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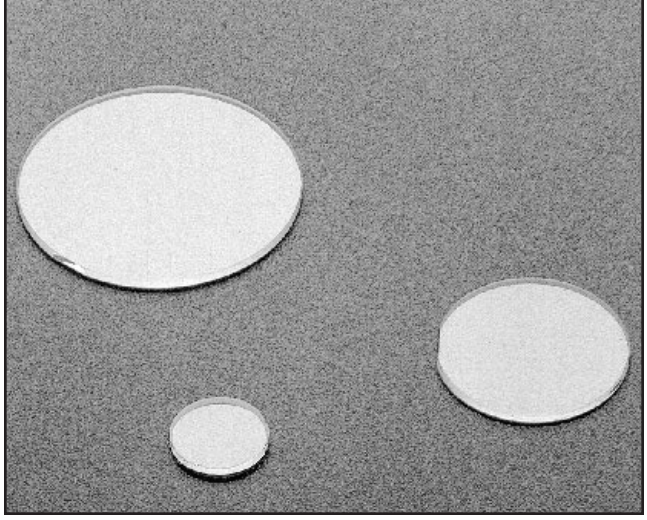
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Available in:
✔**Production Quantities**
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Quartz Retardation Plates

Melles Griot offers quarter- or half-wave first-order or multiple-order plates, which are recommended for high- and low-power laser applications.

Multiple-order quartz retarders are made from a single crystalline plate:

- Retardation is slightly temperature dependent.
- The temperature coefficient of retardance (phase difference between O and E rays at emergence) is approximately 1.0 nm/°C, as deviated from 20°C. Retardance decreases as temperature increases.

First-order retarders, also called zero-order retarders, are assembled from pairs of optically contacted crystalline quartz plates:

- The quartz plates have orthogonal optic axis directions; therefore, the roles of the ordinary and extraordinary rays are interchanged in passing from one plate to the other.
- Net retardation is essentially temperature invariant since both plates are nearly equal in thickness (<0.01 nm/°C).

The standard wavelengths carried in stock include many of the most commonly used laser lines, from 193 nm to 1550 nm. Custom quartz retardation plates are available for specific wavelengths from 193 nm to 2300 nm.

APPLICATION NOTE

Wavelength Effects on Quartz Retardation Plates

Due to the high degree of accuracy in the manufacturing of these quartz retardation plates, they should not be used far outside of their design wavelength. However, they can be used at wavelengths that are close to their design wavelength, depending on which type they are. Multiple-order plates are more susceptible to changes in wavelength and they should not be used more than several nanometers outside of their design wavelength, unless some degree of change in the retardation amount is tolerable. First-order waveplates, which are much less susceptible to wavelength changes, can be used up to ~2% above or below the design wavelength with little effect on the retardation.

SPECIFICATIONS: QUARTZ RETARDATION PLATES

Wavelength: Specified by customer

Wavelength Range: 193–2300 nm

Material: Crystal quartz, c-axis cut

Retardation Tolerance: See table below

Wavefront Distortion: λ/10 peak to valley at 632.8 nm

Diameter: ϕ+0, −0.15 mm

Parallelism: 0.5 arc seconds

Optic Axis: Normal to facet on circumference of retarder

Surface Quality: 20–10 scratch and dig

AR Coatings:

For multiple-order plates, see Chapter 5, *Optical Coatings*.

