

Insert Grades

A1~A20



A

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Insert Grades

A6~A20

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Summary of Insert Grades

A

Kyocera promotes research and development to help improve customers' productivity and profitability. Kyocera provides high-quality inserts in various grades including Cermet, Coated Carbide, Coated Super Micro Grain Carbide, Carbide, Ceramic, PCD and CBN.

Turning

Workpiece Material	Steel (Carbon steel / Alloy steel)					Stainless steel / Cast steel					Cast Iron (Gray cast iron / Nodular cast iron)							
	Cutting Range					Cutting Range					Cutting Range							
	Finishing	←			→	Roughing	Finishing	←			→	Roughing	Finishing	←			→	Roughing
Classification	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30				
Cermet	TN Series	TN6010					TN6010											
		TN620					TN620											
		TN6020					TN6020											
		TN60					TN60									TN60		
		TN90					TN90											
Coated Carbide	CA Series	CA510																
		CA515																
		CA525																
		CA530																
		CA5505																
Coated Carbide	PR Series	PR930					PR930											
		PR1005																
		PR1025																
		PR1115																
		PR1225																
Ceramic	Ceramic																	
Carbide	Carbide																	
CBN	CBN																	

Insert Grades



Turning

Workpiece Material		Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Heat-resistant alloys / Ni-base heat-resistant alloys)				Hard Materials (Hardened steel / Chilled cast iron)				Sintered Steel			
Cutting Range		Finishing ← → Roughing				Finishing ← → Roughing				Finishing ← → Roughing				Finishing ← → Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30	01	10	20	30
Coated Carbide	CA Series						CA6515										
	PR Series							CA6525									
	MEGACOAT (PR Series)						PR1305										
	MEGACOAT NANO (PR Series)						PR1310										
Cermet													TN6010				
Ceramic						CF1				KT66							
CBN							KS6030				A66N						
	MEGACOAT						KS6040				PT600M						
											KBN510						
											KBN525						
											KBN900						
											KBN05M						
											KBN10M						
											KBN25M						
											KBN30M						
											KBN35M						

Workpiece Material		Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast iron)				Sintered Steel			
Cutting Range		Finishing ← → Roughing				Finishing ← → Roughing				Finishing ← → Roughing				Finishing ← → Roughing			
Classification		N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30	01	10	20	30
Coated Carbide	MEGACOAT NANO (PR Series)							PR1535									
Carbide							SW05										
							SW10										
							SW25										
PCD							KW10										
							GW15										
							KPD001										
							KPD010										

PVD Coated Carbide for Small Tools

Workpiece Material		Steel (Carbon steel / Alloy steel)				Stainless steel / Cast steel				Cast Iron (Gray cast iron / Nodular cast iron)					
Cutting Range		Finishing ← → Roughing				Finishing ← → Roughing				Finishing ← → Roughing					
Classification		P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Coated Carbide	PR Series		PR930					PR930							
			PR1005					PR1025							
			PR1025					PR1125							
			PR1115					PR1115							
MEGACOAT (PR Series)			PR1225				PR1225								
MEGACOAT NANO (PR Series)			PR1425				PR1425								

Summary of Insert Grades

A

Grooving / Cut-Off



Insert Grades

Workpiece Material	Steel (Carbon steel / Alloy steel)					Stainless steel / Cast steel					Cast Iron (Gray cast iron / Nodular cast iron)				
	Cutting Range					Cutting Range					Cutting Range				
	Classification	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Cermet	MEGACOAT (PV Series)	PV7040										PV7040			
	TN Series	TN6020					TN6020					TN60			
		TN60					TN60					TN60			
TC Series	TN90					TN90					TC40N				
	TC40N					TC60M					TC40N				
Coated Carbide	CR Series	CR9025					CR9025								
	PR Series	PR630					PR630								
		PR660					PR660								
		PR915					PR915					PR905			
		PR930					PR930								
		PR1025					PR1025								
	MEGACOAT (PR Series)	PR1115					PR1215					PR1215			
PR1215					PR1225										
MEGACOAT NANO (PR Series)	PR1535					PR1535									
Ceramic											A65 A66N PT600M				
Carbide											KW10 GW15				

Workpiece Material	Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast iron)				Sintered Steel					
	Cutting Range				Cutting Range				Cutting Range				Cutting Range					
	Classification	N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30	01	10	20	30	
Coated Carbide	MEGACOAT (PR Series)													PR1215 PR1225				
														TN60				
Cermet																		
Ceramic										A65 A66N PT600M								
Carbide		KW10 GW15				KW10 GW15												
CBN									KBN510 KBN525					KBN570				
PCD	KPD001 KPD010					KPD001 KPD010												



Drilling

Workpiece Material	Steel (Carbon steel / Alloy steel)					Stainless steel / Cast steel					Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range	Finishing ← → Roughing					Finishing ← → Roughing					Finishing ← → Roughing			
Classification	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Coated Carbide	CA Series							CA6535						
	PR Series			PR660				PR660						
	MEGACOAT (PR Series)		PR830					PR830						
			PR1225					PR1225				PR1210		
MEGACOAT NANO (PR Series)		PR1230												
		PR1535					PR1535							
Carbide												KW10		
												GW15		

Workpiece Material	Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast Iron)			
Cutting Range	Finishing ← → Roughing				Finishing ← → Roughing				Finishing ← → Roughing			
Classification	N01	N10	N20	N30	S01	S10	S20	S30	H01	H10	H20	H30
Coated Carbide										PR1230		
MEGACOAT (PR Series)												
Carbide		KW10				KW10						
		GW15				GW15						

Milling

Workpiece Material	Steel (Carbon steel / Alloy steel)					Stainless steel / Cast steel					Cast Iron (Gray cast iron / Nodular cast iron)			
Cutting Range	Finishing ← → Roughing					Finishing ← → Roughing					Finishing ← → Roughing			
Classification	P01	P10	P20	P30	P40	M01	M10	M20	M30	M40	K01	K10	K20	K30
Cermet	TN Series	TN60					TN60							
	TC Series	TN100M					TN100M							
		TC60M						TC60M						
Coated Carbide	CA Series							CA6535				CA420M		
	PR Series		PR830					PR830						
	MEGACOAT (PR Series)		PR1225					PR1225				PR1210		
			PR1230											
	MEGACOAT NANO (PR Series)		PR1525					PR1525				PR1510		
		PR1535					PR1535							
Carbide												KW10		
												GW25		

Workpiece Material	Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Heat-resistant alloys / Ni-base heat-resistant alloys)				Difficult-to-cut Materials (Titanium / Titanium alloys)				Hard Materials (Hardened steel / Chilled cast Iron)			
Cutting Range	Finishing ← → Roughing				Finishing ← → Roughing				Finishing ← → Roughing				Finishing ← → Roughing			
Classification	N01	N10	N20	N30	S01	S10	S20	S30	S01	S10	S20	S30	H01	H10	H20	H30
Coated Carbide	CA Series						CA6535				CA6535					
	PR Series										PR905					
	MEGACOAT (PR Series)										PR1210					
	MEGACOAT NANO (PR Series)						PR1535				PR1535					
Carbide		KW10									KW10					
		GW25									GW25					
CBN														KBN525		
PCD		KPD001									KPD001					
		KPD010									KPD010					
		KPD230														
		KPD250														

Cermet



Cermet

KYOCERA is known as one of the leading manufacturer of cermets. Cermets combine toughness with superior wear resistance, and provide longer tool life and excellent surface finishes. Typical materials used in cermets are TiC, TiN, TiCN and NbC.

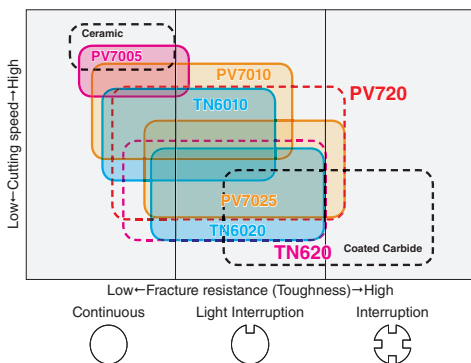
PVD Coated Cermet (MEGACOAT / MEGACOAT NANO Cermet)

PVD Coated Cermet is coated on cermet substrate with a thin layer of high wear resistance and high adhesion resistance by PVD (Physical Vapor Deposition) technology. Generally because of the low processing temperature of PVD compared with CVD, PVD Coated Cermet features less deterioration and more bending strength.

Features of Cermet and PVD Coated Cermet

Classification	Symbol	Color	Main Component (Coated Composition)	Advantages and Applications		
<div style="background-color: #0070C0; color: white; padding: 5px; text-align: center; border-radius: 5px;"> P Steel </div>	Cermet	TN620	Gray	TiCN	<ul style="list-style-type: none"> Three types of special reinforcement technology realized the superior fracture resistance and wear resistance Application: Stable machining of steel 	
		TN6010 (Super Micro-Grain)	Gray	TiCN	<ul style="list-style-type: none"> Improved surface cermet with superior wear resistance and toughness Application: Economical uncoated cermet for steel 	
		TN60	Gray	TiCN+NbC	<ul style="list-style-type: none"> Superior cermet with wear resistance and toughness Application: Machining of steel and stainless steel 	
		TN6020 (Super Micro-Grain)	Gray	TiCN	<ul style="list-style-type: none"> Super micro-grain cermet with superior wear resistance and toughness Application: For steel machining, superior wear resistance and toughness 	
		TN100M	Gray	TiCN+NbC	<ul style="list-style-type: none"> Tough cermet with improved oxidation resistance and thermal shock resistance Application: Milling of steel at high speed 	
		TC40N	Gray	TiC+TiN	<ul style="list-style-type: none"> Good balance of wear resistance and toughness Application: Grooving and threading of steel 	
<div style="background-color: #FF0000; color: white; padding: 5px; text-align: center; border-radius: 5px;"> K Cast Iron </div>	MEGACOAT NANO Cermet	PV720	Gold	TiCN (MEGACOAT NANO)	<ul style="list-style-type: none"> Superior wear and adhesion resistance MEGACOAT NANO on the special reinforcement cermet Application: First choice PVD coated cermet for steel machining, high efficient machining and high quality surface finish 	
		MEGACOAT Cermet	PV7010 (Super Micro-Grain)	Blackish red	TiCN (MEGACOAT)	<ul style="list-style-type: none"> Heat-resistant MEGACOAT on improved surface cermet with excellent wear resistance and toughness Application: Stable and improved tool life in steel machining, excellent surface finish
			PV7025 (Super Micro-Grain)	Blackish red	TiCN (MEGACOAT)	<ul style="list-style-type: none"> MEGACOAT on the super micro-grain cermet Application: PVD coated cermet for steel machining. High strength and longer tool life given by MEGACOAT
			PV7040	Blackish red	TiC+TiN (MEGACOAT)	<ul style="list-style-type: none"> MEGACOAT Cermet for Grooving Application: Excellent surface finish and longer tool life in Steel grooving
			PV7005	Blackish red	TiC+TiN (MEGACOAT)	<ul style="list-style-type: none"> Heat-resistant MEGACOAT on cermet with excellent wear resistance Application: High speed finishing of gray and nodular cast iron

