Photonics On Crystals

POC-OC-122488-Ohara Cearceram-Z Glass Datasheet

1 Main Features

- Near-zero thermal expansion ensures exceptional dimensional stability for high-precision applications.
- High thermal resistance and mechanical durability suitable for extreme environments.
- Outstanding optical clarity and homogeneity across a broad range of applications.
- Processed and customized by POC for various optical, industrial, and metrological uses.
- Excellent performance in precision instruments, optics, and demanding scientific applications.

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2. Material General Description

Ohara Cearceram-Z Glass is a premium glass-ceramic material renowned for its exceptional thermal and mechanical properties. While this material is manufactured by Ohara, Photonics On Crystals (POC) specializes in processing Cearceram-Z Glass into custom components tailored for a wide range of industries.

This glass-ceramic material is distinguished by its near-zero coefficient of thermal expansion, ensuring unparalleled dimensional stability even under significant temperature variations. Cearceram-Z is highly resistant to thermal and mechanical stresses, making it ideal for applications

requiring long-term precision and durability. It is widely used in optical systems, high-performance metrology instruments, and other advanced scientific and industrial applications.

The material's exceptional homogeneity and stability make it indispensable for high-performance optics, from astronomical telescopes to cutting-edge photonics devices. Its versatility is complemented by POC's expertise in shaping, coating, and customizing Cearceram-Z Glass for specialized requirements.

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3. General Applications and Examples

1. **Astronomy and Optics:**
   Ohara Cearceram-Z Glass is widely used in telescope mirrors and optical substrates for astronomical applications. Its thermal stability ensures precise optical performance even under fluctuating temperatures.
2. **Semiconductor and Lithography:**
   Cearceram-Z Glass serves as a critical substrate material in lithography tools and semiconductor manufacturing, where thermal expansion must be minimized to achieve nanometer-level precision.
3. **Metrology and Measurement:**
   Due to its dimensional stability, Cearceram-Z Glass is ideal for high-precision measurement tools, including interferometers, coordinate measuring machines, and optical comparators.
4. **High-Performance Optics:**
   Custom optical components such as mirrors, windows, and beam splitters are fabricated from Cearceram-Z for applications in laser systems and imaging devices.
5. **Scientific Instruments:**
   Used in a variety of advanced research instruments, Cearceram-Z Glass ensures reliability and precision for applications demanding extreme accuracy and stability.

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4. Chemical, Physical, or Structural Properties

Property	**Value**
Material Type	Glass-ceramic
Density	~2.5 g/cm³
Thermal Expansion Coefficient	~0.02 × 10^-6/K
Young's Modulus	90 GPa
Poisson's Ratio	0.24
Hardness (Knoop)	~650
Refractive Index (at 550 nm)	~1.54
Transparency Range	0.3–2.5 µm

Chemical Durability	Resistant to acids and alkalis

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5. Optical, Laser, or Nonlinear Optical Properties

Property	Value
Thermal Stability	Ultra-stable for precision optics
Surface Quality	10-5 (scratch-dig)
Surface Flatness	λ/10 @ 632.8 nm
Optical Homogeneity	Excellent across large dimensions
Absorption Coefficient	Low, minimizing energy loss

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6. Spectrum Transmission Curves

Transmission characteristics of Cearceram-Z Glass exhibit high transparency within the 0.3–2.5 µm range. This allows for superior performance in visible and near-infrared applications. Spectrum transmission data can be provided upon request.

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7. Coating Specification

- **Anti-Reflective Coatings:** Customizable coatings to enhance transmission for specific wavelength ranges.
- **Metallic Coatings:** For high reflectivity, especially in laser systems.
- **Protective Coatings:** Durable coatings for enhanced longevity in demanding environments.

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8. Standard Fabrication Specifications

Specification	Value
Dimensional Tolerance	±0.02 mm
Surface Flatness	λ/10 @ 632.8 nm
Parallelism	<5 arcseconds
Scratch-Dig Quality	10-5
Maximum Size	Up to 800 mm (customizable)
Beveling	<0.2 × 45°

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9. POC Strength and Capabilities

Photonics On Crystals

Photonics On Crystals (POC) provides advanced customization and fabrication of Ohara Cearceram-Z Glass, transforming this high-performance material into precision components tailored for diverse applications. With a commitment to quality and precision, POC ensures that every product meets the specific needs of industries ranging from optics to semiconductor manufacturing.

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10. Standard Products

Product	**Dimensions (mm)**	**Surface Flatness**	**Price (USD)**
Cearceram-Z Optical Substrate	100 × 100 × 20	λ/10	$2,500–$4,500
Cearceram-Z Prism	50 × 50 × 10	λ/8	$1,500–$3,000
Cearceram-Z Optical Window	200 × 200 × 30	λ/6	$3,500–$6,500
Customization Options	Available upon request	Tailored Specifications	Contact for quote