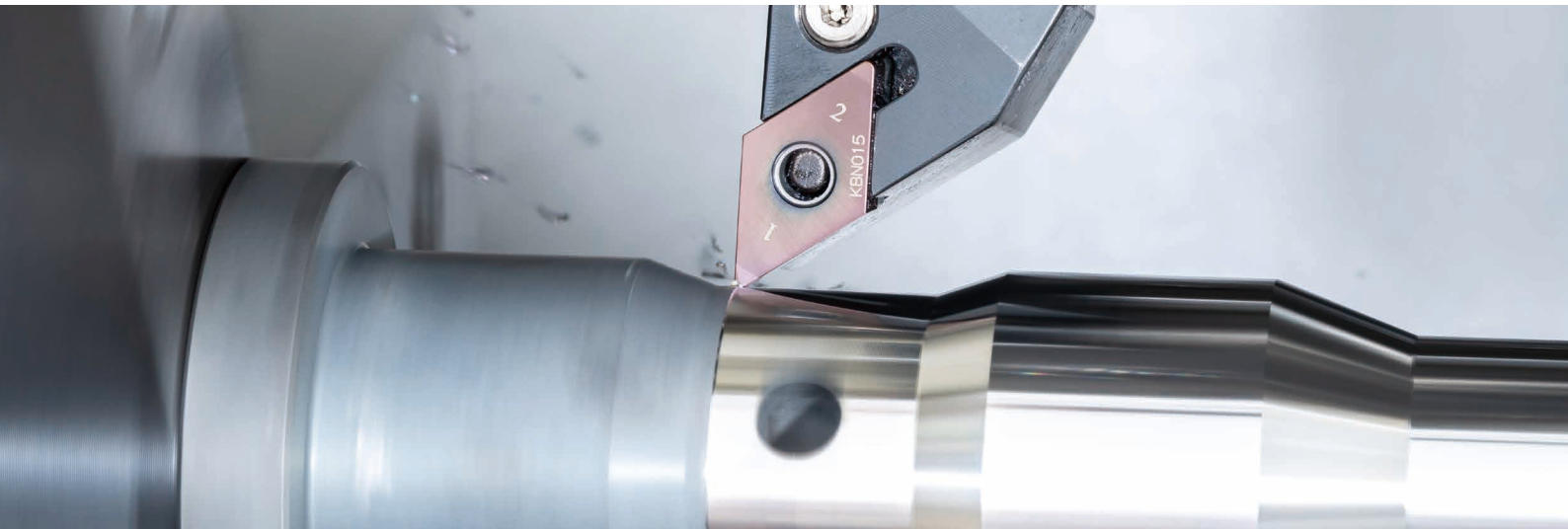


New Coated CBN for Machining Hardened Material

KBN015

NEW



"Wear Resistance + Fracture Resistance" Lowers Costs when Machining Hardened Material

