

TOOLMAKER SOLUTIONS

Borazon® CBN



CBN abrasives for
demanding grinding
applications in automotive,
aerospace and oil & gas



HYPERION

Materials & Technologies

BORAZON® CBN

Hyperion's family of Borazon cubic boron nitride (CBN) products achieves optimal performance in conjunction with a variety of bond systems. The numerous crystal coating and surface treatments enhance crystal retention and performance characteristics (e.g., heat transfer and lubricating qualities).

IMPROVED GRINDING

Borazon CBN is recognized as one of the greatest technological advancements for grinding hardened ferrous and superalloy materials. It is second in hardness only to diamond with twice the hardness and four times the abrasion resistance of conventional abrasives. Borazon CBN has exceptional thermal conductivity and provides improved surface integrity in the grinding of hardened tool, die and alloy steels as well as nickel- and cobalt-based superalloys.

OPTIMUM PERFORMANCE IN ALL BOND SYSTEMS

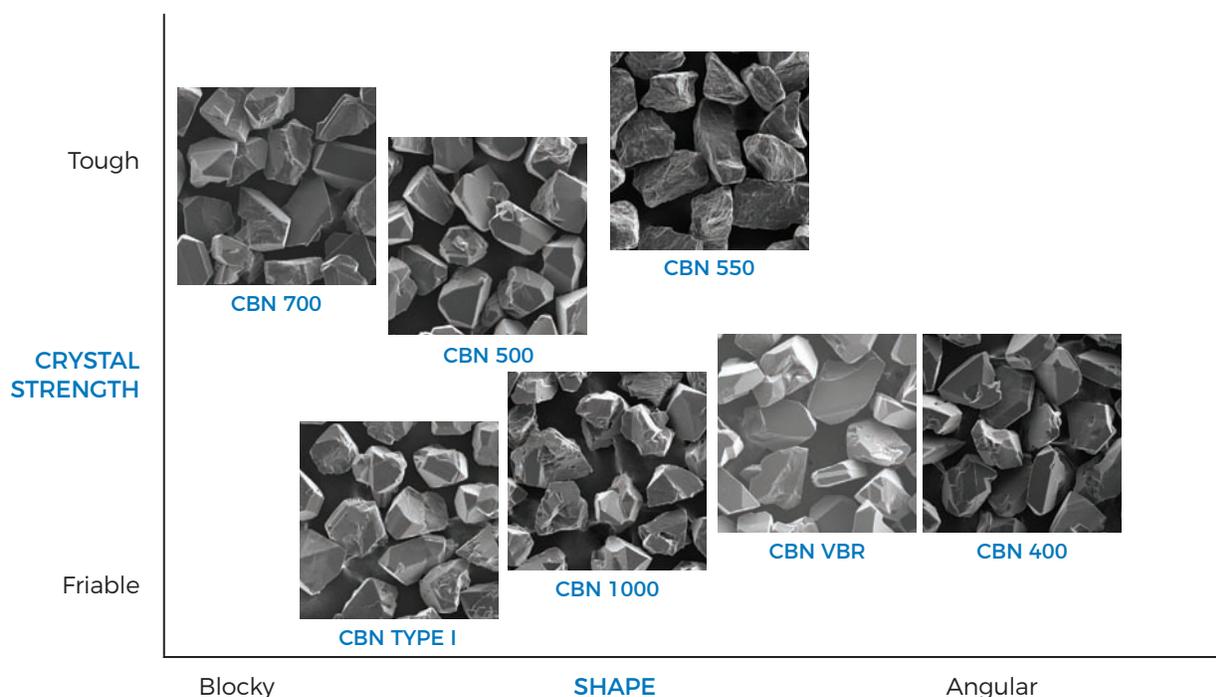
The family of Borazon CBN products achieves optimal performance in conjunction with a variety of bond systems. Hyperion offers numerous crystal coatings and surface treatments to enhance crystal retention and performance characteristics. These coatings were developed to improve performance through greater crystal retention, heat transfer and lubricating qualities.

MATERIALS ARE NO MATCH FOR BORAZON CBN

In today's manufacturing arena, there are hundreds of raw materials being ground, from superalloys and thermal sprays in aerospace products to hardened steel in bearings and gears. Borazon CBN grinds these materials with extreme efficiency and optimum cycle times.

