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# INCERAMICS S.A.

## CERAMIC INJECTION MOULDING: PRECISION AND STRENGTH

Dear Sir or Madam,

We have the pleasure of informing you about our new Ceramic Injection Molding (CIM) production line. This method allows us to manufacture ceramic components of complex shapes with narrow dimensional tolerances and sharp edges. We can use CIM with nearly all ceramic materials. We typically use high alumina and structural zirconia ceramics, in addition to zirconia solid electrolytes.

The CIM production process is similar to that of thermoplastic injection molding. In most cases, machine finishing is not necessary, even when the smoothest of surfaces are required.

We use ecological injection materials and remove from our products approximately 50% of the plastifier in water bath. Because our mold constructions are often the same as those typically used in plastic injection, it is easy to design new products and applications.

Basic Parameters of selected ceramic materials:




1) Alumina ($Al_2O_3$) - high degree of scratch and thermal resistance, as well as hardness:

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|---|---|
| Flexural strength: | 300-380 MPa |
| Compressive strength: | 2000 MPa |
| Maximal usable temperature: | 1750° C |

2) Yttria Partially Stabilized Zirconia ($ZrO_2$-$Y_2O_3$) - highly durable, high flexural strength, as wells as good slide characteristics:

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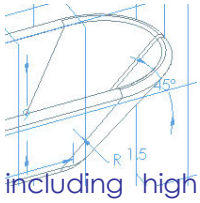
|---|---|
| Flexural strength: | up to 1000 MPa |
| Compressive strength: | up to 4500 Mpa |
| Maximal usable temperature: | 1500° C |

3) Yttria Fully Stabilized Zirconia ($ZrO_2$-$Y_2O_3$) - possesses selective ionic conductivity and excellent thermal resistance:




| | |
|---|---|
| Flexural strength: | 200 MPa |
| Compressive strength: | 2000 MPa |
| Maximal usable temperature: | 2200° C |

4) Zirconia - Alumina composite possessing unique thermomechanical properties, including high thermal shock resistance, mechanical strength and hardness.

Depending on our customer's needs, we can use materials with parameters that meet specific application requirements. In some cases, we can glue ceramic elements together.

We invite you to take advantage of both our engineering staff's experience and knowledge, as well as our production capabilities. It is our great pleasure to help our customers make use of the possibilities of modern ceramics.

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| Laboratory Ceramics | Structural Ceramics | Knives and Technical Blades | Ceramic Glues | |
| Heating Elements | Ceramic Casings | Ceramic Sensors | Electric Assembly Tools | Technological Machine Parts |