1st recommended grade for general purpose machining of high hardness material

Supports high speed, continuous to interrupted machining

Newly developed "MEGACOAT TOUGH" Coating technology

Three grades for a variety of hardened material options

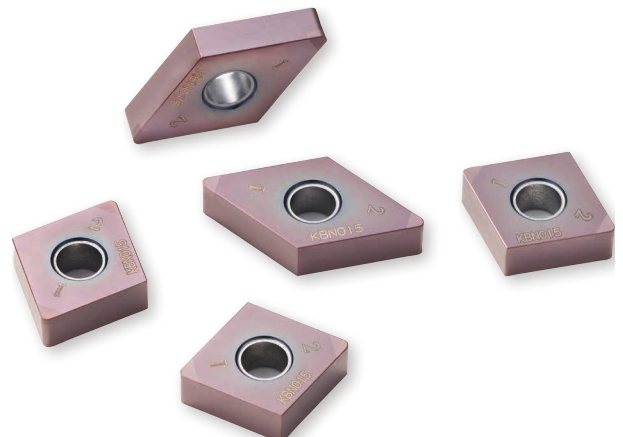
KBN010 / KBN015 / KBN020

NEW

New Coating is Now Available



MEGACOAT
TOUGH | CBN |



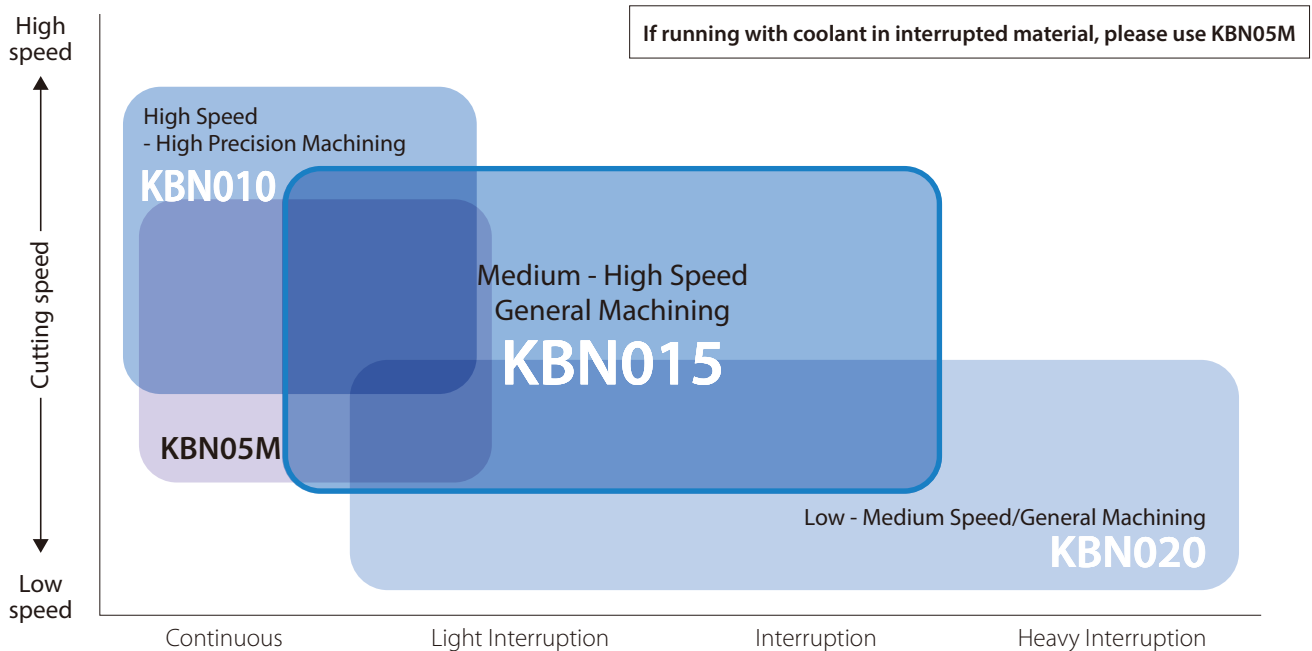
KBN015

1st recommended grade for general purpose machining of high hardness material.

"Wear resistance + Fracture resistance" lowers costs when machining hardened material.

1

KBN015 : 1st recommended grade for general purpose machining of high hardness material



KBN015

1st recommended grade of high hardness material

Available for a wide range of machining applications from continuous to interrupted machining to high speed machining



- New CBN maintains heat resistance and fracture resistance
- "MEGACOAT TOUGH" Coating technology
- Special multi-layer improves wear resistance

KBN010



High speed, high-precision machining

- Mixed structure of micro grain CBN and coarse grain CBN
- Excellent heat resistance and surface quality
- "MEGACOAT TOUGH" Coating technology

KBN020



Good for heavily interrupted machining

- High content CBN with high purity TiN binder
- High fracture resistance
- "MEGACOAT TOUGH" Coating technology

Case Studies

Gear SCM420H 58-60HRC

Continuous Facing

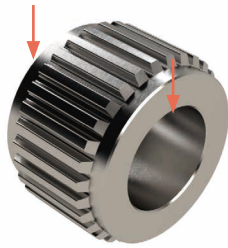
Vc = 180 m/min

ap = 0.2 mm

f = 0.1 mm/rev

Wet

CNGA120408S01225MEW



Tool Life

KBN015 2,000 pcs/edge

1.3×

Competitor A 1,500 pcs/edge

KBN015 showed good cutting edge condition and maintains long tool life.

(User evaluation)

Outer Race S55C 62HRC

Internal Interrupted Turning

Vc = 160 m/min

ap = 0.2 mm

f = 0.17 mm/rev

Dry

TNGA160412S00545



Tool Life

KBN015 500 pcs/edge

1.6×

Competitor B 300 pcs/edge

KBN015 is resistant to chipping and maintains extended long tool life.

(User evaluation)

Gear SNCM220[®] 58HRC

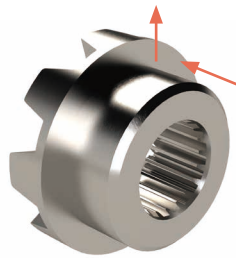
Vc = 125 m/min

ap = 0.25 mm

f = 0.1 mm/rev

Dry

CNGA120408S04030MEH



Tool Life

KBN010 600 pcs/edge

3.0×

Competitor C 200 pcs/edge

KBN010 provides longer tool life than competitor D.

(User evaluation)

Roll SKD11 62HRC

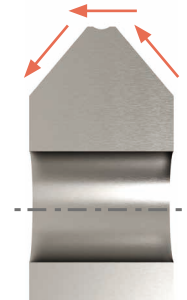
Vc = 145 m/min

ap = 0.25-0.50 mm

f = 0.1 mm/rev

Dry

DNGA150608S01225



Tool Life

KBN010 18 pcs/edge

1.3×

Competitor D 13 pcs/edge

Achieved longer tool life with excellent wear resistance in continuous machining of hardened material.

