



IR Transmitting Germanium Oxide Glass

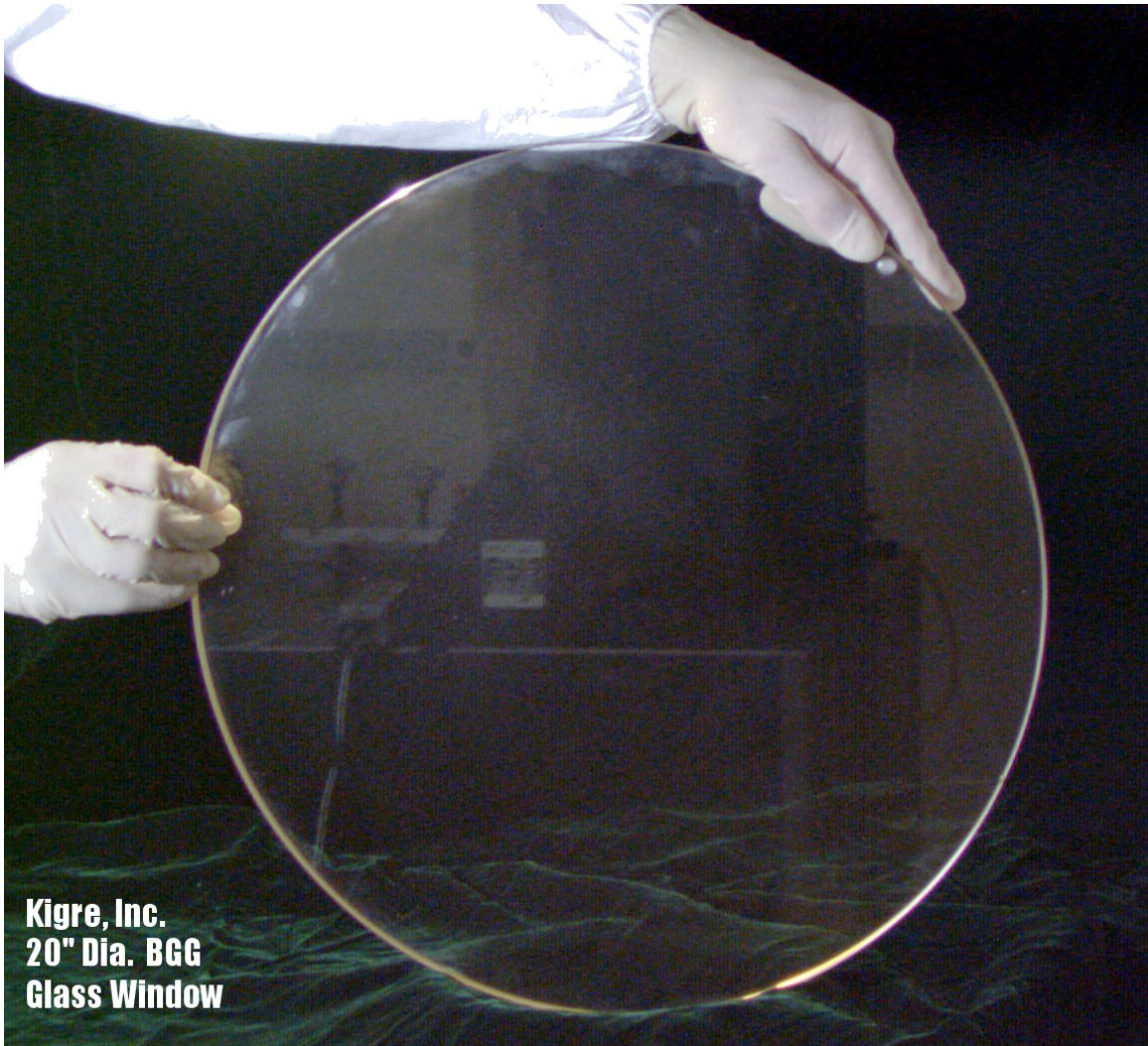
Germanium oxide glass compositions exhibit high transmission in the visible and near IR (300nm – 5.0µm). The low multiphonon emission properties of germanate glasses doped with Holmium & Thulium allow them to be used as a 2.1µm laser materials. BGA, G-115 is an ion-exchangeable germanate glass composition which may be chemically strengthened. Kigre offers custom glass melting of germanate glasses for use in the fabrication of Vis-NIR windows, fiber, optical waveguides or laser gain elements. Large IR windows (up to 1 meter dia.) are made to order basis to customer supplied specifications.

