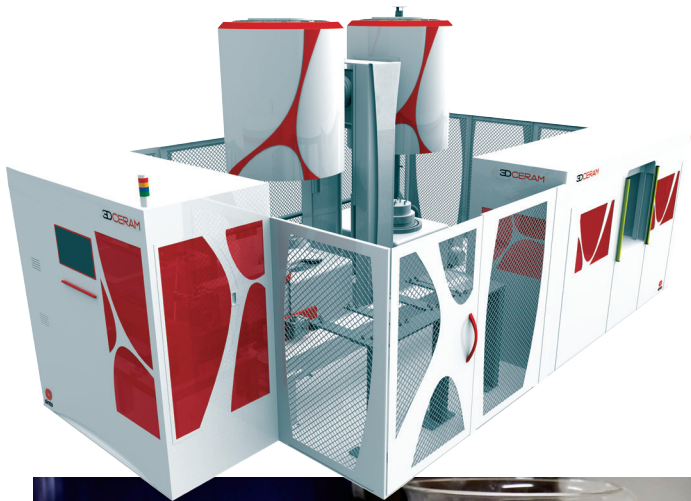


CERAMIC 3D PRINTING

3DMIX - CERAMAKER - SERVICES



The leading Ceramics Additive Manufacturer

Opening new application fields for advanced ceramics with additive manufacturing



Founded in 2001 in Limoges (France), 3DCeram Sinto is directed since 2009 by Christophe Chaput and Richard Gaignon.

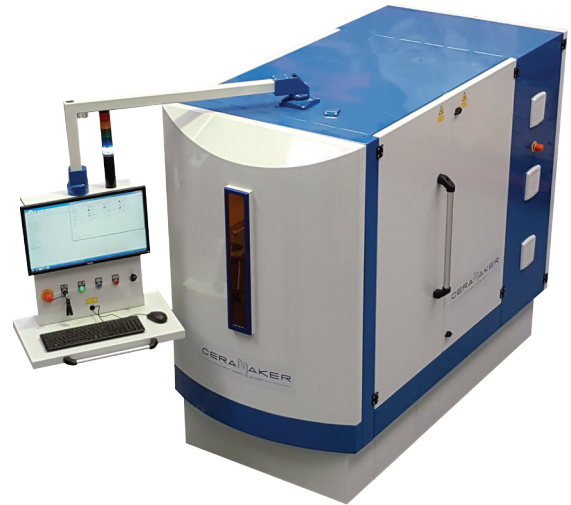
The company built on the laser stereolithography 3D printing technology (SLA) it developed and expanded to establish ceramics in a wide range of new fields and applications.



«The Ceramaker 900 has performed consistently since its installation and churns out Alumina and Zirconia ceramic 3D printed parts reliably. The variety of platform sizes affords flexibility when it comes to choosing the platform. This is particularly useful during machine operations as it minimizes material loading and the overall printing time.»

Sean Looi, Creatz3D Ceramics. Singapore

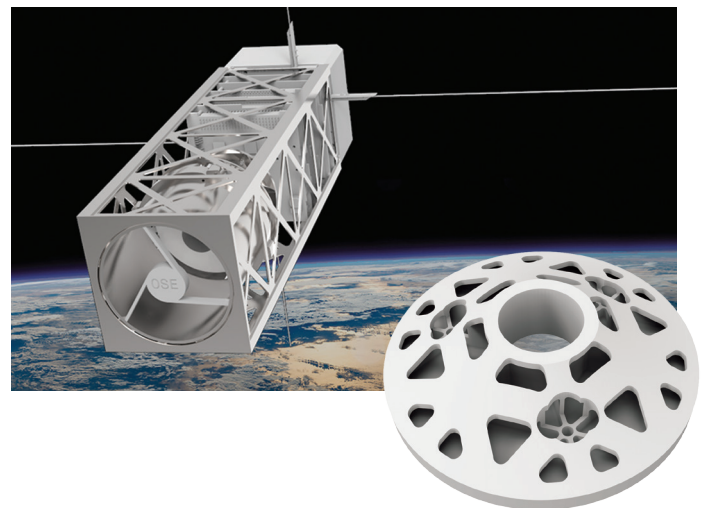
3DCeram Sinto provides customers with unique technological expertise in the field of 3D ceramic printing. It has been producing ceramic parts by additive manufacturing since 2005 thanks to a 3D printer that it has developed for its own needs: the CERAMAKER printer.



