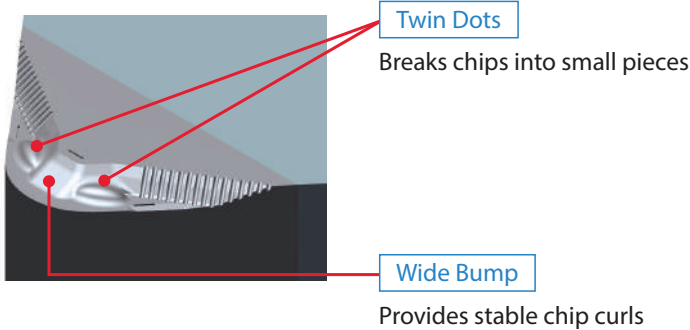
# 3 HH/HL Chipbreaker Hardened Steel Finishing

**Small D.O.C.**  
( $a_p = 0.1 \sim 0.3 \text{ mm}$ )

Molded chipbreaker provides excellent chip control and Low cutting force when machining hardened material

1st Recommendation

## HH Chipbreaker (Workpiece 55HRC or more)

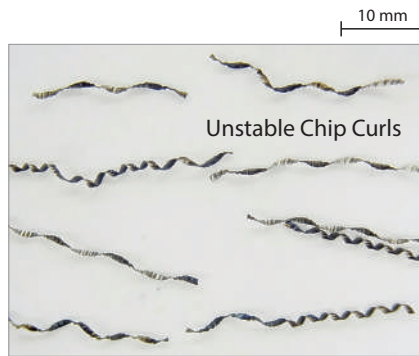


### Stable chip control for hardened workpieces which are 55HRC or more

Chip Control Comparison (Internal Evaluation)

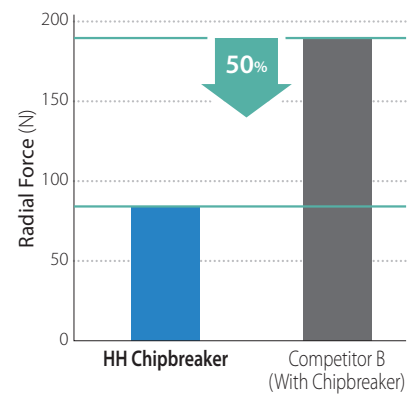


HH Chipbreaker



Competitor A  
(With Chipbreaker)

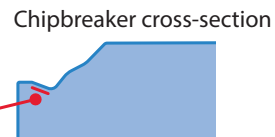
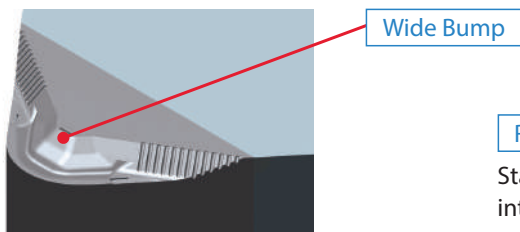
Cutting Force Comparison (Internal Evaluation)



Cutting Conditions:  $V_c = 150 \text{ m/min}$ ,  $a_p = 0.2 \text{ mm}$ ,  $f = 0.20 \text{ mm/rev}$ , Wet, CN\*\*120408 Type  
Workpiece: SCM415H, 55HRC

Cutting Conditions:  $V_c = 150 \text{ m/min}$ ,  $a_p = 0.2 \text{ mm}$ ,  
 $f = 0.15 \text{ mm/rev}$ , Wet, CN\*\*120408 Type  
Workpiece: SCM415H, 60HRC

## HL Chipbreaker (Workpiece 55HRC or less)



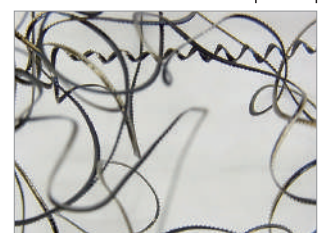
Stable chip control for softer interior of hardened materials

Stable chip curls for workpieces which are 55HRC or less

Chip Control Comparison (Internal Evaluation)



HL Chipbreaker



Competitor C (With Chipbreaker)

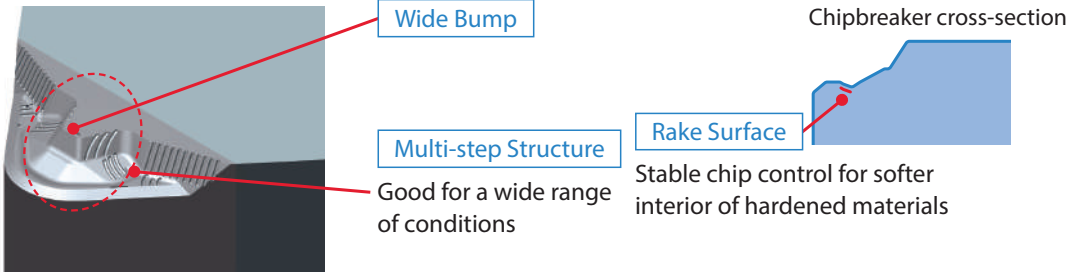
Cutting Conditions:  $V_c = 150 \text{ m/min}$ ,  $a_p = 0.2 \text{ mm}$ ,  $f = 0.20 \text{ mm/rev}$ , Wet, CN\*\*120408 Type Workpiece: SCM415H, 50HRC

