

Our know-how is
your advantage

Ceramic Injection
Molding (CIM)



Metal Injection
Molding (MIM)



Innovation for large-scale serial production: injection molding of ceramics and metals

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A new standard in design and function

The Powder Injection Molding (PIM) process, a specialized method applied in the injection molding field, combines the material properties and application-relevant benefits of ceramics and metals with the manufacturing advantages of injection molding.

As products, we can make solid forms, for instance, from the following materials: zirconium oxide or aluminum oxide ceramics, low-alloy, non-rusting or heat-resistant steels, tool steel, soft magnetic alloys or other special alloys.

In the focus of applications for PIM technology we find all the **advantages these materials offer**, such as:

- high resistance to chemicals,
- good frictional behavior/wear performance (dry run),
- appealing design (high gloss surfacing possible, excellent haptic properties, various colors possible),
- good mechanical properties (high rigidity),
- magnetic behavior, and
- good thermal behavior (high temperature stability; similar thermal expansion-ceramics/steel)

in synergy with **process-technical advantages**, such as:

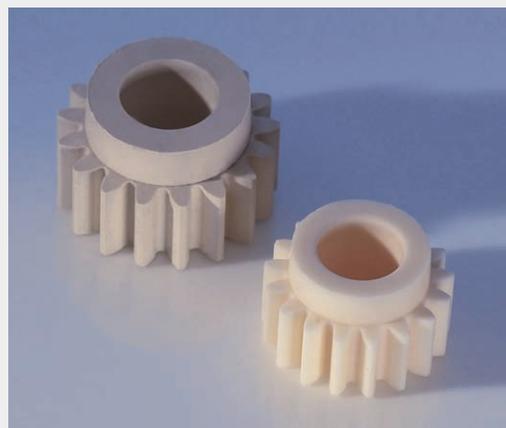
- free, three-dimensional form design,
- special processes are possible (2-component injection molding),
- high processing safety.

Exemplary product fields for PIM technology are found in the:

- **medical technology field** (dosing technology, fluidics),
- **communications and automotive technologies** (design covers and casings, trimmings, control keys)
- **mechatronics/actuators** (drive elements like gear or worm wheels, bearings, magnetic return path).

Highest precision
– even in complex
components

With PIM, the manufacturing process is a multi-stage procedure, which consists in preparing a plastic highly filled with metallic/ceramic particles, its injection molding (“green” part), de-binding (plastics removal) and sintering. According to whether ceramic or metallic fillers are being processed, the PIM techniques are distinguished into Ceramic Injection Molding (CIM) and Metal Injection Molding (MIM).



Gear wheel with “green” part

Robust process linking as key to success

Component groups
with PIM prod-
ucts – only from
OECHSLER

Linked up with the molding processes, we frequently use finishing techniques like tumbling, grinding and polishing, if necessary, combined with treatments such as printing, gluing, stove-enameling and laser finishing. At OECHSLER, using these techniques, we are able to provide you with a product featuring individually conceived surfaces as to function and design.

A major factor ensuring the safe and reliable production of ceramic and metallic components is our continuous and consistent monitoring and control of the entire process. One important measure in this context consists of a systematic thermal management within the processing chain; here at OECHSLER, this is firmly based on coordinated FEM-simulation, controlled precision process management and monitoring.

In our special field, we place major emphasis on conception and design of injection

molding tools, as well as an intercoordinated process management of the injection molding, de-binding and sintering processes. By constructing manufacturing units adapted for specific applications and optimizing the processes involved, it has become possible, for the first time, to manufacture PIM components serially in large quantities safely and economically with a minimum amount of handling.

As a systems supplier of component assemblies incorporating plastics, OECHSLER provides further advantages. For our customers, we can also integrate injection-molded ceramics/metals in complex component groups by means of manual, semi- and fully automatic assembly processes. As required, we can also make the precision plastic parts necessary for this purpose through other specialized IM processes such as polymer bonded magnets, IMD, multi-component technique, and in-mold assembly.



Ceramic micro part



Cover made by MIM technology

OECHSLER – Powder Injection Molding at a glance

- Application-related selection of materials (plastic, metal, ceramic)
- Development support (design for manufacture and application)
- Design and manufacture of injection molding tools for PIM technology
- Manufacture of components in PIM (CIM and MIM) techniques
- Appearance-specific finishing (e.g., glossy / matte) and lettering
- Assembly of component groups

Locations:

Germany

- Ansbach
- Weißenburg
- Küps

China

- Taicang

Romania

- Lipova



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