www.lithoz.com

Additive manufacturing for high-performance ceramics.

Layer by layer to your product!

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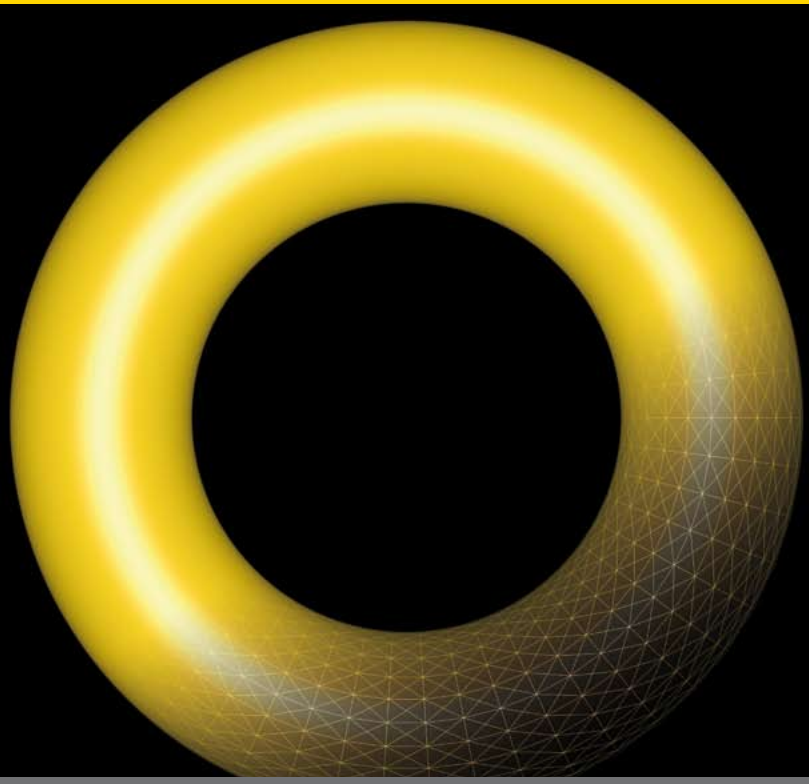
The additive manufacturing process for ceramics available for the first time, offering:

- **high accuracy**
- **fine details**
- **high density**
- **high strength**



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LITHOZ®

Manufacture the future.

LCM-Lithography based Ceramic Manufacturing

New possibilities for ceramic materials
The Lithography-based Ceramic Manufacturing (LCM)-process opens up previously unimaginable opportunities with regard to the shaping of ceramic materials. The layer-by-layer building process enables the fabrication of any designed parts regardless of geometrical limitations. The main focus lies no longer on production-oriented construction but on the uncompromising realization of the best solution possible.

The LCM-process enables industrial and research companies alike to produce cost effective and quickly functional prototypes and small scale series. Highly complex parts with any geometry, which could not be produced until now, can be realized with the LCM-process. Due to its superior quality and precision the produced parts are suitable for serial production.

Revolutionary Technology
Based on the concept of Additive Manufacturing Technologies the LCM-process for the structuring of ceramics was developed by Lithoz. The LCM-process not only uses the same ceramic material as the serial production, it also ensures that precision, density and strength of the part can be guaranteed.

The tool-free manufacturing also allows the simultaneous production of different individual parts or small scale series up to several hundred parts at a higher speed and with lower costs than conventional methods.

Imaging Technology
The LCM-process is based on the selective curing of a photosensitive resin which contains homogeneously dispersed ceramic particles. The centrepiece of the process is a specifically designed imaging system that enables the transfer of the layer information by means of the latest LED-technology. This innovative imaging technique along with special projection optics even allows the production of small structures and very fine details.

Photopolymers – the Key to Success
Photopolymers constitute the backbone of the formed part during the production process. They act as binder between the ceramic particles and make the precise shaping of the part possible. They also allow high densities of the green body and thus lead to extremely high densities of the sintered product. Since the curing of the material takes place at ambient temperature, the formation of thermal stresses can be avoided.

Post-processing
In analogy to powder injection molding, the shaped form is produced as a green body that has to be further processed to obtain a completely dense ceramic part. These post-processing steps include the debinding and the subsequent sintering into a compact ceramic part. This procedure eventually results in parts consisting of 100% ceramic material which exhibit mechanical properties equal to conventionally fabricated parts.

