



**GANG YAN**

# VITRIFIED BOND DIAMOND PRODUCTS



**THE  
GLOBAL  
CUTTER'S WAY**

BEIJING GANG YAN DIAMOND PRODUCTS COMPANY

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# FOREWORD

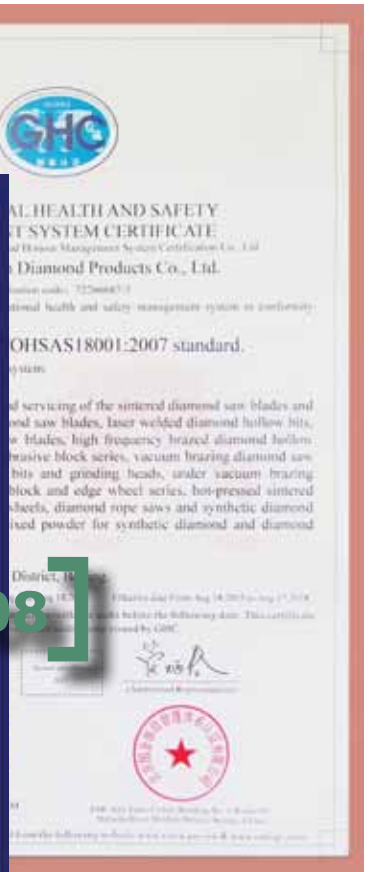
北京安泰钢研超硬材料制品有限责任公司是一家集研究、开发和生产金刚石砂轮的高科技公司。目前产品种类有：金属结合剂、树脂结合剂、陶瓷结合剂、电镀结合剂高精度金刚石砂轮。公司拥有ISO9001质量体系认证，先进的生产设备和良好的售后服务。产品在PDC、超硬刀具、汽车轴承、陶瓷、磁性材料、蓝宝石和半导体行业得到广泛应用。



# PROFESSIONAL DIAMOND TOOLS MANUFACTURER

**B**eijing Gang Yan Diamond Products Company is a high-tech corporation that is specialized in the research, development and production of diamond wheels, including metal bonded, resin bonded, vitrified bond and electroplated precision diamond wheel. We have got quality control certification ISO9001, advanced production equipment and excellent service. Our products have been widely used in the fields of Polycrystalline diamond compact, super-hard cutting tools, bearing, ceramics, magnetic materials, sapphire and semiconductor.

