

CONTRACT MANUFACTURING

High Precision Laser Drilling



High Precision & Flexible Hole Geometries

Drilling of micro-apertures with laser techniques guarantees well-defined drilling geometries with a variety of possible shapes and flank angles.

The outstanding surface quality of laser drilled bores comes along with highest reproducibility and maximum precision.



Keep Your Money for Other Investments

There is no need to release a machine budget, set aside valuable fab space for a new machine or train your staff. After a short briefing, our experts will know what to do and simply deliver – on time, in high quality, and at a reasonable expense.



Trust on Experience

In our application center, we run production processes on our own industry-proven laser machines. You can count on the experience of our engineers – they understand what you want and know the best ways to get the results that you need.

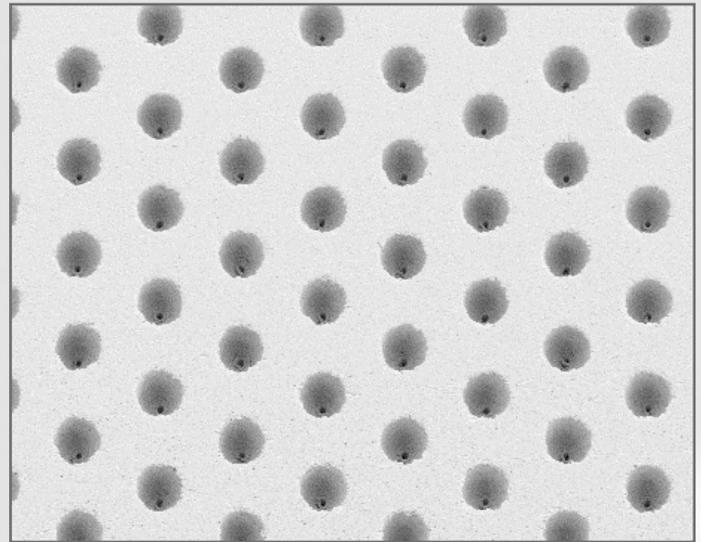
Don't go down the trial-and-error path yourself - we can handle that for you.



From the Heart of Europe to the World

Our German headquarters are always just a day away from you. With 3D-Micromac you can count on reliable engineering.

Made in Germany – quality certified by ISO 9001.



Micro Drilling with USP Lasers

Precision laser drilling with ultrashort pulsed (USP) lasers opens a world of possibilities: When galvanic processes, etching, and long-pulse laser systems reach their limits, laser ablation techniques that utilize ultra-short pulses come into the picture.

The laser allows for an easy change of drilling shapes and patterns. Chipping at the hole edge is avoided, preventing the need for post-processing. All this makes USP laser drilling the perfect solution for microbores starting from 3 μm in diameter.

Precision Laser Drilling

Drilling with USP lasers produces holes with diameters ranging **from a few micrometers to several millimeters**. Any post-processing of these high-precision holes is not necessary. There are virtually no thermal influences - bulging due to fusion and burrs are avoided.

Defined micro holes with diameters **below 10 μm** are used primarily in metrology and industrial deposition. These bores are characterized by high repeatability of the exit diameter ($\pm 0.5 \mu\text{m}$) and the geometry of the bore funnel. These provides advantages for various microfluidic applications such as medical nebulizer units, painting applications, filtration technology and many more.

Due to the **flexible design** of distances and shapes of the holes, flow rates, shapes, and directions of the droplets can be precisely controlled. Substrate sizes and thicknesses as well as processing layouts can be flexibly adapted. The substrates can be perforated with several 1,000 up to 100,000 holes.

Additional processing steps such as marking of components, creation of cavities and hole features $> 50 \mu\text{m}$ in diameter can be performed with the same optical setup.

Achievable Qualities

Material	Material Thickness	Hole Diameter	Taper
Metals, ceramics, thin-film systems	up to 50 μm	$\geq 2 \mu\text{m}$	Adjustable
Metals, ceramics, polymers, glasses	5 - 100 μm	$\geq 2 \mu\text{m}$	Adjustable
Steel, brass, ceramics, polymers, composite fibers, glasses	100 - 500 μm	$\geq 5 \mu\text{m}$	Adjustable

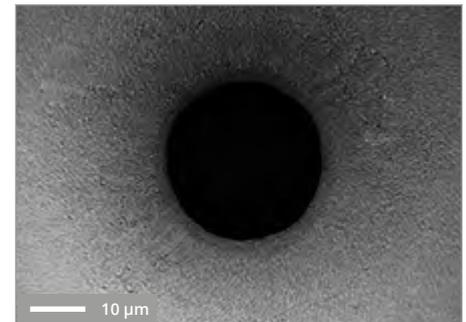
APPLICATION EXAMPLE: Laser Drilling of Metal Micro Sieves

Laser drilling is a versatile and cost-efficient approach for producing micro sieves with high throughput and extraordinary precision. Compared to traditional manufacturing with etching and electroplating processes, laser drilling enables micro sieves production from films or thin plates of almost any material. Furthermore, no polluting chemicals are needed. The advantages of metal sieves are a longer lifetime, biocompatibility, and the possibility of cleaning.

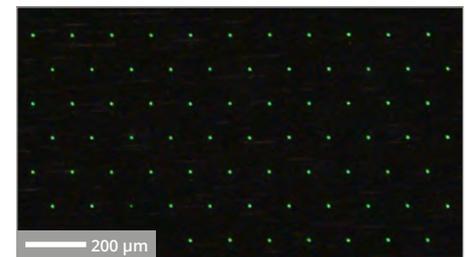
Services of our Application Center

Precision Laser Drilling for:

- Nebulizer meshes
- Microfilter
- Nozzles
- Screens and filters
- Holes in tubes
- Inkjet holes, etc.



SEM picture of an inkjet nozzle



Exit holes of a microsieve (diameter: $\sim 3 \mu\text{m}$)

Get in contact with us to receive your individual offer

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