(User evaluation)

Clutch SCr420H

Vc = 100 m/min

ap = 0.15 mm

f = 0.1 mm/rev

Wet

WNGA080408S01225



Tool Life

KBN020 650 pcs/edge

1.6×

Competitor E 400 pcs/edge

KBN020 provides stable machining with longer tool life.

(User evaluation)

Gear SCM415

Vc = 100 m/min

ap = 0.05 mm

f = 0.15 mm/rev

Wet

CNGA120408S01325MEW



Tool Life

KBN020 300 pcs/edge

1.5×

Competitor F 200 pcs/edge

KBN020 improves dimensional variation with longer tool life.

(User evaluation)

2

"MEGACOAT TOUGH" and new CBN provide both wear resistance and Fracture Resistance



**MEGACOAT
TOUGH** | CBN |



"MEGACOAT TOUGH" coating with newly developed CBN dedicated high adhesion layer
High adhesion suppresses delamination for long tool life and stable machining



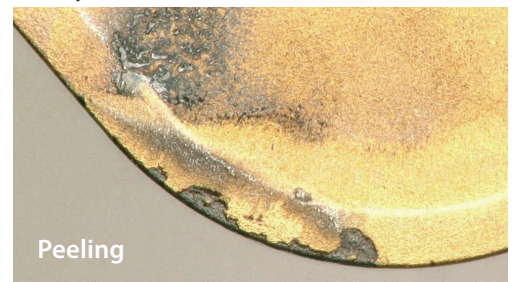
< Section image >

Cutting edge condition after machining (Internal evaluation)

KBN015



Competitor G



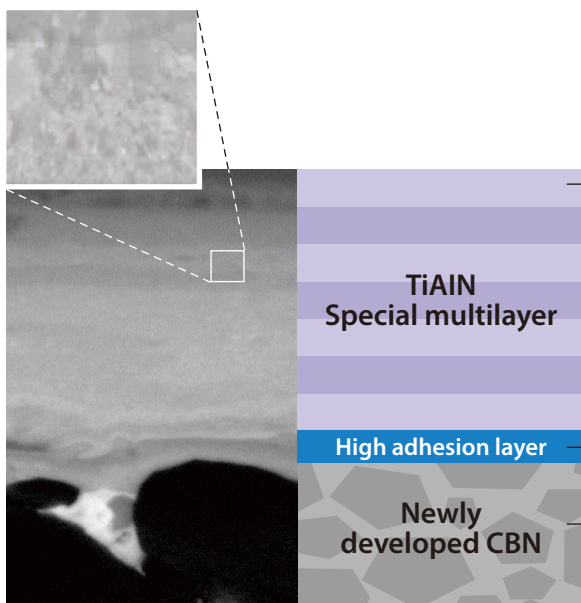
Cutting Conditions : $V_c = 150$ m/min, $a_p = 0.2$ mm, $f = 0.2$ mm/rev, Dry SCM415® HRC61

Intermediate layer and high adhesion layer for decreased stress improve adhesion with CBN

Medium - High Speed/General Machining **KBN015**

"MEGACOAT TOUGH" and New CBN substrate for Long Tool Life and Stable Machining

Micronized film structure

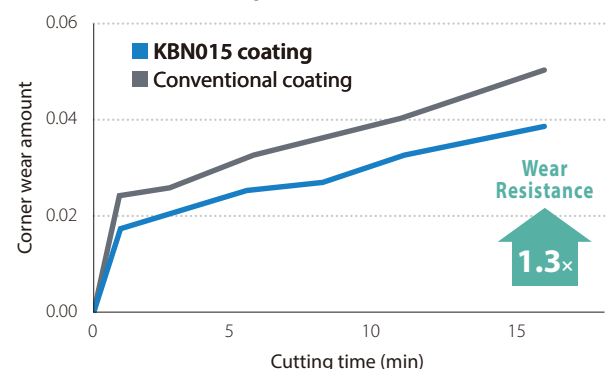


< Layer image >

Wear resistance layer

- Improved heat resistance by optimizing film composition
- Improved hardness and toughness with atomization

Wear resistance comparison (Internal evaluation)



Cutting Conditions : $V_c = 150$ m/min, $f = 0.1$ mm/rev, $a_p = 0.2$ mm Wet SCM420 (H)

"MEGACOAT TOUGH" unique technology
Suppresses delamination with high adhesion

Balanced CBN with heat resistance and fracture resistance

- High purity and tough CBN abrasive grain
- Fine ceramic binder improves heat resistance and fracture resistance

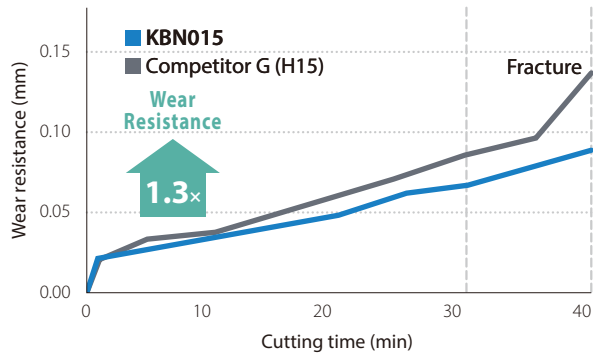
Cutting Performance

Excellent balance of abrasion resistance and fracture resistance, long tool life and stable machining

