



## Super-Abrasive Wheels

**CBN / DIAMOND GRINDING SOLUTION**



# BAY UNION

## ABRASIVE TECHNOLOGY



We believe that helping partners achieve their goals makes the world a better place.

Bay Union Abrasive Technology Co., Ltd. was founded in 1987. We have focused on producing vitrified bonded grinding wheels for many years. Bay Union has advanced vitrified bonds and special self-developed equipment, so we can supply high quality grinding wheels in a very fast and steady way.

High performance, High-quality stability, and Fast delivery are our strength, and that is why we can expand very fast in the high precision grinding market in Taiwan.

In order to satisfy customer's needs, Bay Union is promoting standard series whether for applying Profile grinding (Gear, Bearing...), Surface grinding, Cylindrical grinding and Internal grinding, we can have a faster way in selecting suitable products for your application accordingly.



## Super-Abrasive Wheels

CBN stands for Cubic Boron Nitride, a compound renowned for its hardness, second only to diamond. CBN wheels are highly efficient, long-lasting, and classified as super-abrasive tools.

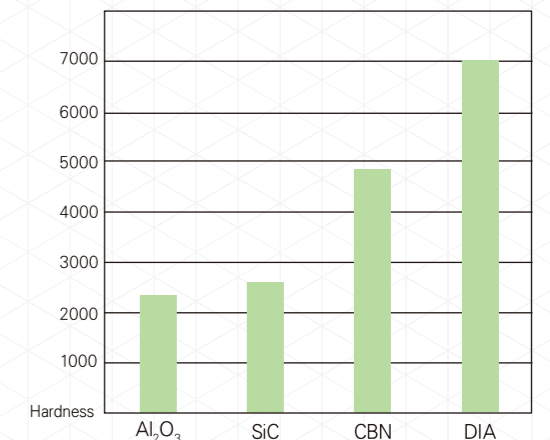
In recent years, the demand for CBN wheels has been on the rise, driven by the increasing need to grind heat-resistant alloys in the aerospace industry and high-speed steel used in mold manufacturing.



Grinding wheels are classified into two main types: conventional wheel and super-abrasive wheel. Conventional wheels use abrasive grains like silicon carbide(SiC) or alumina(Al<sub>2</sub>O<sub>3</sub>), suitable for standard grinding tasks. In contrast, super-abrasive wheels utilize harder materials such as diamond or cubic boron nitride (CBN), offering superior performance for demanding applications.

### Material

|                      |   |  |  |
|----------------------|---|--|--|
| <b>Diamond wheel</b> | <ul style="list-style-type: none"> <li>● Quartz, Glass</li> <li>● PCD / PCBN</li> </ul> | <ul style="list-style-type: none"> <li>● Hard alloys cermet</li> <li>● Ceramics, Silicon</li> </ul>  | <ul style="list-style-type: none"> <li>● Ferrite, samarium cobalt magnets</li> <li>● Compound semiconductor materials</li> </ul> |
| <b>CBD wheel</b>     | <ul style="list-style-type: none"> <li>● Tungsten</li> <li>● Cast iron</li> </ul>       | <ul style="list-style-type: none"> <li>● Heat-resistant alloys</li> <li>● Titanium alloys</li> </ul> | <ul style="list-style-type: none"> <li>● Thermal sprayed metals</li> <li>● Neodymium magnets</li> </ul>                          |
| <b>CBN wheel</b>     | <ul style="list-style-type: none"> <li>● Carbon steel</li> <li>● HSS</li> </ul>         | <ul style="list-style-type: none"> <li>● Tool steel</li> <li>● Stainless steel</li> </ul>            | <ul style="list-style-type: none"> <li>● Alloy steel</li> <li>● Bearing steel</li> <li>● Sintered metals</li> </ul>              |



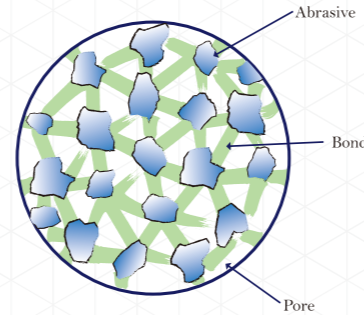
# Three Key Elements of Grinding Wheel

## Abrasive

Abrasives are the cutting edges in a grinding wheel. The choice of abrasive directly impacts the wheel's grinding performance and efficiency. The type of abrasive, its crystal shape, volume percentage, and uniformity all play crucial roles. Uniform distribution of abrasives ensures consistent cutting edge distance, and adjusting this distribution can achieve different grinding effects.

