

From Lab to Line: Additive Manufacturing of Fine-Structured Ceramics for Thermal Management Solutions

Ceramics Expo 2026; 5th of May, Cleveland

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Advantages & Limitations | Additive Screen Printing

Exentis is the only company worldwide to offer a unique technology capable of manufacturing **millions of industrial components** with its Industrialized Additive Manufacturing process.

Advantages

High build rate
High build rate of up to 5'000 cm³/h as enabler for Additive Manufacturing on industrial scale

Low costs
Low production costs compared to other AM technologies

High resolution
High resolution enables micro structures; Bore holes of 0.125 mm and wall thickness of 0.07 mm

Broad material portfolio
Processability of metals, polymers, ceramics, organic materials and bio materials

Multi-material processing
Capability of processing of up to 4 materials in a single layer or across layers

Low post processing requirements
Low post processing requirements due to high surface quality and no necessity of support structures

Low material and energy consumption
Low material and energy consumption during AM process

Flexible production process
Flexibility of production process due to time- and cost-efficient availability of the screens (compared with e.g., die casting)

Mech. properties comparable to sinter parts
Surface diffusion as binding mechanism for metal and ceramic parts

Limitations

Tool dependency
Dependency from part geometry-specific tool

Part size limitations
Max. part dimensions of 430 x 430 x 50 mm (l x w x h)

Geometrical constraints
Limited possibility of adapting geometry along z-axis (adaption of geometry along z-axis only possible by change of screen)

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Focus | Material Portfolio & Fields of Application

Metals

Stainless Steel, Copper Alloys, Titanium Alloys, Quenched and Tempered Steel, Soft-Magnetic Materials, Inconel

Ceramics

Alumina, Zirconia, Silicon Carbide, Alumina Nitride, Bariumtitanate

Further Materials

Polymers, Graphite, Bioinks, Active Pharmaceutical Ingredients (APIs)







Semicon



Automotive



New Energy



MedTech



Pharma



Filter & Fine Structures



Industry



Cooling Structures

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Production Systems | From Lab to Line



EX431 | EX431 GMP

For medium sized series, optional for clean room requirements



EX432i

For large scale production, modular, 1 to 4 printing stations



EX434 iflex GMP

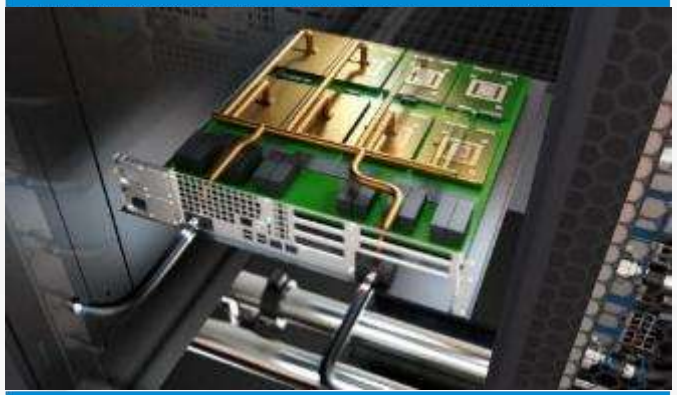
Modular, 1 to 6 printing stations, for multi-material applications, e.g. in Pharma, for clean room requirements

Selected Applications

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High Volume Application | Cooling Structures: SiC, AlN

Application



Component



Description

- Cooling structures, heat sinks
- Increased power density
- Increased cooling demand
- Hot spots
- Customized materials and structures

Added Value through Exentis

+ Customized structures
+ Customized material
+ High voume production feasible
+ High dimensional and surface accuracy

Millions of parts required p.a.!



High Volume Application | RTP – Semiconductor: AlN

Application



Description

- Conversion of ammonia into hydrogen
- Manufacturing of structures with high density
- Very fine and precise chanels
- Leak tight structures
- High surface quality