IMPROVED MACHINING

Borazon CBN enhances the capability of modern machine tools providing increased productivity and higher operating efficiency. With longer life and minimal wheel wear, expensive machine tools are in operation longer between tool changes and need fewer adjustments during operation. Parts are of better quality when ground with Borazon CBN. This optimal product line prevents thermal damage while producing better finishes and improved part-to-part consistency.



BORAZON® CBN

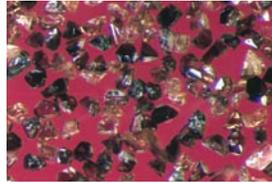
VITRIFIED BOND SYSTEM

Borazon CBN VBR

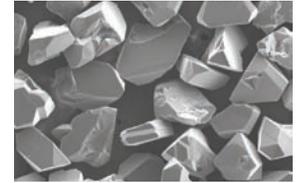
Density 3.48 g/cm³

Borazon CBN VBR is the newest addition to the Borazon CBN family. This sharp, truncated tetrahedral-shaped, brown Borazon CBN is designed for vitreous bond grinding wheel systems and provides outstanding life in aerospace grinding of superalloy materials.

V



V Vitrified Bond

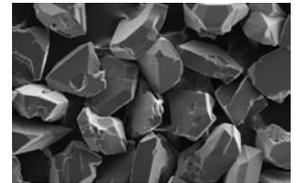
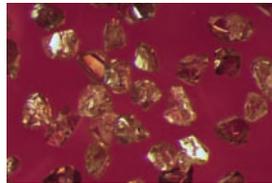


Borazon CBN 400

Density 3.48 g/cm³

The fracture strength (toughness) of Borazon CBN 400 is slightly less than that of Borazon CBN 500. Its shape and unique fracture characteristics provide extended wheel life and low grinding power. Borazon CBN 400 is ideally suited for automotive cam and crank shaft grinding applications and ID/OD grinding of tools and dies among other applications.

V

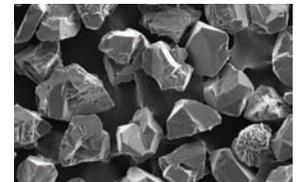
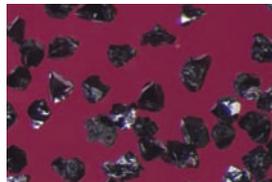


Borazon CBN 1000

Density 3.48 g/cm³

This product provides high-performance in vitreous bond applications. Medium fracture strength, high thermal stability and sharp, angular crystal shapes provide increased performance and grinding efficiency in automotive, aerospace and other production grinding applications.

V

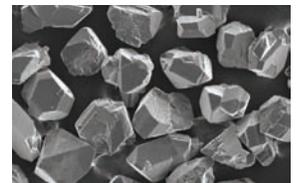
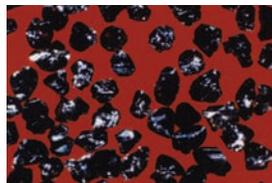


Borazon CBN Type I

Density 3.48 g/cm³

Black, semi-tough, semi-blocky monocrystal is extensively used in vitreous bond grinding wheel systems. Optimum balance of fracture strength and breakdown characteristics enhance wheel life, surface finish and dressing interval.

V

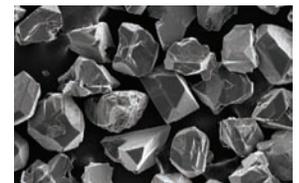


Borazon CBN SP1S

Density 3.48 g/cm³

Borazon CBN SP1S is a general purpose black CBN crystal with medium toughness and fracture characteristics. It is suitable for vitreous bond grinding wheel systems in value-oriented applications.

V



BORAZON® CBN

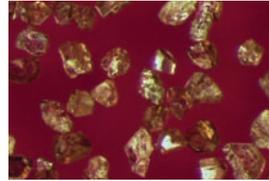
ELECTROPLATED / SINGLE LAYER

Borazon CBN 700

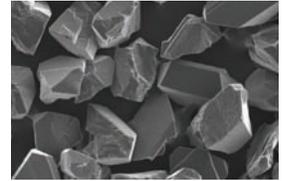
Density 3.48 g/cm³

Borazon CBN 700 is gold in color and tough and blocky with sharp edges. It has the highest fracture strength of any monocrystalline Borazon CBN product and provides longest life performance without increasing power consumption. Borazon CBN 700 is ideally suited for hardened tool steels, stainless steels and nickel- and cobalt-based superalloys.