## Bond

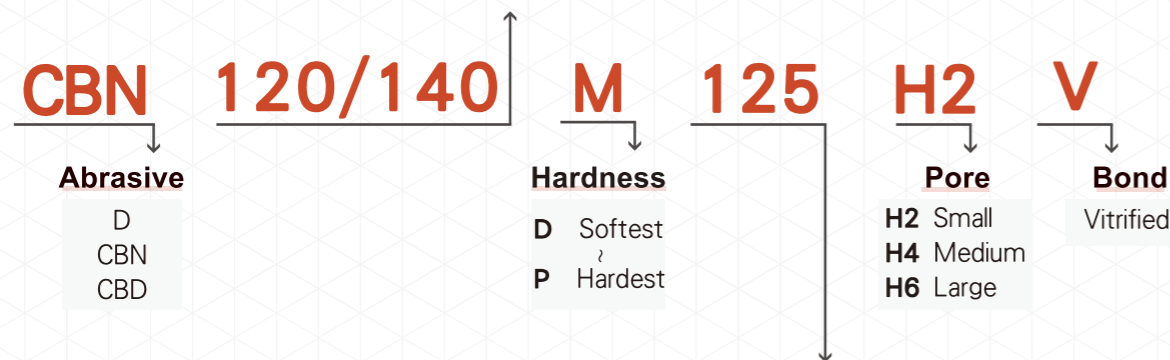
Bond is another crucial element of a grinding wheel. It affects the wheel's hardness, strength, and grinding behavior. Common bonds include vitrified bond, resin bond, and metal bond (sintered or electroplated). Choosing the right bond for specific application conditions ensures stability and longevity of the grinding wheel.



## Pore

In a grinding wheel, besides the space occupied by abrasives and bonds, the remaining space consists of porosity. The pores in a grinding wheel help expel metal debris, allow grinding fluid to reach hot spots, and improve heat dissipation. An appropriate increase in porosity can also enhance the grinding feed rate.

| Grit Size    |           |              |           |              |           |
|--------------|-----------|--------------|-----------|--------------|-----------|
| US(JIS) Mesh | FEPA (μm) | US(JIS) Mesh | FEPA (μm) | US(JIS) Mesh | FEPA (μm) |
| #30/40       | D 602     | #120/140     | D 126     | #325/400     | D 46      |
| #40/50       | D 427     | #140/170     | D 107     | #400/500     | 40~60     |
| #50/60       | D 301     | #170/200     | D 91      | #500         | 30~40     |
| #60/80       | D 252     | #200/230     | D 76      | #600         | 22~36     |
| #80/100      | D 181     | #230/270     | D 64      | #800         | 20~30     |
| #100/120     | D 151     | #270/325     | D 54      | #1000        | 15~25     |



## Concentration

Concentration indicates the amount of super-abrasive in a grinding wheel. Higher concentration increases cutting strength and hardness, ideal for hard materials but generates more heat.

| Concentration      | 25  | 50  | 75  | 100 | 125 | 150 | 175 | 200 |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| ct/cm <sup>3</sup> | 1.1 | 2.2 | 3.3 | 4.4 | 5.5 | 6.6 | 7.7 | 8.8 |

# CBN Application

Bearing Alloys / High-temperature Alloys

## Internal Grinding $\phi 2\sim\phi 70$

Provides precise grinding of internal diameters and deep holes. Ideal for high-hardness materials, offering excellent surface finishes. Capable of both rough and fine grinding. Delivers high internal surface quality and dimensional accuracy, suitable for complex internal shapes.