Medium Speed Machining Evaluation ($V_c=150\text{m/min}$)

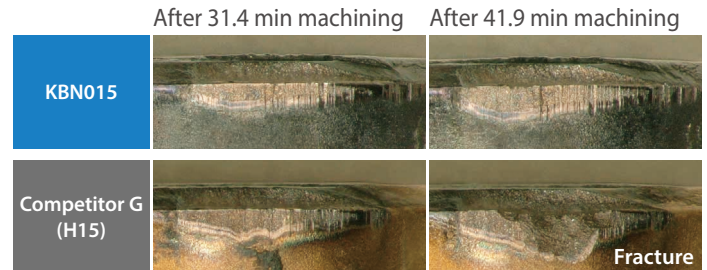
KBN015 has 1.3 times higher wear resistance of competitor G (H15) of the same grade.

Wear resistance comparison (Internal evaluation)



Cutting Conditions : $V_c = 150 \text{ m/min}$, $f = 0.1 \text{ mm/rev}$, $a_p = 0.2 \text{ mm}$ Wet SCM415®

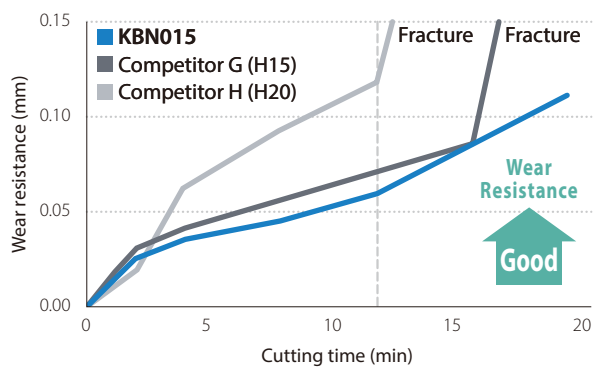
Edge condition



High Speed Machining Evaluation ($V_c=200\text{m/min}$)

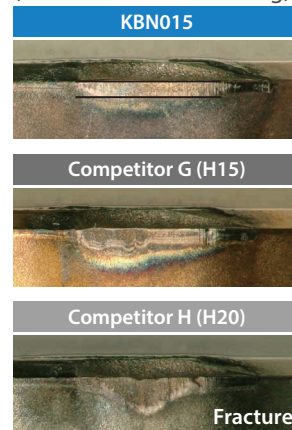
KBN015 has excellent wear resistance and fracture resistance compared to competitor's H15 and H20 grades.

Wear resistance comparison (Internal evaluation)



Cutting Conditions : $V_c = 200 \text{ m/min}$, $f = 0.1 \text{ mm/rev}$, $a_p = 0.2 \text{ mm}$ Wet SCM415®

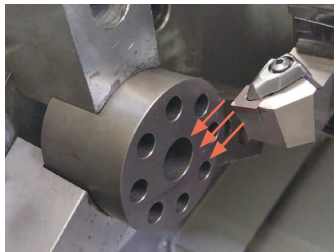
Edge condition
(after 11.5 min machining)



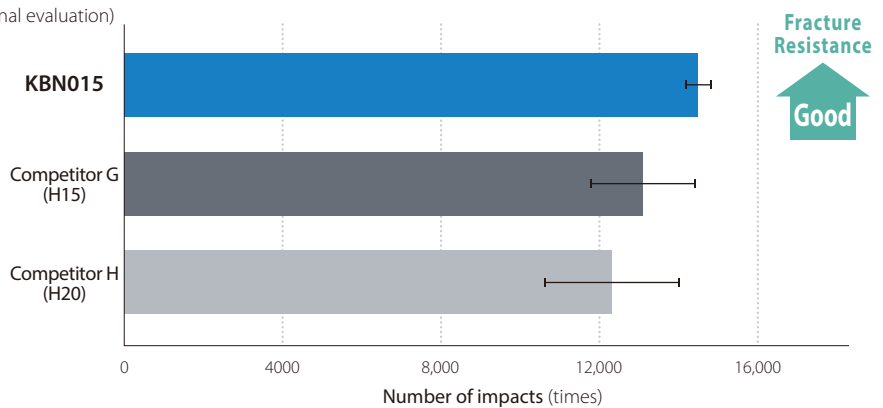
Interrupted machining evaluation

KBN015 is resistant to chipping and has high stability compared to competitor's H15 and H20 grades.