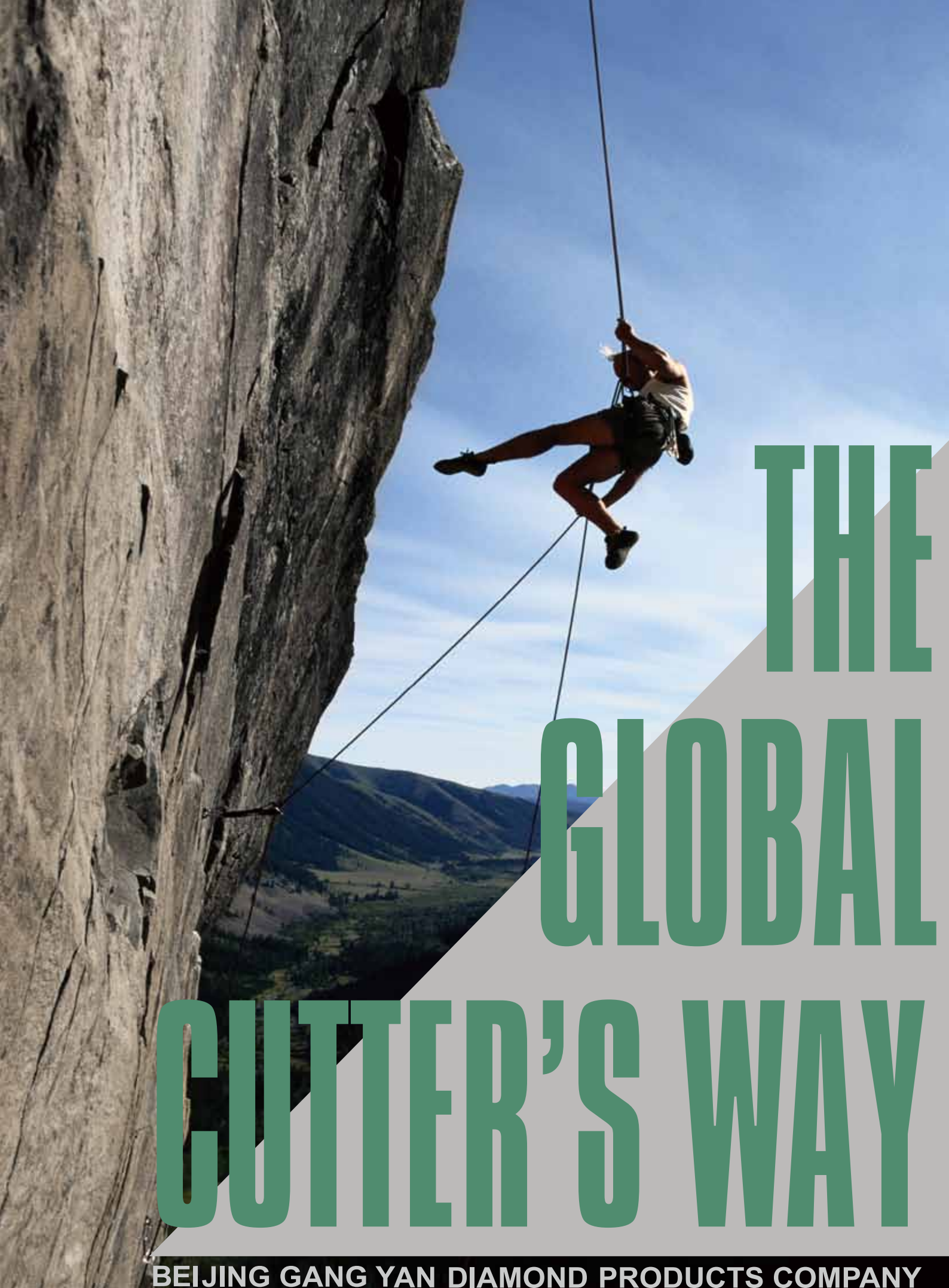




[ISO 9001:2008]



[Certification]



# THE GLOBAL CUTTER'S WAY

BEIJING GANG YAN DIAMOND PRODUCTS COMPANY

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# 结合剂类型 / Bonding

## 树脂结合剂 ( R )

树脂结合剂主要由酚醛或聚酰亚胺及一定量的填料组成。树脂结合剂超硬磨具具有加工速度快，抛光性能好等特点，其应用较为广泛。

## 金属结合剂 ( M )

金属结合剂主要由青铜等组成，耐磨性大大高于树脂结合剂磨具，主要用于高硬度材料的加工，磨削过程产生大量的热，一般在冷却液的环境中工作。

## 陶瓷结合剂 ( V )

陶瓷结合剂主要由玻璃粉末组成，陶瓷结合剂超硬磨具不同于金属结合剂和树脂结合剂，其内部有一定量的孔隙，便于容屑排屑、冷却工件。目前陶瓷结合剂超硬磨具广泛应用于汽车、航空航天、精密机械零部件加工等方面。

