

# Air Gap Type Waveplates | WPQG



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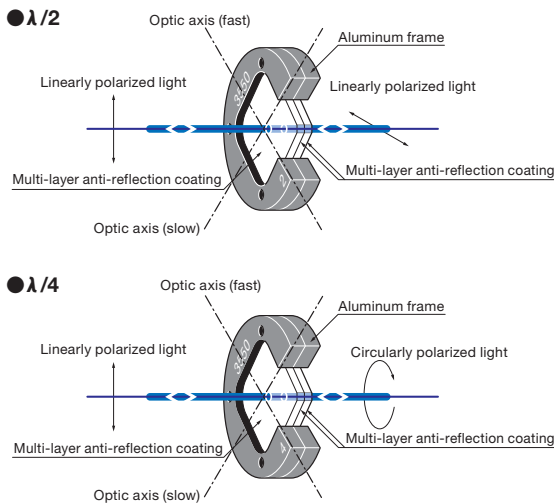
Polarizers

**Air spaced two piece waveplates are suitable for use with high-energy lasers (no optical contact occurs).**

- These products utilize birefringence of quartz and give phase difference of  $\lambda/4$  ( $\pi/2$ ,  $90^\circ$ ) or  $\lambda/2$  ( $\pi$ ,  $180^\circ$ ) to the input beams.  $\lambda/4$  retarders convert linearly polarization to circularly and circularly polarization to linearly.  $\lambda/2$  retarders convert the direction of polarization arbitrarily.
- Air spaced type waveplates are zero-order (first-order) retardation plates (phase plates) which are assembled from pairs of crystalline quartz plates and are mounted on aluminum frames.
- Custom-made air spaced type waveplates for other wavelengths (248nm, 257nm, 308nm etc.) are also available.



### Schematic

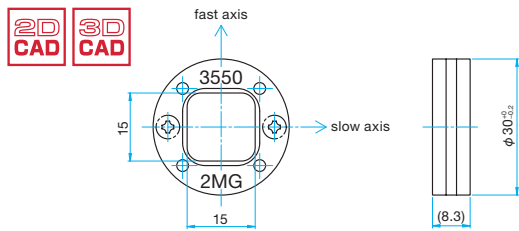


Specifications	
Material	Optical grade crystalline quartz
Material of frame	Aluminum Finishing: Black anodized
Clear aperture	15x15mm
Surface flatness of substrate	$\lambda/10$
Angular deviation of beam	$<5''$
Coating	Both surfaces: Narrowband multi-layer anti-reflection coating (Four surfaces)
Transmittance	$>98\%$
Surface Quality (Scratch-Dig)	20-10

**Guide**  
 ▶ Please contact our Sales Division for customized products. (Customized on size etc.)

**Attention**  
 ▶ Unlike multiple-order (higher-order) waveplates that are made from a single quartz plate, the net retardations of zero-order waveplates are almost not affected by temperature change.  
 ▶ Optical axis is parallel to the edge of 15mm squared plate.  
 ▶ These products can be used for the beams which wavelengths are in  $\pm 1\%$  of rated wavelength.  
 ▶ The surface flatness is the reflected wavefront distortion of the surface before coating.  
 ▶ Be sure to wear laser safety goggles when checking optical path and adjusting optical axis.  
 ▶ Standard thickness of Aluminum frame is 8.3mm (subject to differ without notice).

### Outline Drawing (in mm)



$\lambda/2$				
Part Number	Wavelength Range [nm]	Theoretical retardation [nm]	Retardation tolerance	Laser Damage Threshold* [J/cm <sup>2</sup> ]
WPQG-2660-2M	266	133.0	$<\lambda/50$	1.4
WPQG-3550-2M	355	177.5	$<\lambda/50$	4
WPQG-5320-2M	532	266.0	$\lambda/100 - \lambda/200$	4
WPQG-10640-2M	1064	532.0	$\lambda/200 - \lambda/500$	7

\* Laser pulse width 10ns, repetition frequency 20Hz

$\lambda/4$				
Part Number	Wavelength Range [nm]	Theoretical retardation [nm]	Retardation tolerance	Laser Damage Threshold* [J/cm <sup>2</sup> ]
WPQG-2660-4M	266	66.5	$<\lambda/50$	1.4
WPQG-3550-4M	355	88.8	$<\lambda/50$	4
WPQG-5320-4M	532	133.0	$\lambda/100 - \lambda/200$	4
WPQG-10640-4M	1064	266.0	$\lambda/200 - \lambda/500$	7

\* Laser pulse width 10ns, repetition frequency 20Hz