LASERTEC PrecisionTool – Series

Perfect cutting edges, clearance angles and chip breakers in precision tools.
Perfect cutting edges, clearance angles and chip breaker geometries in PCD / CVD diamond – separation of PCD / CBN circular blanks.

PCD / CVD diamond / CBN – Machining highlights

- Laser creates “ultra-sharp” cutting edges without breakouts.

- **ALL IN ONE:** Production of cutting edge, clearance angle and chip breaker in PCD / CVD-D in one clamping on one machine.

- Best cutting edge quality without breakouts. Free choice of clearance angle from 0° to 35°.

- Incorporation of chip breakers also in CVD-D diamond and CBN for controlled chip breaking and longer tool life times.

- Separating and cutting out: separation of PCD / CBN circular blanks is 10 x faster than wire-cut EDM.

Chip breaker geometries in carbide

Manufacture of prototypes of carbide indexable inserts and laser machining of carbide pressing tools.

Tungsten Carbide – Machining highlights

- Highlights of carbide machining
  - A simple and cost-effective solution for producing the complete chip breaker geometry in prototypes.
  - **NEW picosecond laser:** The high-end solution for producing carbide pressing stamps with surface qualities of up to Ra 0.3 μm.
  - **LASERTEC 50 PrecisionTool with picosecond laser:** The 5-axis solution for complex prototypes and special carbide machining.
High-end laser precision machining

The new standard for cutting edge quality in PCD, chip breaker geometries in tungsten carbide made easy, rapid separation of PCD / CBN circular blanks.

1. Cutting edges without breakouts, free choice of clearance angle and feasibility of chip breakers in PCD / CVD-Diamond.

2. Ultra-flexible prototype manufacture of chip breakers in carbide with up to Ra 0.3 µm.

3. Cutting out of PCD and CBN circular blanks, in 2D and 3D.

Technical data

<table>
<thead>
<tr>
<th></th>
<th>LASERTEC 20 PrecisionTool</th>
<th>LASERTEC 40 PrecisionTool</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel (X / Y / Z) in mm</td>
<td>200 / 400 / 280</td>
<td>400 / 300 / 500</td>
</tr>
<tr>
<td>Laser source</td>
<td>Fiber laser (100 W)</td>
<td>Nd:YVO4 (12 W), fiber laser (100 W)</td>
</tr>
<tr>
<td>Applications</td>
<td>Rough machining and finishing of PCD, CVD and MCD Diamond tools, finishing of cutting edges in PCD / CVD and chip breakers in PCD</td>
<td>Prototype manufacture of chip breaker geometries in carbide and chip breakers in PCD / CBN</td>
</tr>
<tr>
<td>Machine</td>
<td>Maximum long-term precision as a result of highly stable monoBLOCK® construction and cooled drives, highly dynamic with linear / torque motors in all 5 axes</td>
<td>Optional 4th axis as an indexing device, polymer concrete base frame, excellent accessibility as a result of a circular cabin and automatic fine positioning using image processing is possible</td>
</tr>
<tr>
<td>Technology</td>
<td>Sharp cutting edges of 2–3 µm radius without breakouts, high precision and repeat accuracy and small internal radii of up to 15 µm possible</td>
<td>The cost-effective solution for producing the complete chip breaker geometry in prototypes</td>
</tr>
<tr>
<td>Control system</td>
<td>SIEMENS 84DD solutionline with DMG ERGOline® control</td>
<td>LASERSOFT-3D</td>
</tr>
</tbody>
</table>
LASERTEC 20 PrecisionTool

Redefined cutting quality: Working area with integrated NC swivel rotary table (4th / 5th axis), laser head with new precision scanner and integrable infrared measuring probe.

LASERTEC 40 PrecisionTool

Laser technology for manufacturers of carbide indexable inserts: Working area with cross table, digital servo drives and 300 x 400 mm travel.