## Profile Grinding

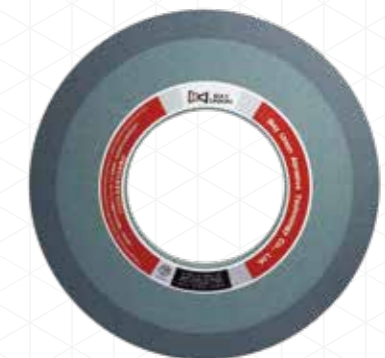
(Bearing, Linear Guideway)

Capable of grinding precise geometries for complex profiles. Highly effective for grinding hard materials like carbide and high-speed steel. Offers excellent wear resistance and thermal stability for long-term use. Achieves high precision in shape control, ideal for precision molds and complex components.

## Cylindrical Grinding $\phi 355\sim\phi 510$

(Camshaft, Bearing)

High precision, achieving accurate dimensions and smooth surfaces. Suitable for grinding hard materials like tool steels. Reduces wear and heat generation, improving efficiency. Achieves high precision in shape control, ideal for precision molds and complex components.



## Surface Grinding $\phi 150 / \phi 180 / \phi 205$

(Stavax, DC53, HSS)

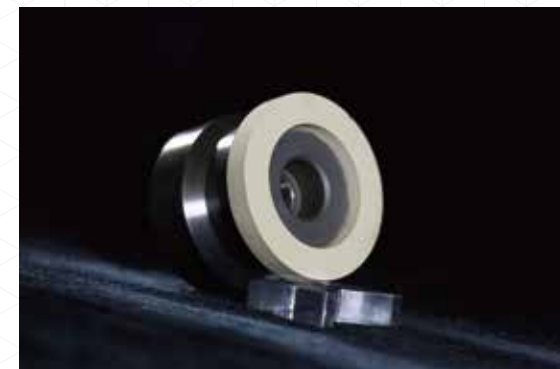
Provides high flatness precision and superior surface finishes. Primarily used for grinding hard or ultra-hard materials. Reduces thermal effects during grinding, avoiding workpiece distortion. Ensures high precision for flat surfaces, suitable for precision machinery and tooling parts.

## DIA Application



### **PCD / PCBN** $\phi$ 100 / $\phi$ 125 / $\phi$ 150

High-hardness PCD / PCBN tools are used for cutting various precision components. Machining such tools requires ultra-hard diamonds, with diamond grinding wheels of #600, #2000, and #8000 commonly used for sharpening the cutting edges. This ensures cutting tool a smooth surface and sharp edge, maintaining high precision and low friction while extending tool life.



### **Ceramic** $\phi$ 10 ~ $\phi$ 100 ( $Al_2O_3$ 、SiC、Quartz)

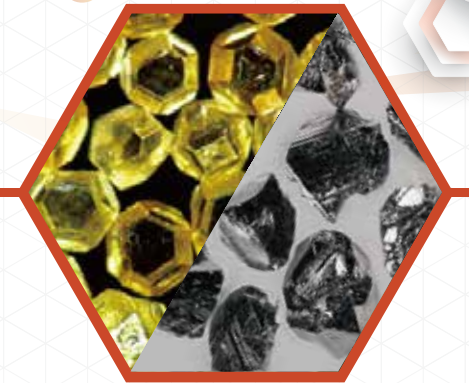
Industrial ceramics are widely used in semi-conductors for corrosion resistance, anti-static properties, and wear resistance. High-quality diamonds ensure low warpage, precise dimensions, and smooth surfaces. Bayunion provides customized grinding wheels for specialized applications.

### **Silicon / SiC Wafer** $\phi$ 200 / $\phi$ 250 / $\phi$ 300

Bayunion's wafer thinning wheels are used for Si wafer back thinning and reclaimed wafer grinding. Available in standard grits from #1000 to #8000, they can replace OEM (Original equipment manufacturer) grinding wheels, with long-life versions also offered to reduce costs. For single-crystal SiC wafer grinding, the RG series enables high-efficiency rough grinding, while the FG series achieves surface roughness below Ra 2nm, significantly reducing CMP time.



## CBD Application



### **Tungsten-carbide**

For aspherical tungsten steel molds used in optics, Bayunion's CBD can replace conventional electroplated grinding pins. With the advantage of being dressable, it significantly reduces the need for wheel replacement. Additionally, using ceramic CBD grinding pins can achieve superior surface roughness. Available grit sizes range from #200 to #2000.



