



ACCURATE

precision machining of wood and non-ferrous metals

Polycrystalline Diamond PCD



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Polycrystalline Diamond PCD

In our synthetic diamond product range, the polycrystalline diamond, also known as PCD, is synthesized by sintering the high quality diamond micron powder under the conditions of high pressure high temperature (HPHT).

PCD materials have extremely higher wear resistance than traditional hard metal, and the PCD tools can be reused by resharpener the cutting edges. In this way, the PCD materials have a much longer lifetime and reduced machine downtime, which makes PCD an ideal material replace the hard metal and ceramics, and become a cost-effective choice for tool makers.

Production process



Step 1: Preparation and mixing of raw materials

Production process starts from the powder mixing, selects high quality diamond powder of different diamond grain sizes from 1 micron to 2-30 microns, according to the formulation design, to add cobalt (Co) and other elements. Powders of different grain sizes are prepared in separate systems to avoid contamination. This process is strictly controlled, as the uniformity of the mixed powders plays a key role to ensure the final consistency and conductivity of the PCD layer. With this technology, the overall thickness of only 0.5mm could be achieved.

After powder mixing, the mixed raw materials and the WC substrate are assembled in a special metal cup to form a composite.

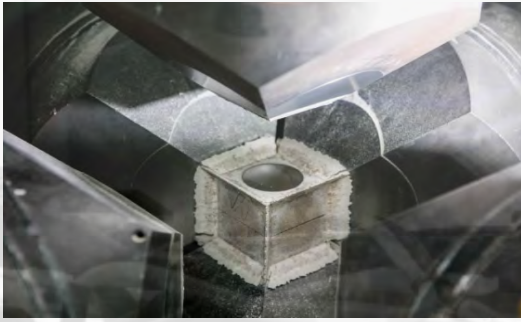


Step 2: Assembly of composites



Step 3: Purification and activation of the mixture

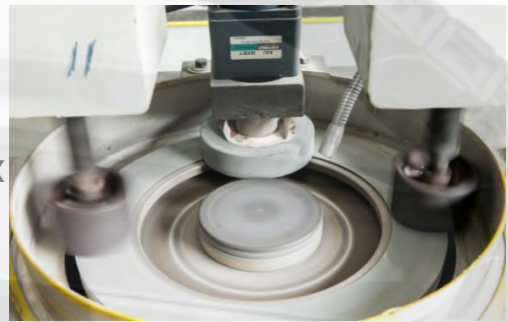
The mixed powder is reduced at high temperature to purify its impurities and activate its metal catalyst.



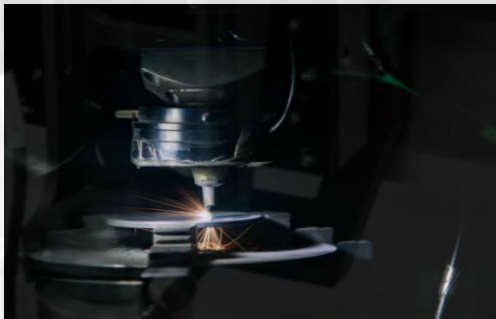
Step 4: High pressure high temperature synthesis

» The polycrystalline diamond composite blanks are synthesized by cubic press under the conditions of high pressure and high temperature (HPHT).

To polish the PCD layer to the mirror surface and to grind the overall thickness to the required thickness according to customer requirements.



Step 5: PCD blanks lapping and polishing



Step 6: Laser cutting

» According to the customer's applications, to laser cut the PCD round blanks to the shapes and geometries required by the customer.

Key performance indicators are fully monitored to ensure product quality and performance. All finished products should pass the ultrasonic scanning inspection and size inspection to ensure that qualified products are delivered to customers.



Step 7: Ultrasonic scanning inspection

Grades and specifications

Grade name	PCD grain size	PCD disc diameter	PCD layer thickness	Overall thickness (mm)
A001	1 μm	64mm	0.5mm (+0.15/-0.1mm)	1.6 / 2.0 / 3.2
A004	4 μm	64mm	0.5mm (+0.15/-0.1mm)	1.6 / 2.0 / 3.2
A010	10 μm	64mm	0.5mm (+0.15/-0.1mm)	1.6 / 2.0 / 3.2
A302	2-30 μm	64mm	0.5mm (+0.15/-0.1mm)	1.6 / 2.0 / 3.2
AT004	4 μm	64mm	0.5mm (+0.15/-0.1mm)	1.6 / 2.0 / 3.2
AT010	10 μm	64mm	0.5mm (+0.15/-0.1mm)	1.6 / 2.0 / 3.2
AT302	2-30 μm	64mm	0.5mm (+0.15/-0.1mm)	1.6 / 2.0 / 3.2

- PCD layer thickness of 0.3mm is available on request.
- Custom dimensions are available on request.
- Overall thickness of 0.5mm, 0.6mm, 0.8mm, 1.0mm, 1.2mm, 1.4mm, 5.0mm and 8.0mm are available.
- Laser cut PCD segment is available, according to customer drawings.

Grades and applications

Grade name	Wear resistance	Conductivity (EDM)	Grindability	Features and Applications
A001	●●●○○	●●●●●	●●●●●	<ul style="list-style-type: none"> • 1 μm average grain size • Super-finishing • Aluminum, aluminum silicon alloys, titanium, composites and others • Where high chip resistance is required
A004	●●●●○○	●●●●●	●●●●●	<ul style="list-style-type: none"> • 4 μm average grain size • Finishing and semi-finishing • Aluminum alloys, precious metals • Optimum balance between resistance to abrasions and chips
A010	●●●●○○	●●●●○○	●●●●○○	<ul style="list-style-type: none"> • 10 μm average grain size • Rough machining and finishing • General type with a good balance between toughness and wear resistance • Low to medium content aluminum alloys
A302	●●●●●	●●●○○	●●●○○	<ul style="list-style-type: none"> • Combination of 2 μm to 30 μm grain sizes • High wear resistance and heat resistance • High silicon aluminum alloys, metal matrix composites, tungsten carbides and others
AT004	●●●●○○	●●●●●	●●●●●	<ul style="list-style-type: none"> • Finishing • Chipboard, wood cutting tools with high finishing
AT010	●●●●○○	●●●●○○	●●●●○○	<ul style="list-style-type: none"> • Rough machining and finishing • General type • Woodworking
AT302	●●●●●	●●●○○	●●●○○	<ul style="list-style-type: none"> • Highest wear resistance • Woodworking

- PCD layer thickness of 0.3mm is available on request.
- Custom dimensions are available on request.
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About Us

With more than 20 years' experience in super-hard material industry, we have been supplying the diamonds materials and the related products for years, we are using our know-how to help customers to find accurate solutions, the word "ACCURATE" fits our culture very much, with that, we provide not only the product itself, but also our services.

Our Product Range

- Polycrystalline diamond (PCD) carbide based for woodworking and aluminum
- CVD diamond polycrystalline (CVD-P) for dressing tools, heat spreading and optics
- Monocrystalline diamond (CVD and HPHT) for high surface finishing and precision



ACCURATE



LUOYANG ACCURATE TOOLING CO., LTD.

No.1 Chun Cheng Rd. Hi-Tech Development Zone 471003 Luoyang China

Tel +86 379 6327 3379 Cell +86 130 1555 5420

www accuratedia.com info@accuratedia.com