SL



SL Single Layer

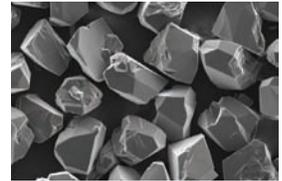
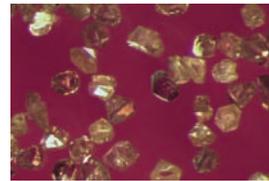


Borazon CBN 500

Density 3.48 g/cm³

Electroplated tools are the best candidates for this golden colored, tough and blocky crystal. Borazon CBN 500 has high fracture strength. Aggressive, long-life performance is provided by this crystal in hardened tool steels, carbon and alloy steels and nickel- and cobalt-based superalloys.

SL

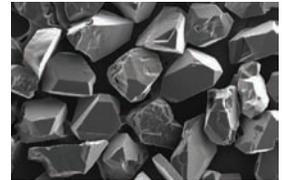


Borazon CBN 300

Density 3.48 g/cm³

Borazon CBN 300 is designed as a blocky, tough crystal for use in general purpose applications. While blocky in shape, it is more irregular than CBN 500 or CBN 700.

SL

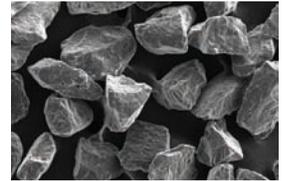
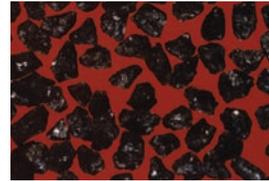


Borazon CBN 570

Density 3.48 g/cm³

Borazon CBN 570 is treated for electroplating applications and is well-suited for applications where large mesh sizes with high particle strength are required. This product is also effective in grinding aerospace components such as turbine blades, vanes and seals.

SL



Form grinding of gear teeth Borazon CBN 500

BORAZON® CBN

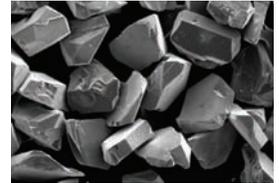
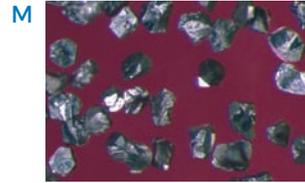
METAL BOND SYSTEMS

Borazon CBN 510

Density 3.52 - 3.68 g/cm³ [metal content 1.5 - 18.5%]

This product has a Borazon CBN 500 base with a titanium treatment that is bonded to the surface of the crystal, forming nitrides and diborides. Particle retention is enhanced in many impregnated metal bond systems. This titanium treatment also improves wetting and bond strength of single-layer, vacuum brazed tools.

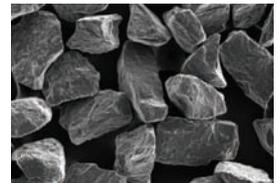
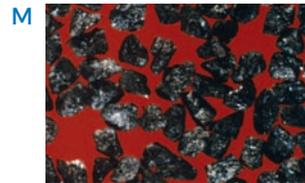
M Metal Bond



Borazon CBN 550

Density 3.48 g/cm³

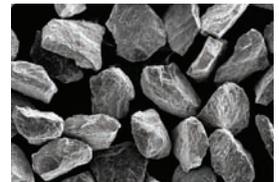
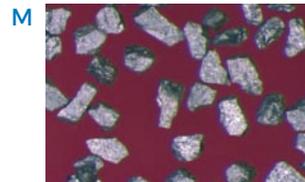
The fracture strength of this extremely tough product is the highest of any Borazon CBN product. Its shape, surface texture and consistent toughness make it ideal for demanding high removal rate applications while providing good surface finish. Borazon CBN 550 is widely used in metal and vacuum braze bond systems for honing and grinding.



Borazon CBN 550 Ti

Density 3.48 g/cm³

Borazon CBN 550 Ti is a titanium-coated version of Borazon CBN 550. It provides greater retention in metal bonds for improved honing performance.



BORAZON® CBN

RESIN BOND SYSTEMS

Borazon CBN 560

Density 5.25 g/cm³ [coating level 60%]

Borazon CBN 560 is the product of coating microcrystalline Borazon CBN 550 with nickel. It is ideally suited for applications where very high grinding forces are encountered. Superior surface finishes are achieved with the use of Borazon CBN 560. Areas where Borazon CBN 560 is most effective are hardened tool and alloy steel and cast irons.

