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"Best Quality, Best Service"
www.spbillion.com

Company Profile

S.P. Billion Enterprise Co., Ltd. was established in 2002. We are expertized trading company with more than 10 years experiences in Diamond Tool. We trade and import Diamond Tool, Grinding, Polishing, Drill, Cutting Wheel from German, Italy, Korea, and China.

All our products are quality controlled according to International Standard.

With over 10 years experiences in Diamond and CBN tools for grinding, polishing and dressing, we comprehend what you need in your business.

The schedule of wheel ordering is as follows:

- * Wheel shape, dimensions of abrasive layer, wheel body dimensions and the bore must be defined in order to avoid misunderstanding.
- * Depending on grinding performance type of super abrasive, concentration and grain size must be defined.
- * Working conditions (wet or dry grinding) have to be determined.
- * If ordering the grinding wheel, it is also advisable to characterize the kind of material to be ground, type of grinder and other criteria that could affect the grinding result.

Diamond and CBN grit size

The chosen grit size affects the performance of the wheel, determining the stock removal rate and surface finishing that can be achieved. Coarser grit size enables higher material removal rate and rougher surface finishing, while a fine grit size is used for attaining a smoother surface finishing.

Standard Diamond and CBN grades

Please refer to below chart 01 and 02.

Superabrasive grit size and Workpiece surface finish.

Surface finish is affected by a number of variables, including machine type and condition, type of material, coolant, wheel speed and bond system. Please refer to below chart 03. As such, this chart should only be used as general guideline.

Chart 01

FEPA Grit Designation	ANSI US Standard Mesh
D/B 251	60/70
D/B 213	70/80
D/B 181	80/100
D/B 151	100/120
D/B 126	120/140
D/B 107	140/170
D/B 91	170/200
D/B 76	200/230
D/B 64	230/270
D/B 54	270/325
D/B 46	325/400
D/B 40	400/500
D/B 30	500/600
D/B 25	800
D/B 20	1000
D/B 15	1200
D/B 10	1600

Chart 02

Grain Size (um)	ANSI US Standard Micron
50	400
45	500
35	600
30	700
25	800
20	1000
17	1100
15	1200
12.5	1400
11	1500
10	1600
9	1800
7.5	2200
6	3000
5	5000
4	6000
3	8000
2.5	10000
2	12000
1	14000
0.5	28000

Chart 03

Grit Size (mesh)	Ra(um)
80	0.55-0.75
100	0.40-0.55
120	0.35-0.40
150	0.30-0.35
180	0.25-0.30
220	0.22-0.25
240	0.18-0.22
320	0.17-0.18
400	0.14-0.18
500	0.14-0.15
600	0.12-0.15
800	0.07-0.12
1200	0.05-0.10
1500	0.025-0.05

Electroplated Diamond/ CBN tools

Electroplated Diamond/CBN tools are featured with free-faster cutting, non-truing and dressing, less heating due to the diamond particles protruding from the surface.

Diamond plated products are usually a single layer of diamonds highly concentrated, and held on by a tough, durable nickel alloy. This high concentration enables plated products to retain their original shape and dimensions throughout its working life.

Our electroplated machines and technology are imported from Germany. We provide all types of high precision electroplated tools.



3. Precision cutting wheel

3.1 Metal core type

With metal core, precision cutting wheels have a higher rigidity, suitable for high-load cutting, deep cutting, also the V-shape, R-shape and other blade edge shapes available for many different purposes. Our highly versatile cutting wheels can satisfy all types of processing requirements.

3.2 Non-core type

To work on precision electronic parts, a thin cutting wheel is required. Our non-core type wheels are hubless and highly precise. The wheels are commonly used with dicing machines or high precision slicing machines. Various types of bonds (metal, resin, electroforming) are available for this type of cutting wheel, which is also used to cut magnetic heads, glass, the ceramics used in electronic, and other materials.



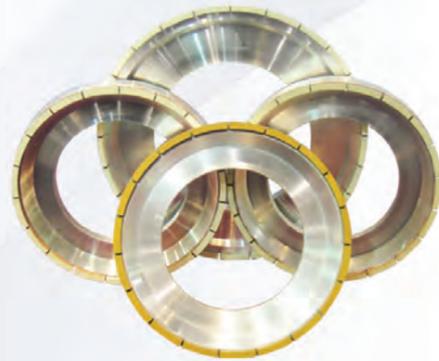
Metal core type



Non-core type

4. Wheels for Wafer Back Grinding

Our Back-Grinding wheels have developing the technology to combine diamond and bond to meet your requirements. Our Special advanced porosity technology make it possible to grind all types of wafer with less bug-surface damage. Our Back-Grinding wheels use a special vitrified bond for rough grinding or resin bond for fine finishing improved process accuracy. Our back- grinding wheel features free cutting, excellent wear resistance, and suitable shape for maintainability and durability.



Diamond CBN wheel

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Diamond CBN wheel

Resin Bond Diamond/CBN grinding wheels

The Resin Bond Diamond/CBN grinding wheels feature effective self-sharpening, sharp cutting, high efficiency, low roughness of workpiece surface, few heat generating and burn free.

The Resin Bond Diamond grinding wheels: machining tungsten carbide, ceramic materials, magnetic materials, silicon materials, thermal spraying alloy materials etc.

The Resin Bond CBN grinding wheels: machining high speed steel, cast iron, etc.

1. Woodworking

For Woodworking Industry, Resin bonded Diamond and CBN Wheels are the best choices. The applications include sharpening and production grinding. With more than 40 years experiences, Our factory has developed the premium bonds for this application. We provide both standard specs and custom made wheels.

- Resin Bond Diamond wheel is to grind Tungsten Carbide tipped tools and saws.
- Resin Bond CBN wheel is to grind the circular saws and band saws made from HSS, tool steel, Stellite type materials.
- CDX wheel is to grind the tool made from the combination of Carbide and hardened tool steel. Our special designed diamond wheel provide efficient grinding on these two kinds of materials.

Blade & Wheel for Semiconductor industry

Ongoing technological advances in Semiconductors and electronic components rise a succession of new materials. As a result, We have developed new precision diamond tools for these materials.

SP Precision diamond wheels have been widely used in cutting, slotting, dicing, back-thinning and other precision processing in semiconductor industry.