Application Map



PV Series

(MEGACOAT / MEGACOAT NANO Cermet)

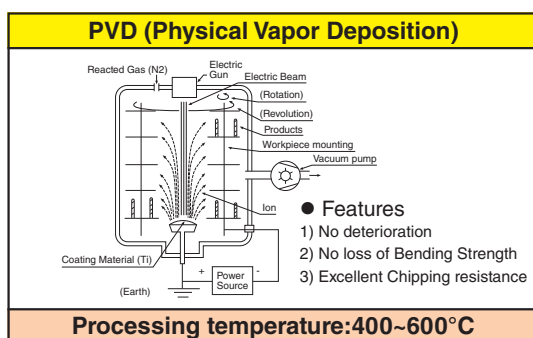
PV720 : Special reinforcement cermet + MEGACOAT NANO
High efficient machining and high quality surface finish
(First choice)

PV7010 : Improved Surface Cermet + MEGACOAT
Stable and long tool life continuous machining of steel

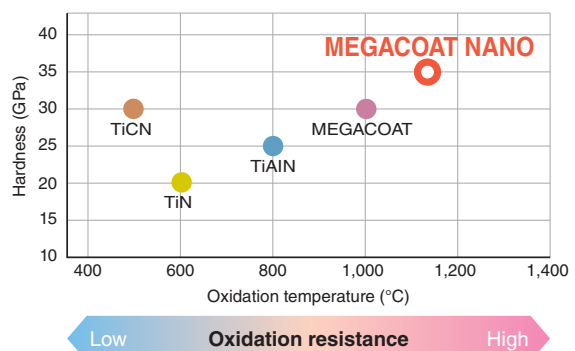
TN Series (Uncoated Cermet)

TN620 : Three types of special reinforcement technology realized the superior fracture resistance and wear resistance
TN6010 : Improved Surface Cermet

PVD Coated



Properties of PVD Coating



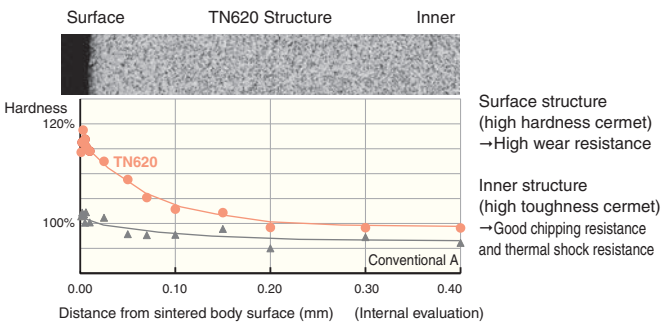


Innovative new cermet which combines stability and surface finish performance generated by special reinforcement technology (Hybrid Technology)

Special Surface-Hardened "Hybrid Structure"

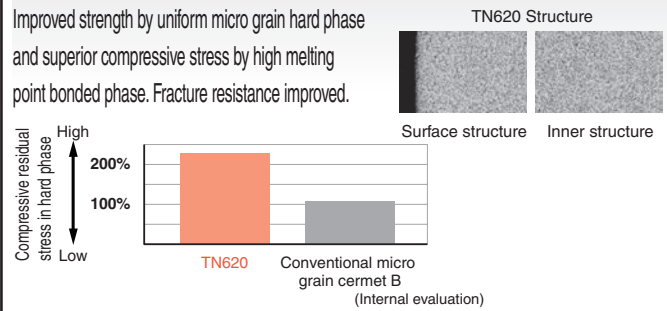
Excellent fracture resistance with the surface-hardened layer using the gradient composition technology. Good balance of stable wear resistance and fracture resistance by continuously-varied hardness.

TN620's inner structure has high toughness and chipping resistance as well as thermal shock resistance. And surface area has higher hardness and wear resistance compared to the conventional micro grain cermet A. (see attached chart)

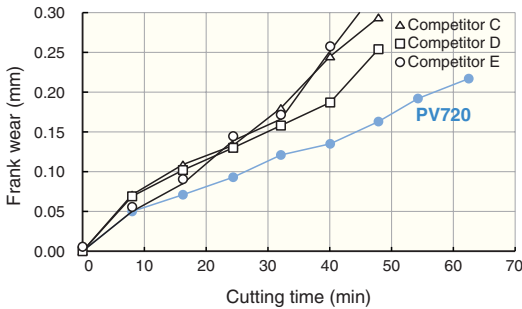


Micro grain "hybrid hard phase"

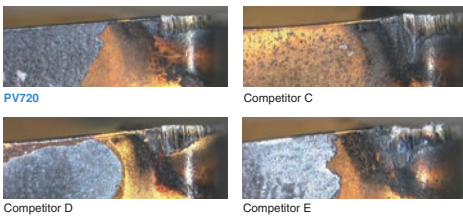
Improved strength by uniform micro grain hard phase and superior compressive stress by high melting point bonded phase. Fracture resistance improved.



Wear Resistance Comparison

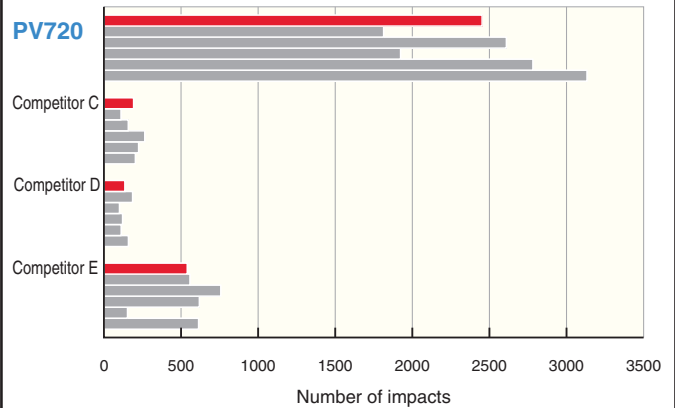


Cutting Conditions
SCM435 V=250m/min ap=1.0 mm f = 0.20mm/rev Wet CNMG120408PQ



Flank wear condition after machining 48 min. (Internal evaluation)

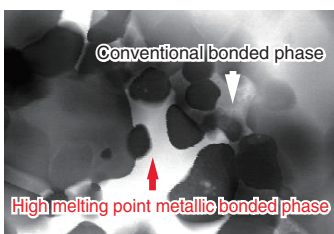
Fracture Resistance Comparison



Cutting Conditions
S45C V=250m/min ap=1.0mm
f = 0.20mm/rev Wet CNMG120408PQ (Internal evaluation)

High melting point "hybrid bonded phase"

Combining the conventional cermet bonded phase (nickel, cobalt) and the special high melting point metallic bonded phase. Improved adhesion resistance and better surface finish are realized by higher thermal resistance of the bonded phase.



Surface finish comparison

φ49 → φ0
High speed
Low speed

Cutting Conditions
Workpiece Material : S10C
Vc=180-0m/min (Constant late)
ap=0.5mm f=0.1mm/rev Wet CNMG120404 type

	PV720	Competitor C	Competitor D	Competitor E
Surface Finish				
Surface Roughness (φ4-φ15) (Vc=15-55m/min)	Good	Bad	Good	Bad

(Internal evaluation)

Insert Grades

A

CVD Coated Carbide (Turning)



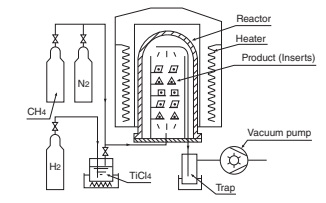
CVD Coated Carbide

Using Chemical Vapor Deposition coating technology, CVD coated carbide grades provide stable, efficient machining at high speeds or for heavy interrupted applications.