## Resin bond

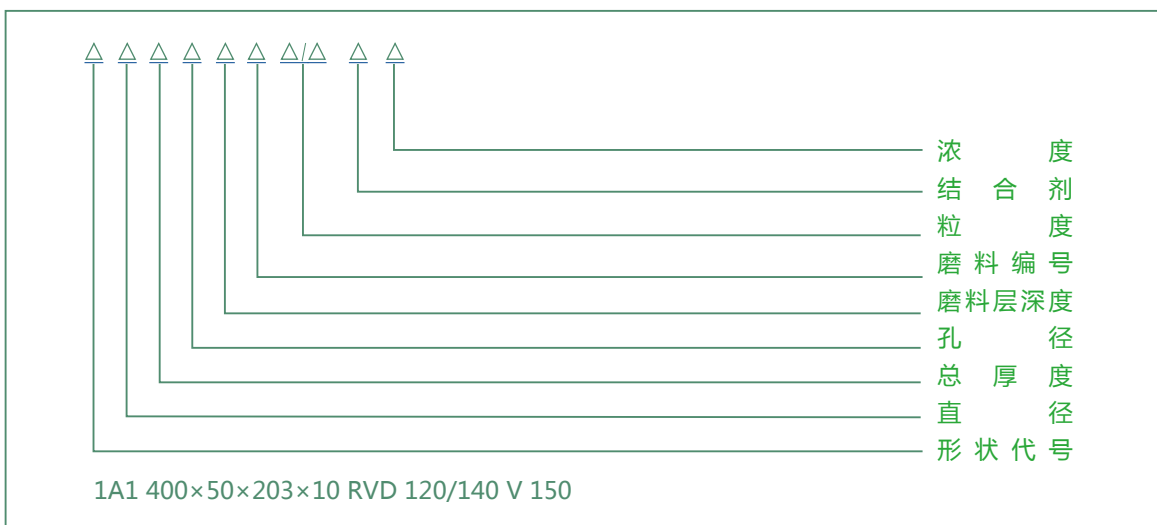
Resin bond is mainly composed of thermosetting phenol resin and highly heat-resistant polyimide resin and some filler. With the features of sharp, low cutting force, easy to be truing and dressing, resin bonded diamond tools are widely used in fine cutting, grinding and polishing processes.

## Metal bond

This binder is composed of alloys of metals such as bronze, nickel, iron and cobalt. Excellent in abrasive holding force and abrasion resistance than resin bonded super-abrasives.

## Vitrified bond

This is an inorganic binding material such as glass, which is substantially free from elastic deformation. Vitrified bonded diamond tools have the outstanding performances in acid and alkali resistance, self-sharpening, good chip absorbing and removing and long working life, and they are widely used in automobile engine parts, aerospace parts and precision machinery parts processing.



# 超硬磨具的基本知识介绍

## Basic Knowledge of the superabrasive

### 磨料粒度表 / Grit size table

公司标准	欧洲标准	美国标准	日本标准	对应粒度范围
80/100	D181	80/100	80/100	180/150 $\mu$ m
100/120	D151	100/120	100/120	150/125 $\mu$ m
120/140	D126	120/140	120/140	125/106 $\mu$ m
140/170	D107	140/170	140/170	106/90 $\mu$ m
170/200	D91	170/200	170/200	90/75 $\mu$ m
200/230	D76	200/230	200/230	75/63 $\mu$ m
230/270	D64	230/270	230/270	63/53 $\mu$ m
270/325	D54	270/325	270/325	53/45 $\mu$ m
325/400	D46	325/400	325/400	45/38 $\mu$ m
W40	D35	30-40 $\mu$ m	500	38/28 $\mu$ m
W28	D25		600	28/24 $\mu$ m
	D20	20-30 $\mu$ m	700	24/20 $\mu$ m
W20	D20A	15-25 $\mu$ m	800	20/16 $\mu$ m
	D20B	12-20 $\mu$ m	1000	16/13 $\mu$ m
	D15	10-15 $\mu$ m	1200	13/10 $\mu$ m
W10	D15A	6-12 $\mu$ m	1500	10/8 $\mu$ m
	D15B		2000	8/6 $\mu$ m
	D15C		2500	6/5 $\mu$ m
W5	D7	4-8 $\mu$ m	3000	5/4 $\mu$ m
	D3	3-6 $\mu$ m	4000	4/3 $\mu$ m
W2.5	D1	2-4 $\mu$ m	5000	3/2 $\mu$ m
	D0.7	1-3 $\mu$ m	8000	2/1 $\mu$ m
	D0.25	0-1 $\mu$ m	15000	1/0 $\mu$ m

### 磨料浓度表 / Concentration

浓度是指磨削层中单位体积内含磨料（金刚石或 CBN）颗粒的克拉数。浓度主要影响磨具的寿命及磨削精度。定义 1cm<sup>3</sup> 含 4.4 ct 金刚石为 C100 浓度，1cm<sup>3</sup> 含 4.18ct CBN 为 V240 浓度（即体积分数为 24%）。具体的浓度对应表如下表：

Concentration refers to the abrasive layer containing abrasive grits (diamond or cubic boron nitride) per unit volume carat. A concentration of 100 corresponds to a grain content of 25 percent in volume or 4.4 carats diamond grits.