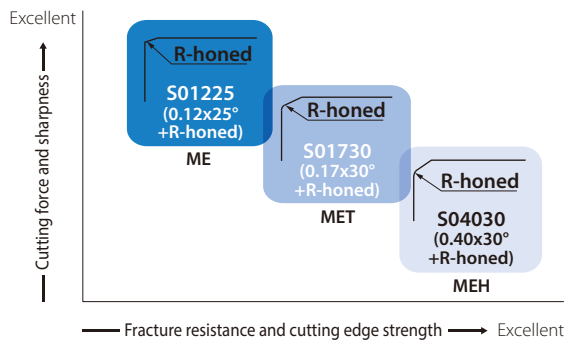
Fracture resistance comparison (Internal evaluation)



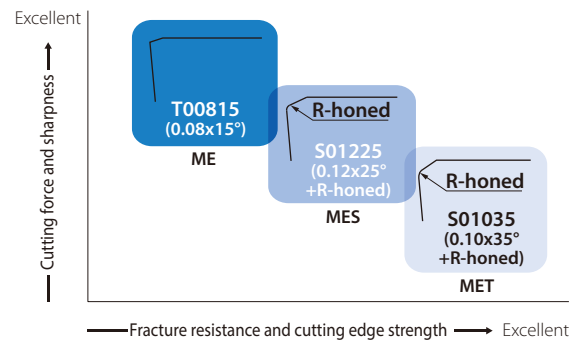
Cutting Conditions : $V_c = 150 \text{ m/min}$
 $f = 0.2 \text{ mm/rev}$, $a_p = 0.2 \text{ mm}$ Dry
SCM415®



Negative Insert



Positive Insert

Negative Insert Standard Cutting Edge Prep.
(Hardened material machining)

Symbol	Cutting Edge Prep.		Applications and Features
ME	S01225	0.12mm x 25° +R-honed	General purpose
MET	S01730	0.17mm x 30° +R-honed	Superior fracture resistance
MEH	S04030	0.40mm x 30° +R-honed	For interrupted - high-feed machining Prevents flaking

Positive Insert Standard Cutting Edge Prep.
(Hardened material machining)

Symbol	Cutting Edge Prep.		Applications and Features
ME	T00815	0.08mm x 15°	Chamfered Sharp edge, Minimize burrs
MES	S01225	0.12mm x 25° +R-honed	General purpose
MET	S01035	0.10mm x 35° +R-honed	For interruption Stable machining

Recommended Cutting Conditions

Workpiece Material		Recommended Insert Grade		Application	Cutting Conditions		
					Vc (m/min)	ap (mm)	f (mm/rev)
Hard Materials	55HRC or more	KBN010	High Precision Machining Finishing	Continuous	80 - 180 - 250	0.05 - 0.20 - 0.35	0.05 - 0.15 - 0.30
		KBN015	High speed/ General	Continuous~ Interruption	80 - 180 - 230	0.05 - 0.20 - 0.50	0.05 - 0.20 - 0.45
		KBN020	Low speed/ General	Continuous~ Heavy Interruption	80 - 120 - 200	0.05 - 0.20 - 0.50	0.05 - 0.20 - 0.45

Solution for Automotive Parts

KBN010 / KBN015 / KBN020

Solution 1

Available for continuous to interrupted/heavy interrupted machining
Can be used on a variety of part shapes such as machining shafts and gears.

Point

Excellent machining performance of auto suspension parts that use a lot of hardened materials

Solution 2

Long tool life and stable machining. High toughness suppresses sudden fractures during continuous to interrupted machining applications.

Point

Stable machining increases productivity



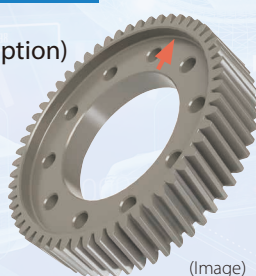
Sun Gear

Boring finishing for spline part (Interruption)



Diff Ring

Facing (Interruption)



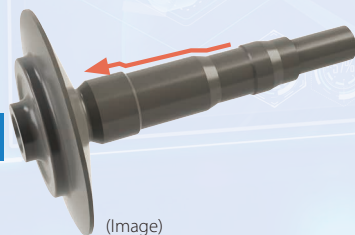
Pinion Gear

External finishing



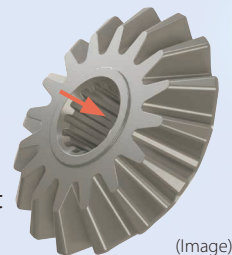
CVT Shaft

External finishing

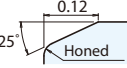


Side Gear

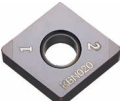
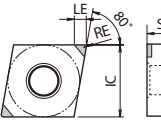
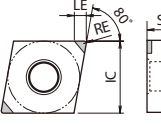
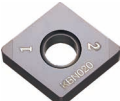
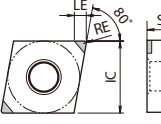
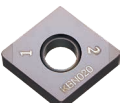
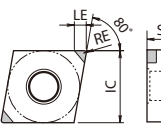
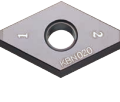
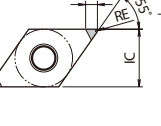
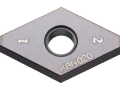
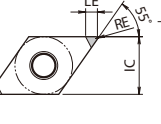
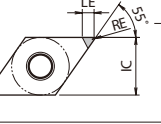
Boring finishing for spline part (Interruption)



