



**Boreas**

**PRECISION  
PERFECTED  
FOR  
SUPERIOR  
SURFACES**

**NEW  
FOR  
B**

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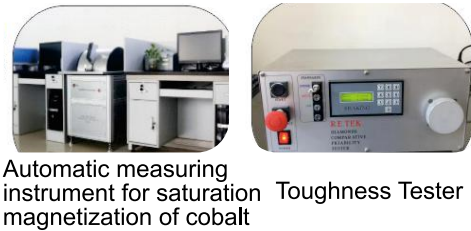
**Boreas 博锐**



# Inspection equipment

## Raw Materials

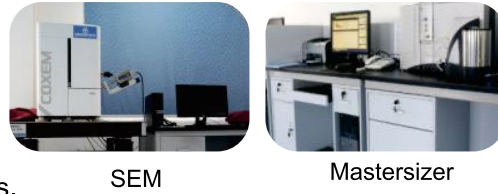
Raw materials is an important factor for quality consistency. It affects the wear resistance and durability of PCD/PCBN. We utilize raw materials from fixed sources and test its toughness and magnetism.



Automatic measuring instrument for saturation magnetization of cobalt Toughness Tester

## Particle Shape

Particle shape affects the desired polishing surface result, so consistent crystal shape is vital for high stock removal rates and scratch-free surface finish. Up-to-date production facilities and specific shaping process ensure more uniform and blocky particles and minimize the long and flaky particles.



SEM Mastersizer

## Particle Size Distribution-PSD

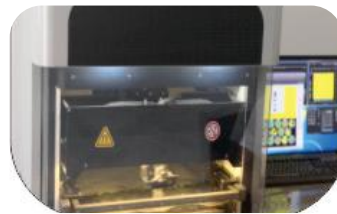
PSD is a primary factor for micron quality, it decides the material removal rate and surface roughness. A narrow PSD maximizes the amount of particles of the same size and minimizes the coarse and fine particles.



Microscope

## Purity

Purity affects the micron particle dispersion and bond retention. Special cleaning processes guarantee the superior standards of product purity.



C-SAM

## Defect Detection

Every PCD/PCBN blank will be ultrasonically scanned before delivery. By C-SAM it can prevent defective products including deep-seated blow holes, internal defects, tiny flaws, impurity, the thickness.

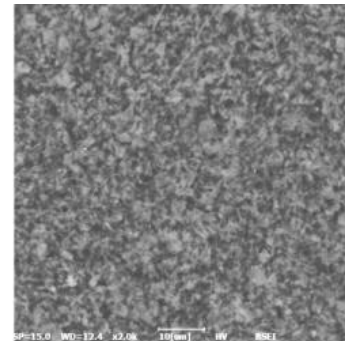
## Analytical Components

The kinds and proportion of elements in the composite sheet have a direct impact on the stability of the product, X-ray diffractometer can effectively control the quality of products.



XRD

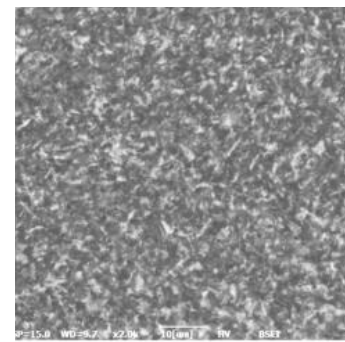
**PCBN** PCBN is a polycrystal sintered from cubic boron nitride powder and binder under high temperature and pressure. There are two main types of binders: metal and ceramic.



### TC145/TC145S

Grain size	Binder Material	Content	HV(Gpa)
1µm	TiC	40-45	29-32

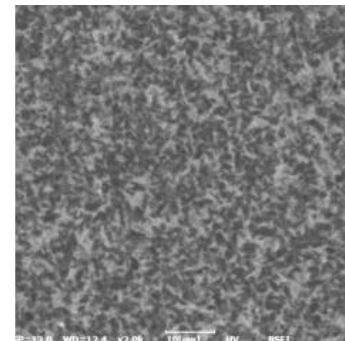
CBN content is 40-45%;  
TiC binder;  
Average particle size is 1 micron;  
For high-speed continuous cutting, its resistance to crescent depression wear is very outstanding in all products.  
TC145 is the finest of all products and can provide micron surface roughness.