Features

- Applicable from low to high speed machining and from finishing to roughing
- Stable machining is achieved due to the superior toughness and crack resistance
- Cutting times are reduced due to good chip control from effective chipbreakers

CVD (Chemical Vapor Deposition)



• Features

- 1) Equally deposited on face
- 2) Easy application for multilayer deposition
- 3) Enabling thick coating

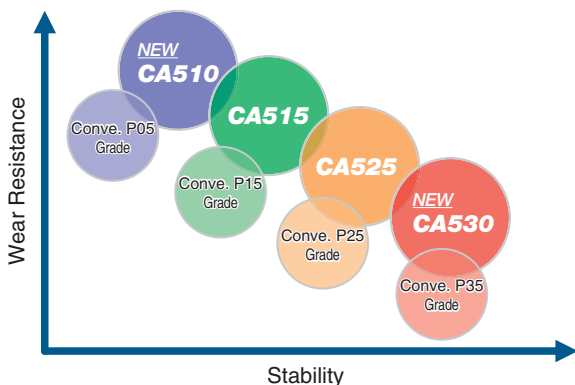
Processing temperature: 900~1100°C

Features of CVD Coated Carbide

Classification	Symbol	Color	Coated Composition	Advantages and Applications
P Steel	CA510	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Special substrate with thermal deformation resistance along with a thick and tough coating layer providing high wear resistance • Application: High speed and high efficiency steel machining
	CA515	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Improved wear resistance and stability due to special substrate with heat deformation resistance and hard and tough coating layer with reinforced interface • Application: Light interrupted machining of steel
	CA525	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Stable and long tool life machining due to special substrate with heat deformation resistance and tougher coating layer and reinforced interface • Application: Interrupted to general machining of steel
	CA530	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Special tough substrate and tough coating layer providing high stability and wear resistance • Application: General to heavy interrupted machining (stability oriented)
	CA5505	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Application: High speed continuous machining of steel, continuous to light interrupted machining of cast iron
	CA5515	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Application: High speed machining of steel, continuous to light interruption
	CA5525	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Application: For general machining of steel, roughing to interruption
	CA5535	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Application: Roughing to heavy interrupted machining of steel
	CR9025	Gold	Columnar TiCN+TiN	• Improved toughness and stability due to specialized carbide substrate with plastic deformation resistance • Application: Cut-off, grooving and multi-function machining of steel
M Stainless Steel	CA6515	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Specialized carbide substrate for machining stainless steel, excellent wear resistance • Application: Continuous to light interrupted machining of stainless steel
	CA6525	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Specialized carbide substrate for machining stainless steel, excellent notching resistance and toughness • Application: First choice for general machining of stainless steel, from finishing to roughing, continuous to interruption
K Cast Iron	CA4010	Gold	Columnar TiCN+Al ₂ O ₃ +TiN	• Application: Continuous to light interrupted high speed machining of cast iron
	CA4115	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Application: Machining nodular cast iron, continuous to light interruption
	CA4120	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	• Application: Roughing to heavy interrupted machining of nodular cast iron
	CA4505	Blackish gray	Micro columnar TiCN+Al ₂ O ₃	• Stable, longer tool life due to improved bonding strength of coating layers and special treatment of the surface of the top coating layer • Application: For gray cast iron and nodular cast iron at high speed in continuous to light interrupted machining
	CA4515	Blackish gray	Micro columnar TiCN+Al ₂ O ₃	• Stable, longer tool life due to improved bonding strength of coating layers and special treatment of the surface of the top coating layer • Application: First choice for gray cast iron and nodular cast iron in light to heavy interrupted machining

Application Map

• Steel



• Stainless Steel

Cutting speed	High	CA6515		
	Low	CA6525 (First choice grade)		PR1125
Applications		Continuous	Light Interruption	Interruption



CVD coated carbide grades for steel

CA5 Series



New coating technology to provide longer tool life and stable machining

★ High Adhesion Strength of Coating Layer Ultra fine interface

- Longer tool life and stable machining by improved adhesion strength
- **40% improved** adhesion strength

★ Smooth and Flat Surface

- Generates low cutting force and stable machining
- Prevents adhesion (edge build-up) and sudden fracturing

★ High Hardness with Tougher α -Al₂O₃ coating layer

- Special crystal control technology
- Longer tool life due to high-aspect ratio of micro columnar α -Al₂O₃ coating layer

★ New Carbide Substrate

- Special carbide substrate with deformation resistance at high temperature
- **10% improved** hardness at high temperature
- Good for high efficient machining

CA510

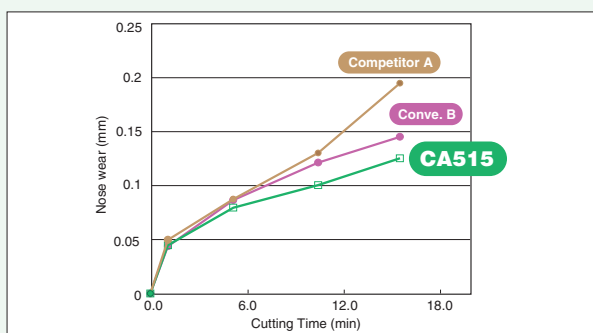
- Special substrate with thermal deformation resistance along with a thick and tough coating layer providing high wear resistance
- Application: High speed and high efficiency steel machining

CA515

- Special substrate and tough coating layer providing thermal deformation and high wear resistance
- Application: For continuous to light interrupted steel machining (general use)

For high speed machining

■ Wear Resistance Comparison SCM435 Vc=300m/min, ap=2.0mm, f=0.3mm/rev, wet

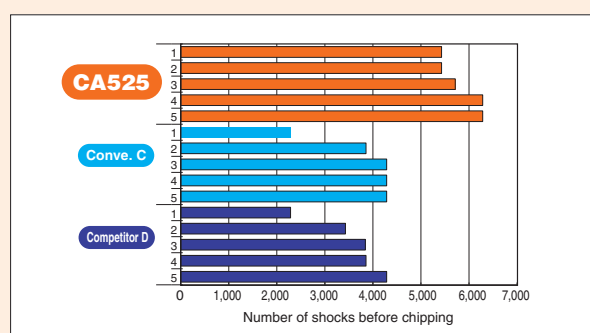


CA525

- Special substrate and tough coating layer provides high wear and fracture resistance
- Application: First choice for steel machining

For stable and general machining

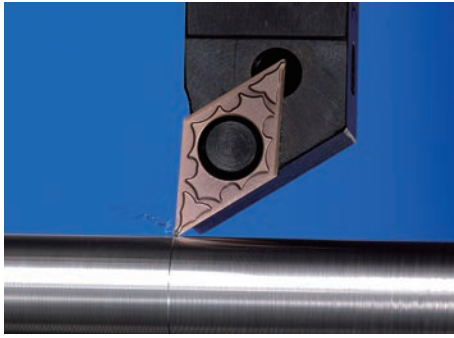
■ Fracture resistance comparison SCM440(with 4 slits) Vc=300m/min, ap=1.5mm, f=0.3mm/rev, Wet



CA530

- Special tough substrate and tough coating layer providing high stability and wear resistance
- Application: General to heavy interrupted machining (stability oriented)

PVD Coated Carbide (for Turning)



PVD Coated Carbide (MEGACOAT / MEGACOAT NANO)

Using a Physical Vapor Deposition coating technology, PVD coated carbide grades are coated on a very tough carbide substrate and suitable for turning.

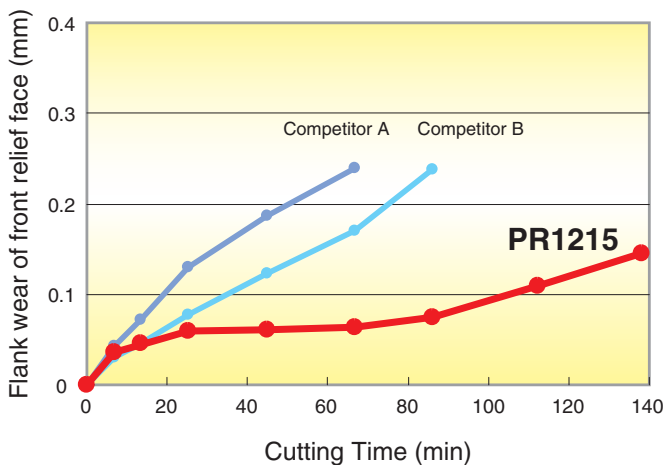
PVD Coated Super Micro-Grain Carbide

- Smooth fine surface of PVD coated carbide provides good surface finish and high precision machining
- Stable machining with excellent toughness

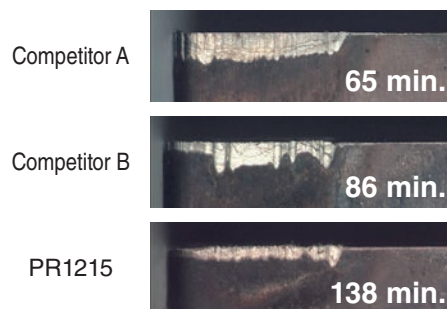
Features of PVD Coated Carbide

Classification	Symbol	Color	Coated Composition	Advantages and Applications
<div style="background-color: #0070C0; color: white; padding: 5px; text-align: center; border-radius: 5px;"> P Steel </div>	PR915 (Super Micro-Grain)	Bluish violet	TiAlN	· Application: Stable and reliable high precision machining of steel
	PR930 (Super Micro-Grain)	Reddish gray	TiCN	· Application: Low machining speed, precise machining with sharp edge
	PR1005	Reddish gray	TiCN	· TiCN base PVD coated hard micro-grain carbide · Application: Turning of free-cutting steel, longer tool life achieved through anti-adhesion performance
	PR1025	Reddish gray	TiCN	· Application: General machining of steel and stainless steel, stable and longer tool life
	PR1115	Purple red	TiAlN	· Superior anti-oxidation performance with well balanced wear resistance and toughness · Application: Machining of steel and stainless steel, for grooving, cut-off and threading
	PR1215	Blackish red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application: Superior adhesion resistance and longer tool life for steel and stainless steel machining
	PR1425	Blackish red	MEGACOAT NANO	· New coating technology [MEGACOAT NANO] is applied. Nano thin multi-layer coating performs superior wear resistance and high oxidation resistance · Application: Various applications of machining steel, High speed machining of stainless steel, extended tool life
<div style="background-color: #FFD700; color: black; padding: 5px; text-align: center; border-radius: 5px;"> M Stainless Steel </div>	PR1125	Purple red	TiAlN	· Hard TiAlN base PVD coated super micro-grain carbide, superior toughness and heat resistance · Application: Finishing and light interrupted machining of stainless steel
	PR1225	Blackish red	MEGACOAT	· Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate · Application: Light interrupted to interrupted machining of stainless steel
<div style="background-color: #FF0000; color: white; padding: 5px; text-align: center; border-radius: 5px;"> K Cast Iron </div>	PR905	Bluish violet	TiAlN	· Smooth fine surface PVD coated hard carbide with plastic deformation resistance · Application: Suitable for machining gray and nodular cast iron
<div style="background-color: #8B4513; color: white; padding: 5px; text-align: center; border-radius: 5px;"> S Heat-resistant Alloys </div>	PR1305	Blackish red	MEGACOAT	· MEGACOAT on hard and superior heat-resistant carbide, superior wear resistance · Application: Finishing of heat-resistant alloys
	PR1310	Blackish red	MEGACOAT	· MEGACOAT on hard and superior heat-resistant carbide, superior wear and oxidation resistance · Application: First choice for continuous and light interrupted machining and finishing of heat-resistant alloys
	PR1325	Blackish red	MEGACOAT	· MEGACOAT on tough carbide · Application: Light interrupted machining and roughing of heat-resistant alloys
	PR1535	Reddish green	MEGACOAT NANO	· Nano thin multi-layer coating MEGACOAT NANO improved wear resistance and stability · Application: Medium to roughing of heat-resistant alloys and stainless steel, cut-off of stainless steel