1. Dicing Blade with Hub

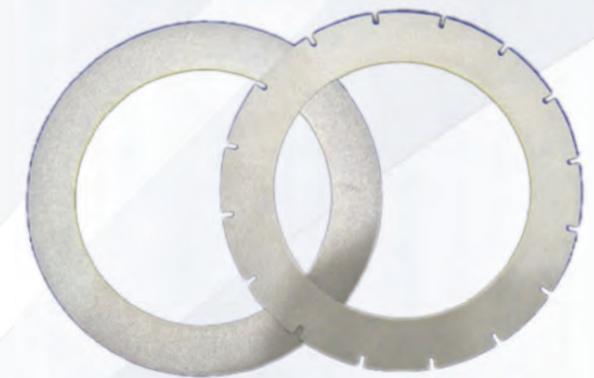
Our diamond blade with Hub is with a stronger edge, which makes the blade more rigid and better prevent a broken edge. Therefore, the cutting with the blade is highly efficient. This wheel is mainly used for the cutting and dicing of wafers, type, silicon, gaas, gap, litaO³, pzt, etc.

2. Dicing Blade without Hub

Dicing Blade without Hub is a kind of ultra thin and precision diamond blade with excellent cutting ability, rigidity and high efficiency. It fits to be used for dicing and slitting of materials, such as semiconductors, electronic components, ceramic, etc.



Dicing Blade with Hub



Dicing Blade without Hub

Metal Bond Diamond / CBN Grinding Wheel

Metal Bonded Diamond/CBN Grinding wheel is with high efficiency, good self-sharpening, high stock removal, good form remaining and good anti-wearing ability.

Metal bond diamond wheel

Used for machining quartz crystal, tungsten carbide, ceramic, glass, composite, sapphire, ferrite, refractory, thermal spraying material and so on.

Metal bond CBN wheel

Used for machining HSS, tool steel, stainless steel, mold steel and titanium alloy etc.



1.1 Top Grinding

We provide the wheel with multiple grits for top grinding applications, which ensures one grinding process to complete both roughing and finishing operations. It is a prerequisite to optimize true running and maximum the productivity of circular saws.

Machines suitable: Akemat, Utma & Walter



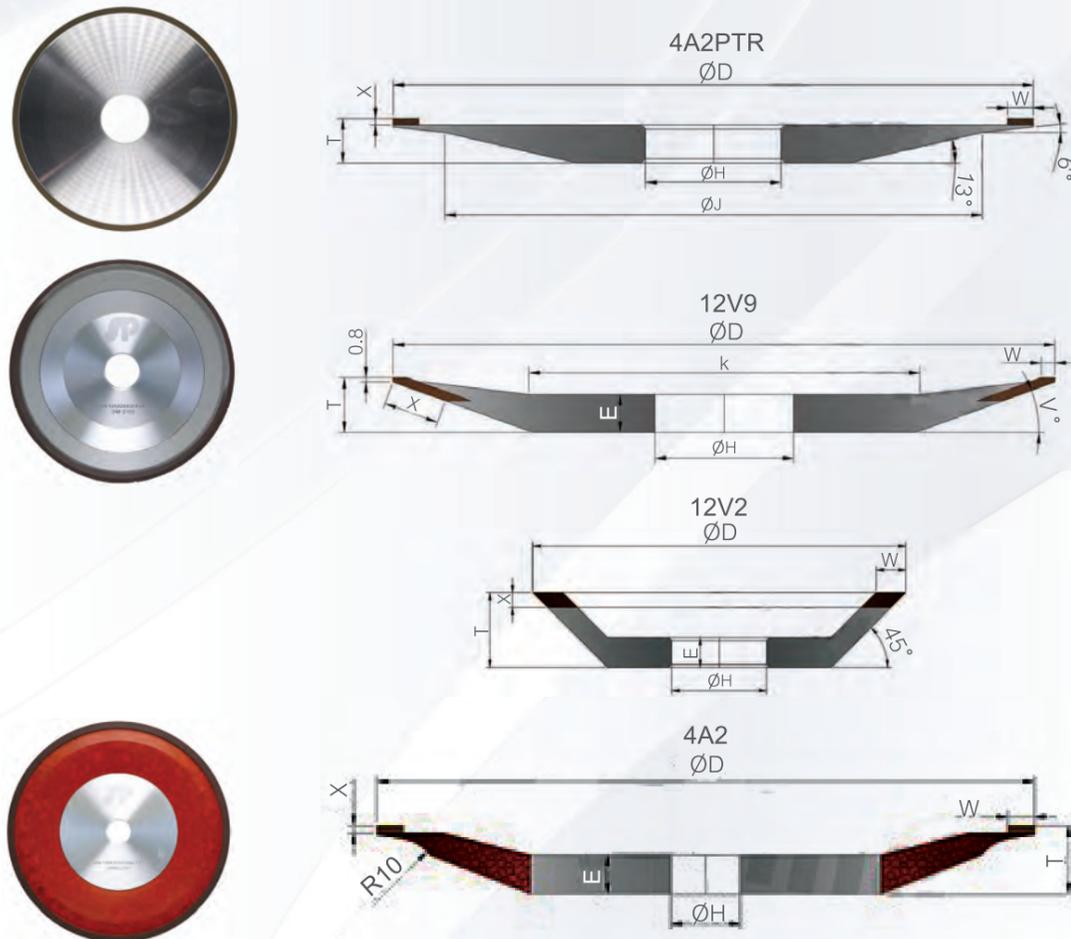
1.2 Face Grinding

Our wheels for Face Grinding optimizes cutting performance of saw and guarantee that it achieves a long service lifetime. We can provide the ultra thin wheel to grind circular saw with more than 100 teeth. The thinnest wheel available is 0.03", which can grind the saw with teeth space of 0.03".

Wheel body: Bakelite and Alumina

Facing wheel with Bakelite core

Bakelite body features flexibility when grinding to ensure the long using life and grinding quality. We provide this type of wheel with the abrasive section of minimum 0.019"thick, to grind the saw with teeth space of 0.039".