### TN056/TN056S

Grain size	Binder Material	Content	HV(Gpa)
1µm	TiN	65-70	30-32

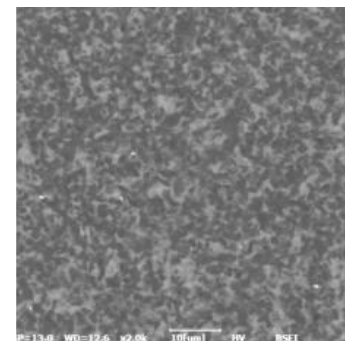
CBN content is 65-70%;  
TiN binder;  
Average particle size is 1 micron;  
It has high wear resistance, good high temperature resistance and ideal for moderately and lightly interrupted processing of hardened steel where high surface finishes is required.



### TN250/TN250S

Grain size	Binder Material	Content	HV(Gpa)
2µm	TiN	50-55	30-32

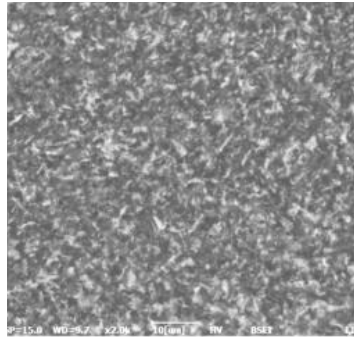
CBN content is 50-55%;  
TiN binder;  
Average particle size is 2 micron;  
This product has good high temperature resistance and excellent workpiece surface finish.  
Application: high-speed continuous and micro-intermittent processing of quenched steel.



### TN260/TN260S

Grain size	Binder Material	Content	HV(Gpa)
2µm	TiN	60-65	31-33

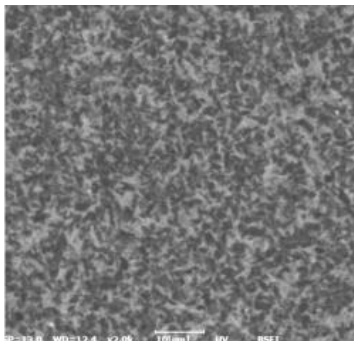
CBN content is 60-65%;  
TiN binder;  
Average particle size is 2 micron;  
This product is suitable for continuous and mild intermittent processing of hardened steel.



## TCN60/TCN60S

Grain size	Binder Material	Content	HV(Gpa)
2µm	TiCN	60-65	33-35

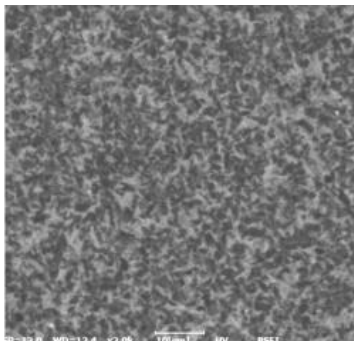
CBN content is 60-65%;  
TiCN binder;  
Average particle size is 2 micron;  
This product has both high wear resistance, good high temperature resistance and excellent workpiece surface finish.  
Application: continuous and weak intermittent processing of quenched steel, nodular cast iron and vermicular cast iron (tensile strength can be  $\geq 400$  for nodular cast iron)



## TC65/TC65S

Grain size	Binder Material	Content	HV(Gpa)
2µm	TiC	65-70	32-34

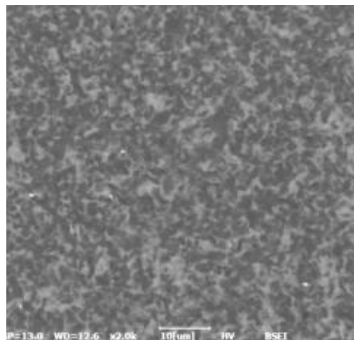
CBN content is 65-70%  
TiC binder;  
Average particle size is 2 micron;  
This product has both high wear resistance and good high temperature resistance, so it is very suitable for cold working tool steel and some valve seat alloys.