PR1215 Wear Resistance Comparison (Off-centered grooving)



Flank wear of front relief face

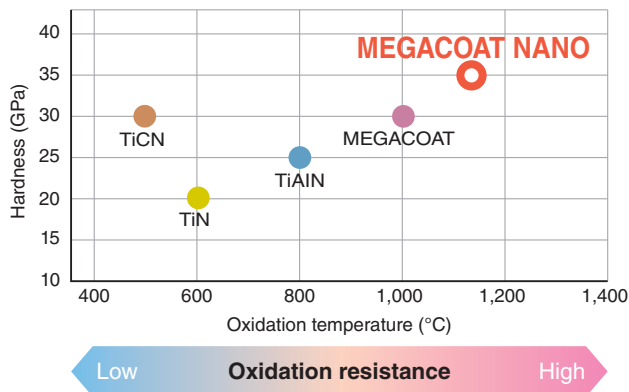
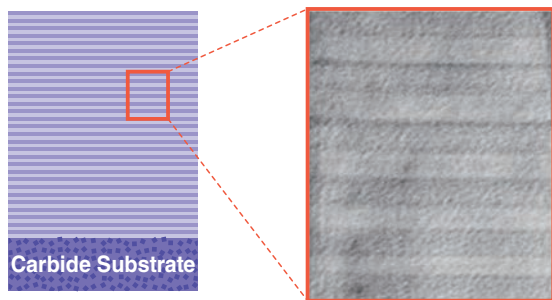


<Cutting Conditions> Vc=150m/min, ae=1.5mm, f=0.1mm/rev, Wet. SNCM439, φ198→φ48



Properties of MEGACOAT NANO

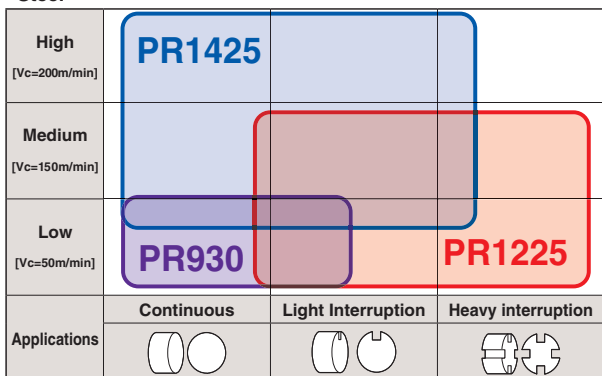
Multi-layer composition of MEGACOAT



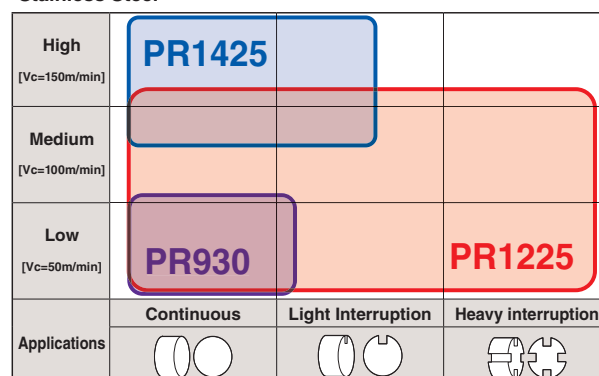
Prevents wear and fracture with high hardness (35GPa) and superior oxidation resistance (oxidation temperature: 1,150°C)

Application Map

• Steel

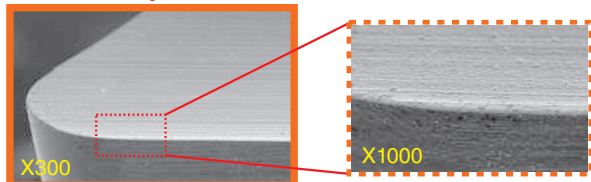


• Stainless Steel

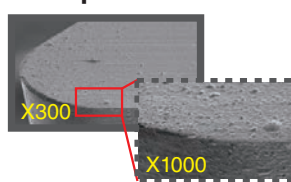


Cutting edge quality (Sharp edge insert)

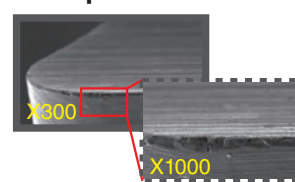
PR1225 / PR1425



Competitor A



Competitor B



<Superior edge-sharpening performance and Smooth surface>

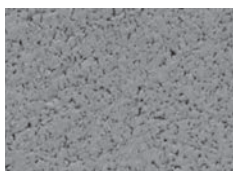
<Delamination (coating peeling) and rough surface>

MEGACOAT Series (PR1225/PR1425) shows high edge sharpening performance and adhesion resistance.

Advantages of PR13 Series

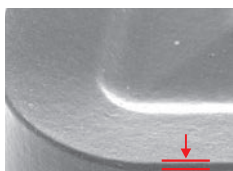
- Superior wear and fracture resistance attained with uniform grain size and MEGACOAT on superior thermal shock resistant carbide
- New edge preparation technology (FET: Fine Edge Treatment) controls and minimizes R honing and provides large tip rake angle, and thus prevents burrs and notching.

Special carbide substrate



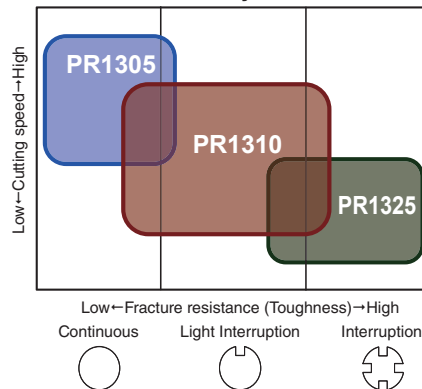
Uniform grain size enables superior thermal shock resistance and constant hardness

New edge preparation technology

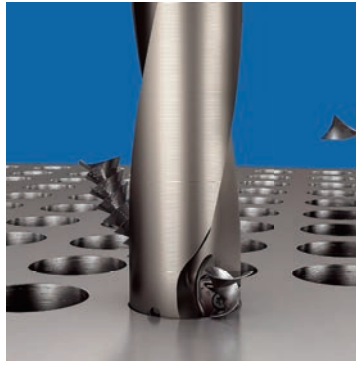


Edge control of FET technology

Heat-resistant alloys



PVD / CVD Coated Carbide for Milling and Drilling



PVD Coated Carbide (MEGACOAT/MEGACOAT NANO)

PVD coated carbide grades for milling and drilling are coated on a very tough carbide substrate. Because of the low process temperature compared with CVD, it features no erosion of bending strength and less deterioration of substrate.

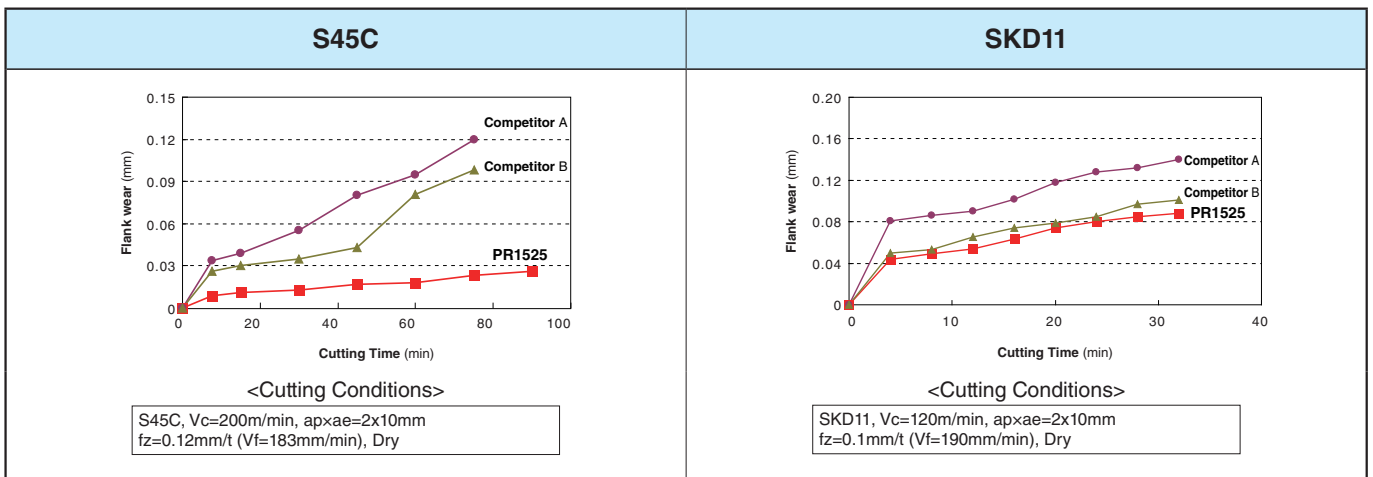
CVD Coated Carbide

CVD coated carbide grades provide stable, efficient machining at high speeds or for heavy interrupted applications. Ti-base (TiN, TiCN) coating with superior hardness and wear resistance or ceramic-base (Al₂O₃) coating with high-thermal stability is applied on a tough carbide substrate. Superior fracture resistance and wear resistance.