LASERTEC 50 PrecisionTool

Cutting out of cutting inserts made from PCD and CBN circular blanks, in 2D and 3D: Large working area with integrated NC swivel rotary table for 3- or 5-axis laser machining.

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<th>LASERTEC 50 PrecisionTool</th>
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<tbody>
<tr>
<td>400 / 300 / 500</td>
<td>500 / 500 / 700</td>
<td>500 / 500 / 700</td>
</tr>
<tr>
<td>Picosecond laser (25 / 50 W)</td>
<td>Picosecond laser (25 / 50 W)</td>
<td>Fiber laser (100 W)</td>
</tr>
<tr>
<td>Optional 4th axis as an indexing device, polymer concrete base frame, excellent accessibility as a result of a circular cabin, automatic fine positioning using image processing is possible</td>
<td>High rigidity as a result of the base frame being made of polymer concrete, dynamic with linear motors in X and Y, and precise with 8 µm positioning accuracy</td>
<td>High rigidity as a result of the base frame being made of polymer concrete, dynamic with linear motors in X and Y, and precise with 8 µm positioning accuracy and 5-axis version: Pre-cutting with clearance angles</td>
</tr>
<tr>
<td>The high-end solution for tool construction. Manufacture of carbide pressing stamps with surface qualities of up to Ra 0.3 µm</td>
<td>The 5-axis solution for complex prototypes and special machining</td>
<td>Clean, precise cuts, low conicity, low heat affected zone from 50 µm and cutting speeds of up to 100 mm/min. in 1.6 mm PCD</td>
</tr>
<tr>
<td>LASERSOFT-3D</td>
<td>SIEMENS 840D solutionline with DMG ERGOline® control</td>
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Tungsten Carbide

PCD / CBN

Cutting out / separating of cutting inserts made from PCD and CBN circular blanks

The high-end solution for tool construction. Manufacture of carbide pressing stamps with surface qualities of up to Ra 0.3 µm

High rigidity as a result of the base frame being made of polymer concrete, dynamic with linear motors in X and Y, and precise with 8 µm positioning accuracy and 5-axis version: Pre-cutting with clearance angles

Clean, precise cuts, low conicity, low heat affected zone from 50 µm and cutting speeds of up to 100 mm/min. in 1.6 mm PCD
ALL IN ONE: Production of cutting edge, clearance angle and chip breaker in PCD / CVD-D in one clamping operation.

Ultra-precise determination of position of the cutting insert to be machined using 3D infrared measuring probe.

LASERSOFT software packages for the laser machining of end mills, ISO and special cutting inserts, chip breakers and marking module.

LASERTEC 20 PrecisionTool

The laser offers unique advantages compared to grinding and wire-cut EDM.

Machine highlights

- Inherently rigid 5-axis precision machine, compact with a 3.5 sq. m floor area.
- Highly dynamic as a result of linear drives in X / Y / Z and torque technology in the NC swivel rotary table.
- Non-contact precision machining without tool wear.

Technology

- Cutting edge without breakouts – the laser cuts through diamond and binding material.
- Coarse-grained PCD varieties can be machined without any loss of quality.
- Chip breakers in the clamping area can be incorporated in one clamping operation with the cutting edge machining.
- As a result of the fine laser focus, internal radii of 15 μm minimum can be achieved.
- Low operating costs since there are no costs for wire-cutting or grinding.
Automatic switching of HSK tools in the HSK63 interface or shank tools in a hydraulic expansion chuck.

Fully integrated, ultra-compact automation solutions for handling cutting inserts, end mills and HSK tools.

Option: Retractable drawer for pallets, cutting inserts or shaft tools.

Linear magazine PH 10 | 100

The complete automation solution for cutting inserts, end mills and HSK tools.