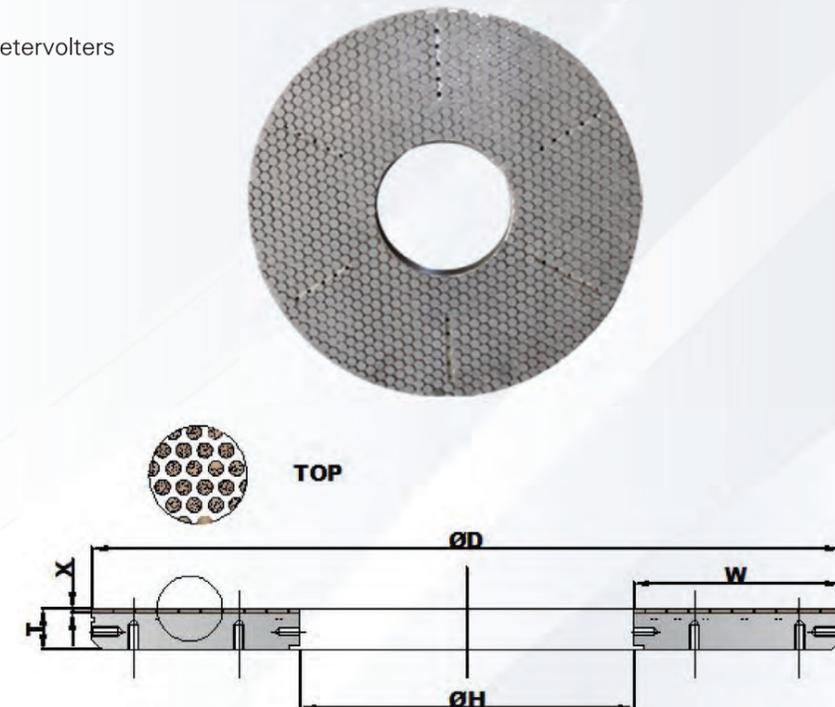


5. Vitrified bond Diamond/CBN double disc

Vitrified bond Diamond/CBN double disc performs grinding and lapping in one process using a fixed abrasive system which cleans work space quickly and easily. They are widely used in Auto parts, Mechanical seal parts and air compressor of Air conditioning industry. Our wheels are with below advantages:

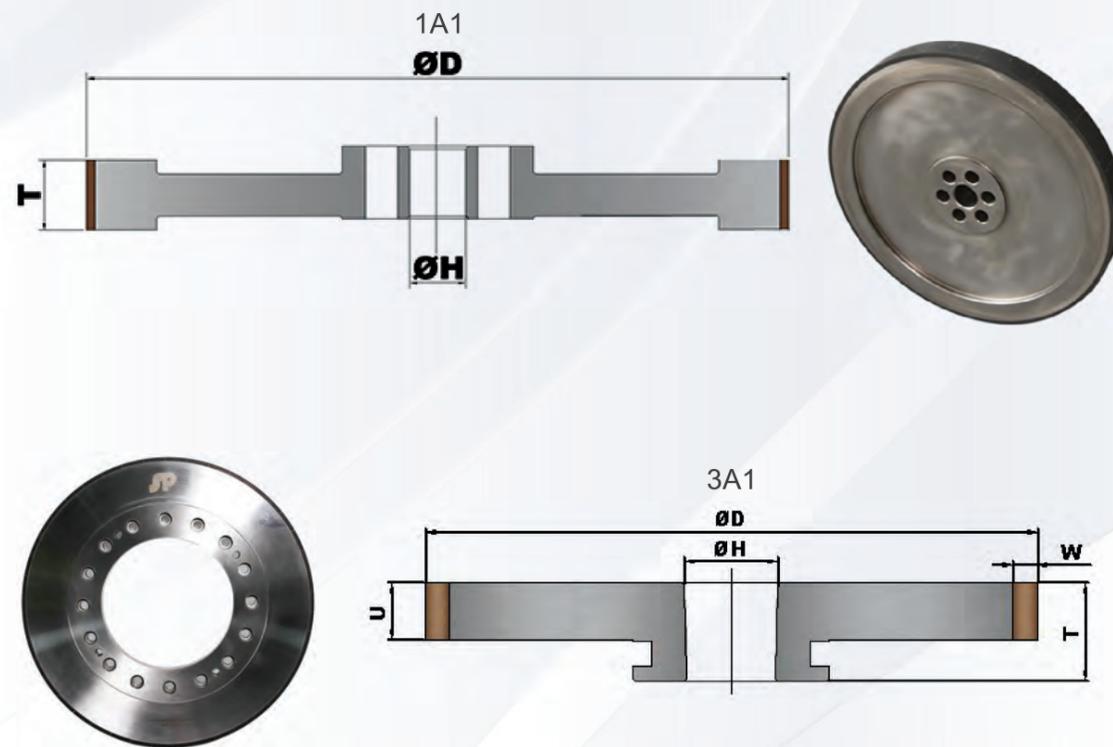
- Precision flatness without roll - off & chipping
- Increase stock removal rate., decrease the process time.
- Running costs are greatly reduced.
- Clean work site
- Reduce cleaning time.

Machines: Petervolters



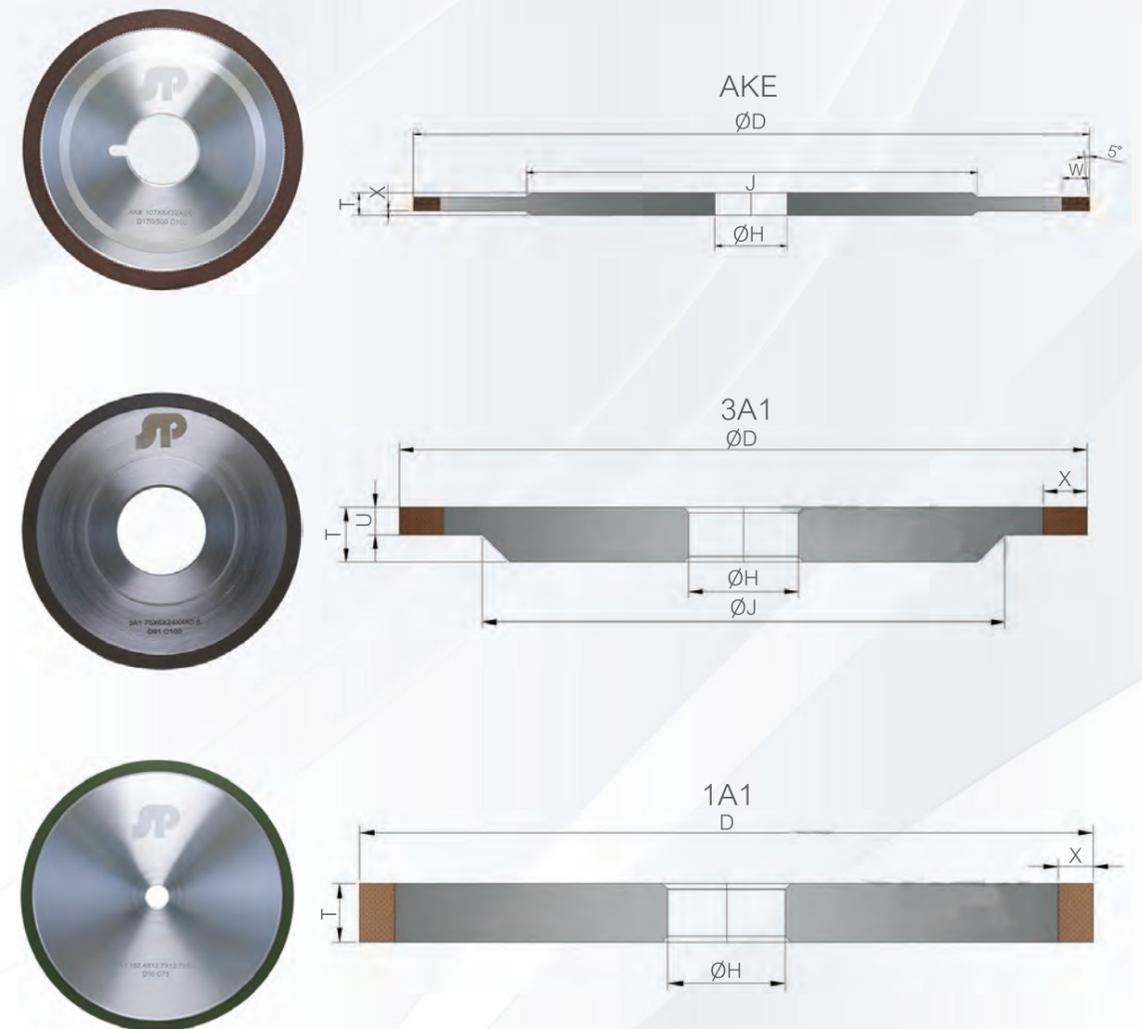
4. For Camshaft, crankshaft and cylindrical grind