Features of CVD / PVD Coated Carbide

Classification	Symbol	Color	Coated Composition	Advantages and Applications
 Steel	PR830	Gold	TiAlN+TiN	<ul style="list-style-type: none"> Improved high temperature stability and wear resistance by TiAlN base PVD coating Application: Milling of steel
	PR1230	Blackish red	MEGACOAT	<ul style="list-style-type: none"> Superior wear and oxidation-resistant MEGACOAT on a special tough carbide substrate Application: Stable and high feed milling and drilling of steel
	PR1525	Reddish green	MEGACOAT NANO	<ul style="list-style-type: none"> New coating technology [MEGACOAT NANO] is applied. Nano thin multi-layer coating performs superior wear resistance and high oxidation resistance Application: Stable and longer tool life for milling steel and stainless steel
 Stainless Steel	PR1225	Blackish red	MEGACOAT	<ul style="list-style-type: none"> Superior wear and oxidation-resistant MEGACOAT on micro-grain carbide substrate Application: General machining and high feed drilling of steel and stainless steel
 Cast Iron	PR1210	Blackish red	MEGACOAT	<ul style="list-style-type: none"> Superior wear and oxidation resistant MEGACOAT coated on special carbide substrate Application: Highly efficient stable milling and drilling of gray and nodular cast iron
	PR1510	Reddish green	MEGACOAT NANO	<ul style="list-style-type: none"> New coating technology [MEGACOAT NANO] is applied. Nano thin multi-layer coating performs superior wear resistance and high oxidation resistance Application: Highly fracture resistance and wear resistance for gray and nodular cast iron
	CA420M	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN (CVD)	<ul style="list-style-type: none"> Kyocera's unique crystal control technology and advanced layer adhesion CVD coating with superior wear resistance and toughness Application: Milling of gray and nodular cast iron
 Heat-resistant Alloys Titanium Alloys	PR1535	Reddish green	MEGACOAT NANO	<ul style="list-style-type: none"> Nano thin multi-layer coating [MEGACOAT NANO] improved wear resistance and stability Application: For milling of Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
 Heat-resistant Alloys	CA6535	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN (CVD)	<ul style="list-style-type: none"> High heat-resistance and wear resistance with CVD coating Application: For milling of Ni-base heat-resistant alloys and martensitic stainless steel

Properties of wear resistance (PR1525)





● New grade for heat-resistant alloys and difficult-to-cut materials



CA6535 (CVD) For martensitic stainless steel and Ni-base heat-resistant alloys

NEW

PR1535 (PVD) For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel

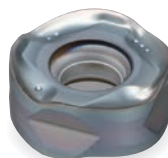
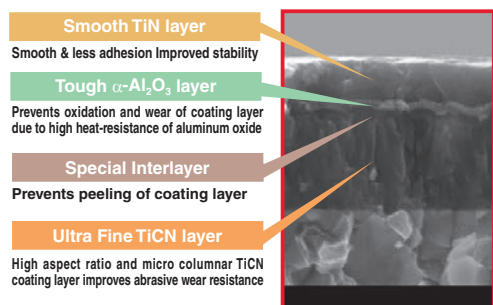
Suitable for variety of workpiece materials

Stable machining by preventing sudden insert fracture
Suitable for high-efficiency machining



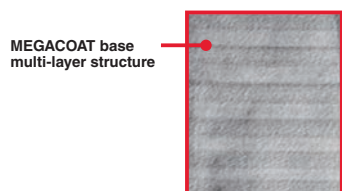
CA6535

For Ni-base heat-resistant alloys and martensitic stainless steel
High heat resistance and wear resistance with CVD coating
Improved stability due to thin layer coating technology

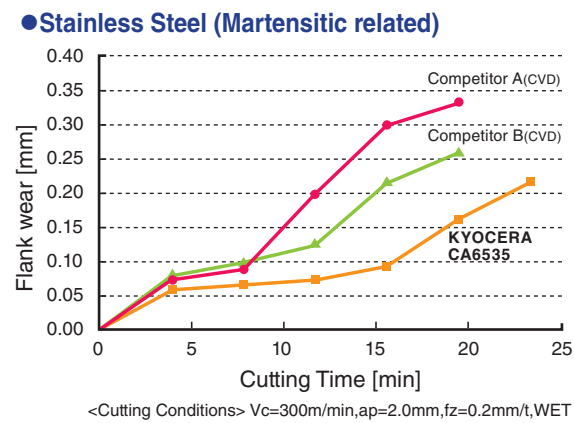
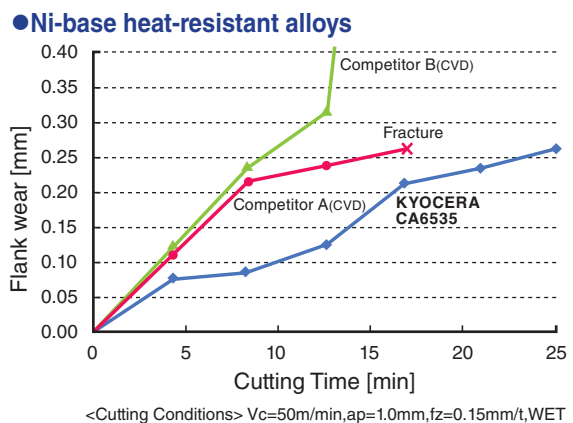


PR1535

For Ni-base heat-resistant alloys, titanium alloys and precipitation hardened stainless steel
Stable and longer tool life by special nano coating layer [MEGACOAT NANO]



■ Tool Life Comparison



Longer tool life and more stable machining than competitors!

Carbide





Carbide

Uncoated tungsten carbide grade is used in a variety of applications due to its superior mechanical properties.

Features

- KW10: Suitable for machining cast iron with high hardness and toughness
- GW15, GW25 : Suitable for machining non-ferrous metals and non-metals
- SW series : Suitable for machining of titanium and titanium alloy

Features of Carbide

Classification	Symbol	Color	Main Component	Advantages and Applications
	KW10	Gray	WC+Co	<ul style="list-style-type: none"> · ISO identification symbol K carbide (K10 relevant) · Application: Machining cast iron, non-ferrous materials and non-metals
	GW15	Gray	WC+Co	<ul style="list-style-type: none"> · ISO identification symbol K carbide (K10 relevant), tough micro-grain carbide · Application: Machining cast iron, non-ferrous materials and non-metals
	GW25	Gray	WC+Co	<ul style="list-style-type: none"> · ISO identification symbol K carbide (K30 relevant) · Application: Milling operations of aluminum
	SW05	Gray	WC+Co	<ul style="list-style-type: none"> · ISO identification symbol K carbide (K05 relevant) · Application: Titanium alloys for continuous machining and finishing
	SW10 (Made to order)	Gray	WC+Co	<ul style="list-style-type: none"> · ISO identification symbol K carbide (K10 relevant) · Application: Titanium alloys for continuous and light interrupted machining
	SW25 (Made to order)	Gray	WC+Co	<ul style="list-style-type: none"> · ISO identification symbol K carbide (K25 relevant) · Application: Titanium alloys for interrupted and light interrupted machining



Ceramic



Ceramic

Ceramics inserts are capable of machining at high speeds. Recommended for hard turning of hardened steel or rough to finish turning of cast iron and heat-resistant alloys.

Features

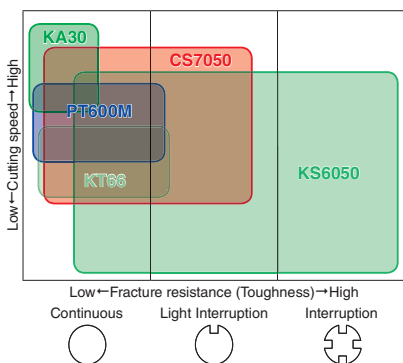
- Excellent wear resistance enables high speeds machining of cast iron
- Ceramic maintains good surface finishes due to the low affinity to workpiece materials
- Silicon nitride ceramic can machine cast iron with coolant due to its superior thermal shock resistance

Features of Ceramic

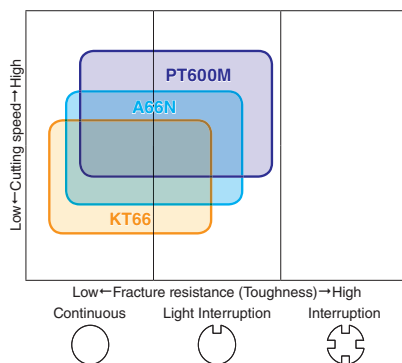
Classification	Symbol	Color	Main Component (Coated Composition)	Coating Layer	Hardness of Substrate (GPa)	Fracture Toughness (MPa·m ^{1/2})	Transverse Strength (MPa)	Advantages and Applications
<div style="background-color: red; color: white; padding: 2px; display: inline-block; border: 1px solid black;">K</div> <div style="background-color: red; color: white; padding: 2px; display: inline-block; border: 1px solid black; font-size: 8px;">Cast Iron</div>	KA30	White	Al ₂ O ₃	-	17.5	4.0	750	· Aluminum Oxide ceramic (Al ₂ O ₃) · Application: Finishing of cast iron at high cutting speeds without coolant
	KS6050	Gray	Si ₃ N ₄	-	15.6	8.0	1,200	· Silicon nitride ceramic (Si ₃ N ₄) · Application: Roughing and interrupted machining of cast iron. Focusing on stability. (with or without coolant)
	CS7050	Grayish white	Si ₃ N ₄ (Special Al ₂ O ₃ COAT)	Thin coating	15.6	8.0	1,200	· Silicon nitride ceramic (Si ₃ N ₄) + CVD Coated Carbide (Special Al ₂ O ₃ COAT) · Application: Finishing and continuous machining, and high speed and high efficient machining. (with or without coolant)
<div style="background-color: red; color: white; padding: 2px; display: inline-block; border: 1px solid black;">K</div> <div style="background-color: red; color: white; padding: 2px; display: inline-block; border: 1px solid black; font-size: 8px;">Cast Iron</div>	KT66	Black	Al ₂ O ₃ +TiC	-	20.1	4.1	980	· Aluminum Oxide and Titanium Carbide ceramic (Al ₂ O ₃ +TiC) · Application: Semi-roughing to finishing of cast iron, and hard materials
	A66N	Gold	Al ₂ O ₃ +TiC (TiN COAT)	Thin coating	20.1	4.1	980	· TiN PVD coated Aluminum Oxide and Titanium Carbide ceramic (TiN coated Al ₂ O ₃ +TiC) · Application: Semi-roughing to finishing of hard materials
<div style="background-color: gray; color: white; padding: 2px; display: inline-block; border: 1px solid black;">H</div> <div style="background-color: gray; color: white; padding: 2px; display: inline-block; border: 1px solid black; font-size: 8px;">Hard Materials</div>	PT600M	Blackish red	Al ₂ O ₃ +TiC (MEGACOAT)	Thin coating	20.1	4.1	980	· Heat-resistant MEGACOAT on Aluminum Oxide and Titanium Carbide ceramic (MEGACOAT Al ₂ O ₃ +TiC) · Application: Semi-roughing to finishing of cast iron, hard materials and hardened roll materials
<div style="background-color: brown; color: white; padding: 2px; display: inline-block; border: 1px solid black;">S</div> <div style="background-color: brown; color: white; padding: 2px; display: inline-block; border: 1px solid black; font-size: 8px;">Heat-resistant Alloys</div>	KS6030	Gray	SiAlON	-	15.2	6.0	600	· SiAlON Ceramic with superior wear resistance and high resistance against boundary wear · Application: Finishing to medium machining of heat-resistant alloys
	KS6040	Brown	SiAlON	-	16.7	7.0	900	· High stability SiAlON ceramic with wear resistance and fracture resistance · Application: Roughing of heat-resistant alloys

