

OPTICAL ISOLATION WITH CIRCULAR POLARIZERS

Circular Polarizers transmit either left-circular polarized light or right-circular polarized light for an input beam of any polarization state.

When circularly polarized light is reflected, its propagation direction reverses, changing left-circular polarization to right-circular polarization and vice-versa. Therefore the same polarizer that produces circular polarization of the incident beam will block the return beam.

Achievement of optical isolation using the circular polarizers described in this catalog requires that the reflection be specular and that no significant depolarization or polarization modification occur by any intervening medium between the reflector and optical isolator.

We offer circular polarizers in two basic designs, each for use in air:

- Dichroic Polarizer/Zero-Order Retarder
- Beamsplitting Polarizer/Zero-Order Retarder

Both designs take advantage of the handedness change of a circularly polarized beam upon reflection. Again, by changing the handedness of the circularly polarized beam, back reflections are blocked by the polarizer.

The degree of this blocking is commonly used to evaluate circular polarizer performance. Termed “isolation”, it can be considered similar to the extinction ratio specification of a linear polarizer.

Isolation represents the percentage of an incident beam which is blocked on its second pass through the circular polarizer. High isolation implies less light will be returned to the source.

A more detailed description of the characteristics of circularly polarized light is provided in *Polarized Light in Optics and Spectroscopy*. This reference (and others) can be found on page 3.

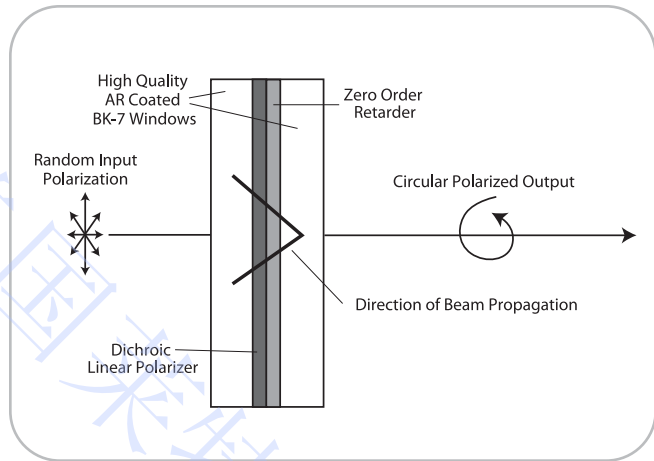
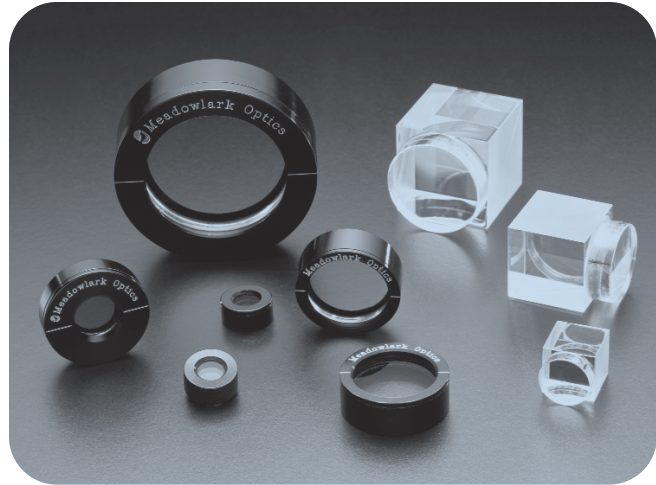


Fig. 1-22 | Dichroic Circular Polarizer construction

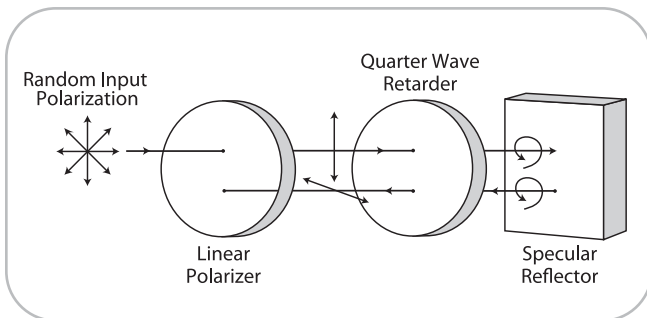


Fig. 1-21 | Optical isolation using a circular polarizer

CUSTOM SIZES ARE AVAILABLE.

PLEASE CONTACT OUR SALES DEPARTMENT TO OBTAIN A PRICE LIST OF STANDARD MEADOWLARK OPTICS COMPONENTS.

DICHOIC CIRCULAR POLARIZERS



Meadowlark Optics Dichroic Circular Polarizers consist of a dichroic linear polarizer and true zero-order quarter-wave retarder. Accurately aligning the retarder fast axis at 45° to the linear polarization direction ensures optimum performance.

True zero-order retarders (page 27-28) are used in the assembly of our Dichroic Circular Polarizers. Tight retardance tolerancing also contributes to the final performance.

Once aligned, both polarizer and retarder materials are laminated between high quality optical flats, providing less than $\lambda/5$ transmitted wavefront distortion. Antireflection coated windows ensure surface losses are minimized.

Achievement of the desired polarization effect requires proper orientation of your Dichroic Circular Polarizer. Be sure to position the indicator marking in the direction of beam propagation.

Our standard Dichroic Circular Polarizers are designed for single wavelength applications. Achromatic versions are also available on a custom basis. Please call for application assistance.

KEY BENEFITS

- High isolation
- Large diameters available
- Low transmitted wavefront distortion

SPECIFICATIONS

| | |
|--|--|
| Polarizer Material: | Dichroic Polymer |
| Retarder Material: | Birefringent Polymer |
| Substrate Material: | BK 7 Grade A, fine annealed |
| Standard Wavelengths: | 532, 632.8, 670, 780, 850, 1064, and 1550 nm |
| Isolation: | 99.8% |
| Transmitted Wavefront Distortion (at 632.8 nm): | |
| Visible: | $\leq \lambda/5$ |
| Near Infrared: | $\leq \lambda/2$ |
| Surface Quality: | 40-20 scratch and dig |
| Beam Deviation: | |
| Visible: | ≤ 1 arc min |
| Near Infrared: | ≤ 2 arc min |
| Reflectance (per surface): | 0.5% |
| Diameter Tolerance: | |
| Mounted: | ± 0.005 in. |
| Unmounted: | +0/-0.010 in. |
| Temperature Range: | -20°C to $+50^\circ\text{C}$ |
| Recommended Safe Operating Limit: | 1 W/cm ² , CW |
| <i>Prolonged exposure to strong ultraviolet radiation may damage these polarizers.</i> | |

ORDERING INFORMATION

| Diameter (in.) | Clear Aperture (in.) | Thickness (in.) | Part Number |
|------------------|----------------------|-----------------|-----------------------|
| <i>Mounted</i> | | | |
| 1.00 | 0.40 | 0.23 | CPM - 050 - λ |
| 1.00 | 0.70 | 0.35 | CPM - 100 - λ |
| 2.00 | 1.20 | 0.50 | CPM - 200 - λ |
| <i>Unmounted</i> | | | |
| 0.50 | 0.40 | 0.13 | CP - 050 - λ |
| 1.00 | 0.80 | 0.25 | CP - 100 - λ |

Meadowlark Optics standard Dichroic Circular Polarizers provide left-hand circular output. Please call to request a quote for right-hand circular output.