金刚石浓度	每立方厘米含磨料克拉数ct/cm <sup>3</sup>	CBN浓度	每立方厘米含磨料克拉数ct/cm <sup>3</sup>
C50	2.2	V120	2.09
C75	3.3	V180	3.13
C100	4.4	V240	4.18
C150	6.6	V360	6.25
C200	8.8	V500	8.68



# 公司陶瓷磨具典型产品简介及应用

## Introduction and application of our vitrified superabrasive

### 陶瓷结合剂 CBN 双端面磨砂轮

#### vitrified bonded CBN wheel for grinding two-side planes



**特点:** 铝基体, 多块镶嵌式陶瓷结合剂立方氮化硼 (CBN) 磨削层。砂轮的硬度、浓度、气孔率和磨料粒度可根据具体磨削工况调整, 从而保证用户在磨削精度、表面粗糙度、效率等方面的要求。

#### Features:

Segmented vitrified CBN wheel consists of epoxy bonding a ring of vitrified CBN segments to steel core or alumina alloy core. The wheels hardness, concentration, porosity and grain size of vitrified CBN wheels, which also has a good self-sharpening, can be adjusted according to the specific grinding conditions, thus ensuring the user the grinding accuracy, surface roughness, and efficiency requirements.

**用途:** 适用于柱塞套、油嘴、油泵等槽口精密磨削, 配套各种进口及国产数控端面磨床。砂轮尺寸、型号可根据用户要求调整。

#### Application:

The vitrified CBN wheels have been widely used in fine grinding fuel injector nozzles and pumps, compressor piston and CV joint.

### CBN 刀具周边磨砂轮

#### vitrified bonded diamond wheels for CBN cutter



#### 主要特点:

- 型面精度保持性好
- 材料去除效率高
- 耐磨性好、耐用度长
- 加工刀片的刃口质量好

#### Features:

- Good shape maintenance
- high material removal rate
- Good abrasion resistance and long work time
- High quality in cutter blade

# PCD/PCBN 刀具行业产品

## Cutting tool industry products of PCD/PCBN

### PCD/PCBN/ 硬质合金刀具磨削用陶瓷金刚石砂轮 Vitrified diamond wheel for machining PCD/PCBN



**用途：**对 PCD、PCBN、硬质合金等制品进行粗磨和精磨。产品质量稳定，性价比高，可与日本、台湾及国产磨床配套使用。可根据客户要求制作不同的粒度、型号等。

#### Application:

With good product stability and cost-effective, the products are used in rough and fine grinding PCD, PCBN and tungsten carbide, etc. They can be used steadily on the Japanese, Taipei and homemade grinders. The grit size and wheel specs can be adjusted according to your requirement.

**特点：**铝基体，重量轻。陶瓷结合剂金刚石磨削层具有组织结构均匀、高气孔率、磨削效率高、使用寿命长、易修整、被磨工件不崩口、表面质量好、精度高等优点。

#### Features:

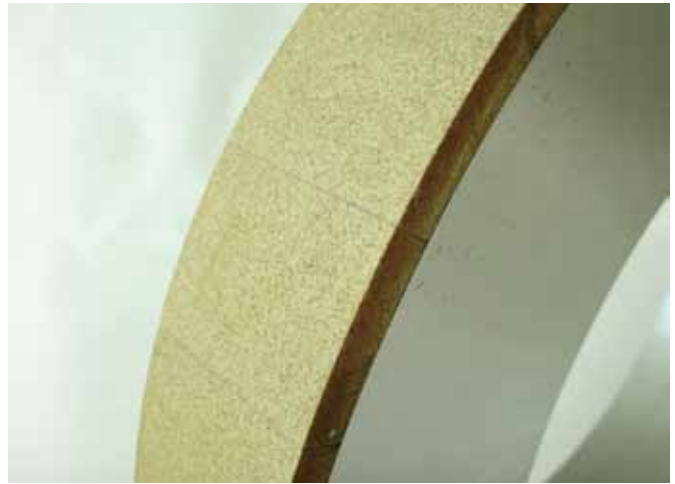
The vitrified bonded diamond wheels are with the characteristic of uniform structure of grinding layer, high porosity, high efficiency in grinding, long using life, ease to truing and dressing, no chipping, good surface quality and well finish.

