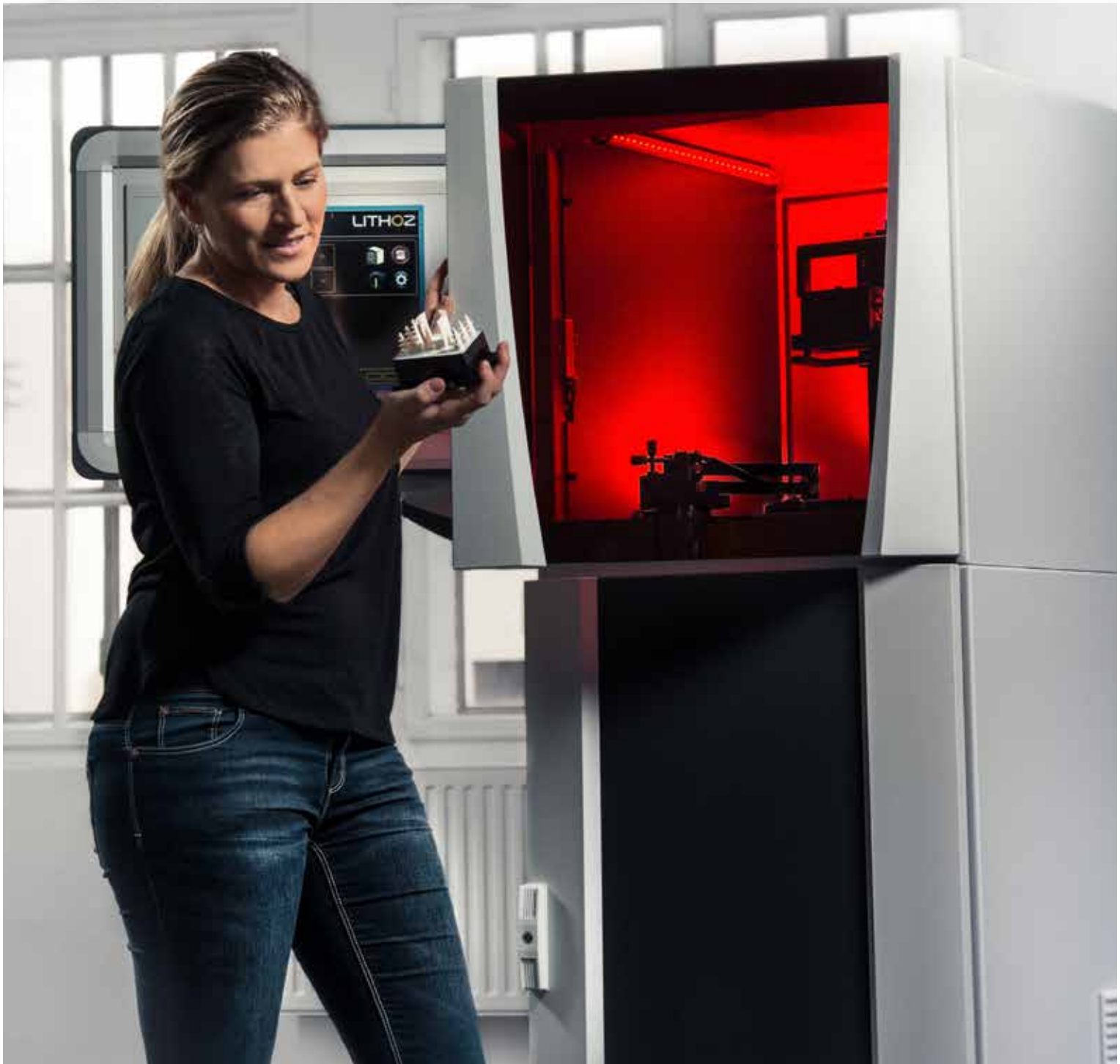


www.lithoz.com

# LITHOZ®

Manufacture the future.



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## Additive manufacturing for high-performance ceramics.

Prototypes. Small scale series. Highly complex.

# LCM-Technology Process and materials

## Welcome to Lithoz

Lithoz is the system provider for additive manufacturing of high-performance ceramics. Our product range includes all significant components that are needed for the production of high-performance ceramics. Apart from the user-friendly plug & play network printer CeraFab 7500 Lithoz also provides a variety of ceramic materials and the special software for the realization of high performance ceramics. In addition we develop materials specifically for our customers' individual needs and wishes.

### Patented LCM-Technology

Based on the concept of additive manufacturing technologies Lithoz developed a superior and unique procedure for the structuring of ceramics. The LCM (Lithography-based Ceramic Manufacturing)-Technology makes the fast and economical generation of fully functional parts possible, with the material properties being equal to serial parts from conventional manufacturing processes.