CERAMAKER 900

In 2015, 3DCeram Sinto decided to market the CERAMAKER additive manufacturing line and related consumables, equipment and services.

In 2019 the company offers a new hybrid 3D printing line (multimaterials).



- ✓ **3DMIX**, ceramic pastes and suspensions, on-demand formulation
- ✓ **CERAMAKER**, 3D printer and equipment and 3DCERAM 4.0 automated additive manufacturing line
- ✓ **SERVICES**, Ceramaker customers' support, topological optimization of parts and on-demand production

A BROAD SELECTION OF CERAMIC PASTES 3DMIX CERAMIC PASTES FOR 3D PRINTERS.



The team at 3DCeram Sinto, made up mainly of engineers or doctors in ceramics or organic chemistry, has developed a range of ceramic pastes and suspensions that achieve optimal printing results.

Pastes dedicated to the CERAMAKER printers

These pastes are used every day in the 3DCeram Sinto workshop to guarantee a standard of quality that satisfies even the most demanding manufacturers.

Zirconia $3Y ZrO_2$

- > Excellent mechanical properties
- > Chemical inertness
- > Great hardness

Zirconia $8Y ZrO_2$

- > 8 mol% yttria-stabilized zirconia is mainly used for fuel cell.

Silicon nitride Si_3N_4

- > Very resistant, low density
- > Excellent resistance to thermal shocks, wear and corrosion
- > Good electrical insulation

Alumina Toughened Zirconia **ATZ**

- > Resistance to wear and thermal shock
- > Biocompatibility

On-demand formulation

This service, intended mainly for ceramicists, consists in testing ceramics for specific applications.

- ✓ **Formulation**
- ✓ **Definition of the printing parameters**
- ✓ **Definition of the sintering parameters**

Silica SiO_2

- > For foundry cores and also optical applications.

Alumina Al_2O_3

- > Good mechanical behavior
- > Good thermal conductivity

Hydroxyapatite/TCP

- > Chemical composition close to bone
- > Biomedical application

Cordierite

- > Low CTE and thermal conductivity
- > Wear resistant
- > Good for vacuum application