类型	尺寸				形状	粒度	浓度
	D	W	X	T			
杯形砂轮	125	15/10/8	5/8/10			W40-W2.5	100%-200%
	150	20/15/10/5	5/8/10				
	250	30/20/15	8/10				
	300	45/40/30	8/10				
平形砂轮	125		5/8/10	20/25		325/400-W5	75%-200%
	150		5/8/10	20/25/30			
	200		5/8/10	20/25/30/40			
	300		5/8/10	25/30/40/50			
	350		5/8/10	25/50			
	400		5/8/10	25/50/100			



## PDC 复合片磨削用陶瓷金刚石砂轮

## vitified diamond wheel for semi-fine and finish machining PDC



**特点：**锋利度好，磨削效率高，不崩边，使用寿命长等。

### Features:

The vitrified diamond wheels are with the characteristic of excellent sharpness, high grinding efficiency, no chipping and long using life, etc.

**用途：**陶瓷平行金刚石砂轮主要用于 PDC 外圆磨削，抛光盘则主要应用于 PCD 的研磨抛光。其它规格使用要求的陶瓷金刚石砂轮可以根据客户的要求定制。

### Application:

The products are widely used in external grinding polycrystalline diamond compact. The specs of vitrified diamond wheels can be made according to your requirement.

类型	尺寸				粒度	浓度
	D	H	X	T		
平形砂轮	200	根据客户要求制定相应孔径	5/8/10	20/25/50	325/400-W5	75%-200%
	300		5/8/10	20/25/30/50		
	400		5/8/10	20/25/30/50		
	460		5/8/10	25/30/40/50		
	500		5/8/10	25/50		
	550		5/8/10	25/50/100		
碟形抛光砂轮	300		30/45	5/8	W40-W10	75%-150%
	400		30/45/60	5/8		

## 无心磨砂轮

### Centerless grinding wheels



**特点：**成批量高效外圆磨削，加工工件的圆度、圆柱度精度高，尺寸一致性好，精磨后工件的表面光洁度好，适用于粗磨半精磨和精密磨削。

**用途：**主要用于硬质合金、陶瓷、磁性材料、不锈钢棒材。PCD、PCBN复合片等材料的加工。

#### **Features:**

With the characteristic of efficient batch external grinding, high roundness and cylindricity of workpiece and good consistency of dimension, good surface finish after fine grinding, the vitrified centerless grinding wheels are used for coarse, semi-fine and fine grinding.

#### **Application:**

The products are mainly used for tungsten carbide, ceramics, magnetic material, stainless steel bar, PCD and PCBN compacts.

## PCD 抛光砂轮

### Vitrified bonded diamond wheel for polishing PCD

#### **Features:**

Good wear resistance, easy to truing and dressing, long using life, excellent sharpness and good chip absorbing and removing

#### **Application:**

The products are mainly used for polishing PCD and ceramics.







## 磨钎杯

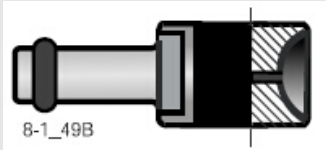
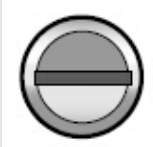

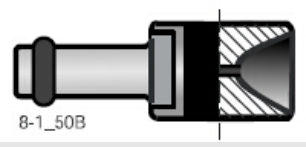

## Drill grinding cup



**用途：**主要用于修整采掘工程和石方工程用的钎头上的硬质合金球齿。

### Application:

Mainly truing and dressing the carbide ball tooth used in mining engineering and rock processing.