Standard Stock (Negative)

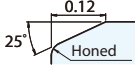
Cutting Edge Preparation			
Symbol	Cutting Edge Specification	Indication Example	Shape
S	Chamfered and Honed	S01225 0.12 mm x 25° chamfered and honed	

Description	IC	S	D1
CNGA 1204_	12.70	4.76	5.16
DNGA 1504_	12.70	4.76	5.16
DNGA 1506_		6.35	

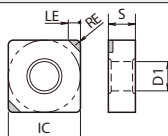
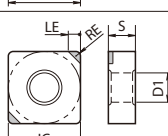
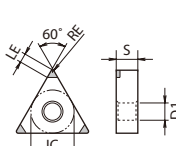
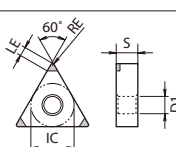
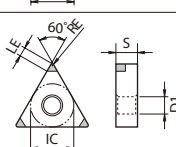
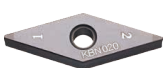
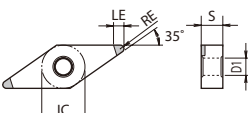
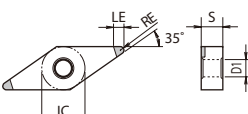
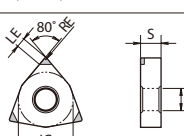
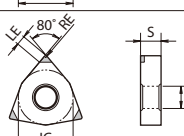
Shape		Description	Cutting Edge Preparation	Dimensions (mm)		No. of Edges	MEGACOAT TOUGH		
				RE	LE		KBN015	KBN010	KBN020
		CNGA 120404S01215MEW	S01215	0.4	2.6	2	●	●	●
		120408S01215MEW		0.8	2.5		●	●	●
		120412S01215MEW		1.2	2.5		●	●	●
		CNGA 120402S01225ME	S01225	0.2	2.6	2	●	●	●
		120404S01225ME		0.4	2.6		●	●	●
		120408S01225ME		0.8	2.6		●	●	●
		120412S01225ME		1.2	2.5		●	●	●
		120416S01225ME		1.6	3.4		●	●	●
		120420S01225ME		2.0	3.4		●	●	●
		CNGA 120404S01730MET	S01730	0.4	2.6	2	●	●	●
		120408S01730MET		0.8	2.6		●	●	●
		120412S01730MET		1.2	2.5		●	●	●
		120416S01730MET		1.6	3.4		●	●	●
		CNGA 120408S04030MEH	S04030	0.8	2.6	2	●	●	●
		120412S04030MEH		1.2	2.5		●	●	●
		DNGA 150401S01225ME	S01225	0.1	2.8	2	●	●	●
		150402S01225ME		0.2	2.7		●	●	●
		150404S01225ME		0.4	2.6		●	●	●
		150408S01225ME		0.8	2.2		●	●	●
		150412S01225ME		1.2	1.9		●	●	●
		150416S01225ME		1.6	3.8		●	●	●
		DNGA 150604S01225ME	S01225	0.4	2.6	2	●	●	●
		150608S01225ME		0.8	2.2		●	●	●
		DNGA 150404S01730MET	S01730	0.4	2.6	2	●	●	●
		150408S01730MET		0.8	2.2		●	●	●
		150412S01730MET		1.2	1.9		●	●	●
		150416S01730MET		1.6	3.8		●	●	●
		DNGA 150604S01730MET	S01730	0.4	2.6	2	●	●	●
		150608S01730MET		0.8	2.2		●	●	●
		DNGA 150404S04030MEH	S04030	0.4	2.6	2	●	●	●
		150408S04030MEH		0.8	2.2		●	●	●
		150412S04030MEH		1.2	1.9		●	●	●

● : Standard Stock

Standard Stock (Negative)

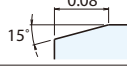
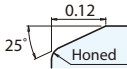
Cutting Edge Preparation			
Symbol	Cutting Edge Specification	Indication Example	Shape
S	Chamfered and Honed	S01225 0.12 mm x 25° chamfered and honed	

Description	IC	S	D1
SNGA 1204_	12.70	4.76	5.16
TNGA 1604_	9.525	4.76	3.81
VNGA 1604_	9.525	4.76	3.81
WNGA 0804_	12.70	4.76	5.16

