InstaVoxel

Mg-PSZ Zirconia (MgO-Partially Stabilized ZrO_2)

Technical Datasheet

Material Description

Mg-PSZ zirconia is a transformation-toughened engineering ceramic partially stabilized with magnesia. It is known for its exceptional fracture toughness, impact resistance, wear resistance, corrosion resistance, and thermal shock performance.

Its engineered microstructure enables stress-induced phase transformation near an advancing crack, helping resist crack propagation under severe mechanical and thermal loading. It is particularly suited to wear-critical tooling, fluid-handling parts, and non-ferrous metal-forming applications.



Example Component: Mg-PSZ zirconia ceramic rod.

Key Features

- **Exceptional fracture toughness and impact resistance**
- **Excellent thermal shock resistance**
- **Excellent wear and abrasion resistance**
- **Excellent chemical and corrosion resistance**
- **High electrical resistivity at room temperature**
- **Low thermal conductivity**

Common Applications

- Wear- and corrosion-resistant industrial components
- Metal extrusion dies and forming tools
- Guide rollers for welded tube production
- Pump, valve, and seal components
- Oil and gas severe-service components
- Thermal-shock-resistant tooling

Physical & Electrical Properties

Density	~5.7–5.8 g/cm³
Thermal Expansion (CTE)	~9.9–10.2 × 10^{-6}/K at 25–400°C
Thermal Conductivity	~2.2–3.1 W/m·K
Electrical Resistivity	≥10^{11} Ω·cm at room temperature, grade-dependent
Maximum Use	Up to ~800°C
Chemical Resistance	Excellent

Mechanical & Performance Properties

Hardness	~10–12 GPa (Vickers Hardness)
Flexural Strength	~600–820 MPa
Compressive Strength	~1,700–2,000 MPa
Fracture Toughness	~12–15 MPa·$m^{1/2}$
Young's Modulus	~205 GPa
Wear Resistance	Excellent

Technical Assistance

Our knowledgeable staff, supported by our in-house team of expert metallurgists and engineers, is ready to assist you with any technical inquiries.

InstaVoxel™ - On-Demand Manufacturing Expert

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