

From green parts  
to complete design  
components



## OECHSLER Ceramics: Injection molding and finishing of ceramics

*Production procedures and manufacturing processes – CIM technology | Page 1*

*Finishing and individualization – Design parts with a „deep gloss“ appearance | Page 2*

*At a glance – Ceramic Injection Molding at OECHSLER | Page 2*

### From the „green part“ to the „high-tech part“

Ceramic Injection Molding (CIM) makes it possible in an almost standardized process to mold ceramic compounds into units with highly complex geometries. Thus, the material properties of ceramics are combined with the technical production capabilities of injection molding technology. By constructing specific production plants and optimally adapted processes, it is now for the first time possible to produce CIM components, not only on a mass production scale, but also safely and economically with a minimum of in-process handling.

At the beginning of the process chain, the so-called **green part** is formed by the injection molding process. This means that the component now already has its final geometry immediately after being formed from a mixture of ceramic powder and plastics (feedstock material). In this state, depending on the binder system (composition of the plastics matrix), the component is, from the dimensional point of view, still up to 30% larger than the final product.

In the next step, by a procedure designated as „de-binding process“, the plastics matrix is removed, and then, in a sintering process often called „burning“, the ceramic powder is compressed to form the final ceramic component under high temperature conditions (>1400 °C, depending on the ceramic material). In this process, the component „shrinks“ to the requested

size but still stays within all specified tolerances.

As for **design applications**, in the subsequent manufacturing steps, the grayish and still unattractive ceramic parts are turned into optically and haptically extremely appealing eye-catchers. In grinding and polishing processes, the components are provided with a smooth, high-gloss, deep-black surface finish that is almost indestructible by external influences.

Finally, by using various special techniques, it is possible to partially matt or coat the components (ESD protection, for example), or to apply lettering.



De-binding and sintering in the ceramic furnace

For **technical applications**, a variety of different materials can be used, ranging from aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) through zirconium oxide (ZrO<sub>2</sub>) to silicon nitride. Consequently, ceramic techniques are eligible for use in almost all applications and product fields:

- **Medical technology** (dosing technology, fluidics)

- **Communications and automotive engineering** (design panels/casings, trimmings, control keys)

- **Mechatronics / Actuators** (drive elements such as gear or worm wheels, bearings or magnetic return paths)

- **Industrial applications** (nozzles, sealing discs)

## Finishing and individualization

www.oechsler.com

*With technical ceramic parts, when the requested component quality has already been achieved, appearance applications often require extensive and demanding surface finishing. By using processing techniques such as tumbling (grinding and polishing) or specific component processing, OECHSLER is able to provide design parts featuring not only an extremely high degree of gloss but also a fascinating impression of depth.*



Lettering with laser technology



Enhancement through finishing

On this „perfect“ surface, further styling is now also possible by other processes such as printing, adhesion, painting, lettering, or coating. In this way, design parts

can also be personalized or individualized, not only adding to the high quality already obtained, but also increasing their value.

## At a glance – OECHSLER – Ceramic Injection Molding

- We provide advice in selecting the best possible material, e.g. aluminum oxide (Al<sub>2</sub>O<sub>3</sub>), zirconium oxide (ZrO<sub>2</sub>), silicon nitride, etc...
- Development support (design for manufacture and application)
- Design and manufacture of injection molding tools for CIM technology
- Production of ceramic components and assemblies (large-scale production)
- Surface finishing e.g. high gloss, matt finish, laser lettering, etc...

Locations:

### Germany

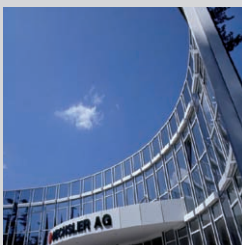
- Ansbach
- Weißenburg
- Küps

### China

- Taicang

### Romania

- Lipova



Our Ansbach Headquarter

## OECHSLER

Germany

OECHSLER AG | Matthias-Oechsler-Strasse 9 | 91522 Ansbach  
Phone: +49 (0) 981 / 1807 - 0 | Fax: +49 (0) 981 / 1807 - 222

Partner:

**Susanne Koepfelle** | PR/Marketing

Phone: +49 (0) 981 / 1807 - 551 | Fax: +49 (0) 981 / 1807 - 290

email: s.koepfelle@oechsler.com | www.oechsler.com