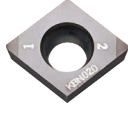
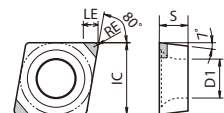
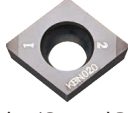
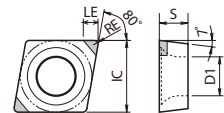
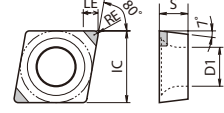
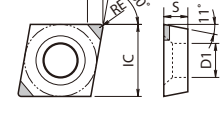
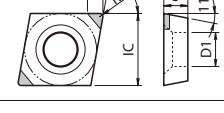
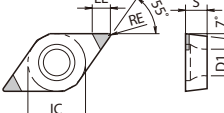
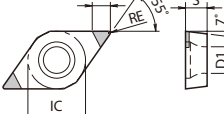
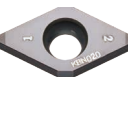
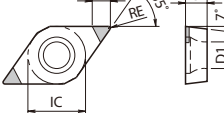
Shape		Description	Cutting Edge Preparation	Dimensions (mm)		No. of Edges	MEGACOAT TOUGH		
				RE	LE		KBN015	KBN010	KBN020
 Multi Edge		SNGA 120404S01225ME	S01225	0.4	2.6	2	●	●	●
		120408S01225ME		0.8	2.6		●	●	●
 Multi Edge/Tough		SNGA 120404S01730MET	S01730	0.4	2.6	2	●	●	●
		120408S01730MET		0.8	2.6		●	●	●
		120412S01730MET		1.2	2.6		●	●	●
 Multi Edge		TNGA 160401S01225ME	S01225	0.1	2.9	3	●	●	●
		160402S01225ME		0.2	2.8		●	●	●
		160404S01225ME		0.4	2.7		●	●	●
		160408S01225ME		0.8	2.4		●	●	●
		160412S01225ME		1.2	2.1		●	●	●
 Multi Edge/Tough		TNGA 160404S01730MET	S01730	0.4	2.7	3	●	●	●
		160408S01730MET		0.8	2.4		●	●	●
		160412S01730MET		1.2	2.1		●	●	●
 Multi Edge/Interruption		TNGA 160404S04030MEH	S04030	0.4	2.7	3	●	●	●
		160408S04030MEH		0.8	2.4		●	●	●
 Multi Edge		VNGA 160401S01225ME	S01225	0.1	2.6	2	●	●	●
		160402S01225ME		0.2	2.3		●	●	●
		160404S01225ME		0.4	2.0		●	●	●
		160408S01225ME		0.8	2.7		●	●	●
 Multi Edge/Tough		VNGA 160404S01730MET	S01730	0.4	2.0	2	●	●	●
		160408S01730MET		0.8	2.7		●	●	●
 Multi Edge		WNGA 080404S01225ME	S01225	0.4	2.6	3	●	●	●
		080408S01225ME		0.8	2.6		●	●	●
 Multi Edge/Tough		WNGA 080404S01730MET	S01730	0.4	2.0	3	●	●	●
		080408S01730MET		0.8	2.6		●	●	●

● : Standard Stock

Standard Stock (Positive)

Cutting Edge Preparation			
Symbol	Cutting Edge Specification	Indication Example	Shape
T	Chamfered	T00815 0.08 mm x 15° chamfered	
S	Chamfered and Honed	S01225 0.12 mm x 25° chamfered and honed	

Description	IC	S	D1
CCMW 0602_	6.35	2.38	2.8
CCMW 09T3_	9.525	3.97	4.4
CPGB 0802_	7.94	2.38	3.5
CPGB 0903_	9.525	3.18	4.5
DCMW 0702_	6.35	2.38	2.8
DCMW 11T3_	9.525	3.97	4.4

