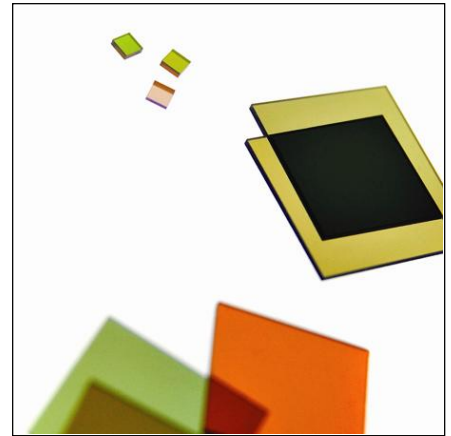
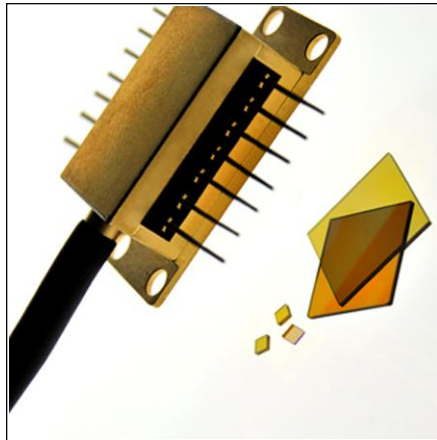


POLARCOR™ Glass Polarizers

Product Information

Specialty Materials



Corning® Polarcor™ is a high performance glass polarizer, featuring excellent optical performance, compact size and unmatched durability, that meets the most stringent requirements of the telecommunications, aerospace and defense, medical and many other markets.

Polarcor is a keystone optical element in polarization-dependent isolators, optical modulators, polarimetry systems, ellipsometers, shutters and many other polarization-based devices. Polarcor is characterized by high extinction and low insertion loss throughout the 600 nm to 2300 nm wavelengths. The polarization mechanism (resonant absorption by elongated silver crystals within the glass material) ensures the elimination of stray light, by absorbing the unwanted polarization. Since Polarcor is a solid glass product it is extremely resistant to chemical, physical and thermal damage, while exhibiting excellent optical properties. Polarcor products are Telecordia, Military Spec and ROHS compliant, are radiation resistant and have been qualified for space applications.

Polarcor can be used to:

- Create or block polarized light
- Reduce glare and suppress reflections
- Enhance contrast of images
- Modulate energy
- Control intensity and color
- Improve signal to noise ratio

Applications:

- Polarization-dependent optical isolators
- Infrared sensors
- Instrument filters
- Modulators
- Fiber polarizers
- Magnetic anomaly detectors
- Various fiber optic devices

Reliability

Polarcor has served the telecommunications market since 1984 and has been used in millions of optical isolators without any reported failures.

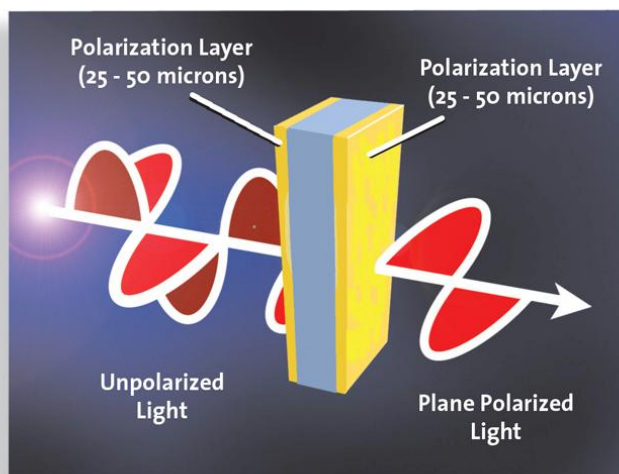
Typical Polarcor Performance

The table below shows typical performance for nominal wavelengths of 633 nm – 2100 nm.

| λ_{Nominal} (nm) | 633 | 800 | 900 | 1060 | 1310 | 1480 | 1550 | 2100 |
|--|---|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|--------------------|
| Polarization Bandwidth (nm) | 630 - 700 | 740 - 860 | 840 - 960 | 960 - 1160 | 1275 - 1345 | 1460 - 1500 | 1510 - 1590 | 2000 - 2100 |
| Contrast Extinction Ratio (dB) | > 10,000:1 > 40 | > 10,000:1 > 40 | > 10,000:1 > 40 | > 10,000:1 > 40 | > 100,000:1 > 40 | > 100,000:1 > 40 | > 100,000:1 > 40 | > 10,000:1 > 40 |
| Transmittance (%) Insertion Loss (dB) without AR-Coating | > 76.5 < 1.16 | > 84.0 < .76 | > 87.0 < 0.60 | > 88.5 < 0.53 | > 90.5 < 0.43 | > 90.5 < 0.43 | > 90.5 < 0.43 | > 90.5 < 0.43 |
| Transmittance (%) Insertion Loss (dB) for 2 sides AR-Coated | > 83.9 < 0.76 | > 93.1 < 0.39 | > 94.3 < 0.25 | 95.7 < 0.19 | > 98.5 < 0.06 | > 98.5 < 0.06 | > 98.5 < 0.06 | - - |
| Refractive Index @ λ_{Nominal} | 1.5210 | 1.5161 | 1.5138 | 1.5123 | 1.5088 | 1.5061 | 1.5051 | 1.5020 |
| Reflectance R (%) per each side* | < 0.4 | < 0.4 | < 0.4 | < 0.4 | < 0.4 | < 0.4 | < 0.4 | < 0.4 |
| Thickness (mm) | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 & 0.20 | 0.50 & 0.20 | 0.50, 0.20 & 0.15 | 0.50 |
| Thickness Tolerances | ±0.05 mm for product with 0.5 mm thickness and ±0.03 mm for products with 0.2 mm and 0.15 mm thickness. | | | | | | | |