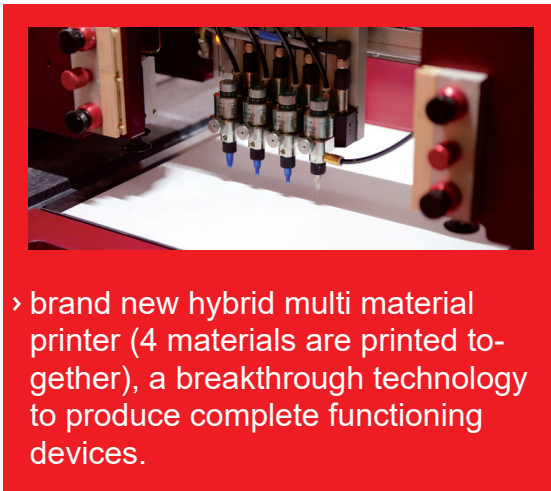


PRODUCTION: THE CERAMAKER 3D PRINTING PRODUCTION LINE

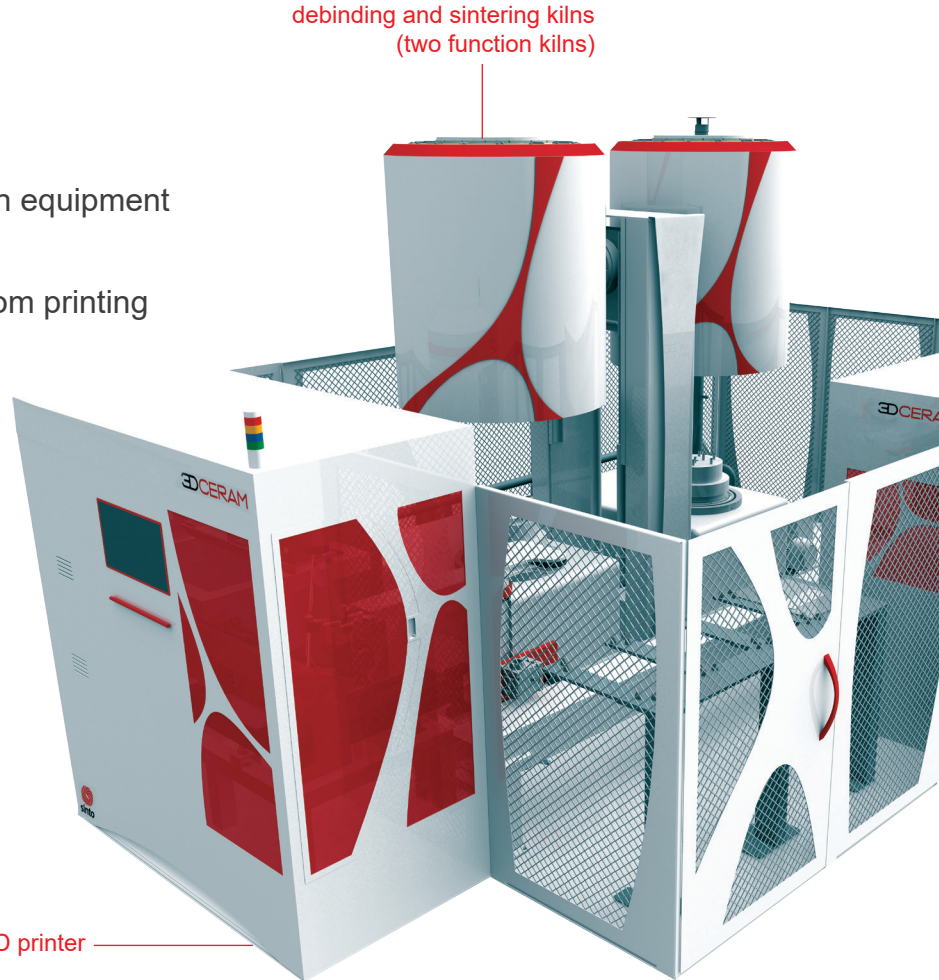
The flexibility of 3D printing, combined with the exceptional properties of ceramics

3DCeram capitalizes on the CERAMAKER for the development of:

- > CERAMAKER 3D printers and production equipment dedicated to additive manufacturing,
- > 3DCERAM 4.0, a fully automated line, from printing to sintering,



- > brand new hybrid multi material printer (4 materials are printed together), a breakthrough technology to produce complete functioning devices.



Producing with the additive manufacturing technology



Creation by CAD

Slicing of the parts before printing

3D printing

Cleaning

Debinding and sintering

Finishing

Other equipment and software supplied with the printer

- ✓ Software suite selected to make the most of the possibilities offered by ceramic 3D printing. Its composition can be tailored according to the type of software you already have.
- ✓ Cleaning hood specifications and installation plan.
- ✓ Oven and refractory supports (optional).

3DCeram Sinto uses 3D laser printing technology (SLA)

With its large platform, the CERAMAKER printer can produce parts measuring up to 20 cm in length.

automated cleaning booths



- ✓ UNIQUE FUNCTIONAL PARTS OR SMALL PRODUCTION RUNS
- ✓ SAME PROPERTIES AS PARTS MADE USING CONVENTIONAL PROCESSES
- ✓ OPEN SYSTEM
- ✓ FROM 100 X 100 MM TO 300 X 300 MM PLATFORM
- ✓ 35 µm RESOLUTION, IRRESPECTIVE OF THE SIZE OF THE WORK PLATFORM
- ✓ FREE LINK SUPPORT TECHNOLOGY FOR SUPPORT MARK-FREE PARTS
- ✓ HYBRID OPTION

New CERAMAKER C900

Ceramaker 3D printers technical data

CERAMAKER 3D PRINTER	Ceramaker C900	Ceramaker C100
Dimensions	1060 x 2250 x 2040 mm (WxDxH)	1000 x 1500 x 1900 mm (WxDxH)
Building platform size	300 x 300 x 100 mm	100 x 100 x 100 mm
Weight	About 1450 kg	About 800 kg
Electrical requirements	220-240 VAC / 50 Hz	
Electric power	2kW	
Light source	UV Laser	
Laser spot diameter	~35 µm	~50 µm
Wavelength UV	355/405 nm	
Layer thickness mm	0.010 – 0.125	
Room operating temperature	20-25 °C	
Room maximum temperature variation	1°C/hour	
Relative humidity	50 %	
Compressed air	6 bars dry	

A DEDICATED SERVICE OFFER THAT WILL HELP YOU BOOST YOUR CERAMIC PROJECT

Combining its ceramic and 3D printing expertise, 3DCeram Sinto designed a new service offer to help you give a new dimension to your ceramic project: let's leverage 3D printing together!

