



E.R. PRECISION OPTICAL

"ONCE YOU LOOK THROUGH OUR OPTICS, YOUR CHOICE WILL BE CRYSTAL" CLEAR™



MATERIAL DATA SHEET – Germanium (Ge)

GERMANIUM

The most notable physical characteristics of germanium are its high index of refraction and its low optical dispersion. These make it especially useful for wide-angle camera lenses, microscopy, and for the core part of optical fibers. Germanium is the material of choice for systems operating in the far IR wavelength 8-12 microns. It is especially used as the front optic in thermal imaging cameras for passive thermal imaging and for hot-spot detection in military, night vision system in cars, and fire fighting applications.

ER Precision Optical offers custom crystals, grown to meet your advanced optics specifications.

MATERIAL CHARACTERISTICS

GROWTH METHOD	Czochralski (CZ) grown material (purity) Optical grade (>99.99999%) Solar grade (>99.999%) Custom grade—please specify
CRYSTALLINE FORM	Single crystal Poly-crystal
ORIENTATION	<100>, <111>
TYPE	N-type (Antimony) P-type (Gallium)
RESISTIVITY	Customer specific (0.005—500 Ω-cm) Undoped Standard to custom optical ranges Solar applications
SIZES	Full ingots, blanks, flats, wedges up to Ø200 mm Custom machined part dimensions available

PHYSICAL PROPERTIES

Melting Point	938°C
Density	5.33 g/cm ³
Thermal expansion coefficient	5.7 x 10.6 per G rad Celsius
Young's Modulus	102.7 GPa <100> 155.6 GPa <111>
Modulus of rupture	72.4 MPa
Hardness	780 Knoop
Intrinsic resistivity	53 Ω-cm

OPTICAL PROPERTIES

Transmission Range	2 to 12µm 46% at 25°C
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