



## Alumina Ceramic

Alumina ceramics( $Al_2O_3$ ) is the most common technical ceramics material, with very high hardness. The material has excellent properties in terms of electrical insulation, high thermal conductivity, high chemical resistance, good wear resistance and low thermal expansion.

### Features Of Alumina Ceramic

- ◆ Relatively low density;
- ◆ Extremely high operating temperature;
- ◆ Very high hardness and compressive strength;
- ◆ Excellent electrical insulation properties;
- ◆ Corrosion and wear resistance;
- ◆ Biologically inert, food compatibility.

### Typical Applications

- ◆ Wire and wire guide;
- ◆ Mechanical seal components;
- ◆ Machine parts;
- ◆ Electronic parts and substrates;
- ◆ Ballistic armor;
- ◆ Roller and ball bearings;
- ◆ Wear-resistant lining;
- ◆ Semiconductor parts;
- ◆ Precision shafts and sleeves in high-wear environments.

Great Ceramic are experts in the production of technical ceramics, we offer ceramic processing, ceramic materials, ceramic casting, ceramic metal packaging and surface metallization services.

[Contact us](#) for more information!

### Alumina Ceramic Properties

The following only lists the performance parameters of the three most common aluminum oxide ceramics. Normally, alumina ceramics are composed of these types.

#### MECHANICAL

Properties	Unit	95% $Al_2O_3$	99% $Al_2O_3$	99.5% $Al_2O_3$
Colour	—	White	Yellow	Yellow
Density	g/cm <sup>3</sup>	3.7	3.85	3.9
Hardness	GPa	13.7	15.2	15.7
Compressive Strength	MPa	2000	2160	2350
Flexural Strength	MPa	280	310	350
Fracture Toughness	MPa · m <sup>1/2</sup>	3~4	3~4	4.5
Modulus of Elasticity	GPa	320	360	370
Poissons Ratio	—	0.23	0.23	0.23

#### THERMAL

Properties	Unit	95% $Al_2O_3$	99% $Al_2O_3$	99.5% $Al_2O_3$
Maximum Use Temperature	°C(No load)	1650	1650	1650
Thermal Conductivity	20°C, W/(m · K)	24	29	32
Thermal Expansion	40 – 400°C, × 10 <sup>-6</sup> /°C	7~8	7~8	7~8
Specific Heat	J/(kg · K)	780	790	780
Thermal Shock Resistance	°C(Put in water)	200	200	200

#### ELECTRICAL

Properties	Unit	95% $Al_2O_3$	99% $Al_2O_3$	99.5% $Al_2O_3$
Dielectric Constant	1MHz	9.4	9.9	9.9
Dielectric Strength	V/m	15 x 10 <sup>6</sup>	15 x 10 <sup>6</sup>	15 x 10 <sup>6</sup>
Dielectric Loss	1MHz	4 x 10 <sup>-4</sup>	2 x 10 <sup>-4</sup>	1 x 10 <sup>-4</sup>
Volume Resistivity	25°C, Ω · cm	> 10 <sup>14</sup>	> 10 <sup>14</sup>	> 10 <sup>14</sup>
Volume Resistivity	500°C, Ω · cm	> 10 <sup>8</sup>	> 10 <sup>8</sup>	> 10 <sup>10</sup>

\*The values are typical material properties and may vary according to products configuration and manufacturing process.

## Alumina Product Introduction



### Alumina Ceramic Rods

Alumina ceramic rods with different diameters and precisions can be customized according to customer needs, and have the characteristics of high temperature resistance and wear resistance.

[Learn More](#)



### Alumina Ceramic Tubes

Alumina ceramic tubes of different diameters and precision can be customized according to customer needs, and have the characteristics of high temperature resistance and wear resistance.

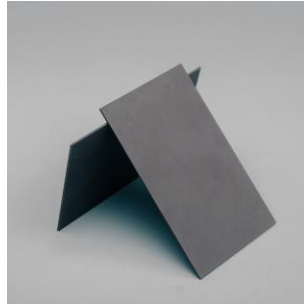
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### Alumina Ceramic Substrate

Great Ceramic provides a variety of alumina ceramic substrates with superior overall performance, good thickness uniformity, and high density.

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### Black Alumina Substrate

Provide black alumina ceramic substrates with the characteristics of good insulation performance, small expansion coefficient, high sensitivity and strong light shielding.

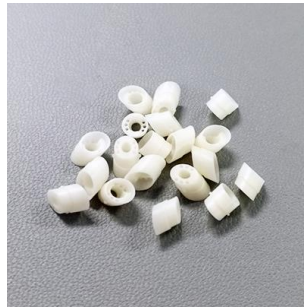
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### Laser Cutting

Laser cutting is utilized to process intricate patterns, penetrating grooves and holes, and pre-treated demarcation lines for breaking on ceramic substrates.

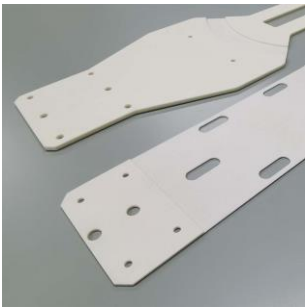
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### Mold Injection Molding

Ceramic injection molding (CIM) has advantages for mass production of ceramic products with high dimensional accuracy and complex shapes.

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### Custom Machining

Great Ceramic has a wide range of grinding and machining equipment to provide customers with efficient ceramic machining solutions.

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### Ceramic Pumps

Designs and manufactures high quality custom ceramic filling pumps for precise fluid transfer in demanding industries.

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### Ceramic Brazing

Great Ceramic provides precision brazing of dissimilar materials such as metals and ceramics to create high-performance brazed assemblies.

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### Surface Metallization

Provides metallized ceramic parts for applications in the power electronics industry such as vacuum circuit breakers, speed control tubes and microwave tubes.

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