Linear magazine PH 10 | 100 – Configuration levels

<table>
<thead>
<tr>
<th>Max. number of levels</th>
<th>6*/4**</th>
<th>6*/4**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of places per level</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Raster dimension (centre of pallet to centre of pallet)</td>
<td>95 mm</td>
<td>190 mm</td>
</tr>
<tr>
<td>Max. tool diameter</td>
<td>85 mm</td>
<td>140 mm</td>
</tr>
<tr>
<td>Max. tool length (from HSK contact face)</td>
<td>240 mm</td>
<td>240 mm</td>
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</tbody>
</table>

*Tool length max. 135 mm  ** Tool length max. 240 mm

LASERTEC 20 PrecisionTool with linear magazine PH 10 | 100

Ultra-compact handling system with application-specific configuration levels.

Highlights

- Ultra-compact linear magazine with optimum accessibility and with workpiece automation from above.
- Automation solutions for handling cutting inserts, end mills, tools with HSK interface (different types of tools can be combined in one automation process).
- Application-specific configuration levels for handling a maximum of 42 HSK tools.
- Option: Replaceable gripper hands on the handling arm for HSK tools, shank tools or cutting inserts.
- Tool clamping using collet system or hydraulic expansion chuck.
- Fixture for cutting inserts with automatic clamping.
Tungsten Carbide

LASERTEC 40 Precision Tool

Manufacture of tungsten carbide indexable insert prototypes

**Machine**
- 3-axis machine with 300 × 400 mm travel
- Optional 4th axis as indexing device
- Polymer concrete base frame
- Excellent accessibility as a result of the circular cabin
- Automatic fine positioning possible by means of image processing

**Software**
- Simple programming based on 3D CAD data
- Job manager for the automatic machining of different parts
- Marking module

LASERTEC 40 Pico

Picosecond laser for carbide pressing stamps with Ra 0.3 μm

- Equipped with the latest picosecond laser technology
- Optionally with 25 W / 50 W laser output power
- High-end solution for tool construction for the manufacture of carbide pressing stamps with surface qualities of up to Ra 0.3 μm
- Polymer concrete base frame
- Excellent accessibility as a result of the circular cabin
- Automatic fine positioning possible by means of image processing

LASERTEC 50 Pico

5-axis machining of challenging carbide tools using a picosecond laser

**Machine**
- Flexible 5-axis precision machine
- Positioning accuracy: 8 μm
- Picosecond laser for the best surface finishes
- 5-axis version for complex prototypes and special carbide machining
LASERTEC 50 PrecisionTool

Highly dynamic separation of PCD / CBN circular blanks is 10 x faster than wire-cut EDM.

**Machine set-up**

- **Long-term stability**: polymer concrete base frame
- **Dynamics**: linear motors in X, Y (up to 1 g and 60 m/min.)
- **Precision**: 8 μm positioning accuracy
- **Versatility**: 5-axis version to pre-cut clearance angles

**Technology**

- Clean, precise cuts
- Conicity at 3.2 mm material thickness only 25 μm per side
- Low heat affected zone of 50 μm
- Cutting speeds of up to 100 mm/min. in 1.6 mm PCD
and chip breakers in precision tools.

Perfect cutting edges, clearance angles

25 years of expertise

LASERTEC showroom in Pfronten

- Long-standing experience in laser machining
  PCD / CBN / CVD diamond / carbide
- Application engineering expertise: training, customer support, complete turnkey solutions
- Holistic process understanding
- Special LASERSOFT software packages
- Regular technology seminars

PrecisionTool – Application overview

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<th>PCD / CVD-D / CBN applications</th>
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</thead>
<tbody>
<tr>
<td>Cutting edge with clearance angle in PCD / CVD-D</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Chip breakers in PCD / CVD-D</td>
<td>+</td>
<td></td>
<td></td>
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<tr>
<td>Separation of PCD / CVD circular blanks</td>
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Tungsten Carbide applications

- Prototyping of carbide indexable inserts with chip breakers
- Carbide pressing stamps with chip breaker geometries

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