球齿形状/Button shape	水槽/Water way	球齿直径/Button diameter
 <p>8-1_49B</p> <p>半球形球齿 Spherical buttons 标记为“S”</p>	 <p>Single-water way 标记为“1”</p>  <p>Double-water way 标记为“2”</p>	7mm
		8mm
 <p>8-1_50B</p> <p>子弹头型球齿 Ballistic buttons 标记为“B”</p>	9mm	
	10mm	
	11mm	
	12mm	
	13mm	
	14mm	
	15mm	
	16mm	
	17mm	
	18mm	
	19mm	
 <p>Three-water way 标记为“3”</p>	20mm	
	21mm	
	22mm	
	23mm	
	24mm	
	25mm	

# 公司陶瓷磨具典型产品简介及应用

## Introduction and application of our vitrified superabrasive

LED 行业用产品

Products for LED industry



类型	尺寸			
	D	W	T	H
金属结合剂	250	40	10	90
陶瓷结合剂	302	30	5	110

**特点：**磨LED衬底砂轮主要应用于LED行业蓝宝石外延片、硅晶片、砷化镓、GaN晶片的背面减薄。我公司研制的磨LED衬底砂轮可替代进口产品，在日本、韩国磨床上稳定使用，砂轮磨削性能优越，性价比高。

**配套：**SHUWA SGM-6301，NTS nanosurface-180G，NTS nanosurface-250/NC-VDM等。

**用途：**蓝宝石外延片、硅晶片、砷化镓、GaN晶片、人造蓝宝石、单晶硅等。

### Features:

The vitrified diamond wheels for LED substrate are mainly used for back thinning of sapphire epitaxial wafer, silicon wafer, gallium arsenide and GaN wafer. Our diamond wheels can replace imported products. They are cost efficiency and can be used steadily on the Japanese and south Korean grinders.



## 蓝宝石钻头

### Products for LED industry

长度	外径	壁厚	接口类型
180	18-54	2	32"
260			25"
300			



## 磨削高纯 Al<sub>2</sub>O<sub>3</sub> 陶瓷磨头

### Products for LED industry



# 公司陶瓷磨具典型产品简介及应用

Introduction and application of our vitrified superabrasive

## 带锯

Products for LED industry



长度	高度	厚度
4550	38	0.7
3230		

## 精密切割锯片

Products for LED industry



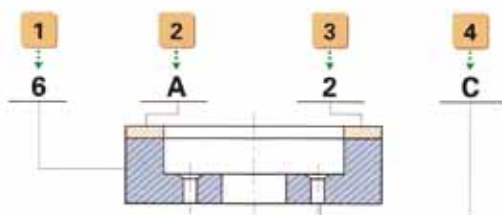
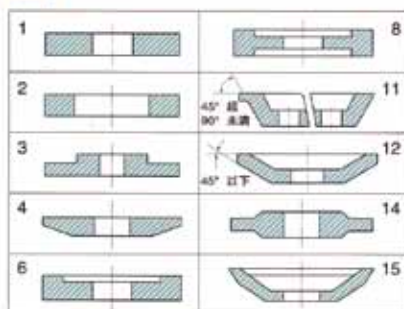
规格型号	直径	刀头高	刀头厚	基体厚
10HPB250	254	10	1.6	1.2
7HPB200t	200	7	1.2	1.0



# 磨具尺寸外形介绍

## 砂轮形状表示方法

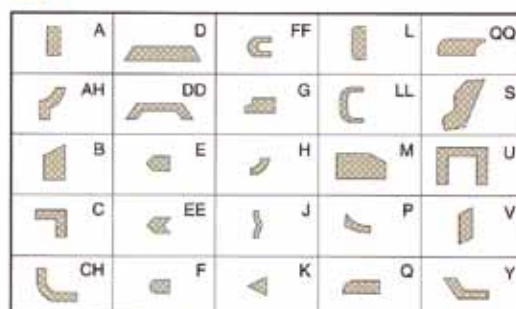
### 1 基体形状



### 3 固定在基体上的磨粒层的位置及代号

代号	位置	图
1	外周	
2	侧面	
3	两侧面	
4	向内倾斜又带有弧度	
5	向外倾斜又带有弧度	
6	外圆的一部分	
7	侧面的一部分	
8	全体	
9	边角	
10	内圆部	