Vitrified bond CBN wheels are used for grinding the automobile camshafts, crankshafts and cylinder in air-compressor industry. Optimum bond specifications have been set for each type of cam material. The wheels are used for high-speed grinding. Thus, they provide bond quality, adhesives and the materials used for the core are carefully designed for safety.



1.3 Side Grinding

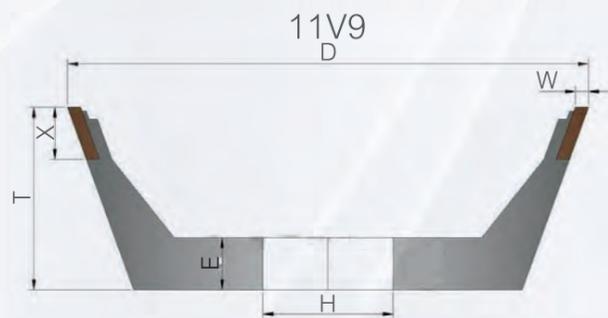
We provide the best wheel for side grinding application, ensuring one grinding process to complete rough and finishing grinding operations simultaneously. It is a prerequisite for an optimized surface quality.



1.4 Cup Wheels

D=Diameter T=Thickness B=Hole Bore

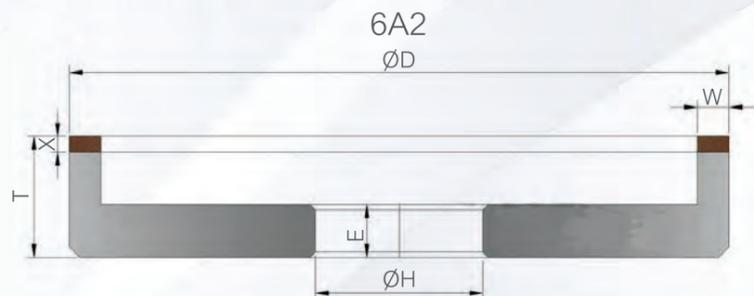
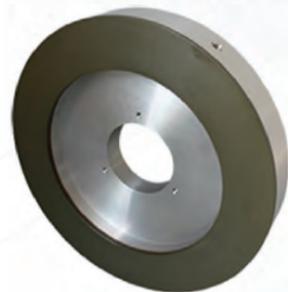
Core: Aluminium or Powdered Aluminium



1.5 Knife Grinding

D=Diameter T=Thickness B=Hole Bore

For Machines: REFORM, GOCKEL



Vitrified bonded CBN wheel

vitrified bonded CBN wheels with significant superiority in high efficiency grinding processes, with conventional wheels. The basic feature of this grinding tool are as below:

The CBN physical properties (hardness, abrasion and high temperature resistance) in connection with vitrified bond properties (hardness, brittleness, porosity structure) allow to machine a workpiece more aggressive with great capacity to achieve high productivity.

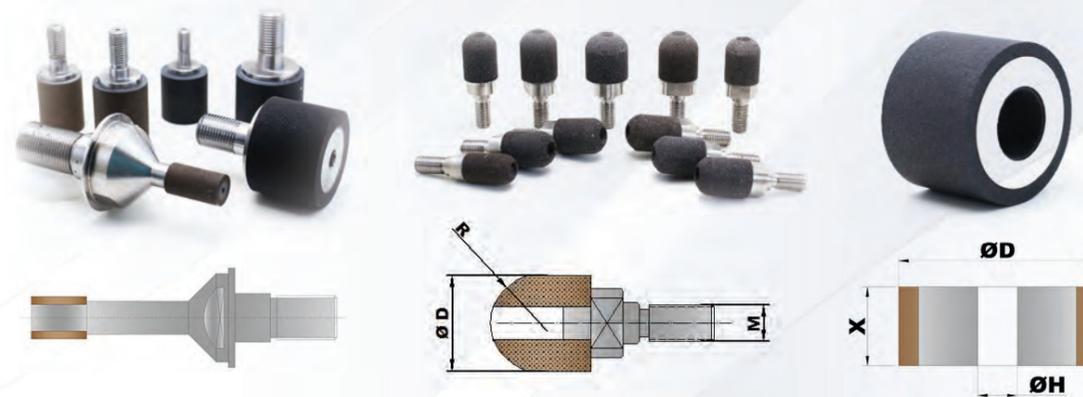
3. For inner grinding

Our vitrified CBN inner grinding wheel are widely used for grooving vane pump rotors and synchromesh ball-joints, as well as for forming injection parts.

Two types of Vitrified bond CBN wheel for Inner grinding:

- wheel with shaft
- wheel without shaft.

The Min. OD can be 3mm.



