

Polarcor™ Glass Polarizers

Product Information

Photonic
Materials



CORNING
Discovering Beyond Imagination

PI201

Issued: December 2006

Supersedes: April 2006

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, medical, military/defense and space industry.

Product Description

Polarcor is a thin glass material through which light is transmitted as highly linearly polarized when the polarization state of the incident light is parallel to the polarization axis. Polarcor is one of the essential optical elements 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, insures the elimination of stray light by absorbing the unwanted light. Since Polarcor is a solid glass product it is extremely resistant to chemical, physical, and thermal damage while exhibiting excellent optical properties.



*Polarcor Glass
Polarizer*

Applications

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

Flexibility

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

Reliability

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

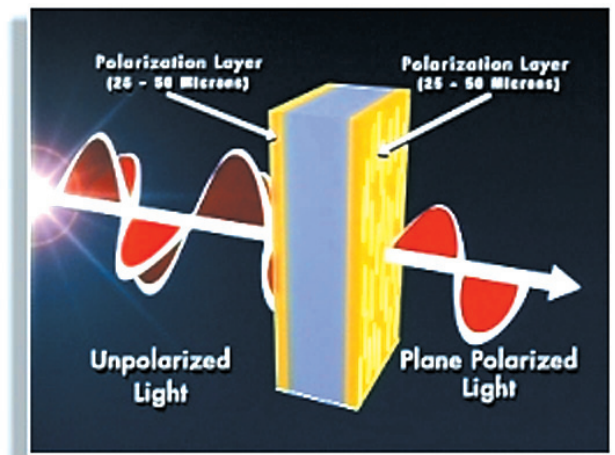
Typical Polarcor Performance

The table below shows typical performance for nominal wavelengths of (633 – 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 – 2300
Contrast Extinction Ratio (dB)	> 10,000:1 > 40	> 10,000:1 > 40	> 10,000:1 > 40	> 10,000:1 > 40	> 100,000:1 > 50	> 100,000:1 > 50	> 100,000:1 > 50	> 10,000:1 > 40
Transmittance (%) Insertion Loss (dB) without AR-Coating	> 76.5 < 1.16	> 84.0 < 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	> 91.3 < 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	< 0.25	< 0.25	< 0.25	–
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 (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.							

* This is the measured reflectance of a witness sample at $0^\circ \pm 5^\circ$ AOI (Angle of Incidence) with a 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™ W I D E B a n d™	
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	> 98.5 < 0.06
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 & 0.20
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 Extinction Ratio (dB)	> 200:1 > 23	> 200:1 > 23	> 200:1 > 23
Transmittance (%) Insertion Loss (dB) without AR-Coating	> 88.5 < 0.53	> 88.5 < 0.53	> 88.5 < 0.53
Thickness (μm)	30 ± 10	30 ± 10	30 ± 10

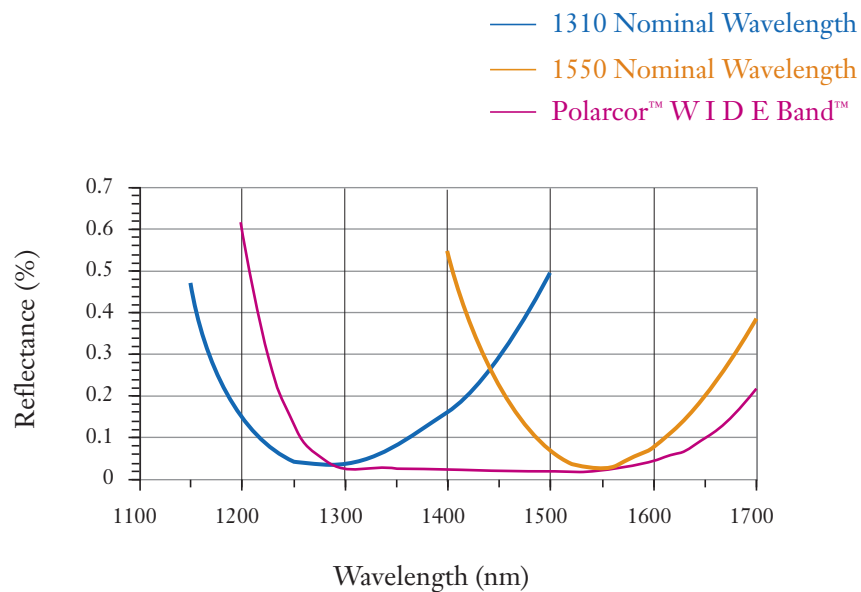
All Polarcor™ UltraThin™ products are offered without AR-Coating.

Thermal Properties	Value	Unit
Coefficient of Thermal Expansion	65×10^{-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 x 1.0 mm and up to 34 x 45 mm for 0.2 mm thickness, and up to 34 x 75 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 coating
- Variety of Polarization Axis Angles relative to 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

Figure 1 shows the typical reflectance spectrum for Polarcor at nominal wavelengths of 1310 and 1550, and for Polarcor™ W I D E Band™



Corning Incorporated
Photonic Materials
HP-CB-o8
Corning, NY 14831
Tel: +1 607.974.7966
Fax: +1 607.974.4658
Email: polarizer@corning.com
www.corning.com/photonicmaterials

Corning China Ltd.
34th Floor, Manulife Tower
169 Electric Road
North Point
Hong Kong
Tel: 852-2807-2723
Fax: 852-2807-2152

Corning (China) Ltd.
Shanghai Representative Office
31/F The Center
989 Chang Le Road
Shanghai 200031
China
Tel: 86-21-5467-4666
Fax: 86-21-5407-5899

Corning Korea Company Ltd.
10th Floor, Kukje Center Building
191, Hangang-Ro 2-Ka
Yongsan-Ku, Seoul, 140-702
Korea
Tel: 82-2-796-9500
Fax: 82-2-796-9300

Corning International K.K.
Akasaka Intercity 6th Floor
1-11-44 Akasaka, Minato-ku,
Toyko, 107-0052
Japan
Tel: 81-3-3586-1052
Fax: 81-3-3587-0906

Corning International Taiwan Co. Ltd.
Room #1203, 12F, No. 205
Tun Hua North Road
Taipei, 105, Taiwan
Taiwan
Tel: 886-2-2716-0338
Fax: 886-2-2716-0339

Corning GmbH-Corning International
Abraham-Lincoln Strasse 30
D65189 Wiesbaden
Weisbaden
Germany
Tel: 49-611-7366-100
Fax: 49-611-7366-143