Property	*BGA	**BGG	**BZG
Index of Refraction (n _D)	1.663	1.785	1.775
Index of Refraction (3.8µm)	1.61	1.69	1.68
Abbe Number	45.6		
dn/dt (20-40 °C.) (x 10 ⁻⁵ /°C.)	+1.2	+0.8	
Stress Optic x 10 ⁻¹⁴ (Pa ⁻¹) @ 3.39µm		1.0	
Transformation Temperature (°C.)	741	704	688
Deformation Temperature (°C.)	873	719	710
Liquidus Temperature (°C.)		1127	1130
CTE, Expansion (20-40°C) (x 10 ⁻⁷ /°C)	63.4	90	83
CTE, Expansion (20-100°C) (x 10 ⁻⁷ /°C)		96	74
Density (g/cc)	3.6	4.8	5.0
Thermal Conductivity (W/cm°C)	0.0055	0.0060	0.0065
Heat Capacity J/g · °C @ 25 °C		0.52	
Thermal Diffusivity (cm ² /sec) 25-100°C		0.00281	0.00294
Specific Heat (W-sec/g-K) 25-100°C		0.4-0.46	0.41-0.47
Young's Modulus (x 10 ⁺⁶ PSI)	12.2	9.2	11.3
Poisson's Ratio	0.29	0.30	0.31
Knoop Hardness (Kg/mm ²)	560	442	490
Shear Modulus (x 10 ⁺⁶ psi)		3.65	4.46
Flexural Strength, Mod of Rupture (psi)		11,480	11,340

*Composition used for the Stinger Post missile domes

**Compositions developed by NRL & Kigre with improved IR performance

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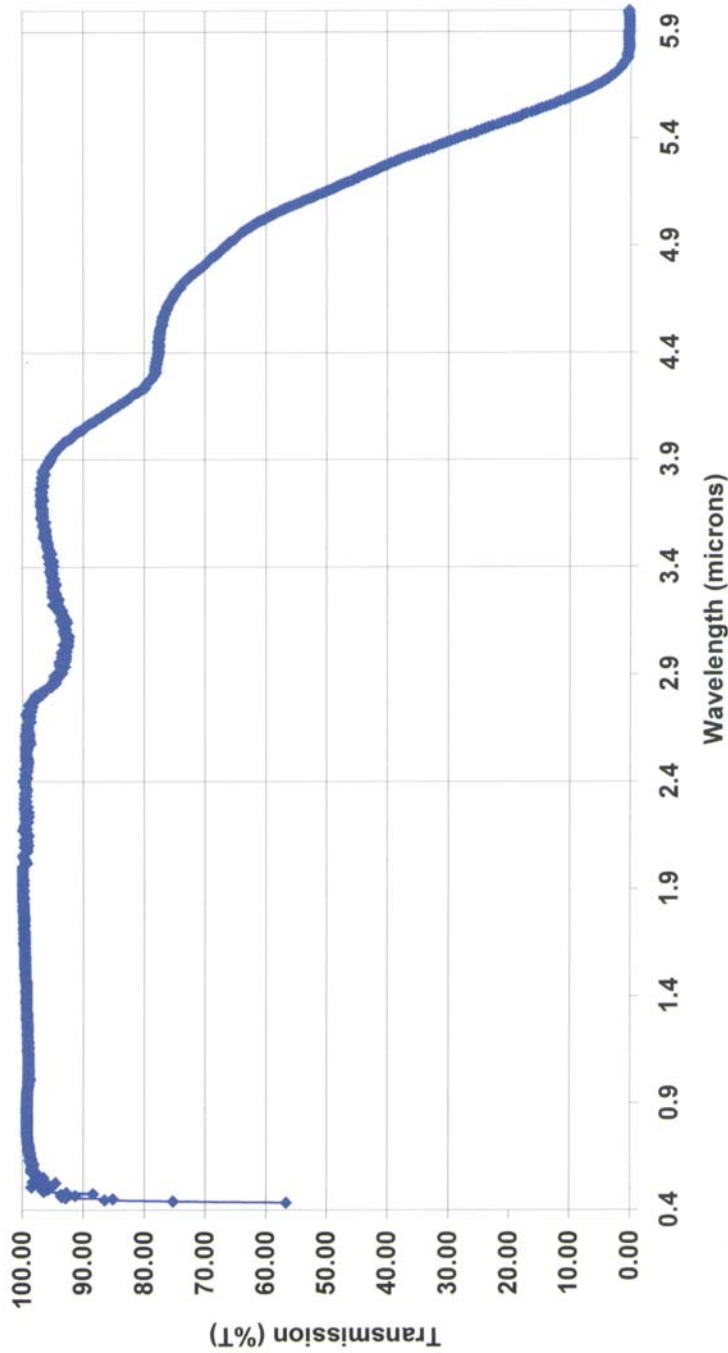
Kigre, Inc.
20" Dia. BGC
Glass Window

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BGG Glass Transmission Spectra 12.7mm Path Length Sample



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