## TN470/TN470S

Grain size	Binder Material	Content	HV(Gpa)
4µm	TiN	70-75	34-36

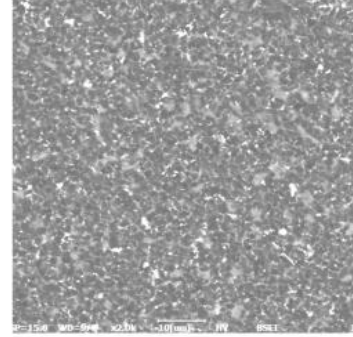
CBN content is 70-75%;  
TiN binder;  
Average particle size is 4 micron;  
Under the condition of high speed cutting, this product has excellent collapse resistance.  
Application: high-speed continuous-intermittent processing of quenched steel.



## TC80/TC80S

Grain size	Binder Material	Content	HV(Gpa)
4µm	TiC	~80	34-37

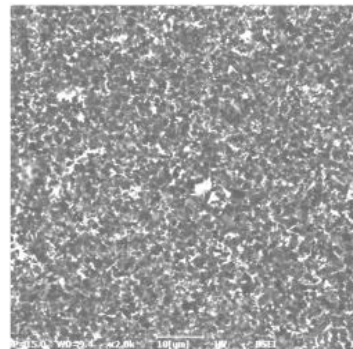
CBN content is 80%;  
TiC binder;  
Average particle size is 4 micron;  
Application continuous and intermittent processing of ductile iron, vermicular cast iron and other difficult cast iron and powder metallurgy.



## BMN290

Grain size	Binder Material	Content	HV(Gpa)
2µm	Cermet	85-90	33-35

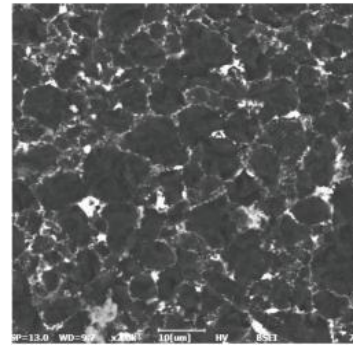
CBN content is 85-90%,  
Cermet binder, average particle size is 2 microns.  
With high hardness and wear resistance, it can be used for high-speed and high-efficiency machining of gray cast iron and boron cast iron.



## C90

Grain size	Binder Material	Content	HV(Gpa)
2µm	Metal	85-90	39-42

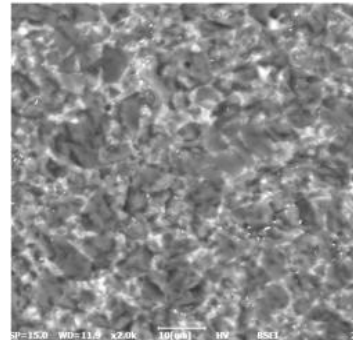
Characteristics:  
1. Approximately 85-90% CBN.  
2. 2µm average grain size.  
3. Metal binder for extreme abrasive.  
Applications: For continuously cutting of cast iron and heavily interrupted turning of all common hardened steels.



## NM900

Grain size	Binder Material	Content	HV(Gpa)
15µm	Metal	85-90	35-38

CBN content is 85-90%;  
Metal binder for extreme abrasive;  
Average particle size is 15 micron;  
This product has high wear resistance and outstanding impact resistance.  
It is used for turning and milling gray cast iron and hard cast iron, as well as heavy turning of hardened steel.



## NL900

Grain size	Binder Material	Content	HV(Gpa)
10µm	AlN	90-92	38-42

This model is CBN polycrystal;  
CBN content is 90%;  
AlN binder;  
Average particle size is 10 micron;  
It has high wear resistance, high temperature resistance;  
Application: turning and milling of quenched gray cast iron and hard cast iron, as well as heavy turning of quenched steel, including brake disc, pump body and other components.



