Precision Retarder

Meadowlark Optics specializes in precision polymer retarders for the visible to near infrared region. Our Precision Retarders have the highest optical quality and tightest retardance tolerance of all polymer retarders. These true zero-order Precision Retarders consist of a birefringent polymer cemented between two precision polished, optically flat BK 7 windows. The retarder fast axis is conveniently marked for quick and easy reference.

Precision Retarders are supplied with a broadband antireflection coating. Optical transmittance of a Precision Retarder is typically greater than 97%. The retardance δ at a wavelength λ that is different from the center wavelength λc is given by:

$$\delta \approx \delta c(\lambda c / \lambda)$$

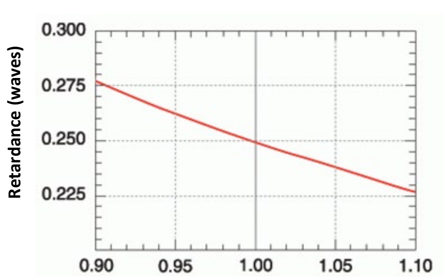
where δc is the retardance at λc.

This relationship is very important when using sources which vary in wavelength from their nominal value. The 2 graphs show the retardance behavior as a function of relative wavelength for a quarter- and half-wave retarder, respectively. The Mueller calculus can be used to calculate the transmitted polarization state based upon the retardance differences from the ideal case.

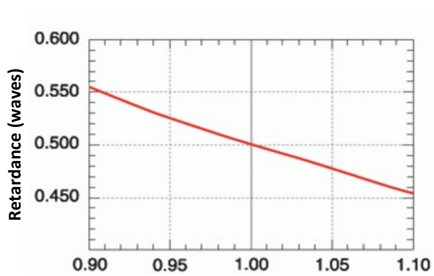
Since polymer retarders are true zero-order devices, they offer the significant advantage of improved angular performance. You can expect less than 1% retardance change over ±10° incidence angle.

Meadowlark Optics has developed precision ellipsometric techniques that can measure retardance to λ/1000.Our metrology for these measurements is the best in the industry. You can have absolute confidence that the calibration measurements supplied with your retarder are of the highest accuracy obtainable.

Quarter-Wave Precision Retarder Performance



Half-Wave Precision Retarder Performance



Key Features

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True zero-order retarders

Excellent off-axis performance

Unequaled measured accuracy

Less temperature dependence than quartz waveplates

Lower cost than compound zero-order waveplates

Better angular acceptance than compound zero-order quartz waveplates

Waveplate Suite

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Precision Retarder

Precision Achromatic Retarder

Precision Superachromatic Retarder

Dual-Wavelength Retarder

Wide Field Retarder

Liquid Crystal Variable Retarder

Polymer Film Retarder

Raptor Applied Polymer Retarder

Large Aperture Retarder

Bi-Crystalline Achromatic Retarder

SPECIFICATIONS

Retarder Material	Birefringent Polymer
Substrate Material	N-BK7
Stardard Wavelengths	532, 632.8, 670, 780, 850, 1064, and 1550 nm
Custom Wavelengths	400 – 1800 nm (please specify)
Standard Retardances	λ/2 and λ/4
Retardance Accuracy	≤ λ/350
Retardance Change (at 30˚tilt)	≤ λ/32 (Half-Wave) and ≤ λ/59 (Quarter-Wave)
Transmitted Wavefront Distortion	≤ λ/5
Surface Quality (scratch-dig)	40 – 20
Beam Deviation	≤ 1 arc-min
Reflectance (per surface)	≤ 0.5% at normal incidence
Threshold	500 W/cm^2, CW 600 mJ/cm^2, 20 ns, visible 4 J/cm^2, 20 ns, 1064 nm
Operating Temperature Range	20˚C to 50˚C

Custom retardance values and sizes are available.
Please call for a quote.

ORDERING INFORMATION

Mounted			
Clear Aperture in. (mm)	***Dimensions ± 0.005 in. (± 0.13 mm)***	***Thickness ± 0.020 in. (±0.51 mm)***	***Part Number***
Half-Wave			
0.40 (10.2)	Ø1.00 (Ø25.4)	0.25 (6.35)	NHM – 050 – λ
0.70 (17.8)	Ø1.00 (Ø25.4)	0.35 (8.9)	NHM – 100 – λ
1.20 (30.5)	Ø2.00 (Ø50.8)	0.50 (12.7)	NHM – 200 – λ
Quarter-Wave			
0.40 (10.2)	Ø1.00 (Ø25.4)	0.25 (6.35)	NQM – 050 – λ
0.70 (17.8)	Ø1.00 (Ø25.4)	0.35 (8.9)	NQM – 100 – λ
1.20 (30.5)	Ø2.00 (Ø50.8)	0.50 (12.7)	NQM – 200 – λ
Unmounted			
Clear Aperture in. (mm)	***Dimensions +0/-0.010 in. (+0/-0.25 mm)***	***Thickness ± 0.020 in. (± 0.51 mm)***	***Part Number***
Half-Wave			
0.40 (10.2)	Ø0.50 (Ø12.70)	0.13 (3.3)	NH – 050 – λ
0.80 (20.3)	Ø1.00 (Ø25.4)	0.26 (6.3)	NH – 100 – λ
1.60 (40.6)	Ø2.00 (Ø50.8)	0.51 (13.0)	NH – 200 – λ
Quarter-Wave			
0.40 (10.2)	Ø0.50 (Ø12.70)	0.13 (3.3)	NQ – 050 – λ
0.80 (20.3)	Ø1.00 (Ø25.4)	0.26 (6.3)	NQ – 100 – λ
1.60 (40.6)	Ø2.00 (Ø50.8)	0.51 (13.0)	NQ – 200 – λ

Please specify your center wavelength λ in nanometers when ordering. Custom sizes and shapes with improved transmitted wavefront distortion and/or beam deviation are available. Please call for a quote.