Micro Laser Sintering

3D MicroPrint GmbH manufactures high-precision micro metal parts using Micro Laser Sintering technology. We offer a comprehensive service from product design and prototype development through to series production.

Why 3D MicroPrint GmbH?

- Micro Laser Sintering combines the advantages of additive manufacturing with those of micro machining
- Complex geometries with high resolution, high dimensional accuracy and low surface roughness
- Moving parts without further assembly - with our “print-as-one” solution
- Micro metal parts with entire value chain from engineering to post-processing
- DIN EN ISO 9001 certified and processing to DIN EN ISO 13485

Technical Key Figures

- Building platform:
  - 60 x 60 x 40 mm (LxWxH)
  - 120 x 120 x 100 mm (LxWxH)
- Layer thickness: 1 - 30 µm
- Laser spot size: < 30 µm
- Accuracy: 5 µm
- Minimum wall thickness: 30 µm
- Roughness: Ra: 1 µm Rz: 5 µm
- Part density: > 99.5 %

Materials

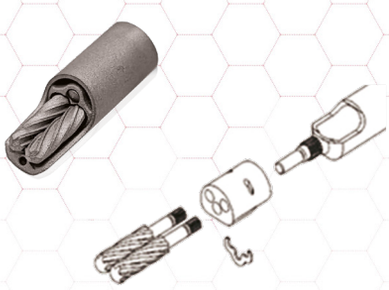
- Stainless steel:
  - 316L (1.4404)
  - 17-4PH (1.4542)
- Titanium:
  - Ti6Al4V (3.7164)
  - Ti (3.7035)
- Copper:
  - CuCr1Zr (2.1293)
  - Cu-OF (2.0040)
- Inconel® 718

Other materials within the scope of a development process

Print-as-One Solution

Arthroscopic shaver

- 1 part instead of 6 - no assembly
- Robust design with improved function
- Integrated channels for flushing, suction and lighting
- High dimensional accuracy - minimal wear and tear
- Cost-efficient and quickly available
- Diameter: 6 mm



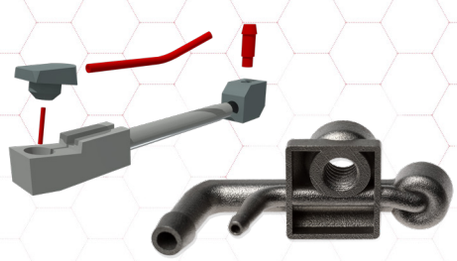
Forceps/Gripper

- 1 part instead of 5 - no assembly
- Integrated light channel - functional and space-saving

diameter	length
3.0 mm	30 mm
1.7 mm	20 mm
1.2 mm	10 mm
0.8 mm	6 mm

Spot-jet nozzle

- 1 part instead of 7 - no assembly
- Self-aligning function and integrated M3 thread
- Made from a single print in stainless steel - no corrosion
- 60 % cost savings of production
- Ready to deliver in 2 days instead of 6 weeks
- Less reworking, less testing required



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Rev.2

Benchmark - Feature Array

3D MicroPrint metal benchmark part to show various feature capabilities und technical specifications:

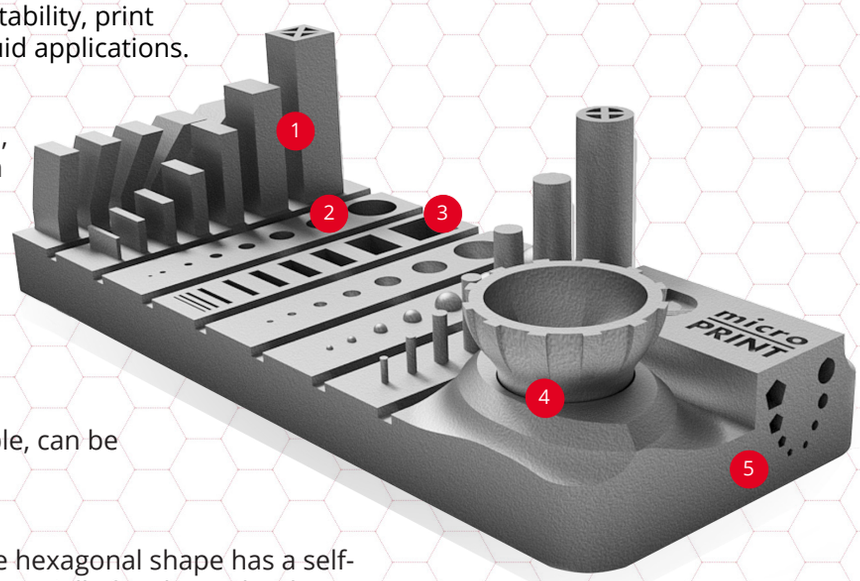
• printing time/part	*> 30 min*	• material	*Stainless Steel 1.4404*
• component density	*> 99.5 %*	• material consumption/part	*2 g*
• layer thickness	*9 µm*	• surface	*Ra 2 - 3 µm*
• number of layers	*~ 610*	• total size of the part	*19.1 x 8.0 x 5.5 mm (LxWxH)*