### 2 磨粒层的断面形状



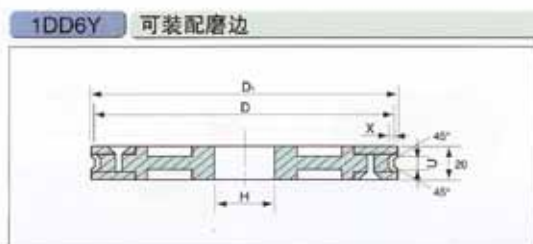
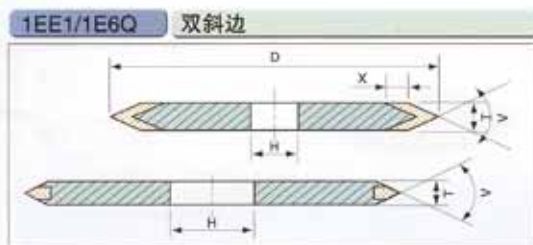
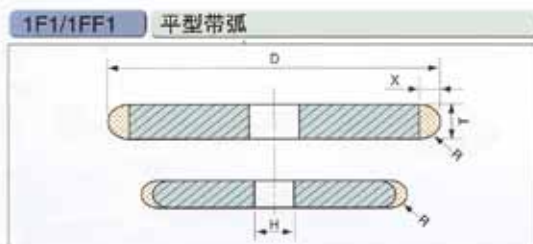
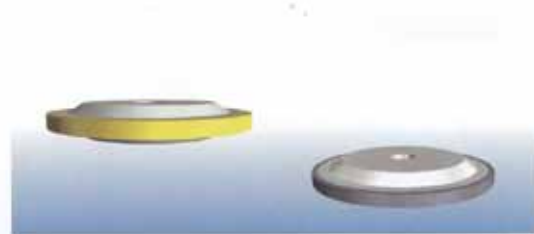
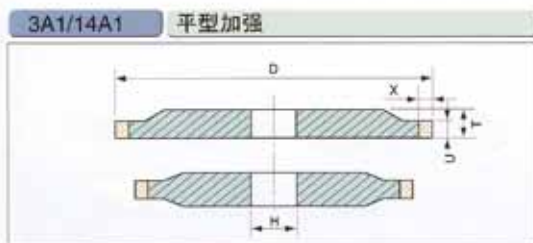
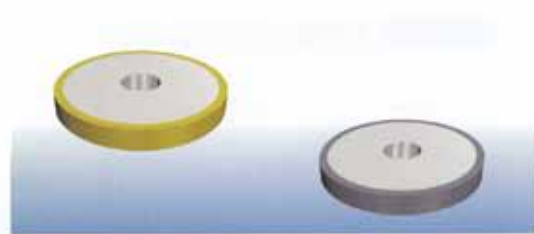
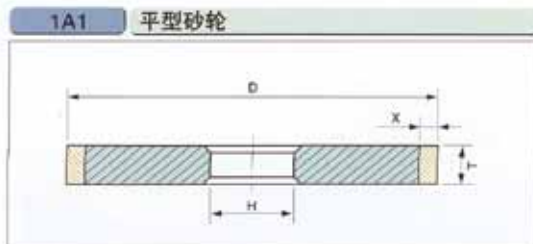
### 4 基体改形及代号

代号	改形内容	图
B	键孔	
C	锥形键孔	
H	直孔	
M	直孔及螺纹孔	
P	单面突出	
Q	磨粒层嵌入基体	
R	两面突出	
S	磨粒层切槽	
SS	磨粒层切槽及基体切槽	
T	螺纹孔	
V	磨粒层倒嵌	
W	带轴	
Y	磨粒层倒嵌及嵌入基体	

# 磨具尺寸外形介绍

## 砂轮形状的表达方法

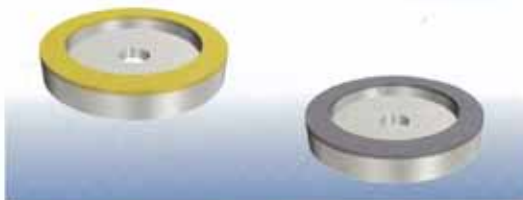
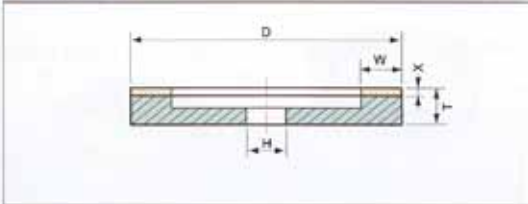
### 砂轮的标准形状 1



