



LET'S PLAY

3D PRINTING

Advanced Ceramic Solutions
in New Dimension

**Additive
Manufacturing with
SiSiC and Al₂O₃**



LET'S 3D PLAY

ADVANCED CERAMIC SOLUTIONS IN NEW DIMENSIONS
3D PRINTING BY CERAMTEC

Additive manufacturing with SiSiC and Al₂O₃

Advanced ceramics from batch size 1 – individually designed additive manufacturing

Additive manufacturing solutions from CeramTec – your benefits

- + Maximum design freedom
- + Flexibility: single-batch customization possible
- + Short delivery times
- + Competent service team
- + Maximum homogeneity, stability and product reliability
- + Simultaneous production of several components on one 3D printer

CeramTec combines the unique product properties of advanced ceramics with the unbeatable process advantages of 3D printing. This is how high-quality, additively manufactured components made of silicon carbide (SiSiC) and aluminium oxide (Al₂O₃) are created: in a large design variety and in the shortest possible production time.

Additive manufacturing without compromise – Silicon Carbide

SiSiC – outstanding material properties

- + Temperature resistance up to 1,350 °C
- + High hardness, stiffness and flexural strength
- + Lower density than metal
- + Very abrasion-resistant
- + Thermal expansion near zero
- + High thermal conductivity
- + Resistant to oxidation
- + Erodible



SiSiC 3D Printing Process

System Specifications		Part Quality	
Build area (w/h/d)	1 job box, 500 x 400 x 300 mm / 19.7 x 15.7 x 11.8 in	Accuracy	± 0,4% (min. ± 0.3 mm)
Layer thickness	150 microns	Minimum feature size	2 mm
Building speed	Approx. 10 mm height per hour	Surface roughness	N11 / Ra25
Material	SiC		

CeramTec SiSiC 3D Material Properties

Properties	Unit	Test specification	ROCAR® 3D light	ROCAR® 3D
Density	g/cm ³	DIN EN 623-2	2,88	2,94
Si content	m%	calculated	~31	~ 24
4-point bending strength	MPa	DIN EN 843-1	150	180
Young's modulus	GPa	DIN EN 843-2 (dynamic)	>280	>300
Thermal conductivity	W/(m x K)	DIN EN 821-2	150	160
Linear thermal expansion coefficient	10 ⁻⁶ /K	DIN EN 821-1	3,9 4,2 4,6	3,9 4,3 4,7

Additive manufacturing without compromise – Aluminium Oxide

Al₂O₃ – outstanding material properties

- + Very good electrical insulation
- + High mechanical & compressive strength
- + High hardness (>1600 HV)
- + Moderate thermal conductivity
- + High corrosion and wear resistance
- + Good gliding properties
- + Low density
- + Operating temperature without mechanical load above 1,000°C



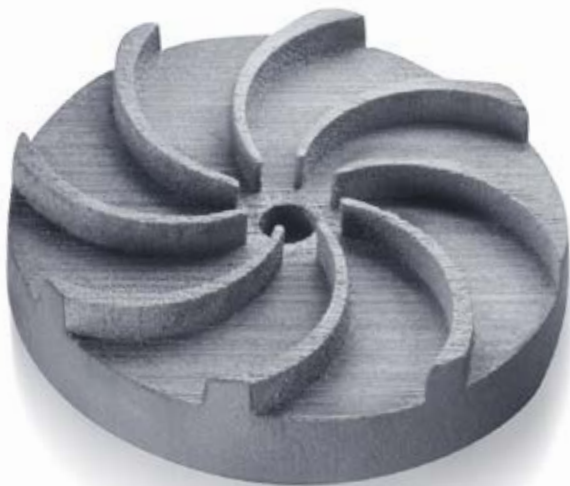
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CeramTec Al₂O₃ 3D Printing Process

System Specifications		Part Quality	
Build area (w/d) on removable build tray	2 trays, 500 x 140 mm / 19.7 x 5.5 in, each	Accuracy	± 50 micron on dimensions up to 5 mm 1% of larger dimensions up to ± 100 micron
Layer thickness	10 microns	Minimum feature size	200 microns
Building speed	Up to 1 mm height per hour	Surface roughness	N7 - N9 / Ra1,6 - 6,3
Material	Alumina Soluble support ceramics		

Benefit from a streamlined process for your success

- + Print directly from CAD data
- + No tooling required
- + Cavities and undercuts possible
- + Short production lead and tooling
- + Maximum flexibility: make design changes with a mouse click
- + Digitalization of existing components possible
- + Competent service team



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THE CERAMIC EXPERTS

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The measured values mentioned before were determined for test samples and are applicable as standard values. The values were determined on the basis of DIN standards and if these were not available, on the basis of CeramTec standards. The values indicated must not be transferred to arbitrary formats, components or parts featuring different surface qualities. They do not constitute a guarantee for certain properties. We expressly reserve the right to make technical changes.