

## Multiple Order Waveplates

Multiple order plates are the most common waveplates.

Their thickness  $d$  can be calculated as follows:

$$d = n\lambda + q$$

$n\lambda$ : a whole multiple of the wavelength

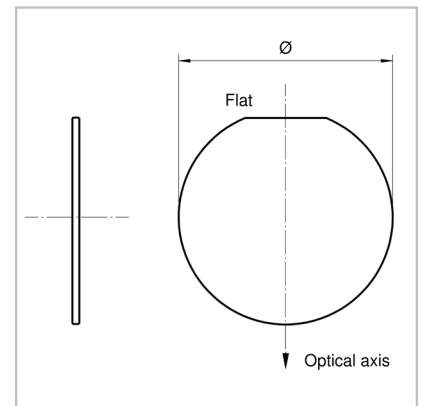
$q$ : thickness with which the desired retardation can be achieved

$q$  corresponds to the so-called "true zero retardation plate", which, at a retardation of  $\lambda/2$ , has a thickness of 45  $\mu\text{m}$  at 800 nm.

The advantage of multiple order plates is that they are easier to manufacture and more user-friendly due to their thickness.

The multiple phase shifting causes a reduced spectral bandwidth.

This makes itself evident in the temperature sensitivity but is sufficient for standard applications.



### Nomenclature

<b>QWPM</b>	<b>1064</b>	<b>-05</b>	<b>-2</b>	<b>AR/AR</b>
Product Code (Multiple Order)	Wavelength in nm	Diameter in inches x 10	Retardation 2: $\lambda/2$ 4: $\lambda/4$	Coating Specification

### Specifications

Spectral bandwidth	Typ. $\lambda \pm 0.5\%$
Typical range of thickness	0.25 mm to 1.5 mm
Wavefront error	$\lambda/10$ at 632.8 nm (transmission)
Retardation tolerance	$\lambda/100$ to $\lambda/600$
Surface quality	5/4 x 0.025 for 1.0" substrates according to ISO 10110 10-5 according to MIL-O-1380A
Parallelism	Wedge < 0.5 arcsec
Damage threshold	LDT > 10 J/cm <sup>2</sup> (10 ns; 1064 nm)
Clear aperture	85 % of diameter
Wavelength	For single wavelength in the range of 248 nm – 2200 nm
Dimensions [mm]	12.7; 15.0; 20.0; 25.4; 30.0; 38.1; 50.8

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