

HIPed ATZ

HIPed ATZ Ceramic Parts by Ceramforge

At **CeramForge**, we specialize in manufacturing **Hot Isostatically Pressed (HIPed) Alumina Toughened Zirconia (ATZ) ceramics**, engineered for exceptional strength, toughness, and durability. Our **HIPed ATZ ceramics** undergo a high-temperature, high-pressure processing technique that eliminates porosity, enhances density, and improves mechanical performance, making them ideal for extreme environments.

Chemical Composition

Oxide Component	Typical Composition (%)
ZrO ₂ (Zirconia)	~80%
Al ₂ O ₃ (Alumina)	~20%
Y ₂ O ₃ (Yttria)	~4-5%
SiO ₂ (Silica)	<0.5%
TiO ₂ , Fe ₂ O ₃ , CaO, MgO (Trace Oxides)	<0.5%

Note: These values are approximate and may vary depending on the specific processing and material grade.

APPLICATIONS

Medical & Biomedical

- Dental implants
- Orthopedic components (hip/knee replacements)
- Surgical instruments

Industrial & Wear Components

- Bearings, bushings, and pump seals
- Cutting tools and nozzles
- Wear-resistant liners

Aerospace & Defense

- Structural components
- High-performance insulators
- Protective armor

Automotive & Energy

- Fuel cell components
- Engine parts

HIPed ATZ Properties

At CeramForge, our **HIPed ATZ ceramics** are designed for industries demanding **unmatched toughness, longevity, and reliability**. We ensure **precision engineering and quality control**, making our components the best choice for critical applications.

Property	Units	Test Method	ATZ (20) HIPed
Color	-	-	White/Gray
Density	g/cm ³	ISO18754	5.45
Water absorption	-	ASTM-373	Nil
Fracture Toughness K	MPa m ^{1/2}	ASTM C-1421 - Chevron Notch	8
Modulus of Elasticity	GPa	ASTM E-1876-99	280
Modulus of Rupture 4 pt	MPa	ASTM C-1161	1600
Hardness Vickers	Kg/mm ²	ASTM C-1327-08	1550
Poisson Ratio	-	ASTM E-1876-99	0.26
Compressive Stregth	MPa	ASTM C-773	2500
Thermal Conductivity RT	W/m°K	ASTM C-408	6.00
Coefficient of Thermal Exp.	X106/°C (25-1000°C)	ASTM C-372	9.0
Maximum Material Use Limit	°C	No Load	1500

Note: These values are approximate and may vary depending on the specific processing and material grade.

KEY PROPERTIES

- **High Fracture Toughness (7.5–9.0 MPa·m^{1/2})**
Enhanced resistance to cracking and impact.
- **Superior Strength & Hardness**
Higher mechanical performance compared to standard ZTA or pure zirconia.
- **Excellent Wear & Abrasion Resistance**
Suitable for high-friction applications.
- **Thermal Shock & Corrosion Resistance**
Withstands extreme temperatures and aggressive chemical environments.
- **High Precision & Surface Finish**
Achieves **tight tolerances and low surface roughness**, making it ideal for high-performance applications.

Innovating Ceramics. Advancing Industries.

For Further information,
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