# 4 HD Chipbreaker for Removing the Carburized Layer

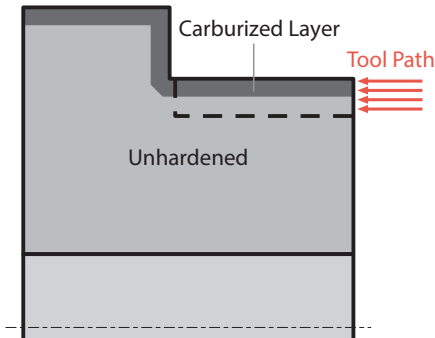
Large D.O.C.  
( $a_p = 0.3 \sim 0.7 \text{ mm}$ )

Maintains stable machining during applications with several passes and varied hardness

## HD Chipbreaker for Carburized Layer to Unhardened Layer

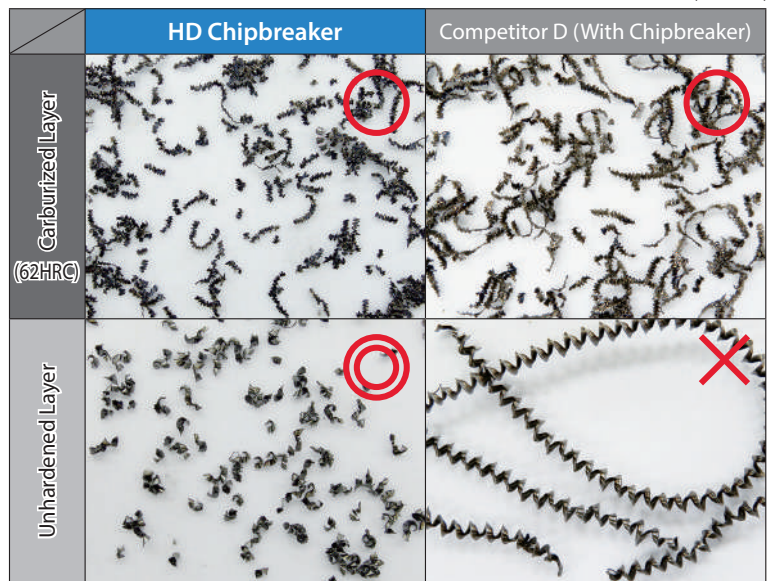


Tool Path Example

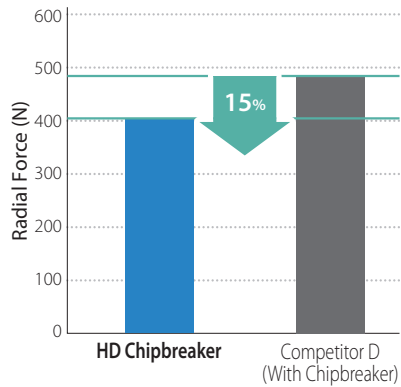


Breaks chips into small pieces at different D.O.C. and hardness

Chip Control Comparison (Internal Evaluation)



Cutting Force in Unhardened Layer Comparison (Internal Evaluation)



Cutting Conditions:  $V_c = 150 \text{ m/min}$ ,  $a_p = 0.5 \text{ mm}$ ,  $f = 0.15 \text{ mm/rev}$ , Wet, CN\*\*120408 Type  
Workpiece: SCM415H

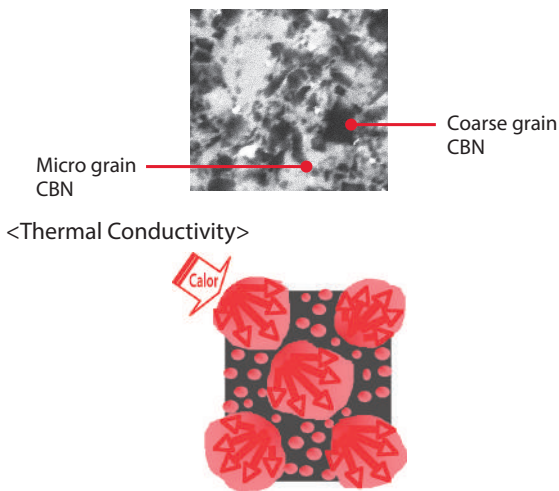
# MEGACOAT CBN KBN05M

Hybrid Grain Structure for High Hardness and High Strength  
MEGACOAT Ensures Longer Tool Life

## Combination of a Hybrid Grain Structure and MEGACOAT Provides Superior Oxidation Resistance and Wear Resistance

### Hybrid Grain Structure

Mixed structure of micro grain CBN and coarse grain CBN provides high hardness, toughness and thermal resistance characteristics.