1. wall thicknesses
The thickness of the 7 walls vary from 0.15 mm to 1.20 mm. To further reduce print volume, the biggest wall feature is hollowed with reinforcement elements - offers stability, print volume reduction for lightweight purposes or fluid applications.

2. vertical holes
The holes have a diameter of 0.10 mm, 0.15 mm, 0.20 mm, 0.30 mm, 0.40 mm, 0.60 mm, 0.80 mm and 1.20 mm.

3. gap
The smallest functional gaps can be created to enable the clearance fit of moving geometries. These gaps can be as small as 15 µm.

4. function integration
The moveable and rotatable pin joint, for example, can be printed as one component.



10 mm

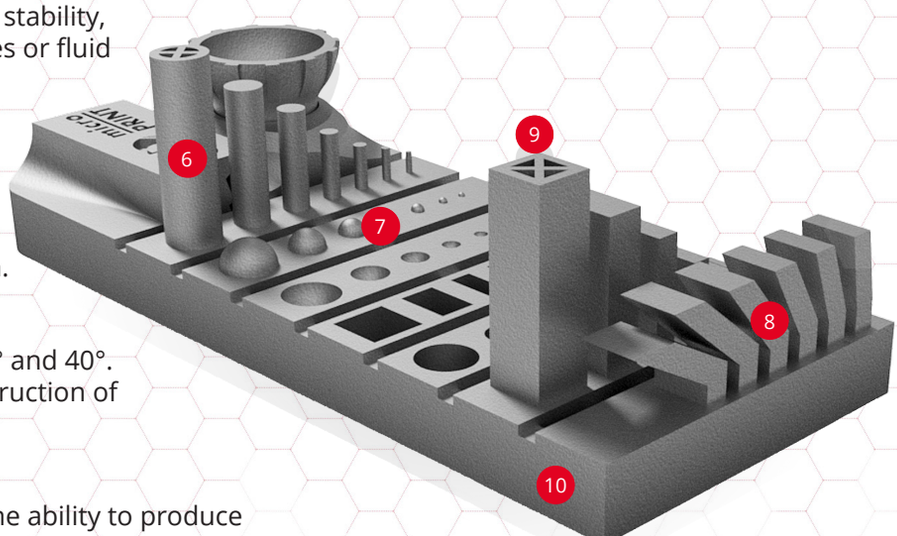
5. horizontal holes
The shape is like a Gothic arch or a drop, and the hexagonal shape has a self-supporting function. This is a great advantage, especially for channels. The smallest internal channels have a diameter of between 0.15 and 0.5 mm.

6. pins
The seven pin diameters vary from 0.15 mm to 1.2 mm. To further reduce print volume, the biggest pin feature is hollowed with reinforcement elements - offers stability, print volume reduction for lightweight purposes or fluid applications.

7. half sphere - Stair effect
Due to our high resolution, we have a very low stair effect. Basically, the lower the layer thickness, the less the stair effect. The radius of the half sphere are 0.08 - 0.6 mm.

8. overhangs
The component has overhangs at angles of 80° and 40°. Depending on the material, support-free construction of overhangs at angles down to 30° is possible.

9. inner structure
One of the greatest benefits of 3D printing is the ability to produce complex internal structures with additional functions.



10 mm

10. surface as printed
'The as printed, unblasted surface has a surface roughness of 2 - 3 µm.

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