Lithoz offers the possibility for a cost effective and fast production of prototypes, small scale series and highly complex parts.



Ceramic Casting Cores, the latest material development of Lithoz used for turbine engine components.

## Standard materials

### LithaLox HP 500 ( $\text{Al}_2\text{O}_3$ )

Material	High-purity alumina
4P-bending-strength	430 MPa
Density	> 3.96 g/cm <sup>3</sup> (99.4 % T.D.)
Surface roughness (Ra)	~ 0.4 $\mu\text{m}$

### LithaCon 3Y 610 purple ( $\text{ZrO}_2$ )

Material	3 mol % stabilized zirconia
4P-bending-strength	650 MPa
Density	> 6.01 g/cm <sup>3</sup> (99.1 % T.D.)
Surface roughness (Ra)	~ 0.6 $\mu\text{m}$

### Customized development of materials

Furthermore, Lithoz develops materials specifically for our customers' individual needs and wishes. Through many years of experience in research and development the team of Lithoz has material competence in glass ceramics, oxides, nitrides and carbides.

# LCM-Technology Manufacturing system

## CeraFab 7500

The CeraFab 7500 is a reliable and user-friendly plug & play network printer that works independently from other devices. It allows the production of parts made of different ceramic materials directly from CAD-data.

### Tool-free manufacturing

Due to the tool-free manufacturing process of our LCM-Technology single parts can be produced and variations in design can be realized quickly within one working cycle. The tool-free production also allows design variations directly from the computer. There are no limitations to the form and structure of the parts that can be built (e.g. undercuts, cell structures and cavities) and they have the same properties as conventionally built ceramic parts.

### Technical properties

The CeraFab 7500 is designed in a way that, depending on the design requirements, any layer thickness between 25  $\mu\text{m}$  and 100  $\mu\text{m}$  can be chosen. With the CeraFab 7500 it is possible to realize very fine layers of 25  $\mu\text{m}$  in excellent quality. The system can build up to 100 layers per hour. With a layer thickness of 50  $\mu\text{m}$ , a building velocity of 5 mm/h can be achieved.

#### CeraFab 7500

Lateral resolution	40 $\mu\text{m}$ (635 dpi)
Number of pixels (X, Y)	1920 x 1080
Building envelope (X, Y, Z)	76 mm x 43 mm x 150 mm
Data format	.stl (binary)
Slice thickness	25 – 100 $\mu\text{m}$
Building velocity	Up to 100 slices per hour
Light source	LED



The CeraFab 7500 is characterized by simple maintenance. A change of material can be completed within 15 minutes.

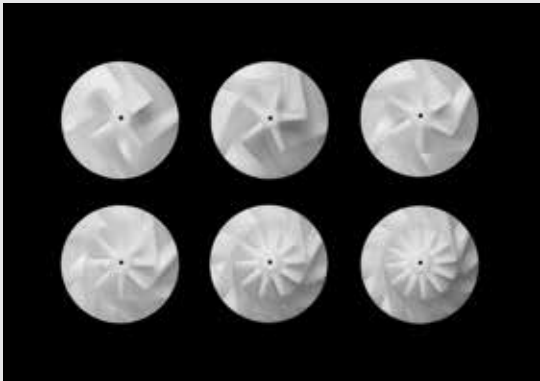


The innovative imaging technique along with special projection optics even allows the production of small structures and very fine details.

# Advantages of the LCM-Technology



## Prototypes



### Time and cost savings

- Production directly from CAD-data
- Simple variations of the part geometry
- No tooling and setup costs
- No costs for changes and design variations
- Low costs up to several hundred parts

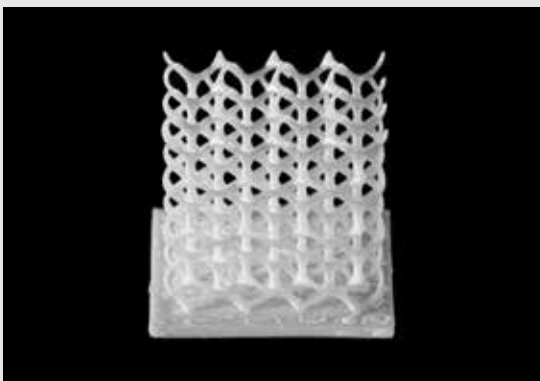
## Small scale series



### Superior quality

- Material properties as in serial production
- High density, high strength and high accuracy
- Exceptional surface quality
- Fully functional parts

## Highly complex



### No geometrical limitations

- New opportunities in terms of design and functionality
- Manufacturability of defined cellular structures
- Thin-walled structures (wall thickness below 150  $\mu\text{m}$ )
- Implementation of undercuts and cavities