Borazon CBN 520

Density 5.8 g/cm³ [coating level 70%]

Heavy-duty resin bond applications benefit from the design of Borazon CBN 520, which has a Borazon CBN 500 base with an advanced two-part coating. It is extremely effective where wheel life and/or form retention are critical. This product provides grinding ratios two to three times that of other resin bonded CBN products, with only minimal increases in grinding energy.

Borazon CBN 420

Density 5.4 g/cm³ [coating level 60%]

This product is made up of a special coating chemically bonded to Borazon CBN 400 for resin bond applications. Borazon CBN 420 provides increased retention of CBN crystal, longer productive life and more consistent performance. It is designed to provide up to twice the life of other CBN products while generating lower grinding forces and less heat in large contact area applications.

Borazon CBN 415

Density 5.25 g/cm³ [coating level 60%]

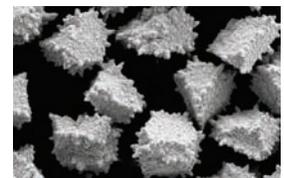
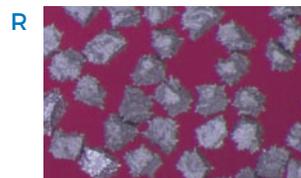
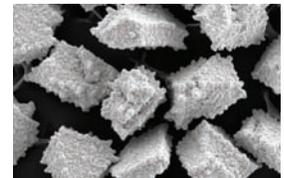
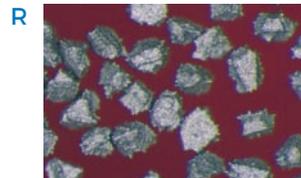
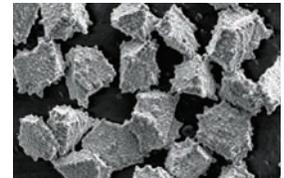
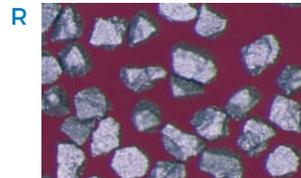
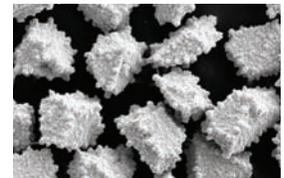
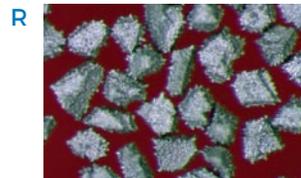
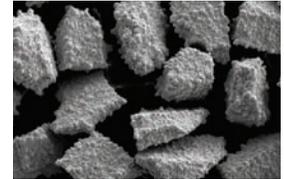
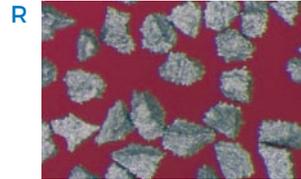
The advanced two-part coating provides chemical bonding of the coating to the Borazon CBN 400 crystal for increased retention of the crystal in resin bond systems. This results in longer wheel life while the sharp edges of the Borazon CBN 400 crystal provide free cutting for lower grinding energy.

Borazon CBN 1200

Density 5.35 g/cm³ [coating level 60%]

Borazon CBN 1200 has an advanced two-part coating applied to the Borazon CBN 1000 crystal. This combination of technologies yields an unusually high level of performance in today's resin bonded grinding wheel systems. Longer wheel life, lower grinding energy and improved surface finish are all made possible at the same time with this superabrasive product.

R Resin Bond



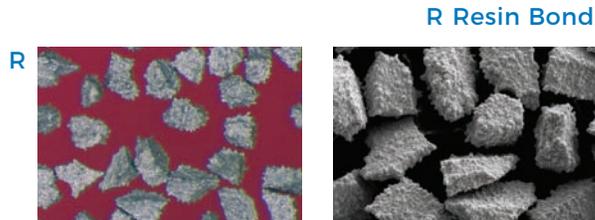
BORAZON® CBN

RESIN BOND SYSTEMS

Borazon CBN Type II

Density 5.25 g/cm³ [coating level 60%]

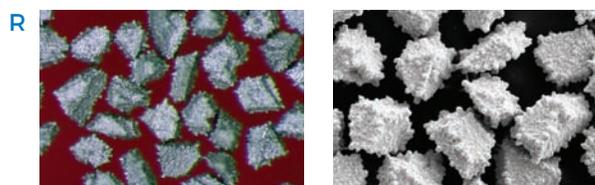
Borazon CBN Type II is a nickel-coated version of Borazon Type I. The nickel coating provides superior performance in phenolic and polyimide resin bond systems. Textured coating enhances crystal retention and extracts heat from the grinding interface. Borazon CBN Type II is the benchmark for performance in CBN used for resin-bonded tools.