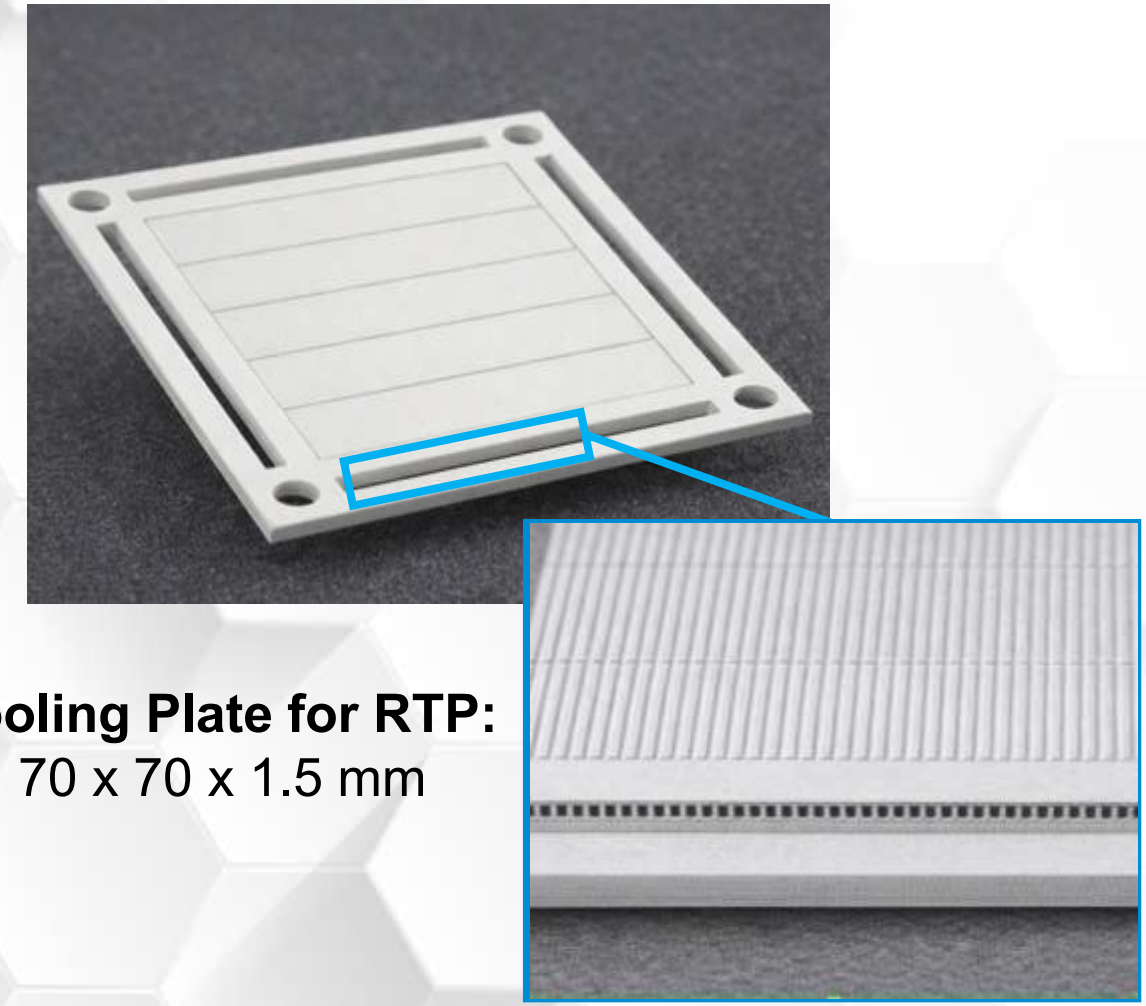
Component



Added Value through Exentis

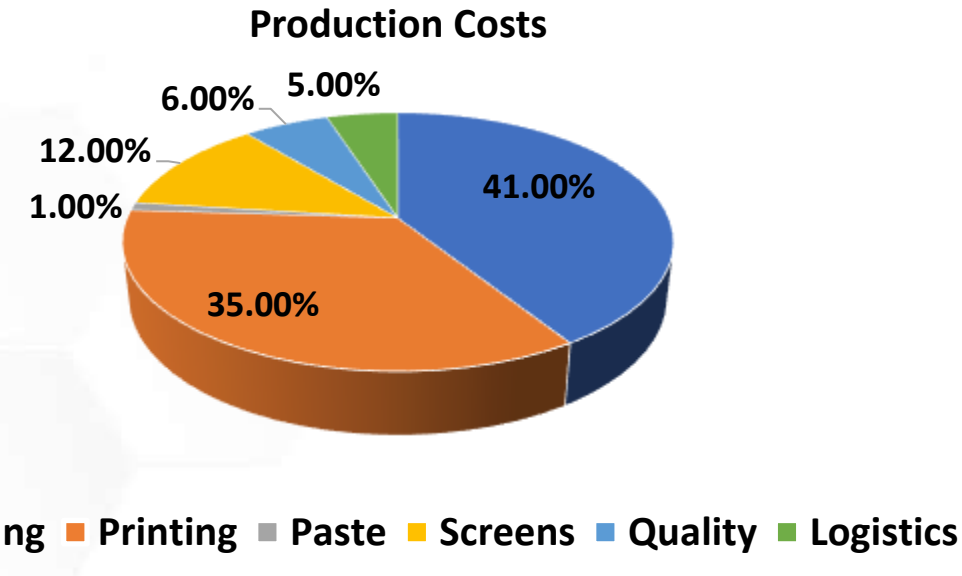
+ Customized structures
+ Only one production technology requires
+ Time savings in production
+ Overprinting without support material
+ No post processing required

High Volume Application | RTP – Semiconductor: AlN