2. For PCD & PCBN inserts

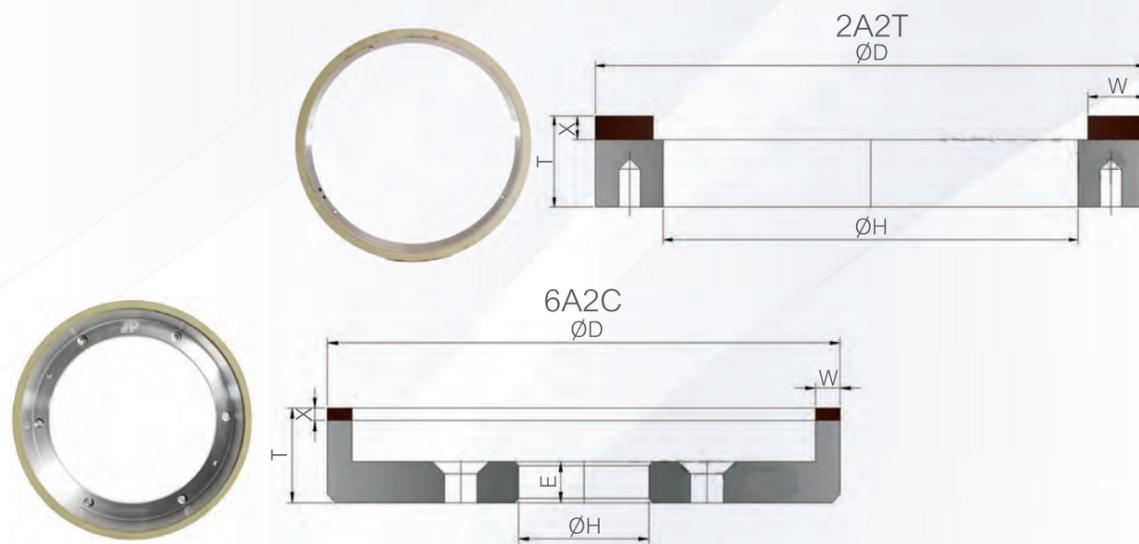
With special vitrified bond, We created a high efficient diamond wheels suitable for sharpening PCD/PCBN insert. The advantages of our bond are as follows:

- The perfect grinding process efficiency
- Shortened shut-down grinder times
- High machining accuracy
- Remarkably higher life in comparison with traditional grinding wheels
- Short grinding times
- Very good tool profile stability

How to choose the grit size?

Grit Size	Machining Type	Application
D22	Rough	Regeneration grinding a blade edge profiling and sharpening of much worn inserts
D15	universal	Standard grain size. There is a possibility of getting a high sharpening efficiency and good quality machined surfaces by taking advantage of additional spark-out passes.
D9	finish	Finishing grinding - getting a very good quality of machined surfaces.
D6	superfinish	Superfinish grinding - getting a brilliant quality of machined surfaces.

Machines: EWAG-RS15&RS12, FARMAN-FD250

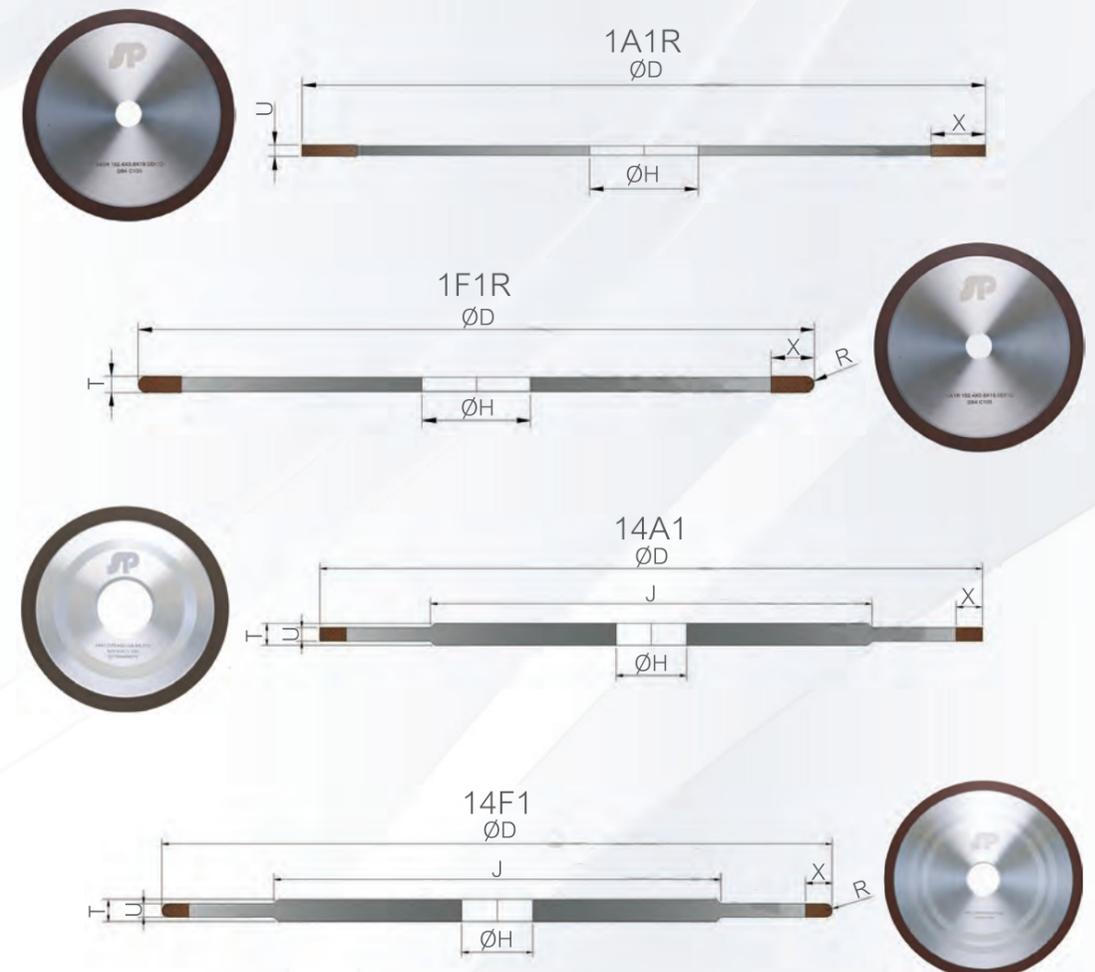


1.6 Profile Wheel

Our Diamond and CBN profile wheels offer aggressive material removal rates combined with superior finishing. Available for all manual and CNC profile grinders using synthetic or oil coolant.

Our premium profile wheels offer the following features:

- Available with hardened steel or aircraft grade aluminum cores ground or turn-on CNC machinery
- CNC ground diamond radius provides an exact match to your grinder's tracing pin
- Machines: Weing, UT.MA, Schneeberger, Walter, Wadkin, Foley, SCMI, United, Tigra, Andi, Nielson
- Applications: Diamond for carbide or inlaid carbide/steel (Bak-Pak); CBN for HSS, Jonalloy, or Stellite
- Styles: 14F1R, 14A1R, 1F1R, 1A1R



1.7 Cold Saw Wheel

For tooth-form grinding

For Automatic saw blade grinding machines, Tempo ECT and Lorach CNC.
Our Cold Saw wheel features the best edge stability.



