

High Damage Threshold, ZnS Optics for Mid-IR Lasers

These ZnS or CLEARTRAN™ optics deliver higher laser damage threshold, better spectral performance, improved environmental stability and greater mechanical durability over anything previously available. They are specifically intended for use with Ho:YAG pumped optical parametric oscillators (OPO's) and other laser systems operating in the 2 μm to 5 μm spectral range. The substrates are precision ground and polished and then coated using ion beam sputtering (IBS) technology. The IBS process yields fully densified thin films which are virtually impervious to water absorption and, thus, extremely stable. These characteristics make them particularly well suited for demanding applications such as IR countermeasures, laser designating/rangefinding, atmospheric sensing, and small molecule spectroscopy.

This series of ZnS optics includes both flat and radiused components with substrates ranging from 5 mm to 150 mm in diameter. They all feature high surface accuracy ($\lambda/10$ at 632.8 nm) and excellent surface quality (20-10), and are offered with a wide range of antireflection, high reflection and multi-spectral coating options. The laser damage threshold of the antireflection bands of these coatings has been measured to be $>8 \text{ J/cm}^2$ (at 2.05 μm in a 75 nsec pulse), while high reflection bands have demonstrated a damage resistance of $>50 \text{ J/cm}^2$ (for the same pulse specifications).



Typical Multi-Wavelength Optics Specifications

Materials	ZnS, CLEARTRAN™
Typical Wavelengths of Operation	2 μm – 5 μm
Surface flatness	$\lambda/10$ @ 633 nm
Coating types	High reflection, antireflection, multi-spectral, beamsplitter, polarizing
Damage threshold	
- High reflection coating	$>50 \text{ J/cm}^2$ (at 2.05 μm in a 75 nsec pulse)
- Antireflection coating	$>8 \text{ J/cm}^2$ (at 2.05 μm in a 75 nsec pulse)
Temperature range	-196 °C to 400 °C
Humidity range	0 to 100%
Size range (length)	15 mm to 150 mm
Surface Quality	20-10
Clear Aperture	90%