Advanced Services for Laser Micromachining

Welding – Cutting – Drilling - Marking

www.mshoham.co.il
About

- Shoham Trading Ltd. is an Israeli leading manufacturer of laser micro machining processes and parts.
- Established in 1980 as a daughter company to Shoham Machine Engineering a lead developer and manufacturer of state of the art, turnkey, machines and systems according to customer needs.
- During the last 30 years, Shoham Trading Ltd. delivered hundreds of machine and systems with a wide after sales support and services.
- With its vast background in developing complicated systems, Shoham Trading established its own manufacturing facilities for laser applications, targeted mainly for Micromachining services to a wide variety of industries.
About

- Our optical knowledge and hi-end laser technology gives us the ability to process most of common materials with up to 0.5 µm accuracies.
- We are not manufacturing full parts, but sub processing activities where others see as impossible to achieve.
- During the last years we achieved some of the smallest features ever reached in an industrial laser micro machining process.
Materials

- **Materials we process:**
  - Metals
    - All
  - Ceramics
    - ALN, Alumina, Sic, SiN
  - Plastics
  - Polymers
  - Glass
    - Soda lime
    - Borofloat and other SCHOTT glasses
    - etc.
  - Silicon and other semiconductor materials
Applications

As Small as You Can Dream

- Applications:
  - Medical
  - Aerospace
  - Micro fluid
  - Sensors
  - Semiconductor
Main Technology advantages

• Laser spot size down to 1µm
• IR to Short UV wavelength
• Fiber and YAG laser
• Pico and Femto laser with advanced manipulating on optical setup in order to get special beam shape and supper small spot size for Micro – Nano fabrications
• Up to 0.5 µm accuracy
• Up to 0.25 µm repeatability
Applications: examples and comparisons

Structures
Applications: examples and comparisons

Micro Mold
Applications: examples and comparisons

Micro Machining – 3D

![Image of micro machined components](image-url)
Applications: examples and comparisons

Surface Treatment - Structures

8 µm figures

4.5 µm figures

6 µm figures
Applications: examples and comparisons

Surface Treatment - Structures

Ra < 0.15 μm
Done with Pico second laser @ 532 nm
Applications: examples and comparisons

Micro structures
Applications: examples and comparisons

Micro Fluidic
Applications: examples and comparisons

**Micro Fluides**

Glass – Borosilicate
Depth – 3µm
Width – 5µm
Applications: examples and comparisons

Micro Fluidic
Manufacturing of micro channels with Pico-Laser
Depth = 4 μm

Micro Cavities in PMMA
Done with Pico Laser
Depth: 80 μm
Applications: examples and comparisons

- Depth: 720 μm
- Taper: 4°-6°
- Achieved surface roughness
- Ra = 0.359 μm
- Lower roughness possible, depending on used laser parameters
Applications: examples and comparisons

Sapphire - Manufacturing of cavities

Micro Fluides
Applications: examples and comparisons

Sapphire - Manufacturing of cavities

Micro Fluides
Applications: examples and comparisons

Transparent Materials
היתוך חומרים שקופים / שקופים למחצה

Polyimide

Glass - Scholl

Wafer

Polyimide

Sapphire

Glass
Applications: examples and comparisons

Metals
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Applications: examples and comparisons

Drilling of stainless steel (injection nozzles).

Drilled with EDM

Drilled with Laser
Applications: examples and comparisons

Cutting of NiTi stents
Applications: examples and comparisons

Cutting and drilling of stainless steel parts
Applications: examples and comparisons

Cutting of Copper-Beryllium parts
Applications: examples and comparisons

Cutting of Copper and Titanium parts
Ceramics
$\text{Al}_2\text{O}_3$ 96% (Alumine)
Zirconia
ALN & SiC
Applications: examples and comparisons

Composite
ADC – Diamond Composite
Applications: examples and comparisons

holographic structures
Where others see impossibilities, we see solutions