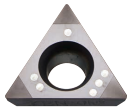
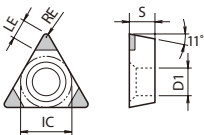
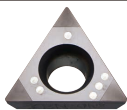
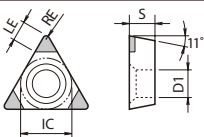
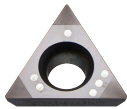
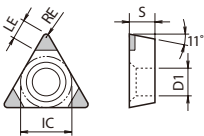
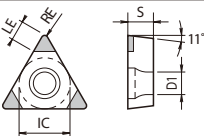
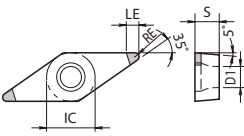
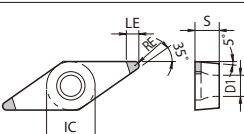
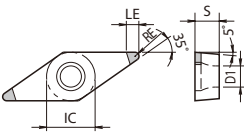
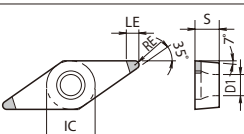
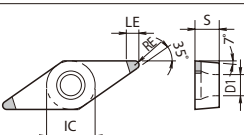
Shape	Description	Cutting Edge Preparation	Dimensions (mm)		No. of Edges	MEGACOAT TOUGH		
			RE	LE		KBN015	KBN010	KBN020
 Multi Edge		T00815	0.2	2.0	2	●	●	●
			0.4	1.9		●	●	●
			0.8	1.8		●	●	●
		T00815	0.2	2.0	2	●	●	●
			0.4	1.9		●	●	●
			0.8	1.8		●	●	●
 Multi Edge/General Purpose		S01225	0.4	1.9	2	●	●	●
			0.8	1.8		●	●	●
		S01225	0.4	1.9	2	●	●	●
			0.8	1.8		●	●	●
 Multi Edge/Tough		S01035	0.4	1.9	2	●	●	●
			0.8	1.8		●	●	●
 Multi Edge		T00815	0.4	1.9	2	●	●	●
		T00815	0.2	2.6		●	●	●
			0.4	2.6	2	●	●	●
 Multi Edge/General Purpose		S01225	0.4	2.5	2	●	●	●
			0.8	2.5		●	●	●
 Multi Edge/Tough		S01035	0.4	1.9	2	●	●	●
			0.8	2.2		●	●	●
		S01035	0.4	2.5	2	●	●	●
			0.8	2.5		●	●	●
 Multi Edge		T00815	0.2	2.4	2	●	●	●
			0.4	2.2		●	●	●
			0.8	1.9		●	●	●
		T00815	0.2	2.4	2	●	●	●
			0.4	2.2		●	●	●
			0.8	1.9		●	●	●
			1.2	1.9		●	●	●
 Multi Edge/General Purpose		S01225	0.2	2.4	2	●	●	●
			0.4	2.2		●	●	●
			0.8	1.9		●	●	●
 Multi Edge/Tough		S01035	0.2	1.9	2	●	●	●
			0.4	1.7		●	●	●
			0.8	1.9		●	●	●
		S01035	0.2	2.4	2	●	●	●
			0.4	2.2		●	●	●
			0.8	1.9		●	●	●
			1.2	1.9		●	●	●
			0.2	2.4		●	●	●

● : Standard Stock

Standard Stock (Positive)

Cutting Edge Preparation				
Symbol	Cutting Edge Specification	Indication Example		Shape
T	Chamfered	T00815	0.08 mm x 15° chamfered	
S	Chamfered and Honed	S01225	0.12 mm x 25° chamfered and honed	

Description	IC	S	D1
TPGB 1103_	6.35	3.18	3.5
TPGB 1603_	9.525		4.5
TPGW 1604_	9.525	4.76	4.4
VBGW 1103_	6.35	3.18	2.8
VBGW 1604_	9.525	4.76	4.4
VCGW 0802_	4.76	2.38	2.3

Shape		Description	Cutting Edge Preparation	Dimensions (mm)		No. of Edges	MEGACOAT TOUGH				
				RE	LE		KBN015	KBN010	KBN020		
 Multi Edge		TPGB 110302T00815ME 110304T00815ME 110308T00815ME	T00815	0.2	2.3	3	●	●	●		
				0.4	2.1		●	●	●		
				0.8	1.8		●	●	●		
 Multi Edge/General Purpose		TPGB 110304S01225MES 110308S01225MES	S01225	0.4	2.1	3	●	●	●		
				0.8	1.8		●	●	●		
 Multi Edge/Tough		TPGB 110302S01035MET 110304S01035MET 110308S01035MET	S01035	0.2	2.3	3	●	●	●		
					0.4		2.1	●	●	●	
					0.8		1.8	●	●	●	
				TPGB 160304S01035MET 160308S01035MET	S01035	0.4	1.8	3	●	●	●
						0.8	1.5		●	●	●
 Multi Edge/Tough		TPGW 160404S01035MET 160408S01035MET	S01035	0.4	1.8	3	●	●	●		
					0.8		1.5	●	●	●	
 Multi Edge		VBGW 110302T00815ME 110304T00815ME 110308T00815ME	T00815	0.2	2.4	2	●	●	●		
					0.4		2.0	●	●	●	
					0.8		1.7	●	●	●	
				VBGW 160402T00815ME 160404T00815ME 160408T00815ME	T00815	0.2	2.4	2	●	●	●
				0.4		2.0	●		●	●	
				0.8		1.7	●		●	●	
 Multi Edge/General Purpose		VBGW 110304S01225MES	S01225	0.4	2.0	2	●	●	●		
		VBGW 160404S01225MES	S01225	0.4	2.0	2	●	●	●		
 Multi Edge/Tough		VBGW 110302S01035MET 110304S01035MET 110308S01035MET	S01035	0.2	2.4	2	●	●	●		
					0.4		2.0	●	●	●	
					0.8		1.7	●	●	●	
				VBGW 160402S01035MET 160404S01035MET 160408S01035MET	S01035	0.2	2.4	2	●	●	●
				0.4		2.0	●		●	●	
				0.8		1.7	●		●	●	
 Multi Edge		VCGW 080202T00815ME 080204T00815ME	T00815	0.2	2.4	2	●	●	●		
					0.4		2.0	●	●	●	
 Multi Edge/Tough		VCGW 080202S01035MET 080204S01035MET 080208S01035MET	S01035	0.2	2.4	2	●	●	●		
					0.4		2.0	●	●	●	
					0.8		1.7	●	●	●	

● : Standard Stock

