CERAMIC 3D PRINTING
3DMIX - CERAMAKER - SERVICES

The leading Ceramics Additive Manufacturer
Opening new application fields for advanced ceramics with additive manufacturing

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.

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

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 ZrO$_2$**

Material with very good mechanical properties at cold temperature, being able to be colored for applications in jewelry, excellent mechanical properties in the high temperatures, weak thermal conductivity at room temperature, conductor in T> 1000°C, great hardness, high wear resistance, low chemical reactivity, good resistance in the attacks of metals.

**Silicon nitride Si$_3$N$_4$**

Silicon nitride is mainly used for aerospace and optical applications but also for biomedical, metrology and semi-conductors also. This ceramic is one of the hardest and most resistant ceramics with low density, excellent resistance to thermal shocks, wear, and corrosion (liquids and gas), low thermal expansion coefficient and good electrical insulation.

**Zirconia 8Y**

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

**Alumina Toughened Zirconia ATZ**

Alumina Toughened Zirconia, known for their biocompatibility, resistance to wear and thermal shock, are recommended for biomedical and industry applications.

**Silica SiO$_2$**

For foundry cores and also optical applications.

**Alumina Al$_2$O$_3$**

Basic material being useful in many applications for technical ceramics, good mechanical behavior in high temperatures, good thermal conductivity, high electric resistivity, hardness, high wear resistance, low chemical reactivity.

**Hydroxyapatite/TCP**

Material used in the biomedical applications for the manufacture of the osseous substitutes, chemical composition close to bone.

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**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
PRODUCTION: THE CERAMAKER 3D PRINTING PRODUCTION LINE

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

3DCeram Sinto shares its expertise through its made-to-measure engineering and start-up services that will help you to make your first parts as quickly as possible.

3DCeram capitalizes on the CERAMAKER for the development of:

- 3DCERAM4 4.0, a fully automated line, from printing to sintering,
- a brand new hybrid multi material printer, a breakthrough technology to produce complete functioning devices,
- large size 3D printers (on demand),
- and, still, CERAMAKER 3D printers and production equipment dedicated to additive manufacturing.

Producing with the additive manufacturing technology

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)

The CERAMAKER is especially well suited to the production of unique functional parts or small production runs of parts with the same properties as those made using conventional processes (machining, injection, etc.).

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

Ceramaker 3D printers technical data

<table>
<thead>
<tr>
<th>CERAMAKER 3D PRINTER</th>
<th>Ceramaker C9</th>
<th>Ceramaker C1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>1060 x 2250 x 2040 mm (WxDxH)</td>
<td>1000 x 1500 x 1900 mm (WxDxH)</td>
</tr>
<tr>
<td>Building platform size</td>
<td>300 x 300 x 100 mm</td>
<td>100 x 100 x 100 mm</td>
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<tr>
<td>Weight</td>
<td>About 1450 kg</td>
<td>About 800 kg</td>
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<tr>
<td>Electrical requirements</td>
<td>220-240 VAC / 50 Hz</td>
<td>2kW</td>
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<tr>
<td>Electric power</td>
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<td>UV Laser</td>
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<tr>
<td>Light source</td>
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<tr>
<td>Laser spot diameter</td>
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<td>Wavelength UV</td>
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<td>Layer thickness mm</td>
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<td>Room operating temperature</td>
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<td>Room maximum temperature variation</td>
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<tr>
<td>Relative humidity</td>
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<tr>
<td>Compressed air</td>
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</tbody>
</table>
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

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 plateform, process audit.
On-demand services

3DCeram Sinto offers a complete range of services to help you design and produce your parts.

Boost the performance of your ceramics with OPTICERAM

Opticeram is a unique service, offering help and support in the design and optimization of ceramic parts before they are produced by 3D printing (weight reductions, increased mechanical strength, etc.).

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

OptiCeram brings a set of tools to design innovative products. For this purpose, we propose to implement the most advanced optimization tools (topological optimization) as well as means of calculation of mechanical and thermal structure.

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.

✓ 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:

- ✔ Austria
- ✔ China
- ✔ France
- ✔ Germany
- ✔ Israel
- ✔ Italy
- ✔ Japan
- ✔ Korea
- ✔ Russia
- ✔ Singapore
- ✔ Spain
- ✔ UK
- ✔ Ukraine
- ✔ United States

and many more to come..

Connect to www.3DCeram.com