SEALED OPTICS

Germanium

Optical

Transmission Range :	1.8 to 23 µm
Refractive Index :	4.0026 at 11 µm
Reflection Loss :	53% at 11 µm (Losses from two surfaces)
Absorption Coefficient :	0.027 cm^{-1} @ 10.6 µm

Physical

Density :	5.33 g/cm^3
Melting Point :	936 °C
Thermal Conductivity :	58.61 W m^{-1} K^{-1} at RT
Linear CTE :	6.1 x 10^{-6}/°C at RT
Specific Heat Capacity :	310 J Kg^{-1} K^{-1}

Mechanical

Youngs Modulus (E) :	102.7 GPa
Shear Modulus (G) :	67 GPa
Bulk Modulus (K) :	77.2 GPa
Rupture Modulus :	89.6 Mpa
Hardness :	780 Knoop
Poisson Ratio :	0.28

Chemical

Chemical Formula	Ge
Solubility :	Insoluble in water
Molecular Weight :	72.59 g/mole

Notes

The refractive index of Germanium changes rapidly with temperature. The material becomes opaque at all wavelengths above 75°C as the band gap saturates with thermal electrons.The lowest-absorbing Ge optics are limited to a throughput power range of 50-100 watts before thermal lensing or thermal runaway.