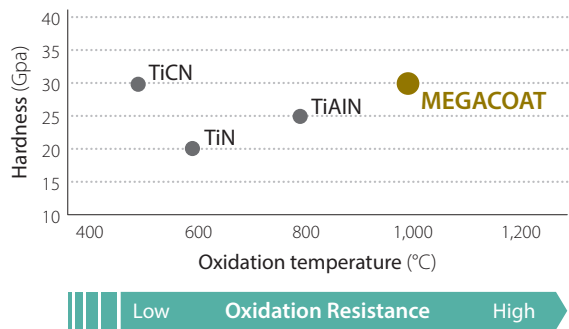


Coarse grain CBN quickly transfers heat

### MEGACOAT

Superior Oxidation Resistance and Wear Resistance

### Coating Properties

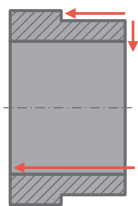


## Case Studies

### Pinion Chromium Molybdenum Hardened Steel (55 ~ 62HRC)

Vc = 130 m/min  
ap = 0.05 mm  
f = 0.08 mm/rev  
Dry

CNGM120408ME-HH



### Tool Life

HH Chipbreaker **70 pcs/edge**

Competitor F (Without Chipbreaker) **30 pcs/edge**

↑  
**2.3x**  
Tool Life

The HH chipbreaker maintained 2.3 times longer tool life than Competitor F.

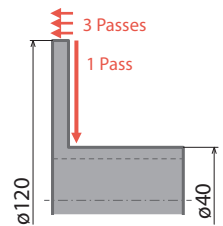
The molded chipbreaker provided stable chip control.

(User Evaluation)

### Plate Chromium Steel Carburizing Treatment (Surface Hardness 550Hv or more)

Vc = 160 m/min  
ap = 0.5 mm  
f = 0.2 mm/rev  
Wet

CNGM120408ME-HD



### Tool Life

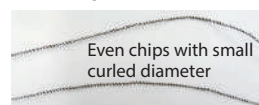
HD Chipbreaker **500 pcs/edge**

Competitor E (Without Chipbreaker) **400 pcs/edge**

↑  
**1.3x**  
Tool Life

### Chip Control

#### HD Chipbreaker



#### Competitor E



The HD chipbreaker maintained 1.3 times longer tool life than Competitor E. Chip control was stable.

(User Evaluation)

# H Chipbreaker Series Description

Edge Preparation		Cutting Edge Spec.		★: 1st Recommendation		H		Hardened Material (Continuous/Interruption)					★	
E		Honed						Dimensions (mm)					MEGACOAT CBN	
S01235		0.12 × 35° Chamfered and Honed						IC	S	D1	RE	LE	No. of Cutting edge	KBN05M
Shape			Description			Edge Preparation								
55HRC~	Small D.O.C.		CNGM120404ME-HH			E	12.7	4.76	5.16	0.4	2.6	2	●	
			CNGM120408ME-HH							0.8	2.6		●	
			CNGM120412ME-HH							1.2	2.5		●	
	Small D.O.C.		DNGM150404ME-HH	0.4	2.6					●				
			DNGM150408ME-HH	0.8	2.2					●				
			DNGM150412ME-HH	1.2	1.9					●				
~55HRC	Small D.O.C.		CNGM120404ME-HL			E	12.7	4.76	5.16	0.4	2.6	2	●	
			CNGM120408ME-HL							0.8	2.6		●	
			CNGM120412ME-HL							1.2	2.5		●	
	Small D.O.C.		DNGM150404ME-HL	0.4	2.6					●				
			DNGM150408ME-HL	0.8	2.2					●				
			DNGM150412ME-HL	1.2	1.9					●				
Carburized Layer to Unhardened Layer	Large D.O.C.		CNGM120404ME-HD			S01235	12.7	4.76	5.16	0.4	2.6	2	●	
			CNGM120408ME-HD							0.8	2.6		●	
			CNGM120412ME-HD							1.2	2.5		●	
	Large D.O.C.		DNGM150404ME-HD	0.4	2.6					●				
			DNGM150408ME-HD	0.8	2.2					●				
			DNGM150412ME-HD	1.2	1.9					●				

● : Standard Stock

## Recommended Cutting Conditions

Chipbreaker	Workpiece	Application	Insert Grades	Min. - Recommendation - Max.		
				Cutting Speed Vc (m/min)	ap (mm)	f (mm/rev)
HH	Hardened Material (55HRC or more)	Finishing	KBN05M	100-150-200	0.1-0.2-0.3	0.1-0.15-0.25
HL	Hardened Material (55HRC or less)					
HD	Hardened Material (From Carburized Layer to Unhardened Layer)	Removing the Carburized Layer	KBN05M	100-150-200	0.3-0.5-0.7	0.1-0.15-0.25