* This is the measured reflectance of a witness sample at $0^\circ \pm 5^\circ$ AOI (Angle of Incidence) with randomly polarized light and where the incident media is air. The witness sample is a substrate such as BK7 material coated along with Polarcor™ parts and it is used for spectral and durability tests.

| Wavelength Bandwidth (nm) | Polarcor™ WIDE Band™ | |
|--|---|---------------------|
| Polarization Bandwidth (nm) | 600 - 1100 | 1275 - 1635 |
| Contrast Extinction Ratio (dB) | > 10,000:1 > 40 | > 100,000:1 > 50 |
| Transmittance (%) Insertion Loss (dB) without AR-Coating | > 60.0 < 2.20 | - - |
| Transmittance (%) Insertion Loss (dB) for 2 sides AR-Coated | > 66.0 < 1.8 | > 93.1 < 0.39 |
| Refractive Index @ Wavelength Bandwidth | 1.5218 – 1.5107 | 1.5083 – 1.5034 |
| Reflectance R (%) per each side* | < 1.0 | < 0.2 |
| Thickness (mm) | 0.50 | 0.50 & 0.2 |
| Thickness Tolerances (mm) | ±0.05 mm for product with 0.5 mm thickness and ±0.03 mm for products with 0.2 mm and 0.15 mm thickness. | |



Typical key specifications for Polarcor™ UltraThin™

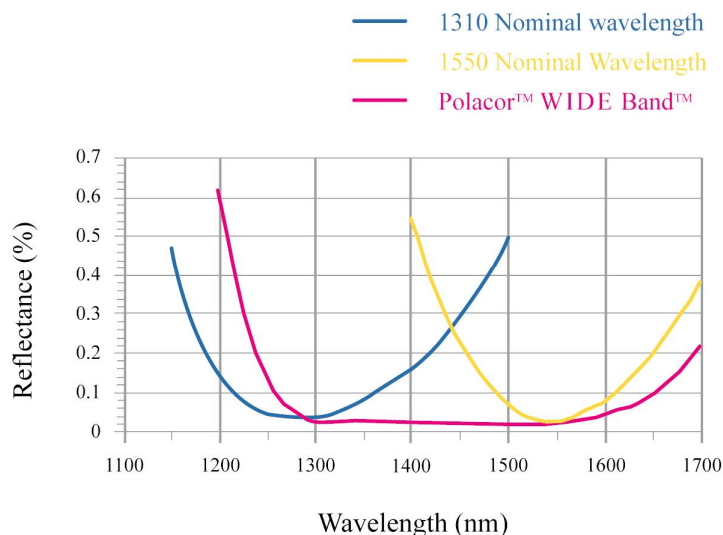
| λ_{Nominal} (nm) | 1060 | 1310 | 1550 |
|---|-------------|-------------|-------------|
| Polarization Bandwidth (nm) | 960 - 1160 | 1275 - 1345 | 1510 - 1590 |
| Contrast | > 200:1 | > 200:1 | > 200:1 |
| Extinction Ratio (dB) | > 23 | > 23 | > 23 |
| Transmittance (%) | > 88.5 | > 88.5 | > 88.5 |
| Insertion Loss (dB) without AR-Coating | < 0.53 | < 0.53 | < 0.53 |
| Thickness (μm) | 30 \pm 10 | 30 \pm 10 | 30 \pm 10 |

All Polarcor™ UltraThin™ products are offered without AR-Coating.

| Thermal Properties | Value | Unit |
|----------------------------------|-----------------------|--------------------|
| Coefficient of Thermal Expansion | 65 x 10 ⁻⁷ | /°C or /°K |
| Mechanical Properties | | |
| Young's Modulus | 58.6 | GPa |
| Poisson's Ratio | 0.21 | |
| Knoop Hardness | 480 | Kg/mm ² |

Key Benefits

- Low insertion loss in polarization-dependent isolators
- High isolation
- Performance durability and stability in harsh environments
- Ability to handle high power applications
- Flexible designs:
 - As small as 1.0 mm x 1.0 mm and up to 34 mm x 45 mm for 0.2 mm thickness; up to 34 mm x 74 mm for 0.5 mm thickness (34 mm is parallel to the polarization axis)
 - Square, rectangle, hexagon and round shapes
- With or without anti-reflective coatings
- Variety of Polarization Axis Angles relative to the edge of the part (such as +45°, -45°, +30°, -30°, etc)
- Wavelength ranges from 600 nm to 2300 nm
- Large acceptance angles allow customers greater packaging design flexibility



The graph at the left shows typical reflectance spectrum for Polarcor at nominal wavelengths of 1310 nm and 1550 nm, and for Polarcor™ W I D E Band™.

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