Application Map

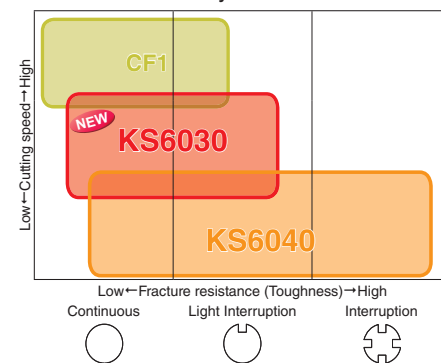
Cast Iron



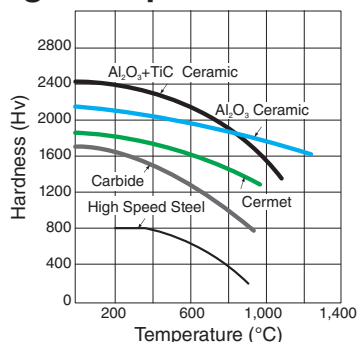
Hard Materials



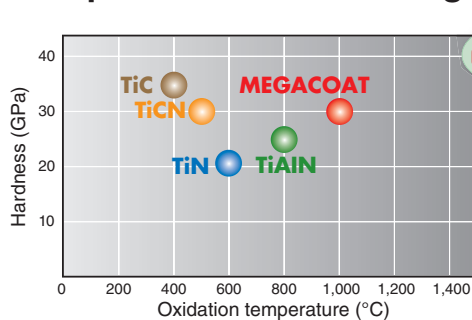
Heat-resistant alloys



High-Temperature Hardness



Properties of PVD Coating



Insert Grades

A

CBN



CBN

CBN (Cubic Boron Nitride) is second only to diamond in hardness, and is a synthetically produced material with high thermal conductivity.

Features

- Superior wear resistance when machining hard materials
- Suitable for high speed machining of cast iron and sintered steel
- High thermal conductivity provides stable machining

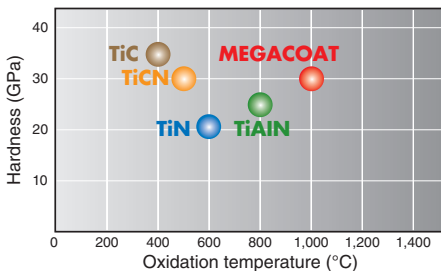
Features of CBN

Classification	Symbol	Color	Ave. grain size (μm)	Hardness of Substrate (GPa)	Transverse Strength (MPa)	Advantages and Applications
H Hard Materials	KBN510	Black	2	28	1,000	· Excellent wear resistance and crack resistance, non-coated CBN · Application: Finishing and continuous machining of hardened die steel
	KBN525	Black	1 and under	25	1,250	· Application: General purpose for hardened steel
	KBN05M (MEGACOAT)	Blackish red	0.5-1.5	27	1,000	· Heat-resistant MEGACOAT on highly heat-resistant CBN substrate · Application: High speed finishing of hardened steel
	KBN10M (MEGACOAT)	Blackish red	2	28	1,000	· Application: High speed finishing of hardened die steel
	KBN25M (MEGACOAT)	Blackish red	1 and under	25	1,250	· Heat-resistant MEGACOAT on micro-grain CBN with heat-resistant binder phase · Application: Stable machining of hardened steel at high cutting speeds
	KBN30M (MEGACOAT)	Blackish red	1-4	30	1,350	· Application: Stable machining of hardened steel for continuous to interrupted machining
Sintered Steel	KBN65B	Black	2	32	1,150	· Excellent wear resistance due to CBN with heat-resistant binder phase, non-coated CBN · Application: Stable machining of sintered steel (ferrous sintered alloy) at low speed
	KBN570	Black	2-4	34	1,350	· High CBN content ratio · Application: Machining of sintered steel (preventing burr formation)
	KBN65M (MEGACOAT)	Blackish red	2	32	1,150	· Heat-resistant MEGACOAT on CBN with heat-resistant binder phase · Application: Machining of sintered steel (ferrous sintered alloy)
	KBN70M (MEGACOAT)	Blackish red	2-4	34	1,350	· Heat-resistant MEGACOAT on CBN rich substrate · Application: Stable machining of sintered steel (ferrous sintered alloys)
K Cast Iron	KBN475	Black	2	39	1,400	· Excellent wear resistance due to high CBN content and special binder · Application: High speed machining of gray cast iron
	KBN60M (MEGACOAT)	Blackish red	0.5-6	33	1,250	· Heat-resistant MEGACOAT on CBN rich substrate with hard binder phase · Application: High speed finishing of gray cast iron
	KBN900 (TiN COAT)	Gold	9	31	630	· TiN coated solid CBN · Application: Heavy duty, interrupted machining and finishing of hardened steel, hardened roll steel and cast iron

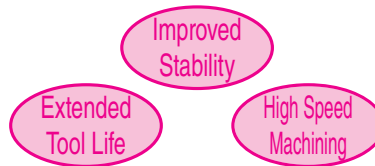
· For KBN35M ref. to page A18

MEGACOAT CBN

Properties of PVD Coating



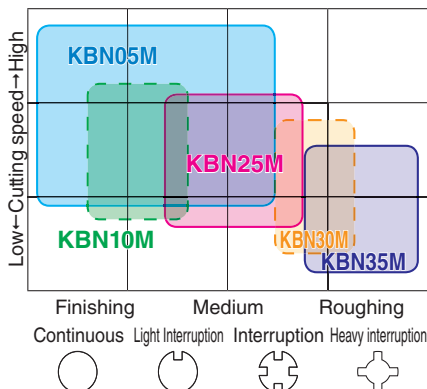
Advantages of MEGACOAT



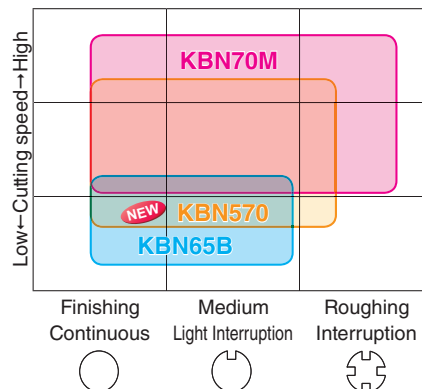
- Longer tool life and stable machining due to superior heat resistance and hardness.
- Stability improvement through prevention of crater wear (oxidation, diffusional wear)
- High thermal stability and surface smoothness provide excellent surface finish

Application Map

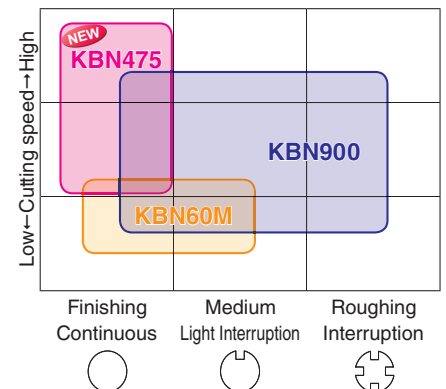
Hard Materials



Sintered Steel



Cast Iron





PCD (Polycrystalline Diamond)



PCD (Polycrystalline Diamond)

PCD (Polycrystalline Diamond) is a synthetic diamond sintered under high temperatures and pressures.