CeraFab 7500

CeraFab 7500

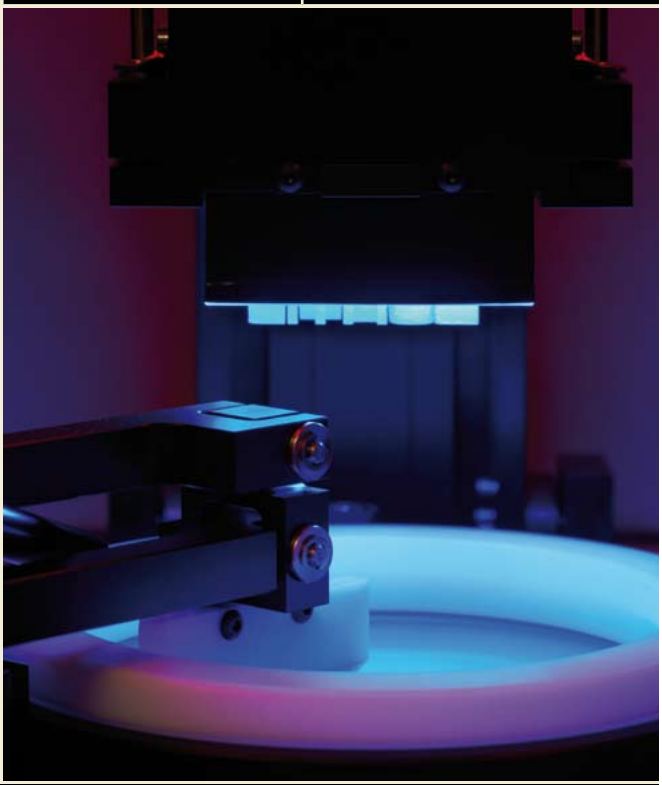
The CeraFab 7500 is a complete system for the production of dense and precise high-performance ceramic parts without any limitations. It is based on the innovative and patented LCM-process and enables the Additive Manufacturing of ceramic materials directly from CAD-data.

Simple maintenance and user-friendly operation allow for fast and easy production of high quality ceramics. An Ethernet-connection facilitates the direct transfer of the data from the desk to the printer. The CeraFab 7500 is a flexible, reliable and durable plug & play network-printer which works completely independent from any other device.

The CeraFab 7500 offers a process for the economic fabrication of ceramic prototypes and small scale series production. Without the need for the production of expensive tools it enables the fast and uncomplicated manufacturing of arbitrary geometries in a single work cycle. This method not only guarantees the same properties as for serial components, it also provides more flexibility and significant savings in costs and time for the prototype production. Using this approach, it is possible to shorten the time-to-market substantially.

Technical properties

Network-connection	Ethernet
Electrical requirements	AC 230 V / 50-60 Hz
Weight	Approx. 250 kg
Machine size (X, Y, Z)	1,2 m x 0,6 m x 1,8 m
Lateral resolution	40 µm (635 dpi)
Number of pixel (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 µm
Building velocity	Up to 100 slices per hour
Light source	LED



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LithaLox HP 500

The best ceramic material for Additive Manufacturing

Material ..... High-purity alumina
Density ..... > 3,96 g/cm³ (99,4 % T.D.)
4P-bending-strength ..... 430 MPa
Weibull-modulus 11

Manufacture the future.

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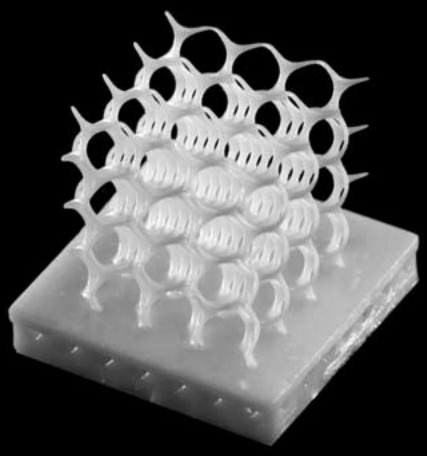
Why use the LCM-process and the CeraFab 7500?

Superior quality and properties

- material properties as in serial production
- high density, high strength and high accuracy
- exceptional surface quality
- fully functional parts

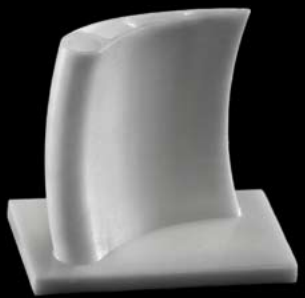


Time and cost savings

- direct production from CAD-data
- faster time-to-market
- simple variations of the part geometry
- no tooling costs
- no setup costs
- low costs up to several hundred parts

Possibilities and advantages

- no geometrical limitations
- manufacturability of defined cellular structures
- thin-walled structures (wall thicknesses below 200 µm)
- implementation of undercuts and cavities
- no demolding



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