Kick-off packs for Ceramaker line customers



Training (prior to Ceramaker printing line commissioning)

A training that combines theory and practical session held at the 3DCeram Sinto facility in Limoges. The team of operators will first enter the 3rd dimension with ceramics and learn about:

- ✓ 3DCeramic pre-processing
- ✓ Ceramaker® operation & maintenance (technical training)
- ✓ Ceramic post-processing – cleaning, debinding and sintering

Commissioning and on-site training (for Ceramaker 900)

After commissioning and acceptance, operators and maintenance related employees will undergo dedicated on-site training:

- ✓ Ceramaker operation technical training
- ✓ Ceramaker maintenance technical training
- ✓ Launch of validation production run (validation samples)

Service packs for Ceramaker 3D printing line customers

3DCeram Sinto provides 3 service packs dedicated to CERAMAKER owners.

From the first-aid kit (maintenance and spare parts kits)...

...to the complete pack (process optimisation)



✓ Access pack

Equipment related technical support (on line assistance) and spare parts kit.

✓ Serinity pack

Equipment related support (priority on line assistance), spare parts kits and priority delivery service, on-site annual inspection and software update.

✓ Performance pack

On-line process support for users from beginner to confirmed level: CAD file creation, design of 3D print media, manufacturing trouble shooting guide, preparation of the building platform, process audit.

On-demand additive manufacturing service

A service to manufacture your parts and help you develop and fine tune your process



At the start of the 2000s, the biomedical industry chose on-demand additive manufacturing service, 3DCeram Sinto's traditional activity, for the production of ceramic implants. Since then, numerous players in the luxury goods industry, and industry in general (the aerospace and automotive industries, etc.), have turned to 3DCeram Sinto to make their parts.

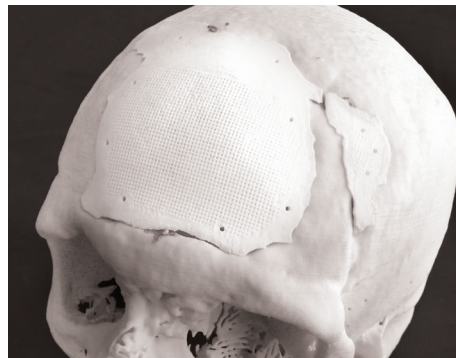


3DCeram Sinto offers help and support in the design and optimization of ceramic parts:

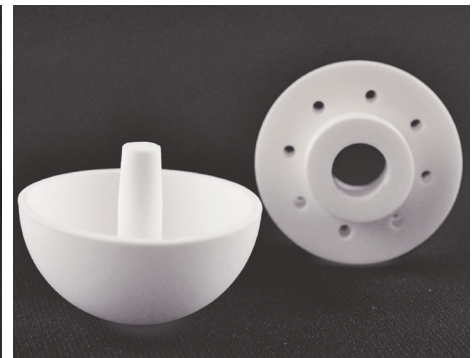
- ✓ Co-Engineering
- ✓ Assistance qualifying key aspects of the specifications (performance, costs and time line)
- ✓ Optimized design proposal



✓ **Luxury**



✓ **Biomedical**



✓ **Industry**



3DCeram Sinto is a french company based in Limoges, in the heart of the European Ceramic Pole of competitiveness.

The company has developed a network of partners to be closer to its customers:

- ✓ China
- ✓ France
- ✓ Germany
- ✓ Israel
- ✓ Italy
- ✓ Japan
- ✓ Korea
- ✓ Russia
- ✓ Singapore
- ✓ Switzerland
- ✓ UK
- ✓ Ukraine
- ✓ United States

and many more to come..
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