Vitrified Diamond CBN Wheel

1. For Diamond Polishing

We have developed the special Vitrified bond diamond wheels for bruting of natural diamond.
Our Diamond Bruting wheel has below features:

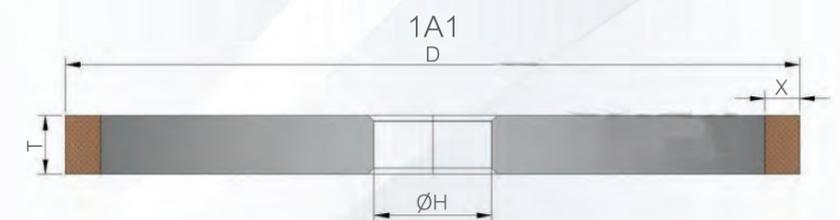
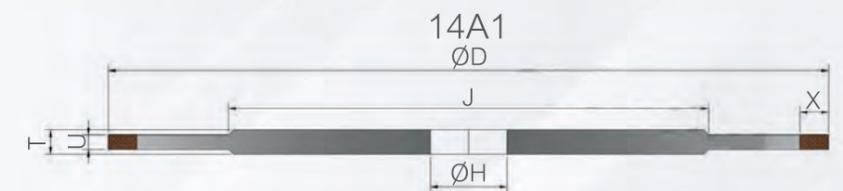
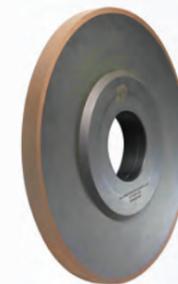
- High working efficiency,
- Long using life
- Less chipping and Premium surface finishing
- More than 10 bond series available for different applications
- Flexible in bond adjustment as per porosity (big/more/less)
- Use various diamond grits for different applications like roughing, fine polishing and finishing
- High performance and rate ratio

Machines: DISCRON machine

Applications:

- First Brute
- Final Brute
- Super Polishing

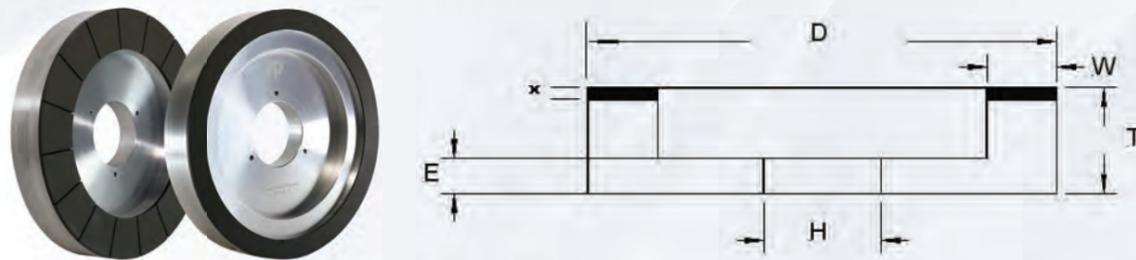
Max OD: 220mm



7. Double Disc

Resin Bond CBN wheels are used for double-disc surface grinding of the inner and outer race surfaces of bearings, transmission gears, washers, tappet shims, compressor part, vane pump vanes and rotors, precision springs, etc. These are applicable to a wide range of materials such as high-speed tool steel, die steel, bearing steel, carbon tool steel, spring steel, cast iron, sintered ferrous metal, etc. Our superior tech for this wide surface wheels is applied in CBN distribution, consistent bond quality and dimensional accuracy.

Max OD: 500mm
Max Width of CBN section: 200mm.



8. Economical Wheel

We offer Economical Diamond/CBN wheels to help customers lower the cost in re-sharpening carbide tipped saws in woodworking industry.

Core available: Bakelite; compound of Bakelite and Alumina

For both Dry grinding and Wet grinding.

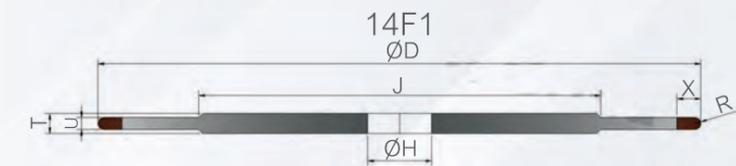
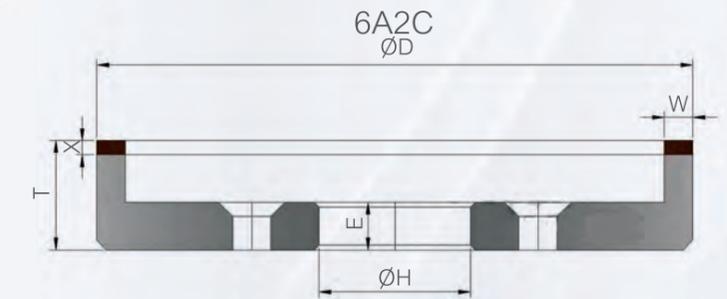


1.8 Weing Wheel

We researched and developed the wheel specially for Weingh Rondamat machine. Our wheels are with high cutting efficiency and long using life.

14F1: for profile grinding machines and blanks for cutter heads.

4E9P: for grinding the cutting face on milling tools.



2. CUT-OFF

Diamond Cut-Off Blades are for cutting tungsten carbide, alloys, quartz, ceramics, glass, carbon fibre composites, fiber glass etc.

CBN Cut-Off Blades are for cutting HSS, hardened Steel and other ferrous material.

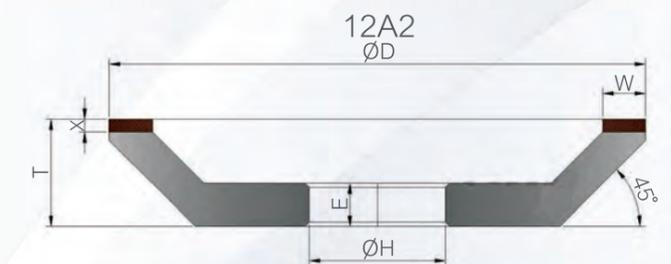
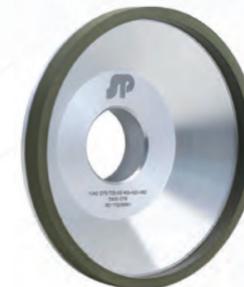
Our Cut-Off blades have several advantages as below:

- high cutting speed
- Free cutting action
- Highly durable
- Continuous uniformity and performance over time
- Bonds available for both Wet cut and Dry Cut
- Steel core
- OD=4" through 16"; Thickness=0.019"-0.059".



6. Paper Industry

In Tissue/ Paper manufacturing industry, CBN wheels are used for grinding the knives, which are made from HSS, hardened steel, alloy steel etc. We have developed the special bond for this type of wheel with long using life and efficient cutting.