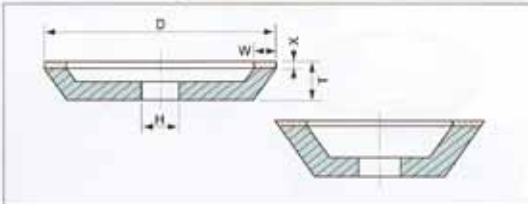


### 砂轮的标准形状 3

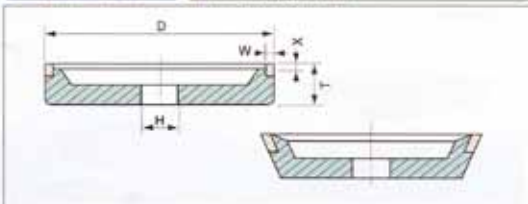
6A2 杯型



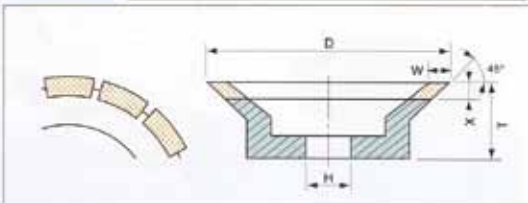
11A2/11B2 碗型



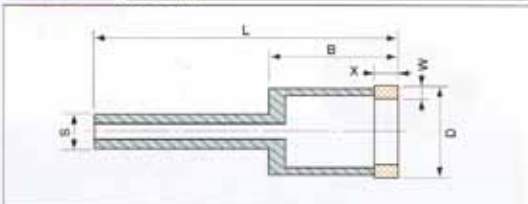
6A9/11V9 杯型边角带金层



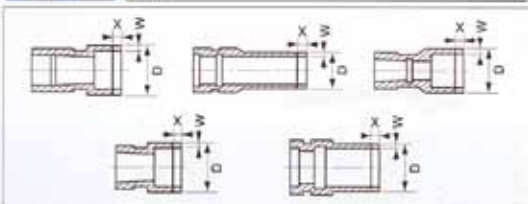
11V2S 楔形杯型带槽



3A2 空心钻



3F2 筒型



## 附录：砂轮的安全使用说明

陶瓷结合剂超硬砂轮由于其优异的性能，如耐酸碱腐蚀性好、形状保持性好、磨削精度高、自锐性好、气孔容屑排屑性好、使用寿命长等，而在现代磨削加工中广泛应用。但由于陶瓷本身硬而脆等特性，不正确的使用会导致砂轮损坏和对操作人员的伤害。为了安全使用，其运输、使用过程需要注意以下事项：

### • 砂轮的搬运

所有的陶瓷砂轮都是易碎的产品，在搬运时必须小心轻放。砂轮包装必须牢固，防震性好，以免在搬运中发生破损。

### • 砂轮的存放

根据不同的规格尺寸分类存放在环境干燥的地方。

### • 砂轮安装就位前的检查

砂轮安装就位前，用目测检查砂轮可能存在的损坏和破损情况，检查机床是否运行正常。

### • 砂轮安装

- (1) 砂轮主轴必须笔直、光滑、洁净、无损；主轴尺寸必须在公差允许范围内。
- (2) 砂轮必须能够自由地安装到主轴和法兰上。
- (3) 不要随意改变砂轮孔径，而强行安装在法兰或主轴上。
- (4) 对于多点紧固法兰，要对称的拧螺丝，不要将紧固螺丝拧得过紧。

### • 砂轮使用

- (1) 在启动机床前，确保机床的防护罩和各个动作开关准备就位。
- (2) 在开始使用砂轮前，要将砂轮空转 1-2 分钟，以保证砂轮进入正常运转状态，然后开启冷却液。
- (3) 在磨削时，操作者要戴好各种安全防护用品。
- (4) 修整或使用砂轮时，接触要轻缓，使用时工件的进给量不要太大。
- (5) 在使用中，砂轮若表面发生钝化，应及时修整，不要持续使用已经钝化的砂轮。
- (6) 砂轮停止转动前，请先将冷却液关闭，以免造成砂轮失去平衡。

### • 基体的拆卸

对于质量较重的基体在拆卸过程中，一个人如果无法完成，应找人帮忙拆卸，防止在拆卸过程中造成对操作人员的伤害。并将拆下的基体和砂轮分开存放。



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