# PCBN standard products series

## PCBN Composite Sheet Product Series with Cemented Carbide Layer

Type	CBN (mm) Layer Thickness	Total Thickness (mm)				
		1.60	2.00	2.38	3.18	4.76
TC145	0.7 ~ 1.0	✓	✓	✓	✓	✓
TN056	0.7 ~ 1.0	✓	✓	✓	✓	✓
TN250	0.7 ~ 1.0	✓	✓	✓	✓	✓
TN260	0.7 ~ 1.0	✓	✓	✓	✓	✓
TCN60	0.7 ~ 1.0	✓	✓	✓	✓	✓
TC65	0.7 ~ 1.0	✓	✓	✓	✓	✓
TN470	0.7 ~ 1.0	✓	✓	✓	✓	✓
TC80	0.7 ~ 1.0	✓	✓	✓	✓	✓
BMN290	0.7 ~ 1.0	✓	✓	✓	✓	✓
NM900	0.7 ~ 1.0	✓	✓	✓	✓	✓
C90	0.7 ~ 1.0	✓	✓	✓	✓	✓

Note: other sizes and styles can be customized according to customer's request

## PCBN Overall Product Series

Type	Total Thickness (mm)			
	1.20	1.60	3.30	4.90
TC145S	✓	✓	✓	✓
TN056S	✓	✓	✓	✓
TN250S	✓	✓	✓	✓
TN260S	✓	✓	✓	✓
TCN60S	✓	✓	✓	✓
TC65S	✓	✓	✓	✓
TN470S	✓	✓	✓	✓
TC80S	✓	✓	✓	✓
NL900	✓	✓	✓	✓

Note: other sizes and styles can be customized according to customer's request

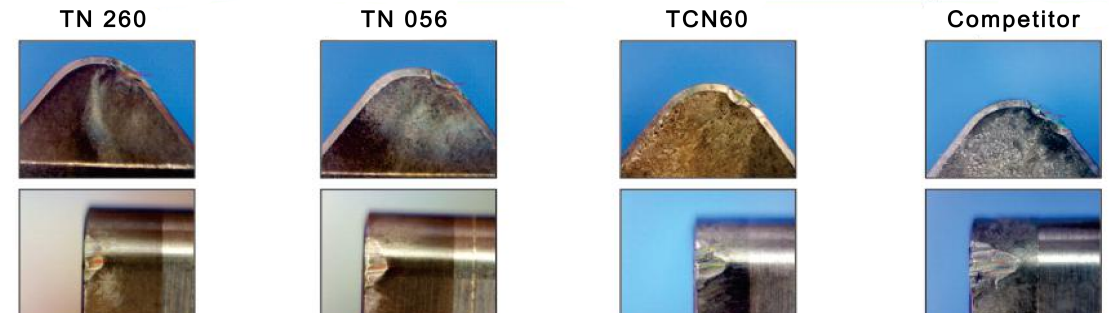
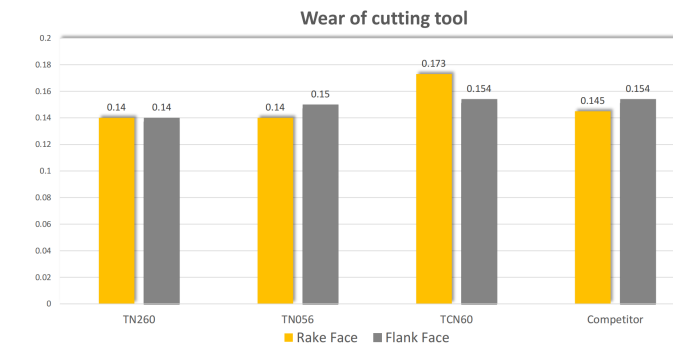
# PCBN

PCBN is a special class of super-hard material which is chemically inert and temperature resistant. It is well-known that PCD diamond cannot be used to machine ferrous alloys because it will chemically react and quickly wear. However, PCBN is well-suited for such ferrous-metal applications. PCBN is ideal for tools used to machine hard ferrous metal items such as: gear steel, bearing steel, cast iron, powder metallurgy material, etc. PCBN is typically used to machine brake discs, engineer blocks, engineer cylinder liners, brake drums, flywheels, valve seats and guides, gears, mold and dies parts etc. Suitable for making PCBN turning, and cutting tools.