### **Mould**

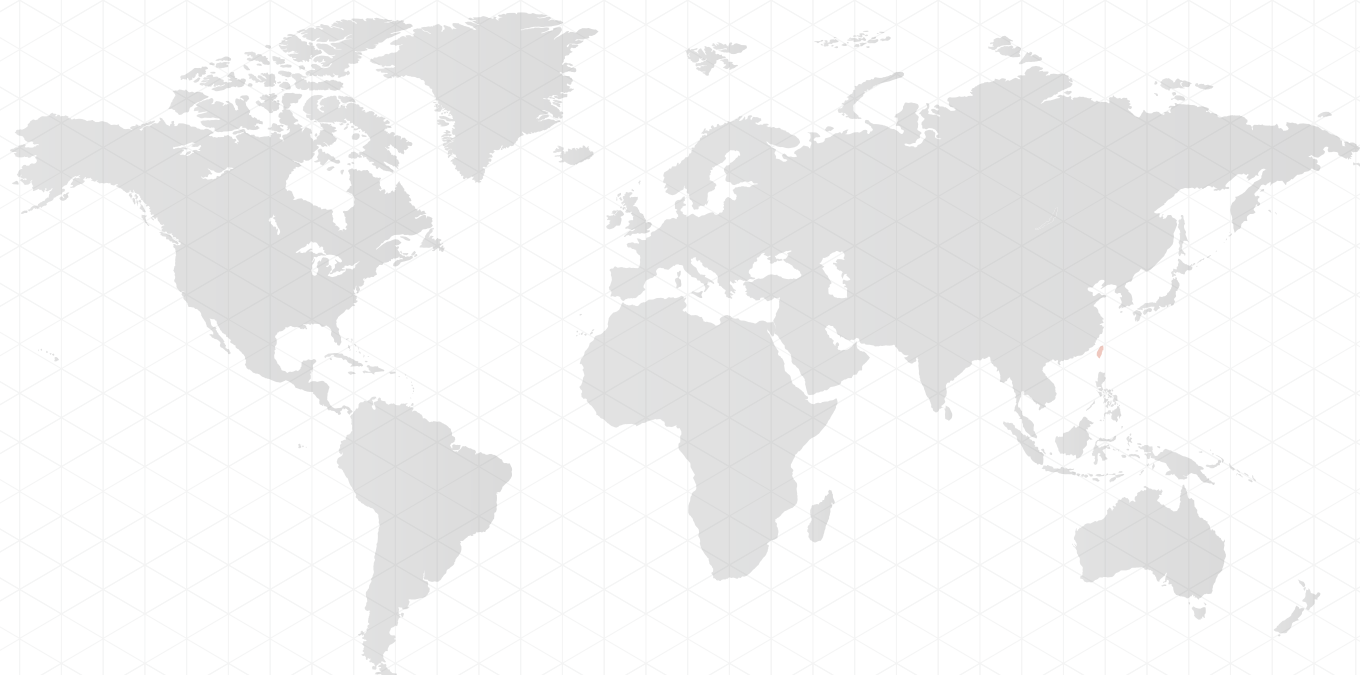
Jig grinding is essential for precision jig manufacturing and maintenance. The workpiece remains fixed while the grinding wheel moves to ensure hole accuracy and consistency. High cutting efficiency and dimensional stability are crucial. CBD improves composite machining, maintaining precision and achieving a smooth surface.



Processing video

### **End-mill grooving**

The flute grinding of tungsten carbide end mills focuses on high material removal efficiency and typically uses metal-bonded diamond grinding wheels. When considering the need to improve chip evacuation, the surface roughness of the flutes must be enhanced. Using ceramic-bonded CBD allows for high removal rates and low processing temperatures while achieving a smoother surface, thereby improving the quality of the tool.



**BAY UNION ABRASIVE TECHNOLOGY CO., LTD.**

北聯研磨科技股份有限公司



NO.239, CHENGFU RD., SANXIA DIST., NEW TAIPEI CITY, 23743 TAIWAN.



+886-2-2668-2588



+886-2-2668-1999



sales@bayunion.com.tw



www.bayunion-tech.com



**BAY UNION**