Features

- Applicable for machining non-ferrous metals and non-metals
 - No edge build-up provides high precision machining
 - Diversified applications for machining of non-ferrous metals and non-metals
 - Finished surface will be rainbow colored
- (Because of polycrystalline diamond, a mirror-like finished surface will not be obtained)

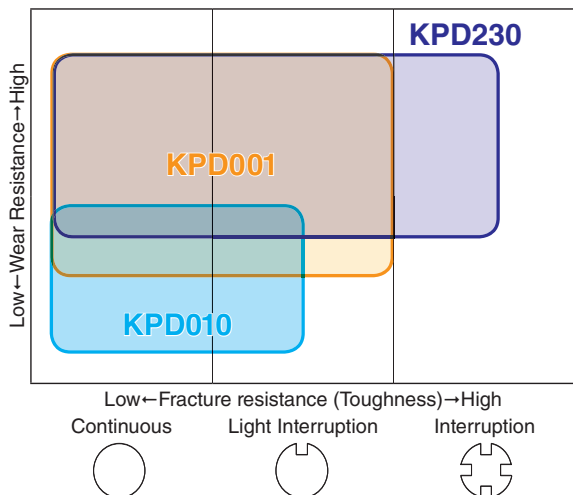
Features of PCD

Classification	Symbol	Ave. grain size (μm)	Advantages and Applications
	KPD001	0.5	· Super Micro-Grain PCD features cutting edge strength, wear resistance, fracture resistance, good edge-sharpening performance and longer, stable tool life · Application: High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics, fiberglass and carbide
	KPD010	10	· Good wear resistance and toughness, good grindability · Application: High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics, fiberglass and carbide
	KPD230	2-30	· Superior abrasive wear resistance and toughness due to high density PCD with mixed rough and fine grains · Application: High speed machining of aluminum alloys, brass, non-ferrous metals and non-metals including plastics and fiberglass
	KPD250 (Made to order)	25	· Superior wear resistance due to rough grain PCD (25μm) · Application: High speed machining of high silicon aluminum alloy and machining of carbide

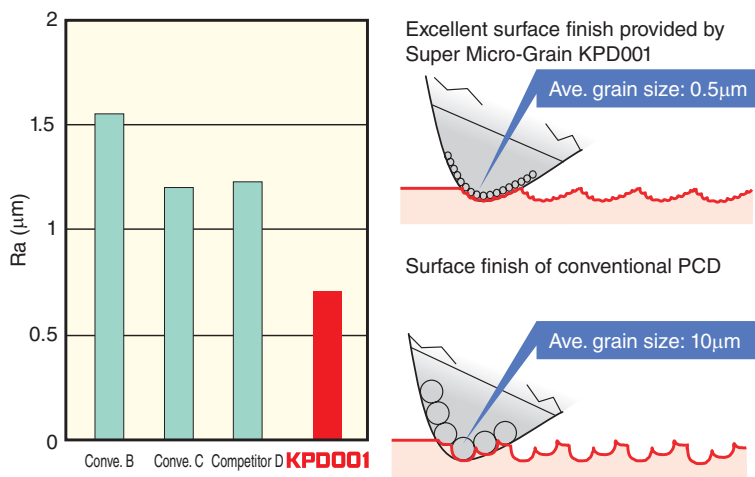
Applications

Workpiece Material	Non-ferrous Metals (Aluminum / Non-ferrous metals / Non-metals)				Difficult-to-cut Materials (Titanium / Titanium alloys)				
	Finishing		Roughing		Finishing		Roughing		
Cutting Range Classification	N01	N10	N20	N30	S01	S10	S20	S30	
Turning Milling	PCD	KPD001				KPD001			
		KPD010				KPD010			
		KPD230							
		KPD250							

Application Map



Surface Finish Roughness Comparison of Aluminum Machining



(Grain size affects surface finish quality)

Insert Grades

A

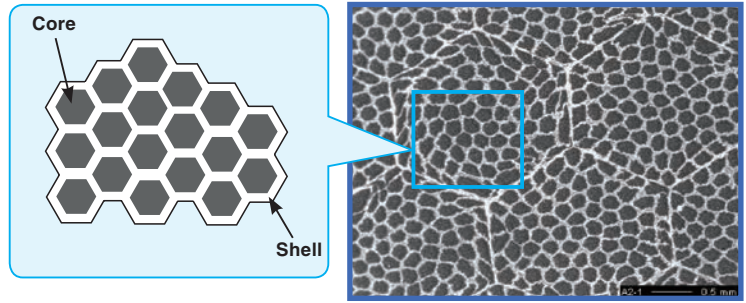
Honeycomb structure CBN / Ceramic

Honeycomb structure CBN / Ceramic

Honeycomb structure is the high structural controlled composite material consisting of a hard and superior wear-resistance core (gray portion) and a tough shell (white portion).

Features

- Honeycomb structure CBN / Ceramic combine a hard, wear-resistant core and a tough shell into one insert.
- The tough shell stops cracks that form in the core.
- CBN is suitable for interrupted machining of exceptionally hard material and ceramic is suitable for heat-resistant alloys

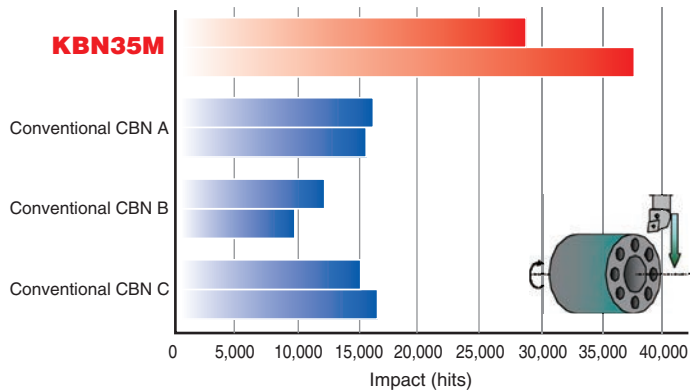
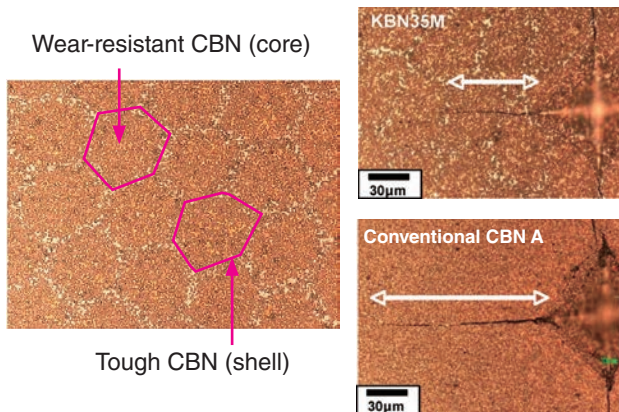


Features of Honeycomb structure CBN / Ceramic

Classification	Symbol	Color	Main Component	Advantages and Applications
H Hard Materials	KBN35M (MEGACOAT)	Blackish red	CBN	<ul style="list-style-type: none"> · Honeycomb structure CBN composite material consisting of wear resistant CBN (core) and tough CBN (shell) · Heat-resistant MEGACOAT on tough Honeycomb structure CBN · Application: Stable machining of hardened steel at interrupted machining
S Heat-resistant Alloys	CF1	Gray	Ceramic	<ul style="list-style-type: none"> · Honeycomb structure ceramic composite material consisting of wear resistant ceramic (core) and tough ceramic (shell) · Application: Machining of heat-resistant alloys like Ni-base heat-resistant alloys

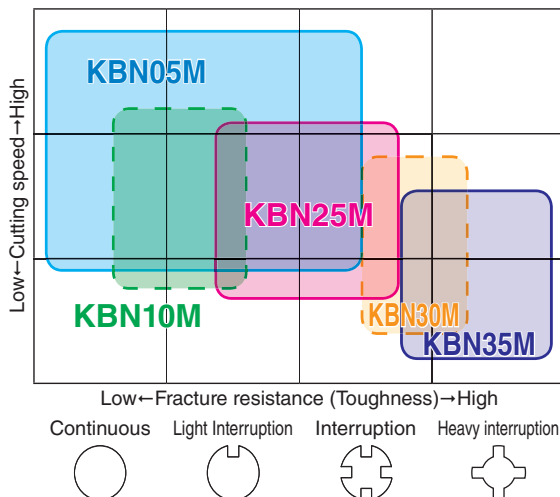
KBN35M (MEGACOAT Honeycomb structure CBN)

- Tough CBN (shell) prevents crack growth

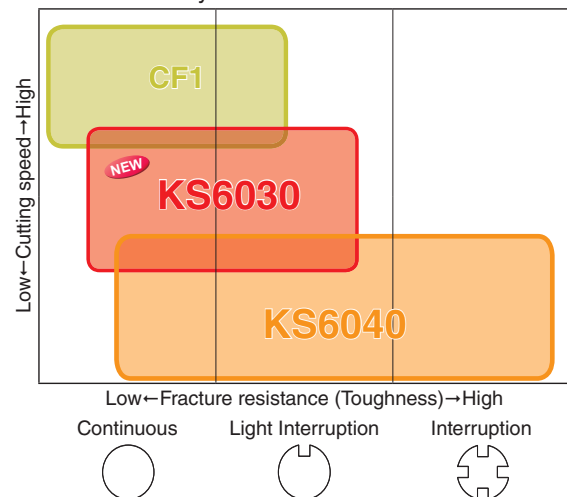


Application Map

- Hard Materials



- Heat-resistant Alloys





■ Cermet

Symbol	Color	Main Component	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness (MPa·m ^{1/2})	Transverse Strength (MPa)
					(HV)	(GPa)		
TN620	Gray	TiCN	-	6.9	1,550	15.2	9.0	2,500
TN6010	Gray	TiCN	-	6.5	1,700	16.7	7.0	2,000
TN6020	Gray	TiCN	-	6.4	1,500	14.7	10.0	2,500
TN60	Gray	TiCN+NbC	-	6.6	1,600	15.7	9.0	1,760
TN90	Gray	TiCN+NbC	-	6.4	1,450	14.2	10.0	1,960
TN100M	Gray	TiCN+NbC	-	6.7	1,520	14.9	10.5	1,860
TC40N	Gray	TiC+TiN	-	6.0	1,650	16.2	9.0	1,570
TC60M	Gray	NbC	-	8.1	1,500	14.7	10.5	1,670