# PCBN applications

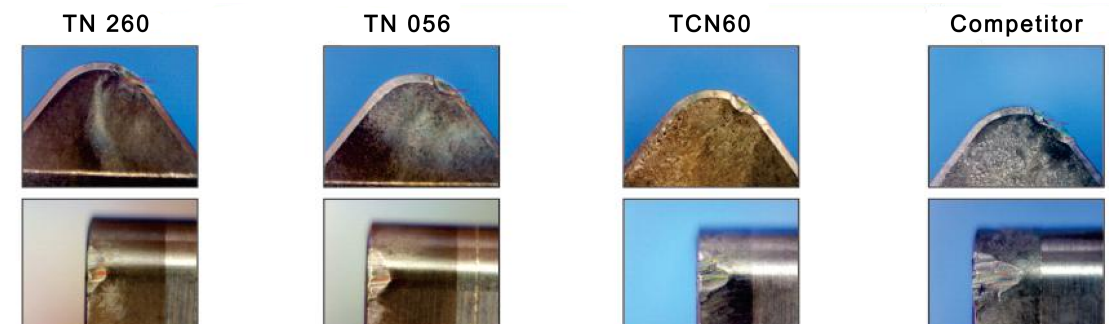
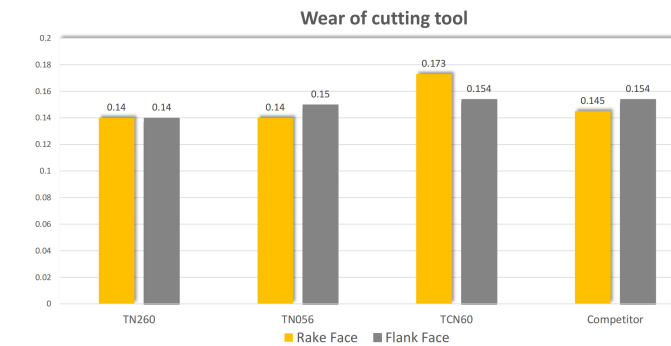
## Case one

Work materials-Gcr15  
Hrc 58-62  
Cutting length = 2000m  
Vc = 150/min  
f = 0.12 mm/rev  
ap = 0.1 mm  
Dry  
Insert CNGA120408-2N



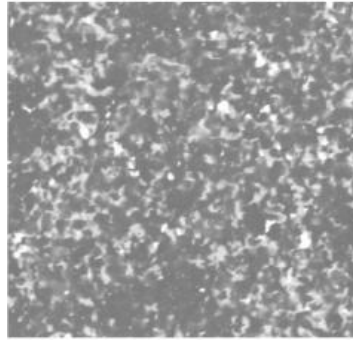
## Case two

Work materials-Gcr15  
Hrc 58-62  
Cutting length = 2000m  
Vc = 150/min  
f = 0.12 mm/rev  
ap = 0.1 mm  
Dry  
Insert CNGA120408-2N



# PCD

Polycrystalline Diamond (PCD) also has high strength and can be made into specific shapes to meet different processing needs.

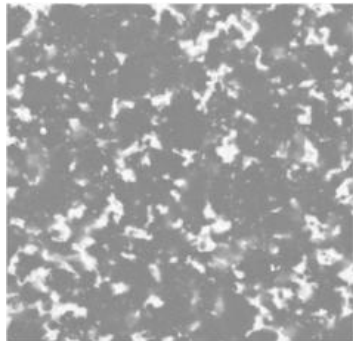


## LTM2200

Grain size	Wear resistance	Electric Conductivity	Grindability
1µm	██████████	██████████	██████████

### Characteristics:

- 1.1µm average grain size.
  - 2.LTM2200'S ultra-fine grain structure is suitable for applications where mirror finishes are required due to its extreme edge sharpness.
- Applications: Ideal for milling and cutting aluminium silicon alloys where extreme chip resistance is required, also for machining titanium and composites.