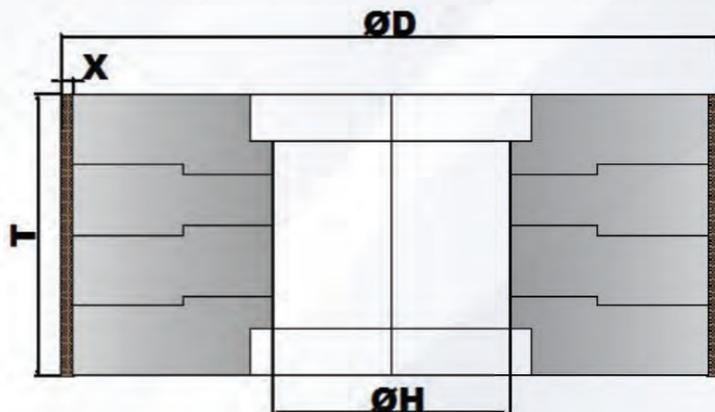
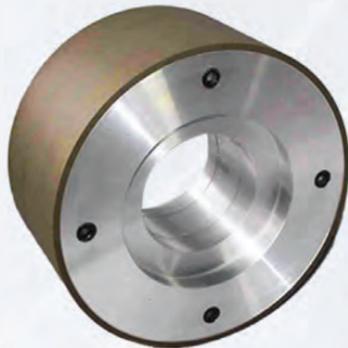
5. Centerless

Diamond & CBN centerless wheels are for TCT cutting tools, bearing parts, automobile parts, plungers, cylinders, engine valves.

Our Centerless wheels are divided into Roughing and Finishing. The finest diamond grit used for centerless Finishing wheel can be 2000mesh, to provide mirror polishing result.

- Max OD: 500mm.
- Max Thickness: 250mm.
- The cores available: Alumina and Bakelite.

(Bakelite core is elastic and light weighed and could provide higher surface finishing and lessen the machine load.)



3. Tool Grinding

We provides the best performance tool grinding wheels for various processing demands such as milling cutters, drills and carbide insert and many more.

3.1 The wheels for CNC Grinder

They are with the newest technology, used on CNC Grinder for the Fluting, Gashing and Clearance Angles of the Tungsten Carbide, HSS, Stainless drill, mill and rimer.

Machines: Walter, Anca, Ewag, Schutte, Schneeberger, Makino, TG-5, Stuer, Strausak, Cininnati, Griffo, Huffmann, Jungner

Availability:

- Polyimide Bond: for small stock removal. Provides perfect finishing when sharpening carbide tools.
- Hybrid Bond: for large stock removal and high feed speed, low machine power.

Polyimide bond grinding wheel

Polyimide is high-performance duroplastic resin. Compared to phenolic resin, it features much better performance in temperature durability (more than 300degree celsius) and flowing ability.

Polyimide grinding wheel provides high cutting efficiency, excellent profile stability and easily being dressed. It is widely used for the re-sharpening and production grinding in Milling & Drilling operations. It offers good finishing and high price-to-performance ratio.

Hybrid bond grinding Wheel

Hybrid wheels ensure higher material removal without compromising on the surface finish, while ensuring considerable reduction in cycle times. These wheels can be used for both Fresh tool manufacturing and re-sharpening, on CNC Tool and Cutter Grinders.

Hybrid wheels can provide below benefits:

- Extremely high stock removal rates
- Maximum cutting ability
- Easy dressing
- Higher productivity
- Shorter process time during flute grinding
- Low grinding forces
- High process stability
- Quiet and even grinding process
- Best tool quality

Hybrid diamond and CBN wheels are used for Fluting, Clearance & Gashing grinding operations

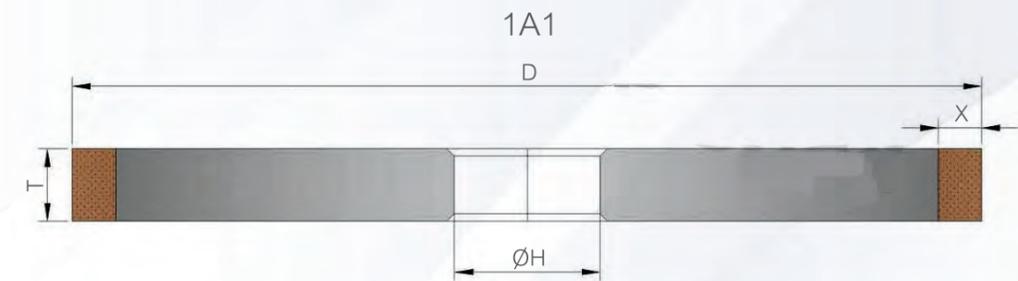
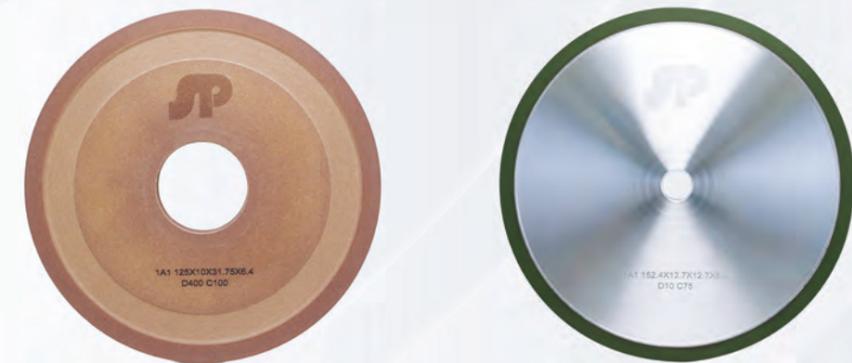
Our Fluting wheels have shown excellent grinding performance in flute grinding with high stock removal capacity (almost 4mm to 6mm per cutting) combined with a minimum of wheel wear. Fluting



4.2 Surface Grinding wheels:

This wheel is used for precision grinding of dies include a broad range of wheels with assorted bonds to meet varying work specifications. Besides the normal Alumina Core and Steel core, We also provide the ceramic core, which has perfect heat dissipation and suitable for deep feed and high stock removal.

It is divided into Roughing, Finishing and Polishing. The finest grit can be 2000mesh.



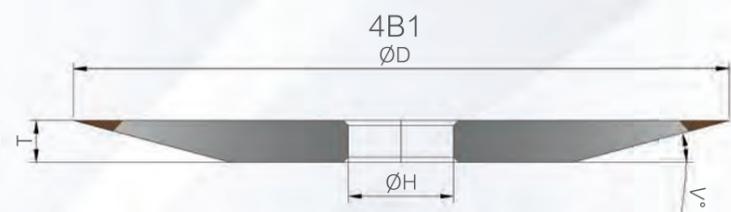
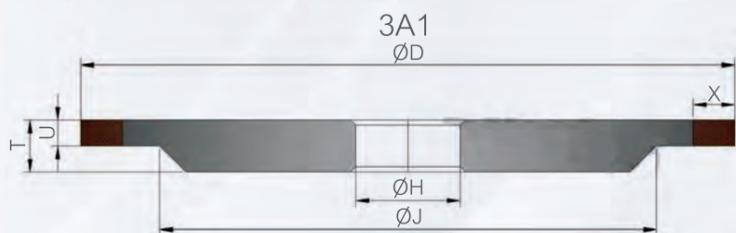
4. Die & Tooling

We have developed the wheels specially for precision grinding purpose in electronic molds industry. It is suitable for slotting and grooving Carbide & HSS, profile grinding and other precision surface grinding.