■ PVD Coated Cermet

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness (MPa·m ^{1/2})	Transverse Strength (MPa)
					(HV)	(GPa)		
PV720	Gold	MEGACOAT NANO	Thin coating	6.9	1,550	15.2	9.0	2,500
PV7005	Blackish red	MEGACOAT	Thin coating	6.0	1,650	16.2	8.5	1,470
PV7010	Blackish red	MEGACOAT	Thin coating	6.5	1,700	16.7	7.0	2,000
PV7025	Blackish red	MEGACOAT	Thin coating	6.4	1,500	14.7	10.0	2,500
PV7040	Blackish red	MEGACOAT	Thin coating	6.0	1,650	16.2	9.0	1,570
PV7020	Gold	TiAlN+TiN	Thin coating	6.4	1,500	14.7	10.0	2,500
PV90	Gold	TiN	Thin coating	6.4	1,450	14.2	10.0	1,960

■ CVD Coated Carbide

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness (MPa·m ^{1/2})	Transverse Strength (MPa)
					(HV)	(GPa)		
CA420M	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.5	1,600	15.8	13.0	3,400
CA4010	Gold	Columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.8	1,720	16.8	9.0	2,450
CA4115	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.7	1,550	15.2	12.0	2,750
CA4120	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.7	1,550	15.2	12.0	2,750
CA4505	Blackish gray	Micro columnar TiCN+Al ₂ O ₃	Thick coating	15.0	1,790	17.5	9.5	2,350
CA4515	Blackish gray	Micro columnar TiCN+Al ₂ O ₃	Thick coating	15.0	1,570	15.4	12.0	2,780
CA510	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.5	1,470	14.4	11.5	2,500
CA515	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.4	1,440	14.1	12.5	2,650
CA525	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.2	1,360	13.3	13.5	2,750
CA530	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	13.9	1,340	13.1	14.5	2,850
CA5505	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.7	1,730	17.0	10.0	2,540
CA5515	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.7	1,550	15.2	12.0	2,750
CA5525	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.5	1,400	13.7	12.0	2,780
CA5535	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thick coating	14.1	1,340	13.1	16.5	2,970
CA6515	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thin coating	14.7	1,530	15.0	12.0	2,780
CA6525	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thin coating	14.7	1,370	13.4	16.0	3,100
CA6535	Gold	Micro columnar TiCN+Al ₂ O ₃ +TiN	Thin coating	14.3	1,320	12.9	16.0	3,700
CR9025	Gold	Columnar TiCN+TiN	Thick coating	14.5	1,400	13.7	12.0	2,780

■ PVD Coated Carbide

Symbol	Color	Coated Composition	Coating Layer	Ratio	Hardness of Substrate		Fracture Toughness (MPa·m ^{1/2})	Transverse Strength (MPa)
					(HV)	(GPa)		
PR630	Gold	TiN	Thin coating	12.5	1,500	14.7	11.0	2,160
PR660	Gold	TiN	Thin coating	13.7	1,450	14.2	13.0	2,250
PR830	Gold	TiAlN+TiN	Thin coating	13.7	1,450	14.2	13.0	2,250
PR905	Bluish violet	TiAlN	Thin coating	14.8	1,720	16.8	9.0	2,450
PR915	Bluish violet	TiAlN	Thin coating	14.1	1,700	16.7	11.0	4,140
PR930	Reddish gray	TiCN	Thin coating	14.1	1,700	16.7	11.0	4,140
PR1005	Reddish gray	TiCN	Thin coating	14.9	1,800	17.6	10.0	3,300
PR1025	Reddish gray	TiCN	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1115	Purple red	TiAlN	Thin coating	14.7	1,700	16.7	11.0	3,000
PR1125	Purple red	TiAlN	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1210	Blackish red	MEGACOAT	Thin coating	14.8	1,720	16.8	9.0	2,450
PR1215	Blackish red	MEGACOAT	Thin coating	14.7	1,700	16.7	11.0	3,000
PR1225	Blackish red	MEGACOAT	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1230	Blackish red	MEGACOAT	Thin coating	13.7	1,450	14.2	13.0	2,250
PR1305	Blackish red	MEGACOAT	Thin coating	15.0	1,790	17.5	9.5	2,350
PR1310	Blackish red	MEGACOAT	Thin coating	14.8	1,720	16.8	9.0	2,450
PR1325	Blackish red	MEGACOAT	Thin coating	14.7	1,370	13.4	16.0	3,100
PR1425	Blackish red	MEGACOAT NANO	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1510	Reddish green	MEGACOAT NANO	Thin coating	14.8	1,720	16.8	9.0	2,450
PR1525	Reddish green	MEGACOAT NANO	Thin coating	14.5	1,600	15.8	13.0	3,400
PR1535	Reddish green	MEGACOAT NANO	Thin coating	14.3	1,320	12.9	16.0	3,700

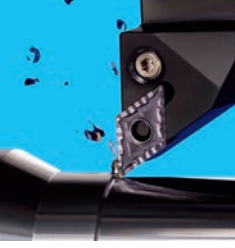


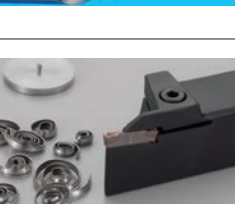





■ Carbide

Symbol	Color	Main Component	Ratio	Hardness of Substrate		Fracture Toughness (MPa·m ^{1/2})	Transverse Strength (MPa)
				(HV)	(GPa)		
KW10	Gray	WC+Co	15.0	1,650	16.2	10.0	1,470
GW15	Gray	WC+Co	14.7	1,700	16.7	11.0	3,000
GW25	Gray	WC+Co	14.5	1,600	15.8	13.0	3,400
SW05	Gray	WC+Co	15.0	1,790	17.5	9.5	2,350
SW10	Gray	WC+Co	14.8	1,720	16.8	9.0	2,450
SW25	Gray	WC+Co	14.7	1,370	13.4	16.0	3,100

Insert Grades

A

Insert Material Selection Table

Applications		Cutting Range	P Steel	M Stainless steel	K Gray Cast Iron	N Nodular Cast Iron	S Non-ferrous Metals	H Heat-resistant Alloys	S Titanium Alloys	H Hard Materials	Sintered Steel		
Turning		Finishing ↑ ↓	TN6010	TN620	KBN475								
			TN620	TN60	KBN60M								
			TN60	PV720	KA30	TN60			CF1				
			TN6020	PV720	KA30	TN60			KS6040				
			PV7010	PV7025	PV7005	PV7005	KPD001		KW10			KT66	TN6010
			PV720	CA6515	CA5505	CA5505	KPD010	CA6515	KPD001	KBN05M		A66N	TN60
			PV7025	CA525	CA4505	CA4505	KW10	CA6525	KPD010	KBN10M		PT600M	
			CA510	CA5535	CA4515	CA4515		PR1305	SW05	KBN25M			KBN570
			CA515	CA6525				PR1310	SW05	KBN30M			KBN70M
			CA525	PR1125				PR1325	SW25	KBN35M			
CA530	PR1535				PR1535		KBN900						
Small Tools		Finishing ↑ ↓	TN6010	TN620									
			TN620	TN60									
			TN6020	PV720									
			PV7010	PV7025	CA4505	CA4505	KPD001	CA6515	KPD001	KBN05M			TN6010
			PV720	PR930	CA4515	CA4515	KPD010	PR1125	KPD010	KBN10M			TN60
			PV7025	PR1025	KW10	KW10	KW10	PR1225	KW10	KBN25M			KBN570
			PR930	PR1225						KBN30M			KBN70M
			PR1005										
			PR1025										
			PR1425										
Boring		Large ↑ Bore Dia. ↓ Small	TN6010	TN60	KBN475								
			TN620	TN60	KBN60M								
			TN6020	PV7025	PV7005	PV7005	KPD001	CA6515	KPD001	PT600M			
			PV7010	CA6515	CA4505	CA4505	KPD010	CA6525	KPD010	KBN05M		TN6010	
			PV720	CA6515	CA4505	CA4505	KPD010	CA6525	KPD010	KBN10M		TN60	
			PV7025	CA6525	CA4505	CA4505	KW10	PR1125	KW10	KBN25M		KBN570	
			CA515	PR1025	CA4515	CA4515	KW10	PR1225	SW05	KBN30M		KBN70M	
			CA525	PR1125	KW10	KW10							
			CA530	PR1225									
			PR1025	PR930									
PR1425													
Cut-Off		Large ↑ Cutting Dia. ↓ Small	CR9025	CR9025									
			PR930	PR930									
			PR915	PR915	KW10	KW10	KW10	KW10	KW10				
			PR1215	PR1215	PR1215	PR1215		PR1225					
			PR1225	PR1225				PR660					
			PR1535	PR1535									
Cut-Off		(Depends on the workpiece material)	PR1025	PR1025	KW10	KW10	KW10	KW10					
			PR1225	PR1225				PR1025					
			PR1535	PR1535				PR1225					
Grooving		Glossy finish ↑ ↓ Stable	TC40N	TC40N									
			TN6020	TN6020									
			TN90	TN90	PR905	PR905	KPD001	PR915	KPD001	KBN510	TC40N		
			PV7040	PV7040	PR1215	PR1215	KW10	KW10	KW10	KBN525			
			PR930	PR930	KW10	KW10	GW15	PR1215		PT600M	KBN570		
			PR1115	PR1115	GW15	GW15		PR1225					
Threading		Glossy finish ↑ ↓ Stable	TC60M	TC60M	KW10	KW10	KW10	KW10	KW10				
			PR930	PR930	GW15	GW15	GW15	GW15	GW15				
			PR1115	PR1115									
Drilling		Wear Resistance ↑ ↓ Toughness	PR830	PR830					PR660				
			PR1225	PR1225	PR1210	PR1210	KW10	PR1225	KW10				
			PR1230	PR660	KW10	KW10	GW15	KW10					
			PR660					GW15					
Milling		Finishing ↑ ↓ Roughing	TN100M	CA6535			KPD230	CA6535	KPD230				
			PR830	PR830	PR1210	PR1210	KPD001	PR830	KPD001				
			PR1225	PR1225	PR1510	PR1510	KPD010	PR660	KW10				
			PR1230	PR1525	KW10	KW10	KW10	PR1225	PR905				
			PR1525	PR1535			GW25	PR1525	PR1210				

* Highlighted materials are recommended choice.