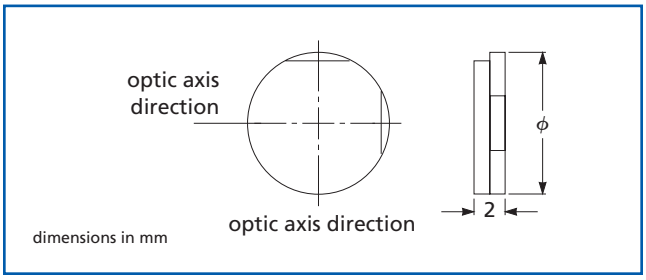
For first-order plates, only antireflection V-coatings are available and are supplied by special order only

Retardation Tolerance for Various Wavelengths

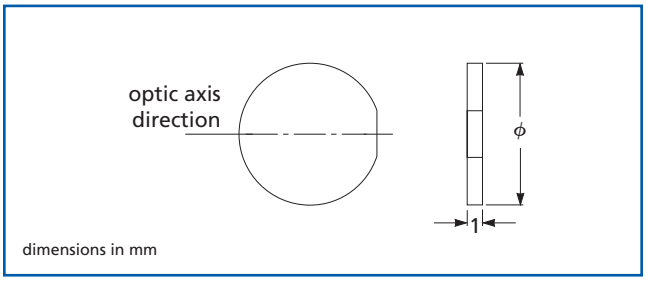
Standard Wavelengths (nm)	Laser Source	Retardation Tolerance (±)
193	ArF (excimer)	λ / 100
248	KrF (excimer)	λ / 200
266	Nd: YAG 4th harmonic	λ / 200
355	Nd: YAG 3rd harmonic	λ / 300
364	Ar-ion	λ / 300
488	Ar-ion	λ / 400
514	Ar-ion	λ / 500
532	Nd: YAG 2nd harmonic	λ / 500
543	HeNe (green)	λ / 500
632	HeNe (red)	λ / 500
670	Diode	λ / 500
780	Diode	λ / 500
830	Diode	λ / 500
1064	Nd: YAG	λ / 500
1300	Diode	λ / 500
1550	Diode	λ / 500

Note: Retardation plates at other wavelengths are available on special order.

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02 WRQ quartz retardation plates, first order



02 WRQ quartz retardation plates, multiple order

Quartz Retardation Plates, First Order*

Diameter ϕ (mm)	PRODUCT NUMBER Retardation λ/2	λ/4
10	02 WRQ 023	02 WRQ 003
20	02 WRQ 027	02 WRQ 007
30	02 WRQ 031	02 WRQ 011

**Please specify product number and wavelength when ordering (for example, specify 02 WRQ 003/632.8).*

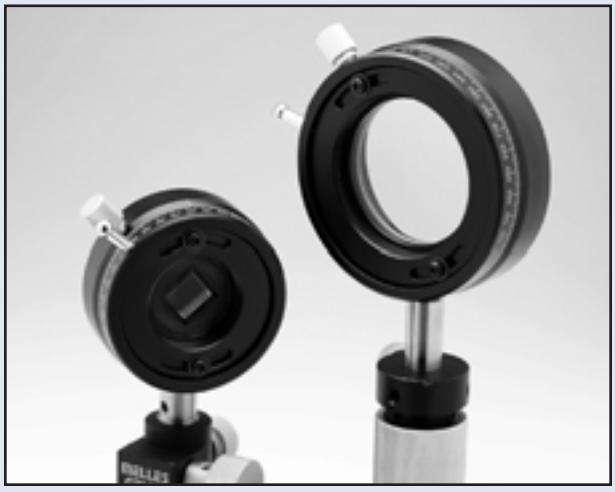
Quartz Retardation Plates, Multiple Order*

Diameter ϕ (mm)	PRODUCT NUMBER Retardation λ/2	λ/4
10	02 WRQ 021	02 WRQ 001
20	02 WRQ 025	02 WRQ 005
30	02 WRQ 029	02 WRQ 009

**Please specify product number and wavelength when ordering (for example, specify 02 WRQ 001/632.8).*

HOLDERS FOR WAVEPLATES

Melles Griot offers two types of holders for retardation plates. The precision holder uses a micrometer versus a lever on the standard holder. Both holders offer 360-degree rotation with 1-degree resolution. The holders are post mountable with a M4-threaded post. An assortment of polarizer holder adaptors are available to accommodate various size waveplates. Please see Chapter 24, *Lens, Filter & Polarizer Mounts* for additional information.



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