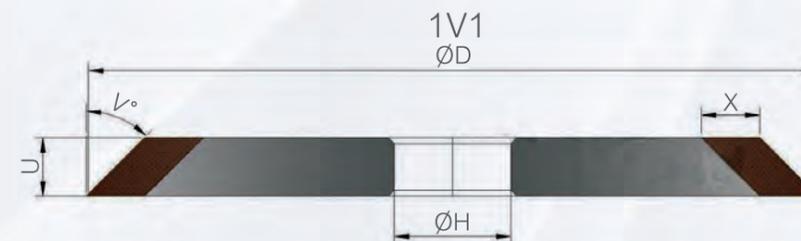
4.1 PG grinding wheel (Profile Grinding wheels)

PG grinding wheels are for precision profile grinding Carbide & HSS. The thinnest wheel available is with 0.0118"; The Max OD is 150mm. The often used wheels are 3A1 or 14A1.

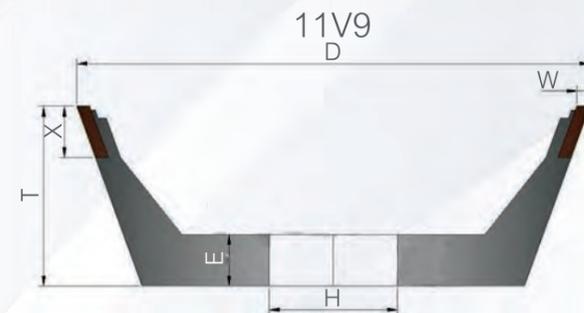
Machines: Wasino, Amada, Waida, Petewe etc.



Our Gashing wheels are very efficient in the gashing operation with very high stock removal capacity and high profile consistency.

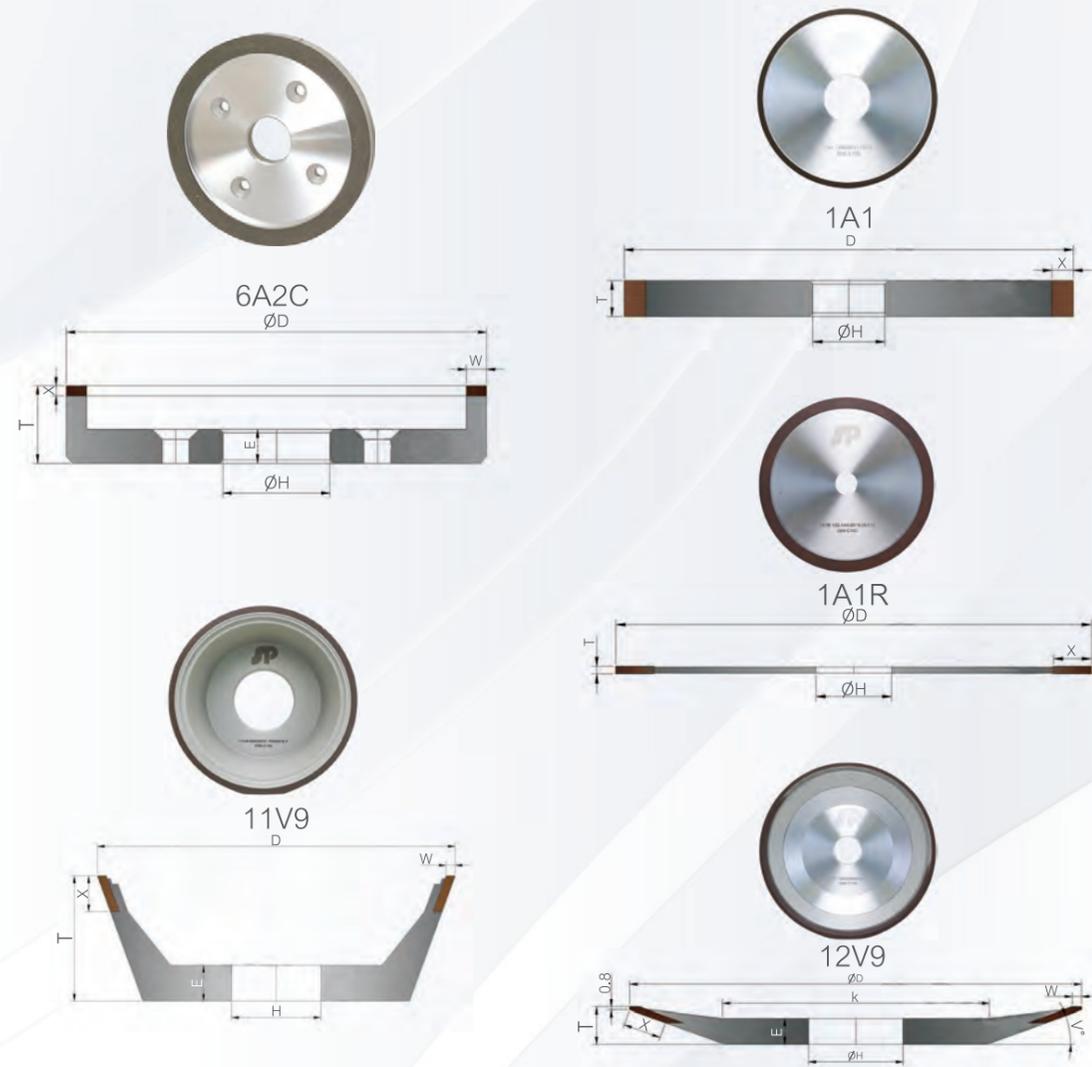


Our Clearance wheels are optimized for clearance and relief grinding showing high stock removal capacity combined with high profile consistency and excellent surface finish:



3.2 Tool Room

In order to meet various demands from customers, We have developed more than 10 bonds for Tool Room application These wheels are for Wet grinding and Dry grinding. The available specs are 1A1, 1A1R, 11V9, 12V9, 6A2 etc. We offer fast delivery and most competitive pricing.



3.3 Burr Wheels

We developed three series of Burr Wheels to meet different needs for Burr processing. These wheels are suitable for both Manual and CNC machines. Our Burr wheels features perfect working efficiency, good edge maintenance and very long dressing circle. These three series include:

- Phenol bond with Copper filler
- Polyimide Bond
- Hybrid Bond

Cores available: Copper Core and Steel Core.