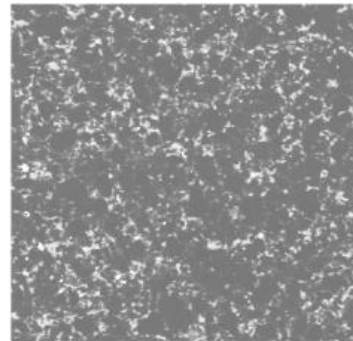


## LTM004

Grain size	Wear resistance	Electric Conductivity	Grindability
4µm	██████████	██████████	██████████

### Characteristics;

- 1.4µm average grain size.
  - 2.LTM004'S 4-micron fine grain structure offers the addition to delivering the optimum balance between tool performance and resistance to abrasions and chips.
- Applications: Ideal for cutting of aluminium alloys where high surface finish is required alongside higher wear resistance.

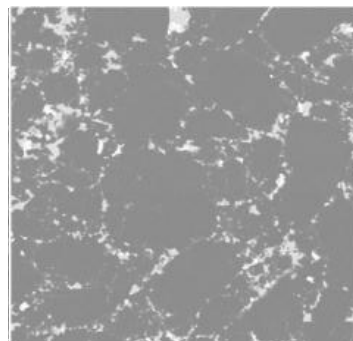


## LTM10

Grain size	Wear resistance	Electric Conductivity	Grindability
10µm	██████████	██████████	██████████

### Characteristics:

- 1.10µm average grain size.
  2. LTM10 is the workhorse PCD grade ideal for many applications where a good balance of toughness and wear resistance is required.
- Applications : The ideal grade where roughing and finishing are performed with a single tool. Highly recommended for low to medium content aluminium alloys.



## LTM90

Grain size	Wear resistance	Electric Conductivity	Grindability
2-30µm	██████████	██████████	██████████

### Characteristics;

- 1.A multi-model PCD with a combination of 2µm to 30µm grain sizes.
  - 2.It s made of unique mixtures and special high temperature and high pressure synthesis technology.
  - 3.The product has very high wear resistance and heat resistance.
- Applications: Successful in machining of high silicon aluminium alloys, metal matrix composites, tungsten carbides.

# PCD standard product series

## PCD Composite Sheet Product Series with Cemented Carbide Layer

Type	Diamond (mm) Layer Thickness	Total Thickness (mm)								
		0.5	0.6	0.8	1.0	1.6	2.0	3.2	5.0	8.0
LTM2200	0.3	✓	✓	✓	✓	✓	✓	✓		
LTM2200	0.5			✓	✓	✓	✓	✓		
LTM004	0.3	✓	✓	✓	✓	✓	✓	✓		
LTM004	0.5			✓	✓	✓	✓	✓		
LTM10	0.3	✓	✓	✓	✓	✓	✓	✓		
LTM10	0.5			✓	✓	✓	✓	✓	✓	
LTM90	0.5			✓	✓	✓	✓	✓	✓	✓

### Note:

1. The composite sheet with total thickness of 0.5, 0.6, and 0.8 does not provide the whole sheet, but can provide knife grain cutting or 1/4 sheet;
2. The composite sheet with total thickness of 1.0,1.2 and 1.4 does not provide the whole sheet, but can provide knife grain cutting or 1/2 sheet.
3. The products with total thickness of 5.0 and 8.0 are customized products.
4. Other sizes and styles can be customized according to customer's request.

# PCD

## PCD cutting tool blanks



PCD cutting tool blanks be customized to meet our customers' special needs or requirements. PCD cutting tool blanks are mainly used for cutting and machining non-ferrous metals and alloys such as Si/Al alloys, aluminium, copper and similar alloys. They are also used to machine non-metallic materials such as wood, graphite, ceramics, plastic, rubber and so forth, where high abrasion resistance and long life are required.

## PCD cutting tool blanks



Ideal for diamond saw blades, construction coring and drilling,diamond cutters for edge-trimming, PCD inserts for turning and milling, diamond drill bits for hole-drilling in composite materials and circuit boards, etc.