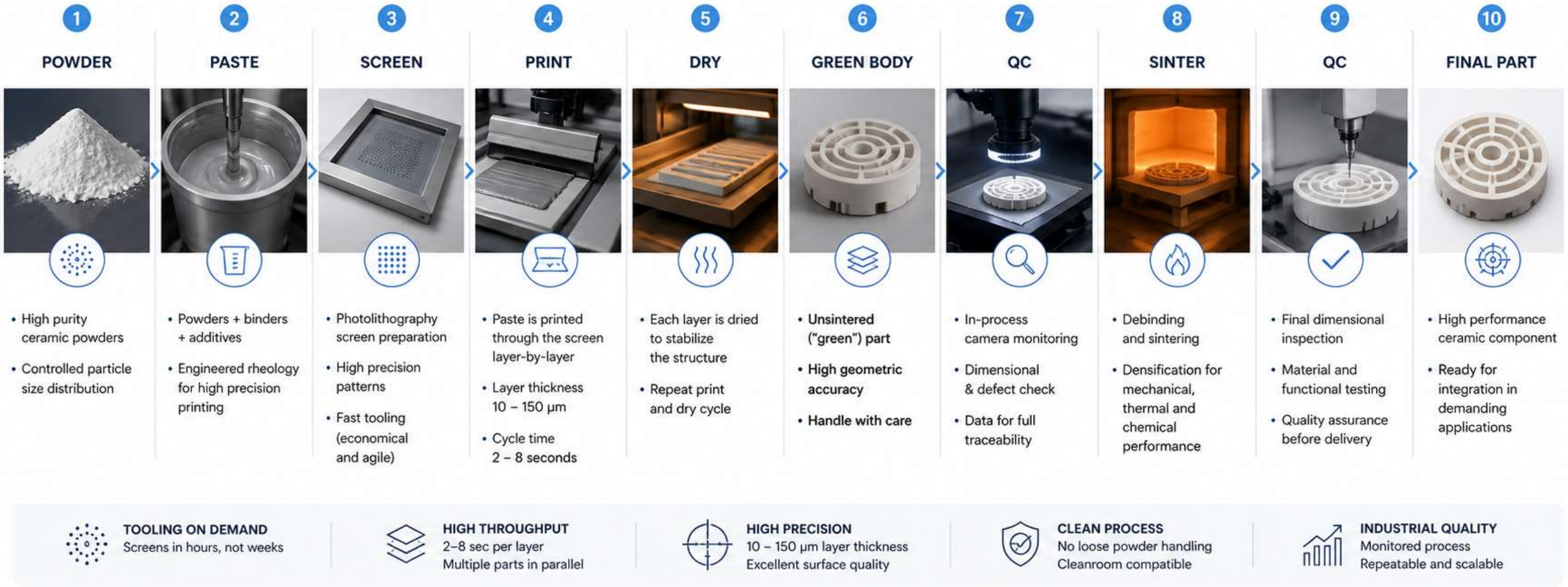
Cooling Plate for RTP:
70 x 70 x 1.5 mm

- **Production Costs:** USD 3.-/pc.
- **Machine Utilization:** 82%
- **Volume:** 250’000 pcs. p.a./1S



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Process Chain | Additive Screen Printing



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