

PhotonEdge

Precision Optical Components

Zero Order Wave Plate

Product Datasheet | Quartz Crystalline | $\lambda/4$ & $\lambda/2$ Retardation | Low Temperature Sensitivity

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1. Product Overview

PhotonEdge Zero Order Wave Plates are precision optical components manufactured from high-quality crystalline quartz using cemented or optically contacted construction. These wave plates achieve true zero-order retardation by combining two quartz plates of opposite crystallographic orientation, providing extremely low temperature sensitivity and broader spectral bandwidth compared to multiple order wave plates.

Our zero order wave plates are available in both 1/4 wave (90 deg phase retardation) and 1/2 wave (180 deg phase retardation) configurations, covering wavelengths from 266nm to 1550nm. Each unit is precision-polished to $\lambda/10$ surface flatness and features durable multi-layer anti-reflection (AR) coatings.

Zero order wave plates offer minimal temperature sensitivity ($< 0.01\lambda/\text{degC}$) and broader spectral bandwidth ($\pm 50\text{nm}$), making them ideal for tunable lasers, broadband sources, and precision optical systems.

2. Technical Specifications

Parameter	Specification
Material	Crystalline Quartz (SiO2)
Construction	Cemented or Optically Contacted
Type	1/4 λ (90 deg) or 1/2 λ (180 deg)
Wavelength Range	266nm - 1550nm (see standard models)
Diameter Tolerance	+0.0 / -0.1mm
Thickness Tolerance	$\pm 0.2\text{mm}$
Surface Flatness	$\lambda/10$ @ 632.8nm
Surface Quality	40-20 Scratch-Dig
Optical Axis	< 10 arcsec
Clear Aperture	$> 85\%$ of central diameter
Retardation Tolerance	$\lambda/300$
Wavefront Distortion	$\lambda/4$ @ 632.8nm
Coating	AR Coating, $R < 0.5\%$
Mount	Unmounted (standard) or Metal Mount (optional)
Damage Threshold	$> 5 \text{ J/cm}^2$ @ 1064nm, 10ns
Operating Temperature	-20 degC to +60 degC
Temperature Sensitivity	$< 0.01\lambda/\text{degC}$

3. Standard Models

4. Material Properties

Our zero order wave plates are manufactured from synthetic crystalline quartz (α -SiO₂) using a dual-plate construction that cancels out thermal drift:

- Dual-plate construction: Two quartz plates with orthogonal optical axes eliminate thermal retardation drift
- Temperature sensitivity: $< 0.01\lambda/\text{degC}$ (vs. $\sim 0.2\lambda/\text{degC}$ for multiple order)
- Spectral bandwidth: $\pm 50\text{nm}$ for 1/2 wave, $\pm 25\text{nm}$ for 1/4 wave
- High retardation accuracy: $\lambda/300$ tolerance
- Wide transmission range: 180nm - 4.5 μm

For higher power applications, consider our Air Spaced Wave Plates.

5. Coating Specifications

Coating Type	Wavelength	Reflectance	Applications
Single-wavelength AR	Design λ $\pm 20\text{nm}$	$R < 0.5\%$ per surface	Laser systems, tunable lasers
Broadband AR (Opti)	400-700nm or 650-1000nm	$R < 1.5\%$ per surface	Tunable lasers, spectroscopy
Dual-wavelength AR	Two design wavelengths	$R < 1.0\%$ per surface	Frequency doubling, OPO systems

6. Ordering Information

Sample Policy: First-time customers can order single-piece samples at regular price. 50% sample credit applies to subsequent bulk orders of 50+ pieces.

When ordering or requesting a quote, please provide:

1. Model number or wavelength and retardation type
2. Diameter requirement
3. Coating specification
4. Quantity and delivery requirements
5. Special requirements (mounting, labeling, packaging, etc.)

Minimum Order Quantity (MOQ): 1 piece for standard models. Volume discounts for 10+ pieces.

Lead Time: 1-2 weeks for standard models in stock. 3 weeks for custom wavelengths or sizes. Rush orders available upon request.

7. Contact Information

Beijing Hengdingguang Technology Co., Ltd.
Brand: PhotonEdge - Precision Optical Components
Website: <https://photonedgeoptics.com>
Email: sales@photonedgeoptics.com
Address: Beijing, China

Manufacturing: 15+ years experience | 67+ product types | 500+ global clients

Quality Assurance: 100% inspection | $\lambda/10$ surface flatness | Zero-defect shipping