Borazon CBN Type III

Density 5.5 g/cm³ [coating level 65%]

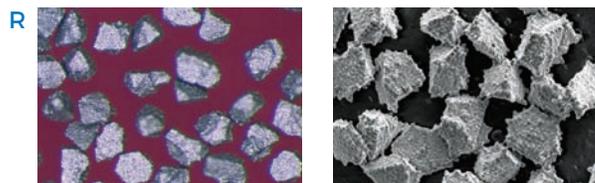
Borazon CBN Type III is a nickel-coated version of Borazon CBN Type I. The 65% coating level provides extra retention in many resin bond systems.



Borazon CBN SP2S

Density 5.10 g/cm³ [coating level 60%]

Borazon CBN SP2S is a general purpose crystal suitable for a wide variety of applications in ferrous alloys. It has 60% by weight nickel coating to enhance crystal retention in resin bond grinding wheels.



SIZE AVAILABILITY

	ANSI (FEPA)	20/30 (B852)	30/40 (B602)	40/50 (B427)	50/60 (B301)	60/80 (B252)	80/100 (B181)	100/120 (B151)	120/140 (B126)	140/170 (B107)	170/200 (B91)	200/230 (B76)	230/270 (B64)	270/325 (B54)	325/400 (B46)	400/500 (None)	
VITRIFIED	VBR					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	400					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	1000					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	Type I					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	SP1S					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
ELECTROPLATED / SINGLE LAYER	700			•	✓	✓	✓	✓									•
	500			•	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	300				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	570	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
METAL	550/550 Ti	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	510			•	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	560	•	•	•	•	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
RESIN	520			•	•	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	420					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	415					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	1200					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	Type II/III					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•
	SP2S					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	•

✓ Standard • Special [please consult your sales representative]

BORAZON® CBN

PRODUCT CHOICE BY BOND SYSTEM

APPLICATION	MATERIAL	VITRIFIED	EP/SINGLE LAYER	METAL	RESIN	
Cutting tools, dies, punches, shears, knives, saw blades	Tool steel > HRc40 Case hardened alloy steel	VBR			560	
		400	700	510	520	
		1000	500	550	420	
		Type I	300	550 Ti	415	
		SP1S			1200	
					Type II SP2S	
Bearing rings, needles, rollers, spacers, balls	SAE 52100, M50 Alloy steel > HRc40	VBR			520	
		400	700		420	
		1000	500		415	
		Type I	300		1200	
		SP1S				
					Type II SP2S	
Pump, compressor parts	Nodular iron Alloy steel	VBR	700		520	
		400	500		420	
		1000	300		415	
		Type I	570		1200	
						Type II SP2S
Engine and drive train components; e.g., camshaft, crankshaft, gears, valve stems, drive shaft, CV joints, piston pins, fuel injectors, turbo-chargers	Alloy steel > HRc40 Chilled iron, nodular iron	VBR	700			
		400	500			
		1000	300			
		Type I	570			
Aerospace and land-based gas turbine parts; e.g., vanes, blades, nozzles, seals	Superalloys	VBR	700			
		400	500			
		1000	300			
Surgical knives, blades, scissors	Alloy steel > HRc40 Stainless steels	VBR	700		520	
		400	500		420	
		1000	300		415	
		Type I			1200	
						Type II SP2S
Honing, superfinishing, cylinder liners, connecting rods	Alloy steel Gray iron Nodular iron Thermal sprays	VBR		510		
		400		550		
		1000		550 Ti		
		Type I				
Grinding of steel and paper mill rolls	Chilled iron High Cr steel Tool steel	VBR			520	
		400			420	
		1000			415	
		Type I			1200	
						Type II SP2S
Various other	Soft steel Thermal spray coatings	VBR	700			
		400	500	510		
		1000	300	550		
		Type I	570	550 Ti		
Gears	AISI 8620		700			
	AISI 4140		300			
	AISI 4340		500			

