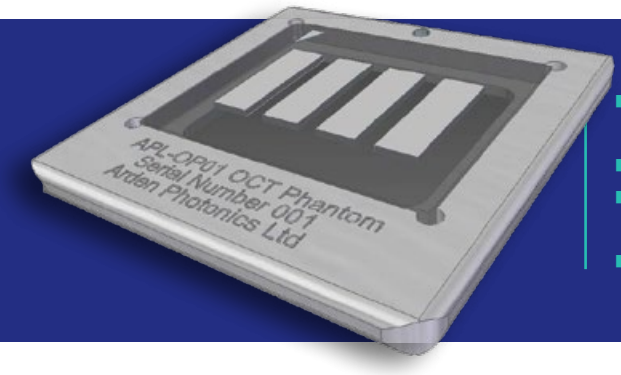
OCT Validation Phantom
APL-OP01



- Four patterns give comprehensive assessment of your OCT instrumentation.
- Patterns laser etched for long term resistance against drift.
- Small, stable and easy to transport for simple machine to machine repeatability testing.
- Gives accurate measurements of OCT performance in all 3 dimensions.

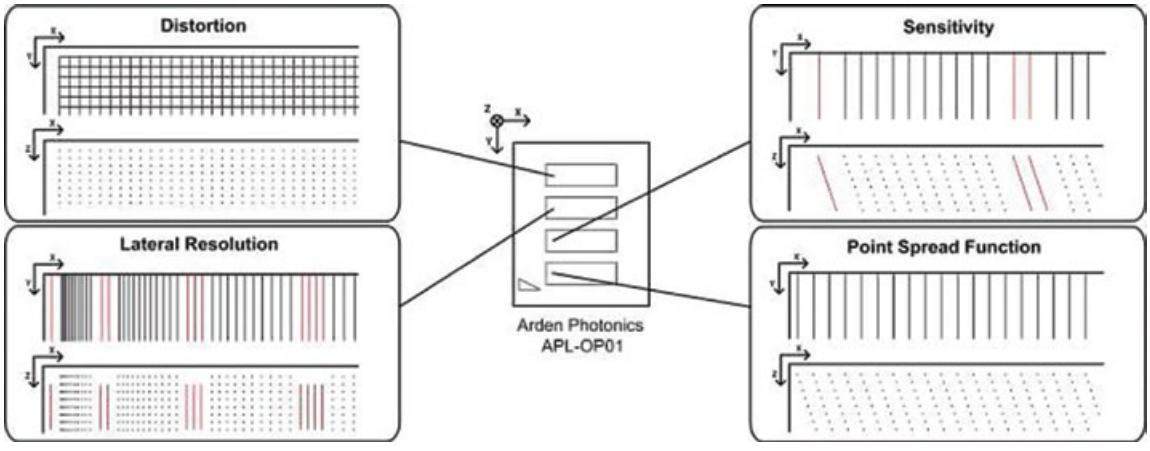
The APL-OP01 OCT Phantom is a device to qualitatively and quantitatively characterize the performance of an OCT system, including spatially varying resolution, sensitivity, distortion and scan linearity. The Phantom contains four geometrical patterns inscribed within a substrate to form localized refractive index changes.

The 4 test patterns are from left to right:

- Point Spread Function
- Sensitivity
- Lateral resolution
- Distortion

Each of the 4 patterns has different features but they all contain 8 layers. In each pattern, the first layer is located 100 µm below the surface of the substrate and the separation between each subsequent layer is 75 µm. So the bottom layer is 625 µm from the top surface of the substrate.

OCT Test Patterns



Note: Indexing lines are indicated in red.

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Distortion Patterns

The Distortion pattern consists of 100µm × 100µm grids.

Lateral Resolution Pattern

The purpose of the Lateral Resolution pattern is to measure the line spacing. Each line (n) is separated from the next line laterally (n+1) by a distance starting at 1 µm and increasing in increments of 1 µm, up to a maximum of 110 µm.

The lines are separated into groups; each group contains 11 lines (11 spaces), with index lines (shown in red) separating each group. The following formula can be used to calculate line spacing:

Line spacing = **11(m-1)+n**

m = the group number,
n = the number of the line within the group

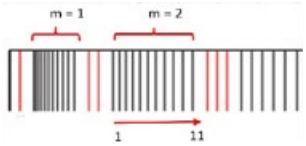

Diagram of the lateral resolution pattern with the group numbers above the line number within a group below

e.g. to calculate the line spacing for lines 7 and 8 in group 5 – the first value is 7 (= n) and the second value is 44 (= 11m-1) so the line spacing is 51 µm.

Lateral Resolution Pattern

The Sensitivity pattern is made up of pairs of lines (2 lines). Both lines in a pair have the same intensity but the intensity of each line pair is greater than that of the previous line pair.

The line pairs are grouped into sets. Each set consists of five line pairs. Each set, n, is separated by n and n+1 index lines e.g. set 3 has 3 index lines on one side and 4 index lines on the other.

Each layer consists of six sets of line pairs with five line pairs in each set (i.e. 30 pairs in total in each layer). The spacing between the lines is 150 µm and each layer is offset laterally by 25 µm.

Point Spread Function Pattern

The Point Spread Function (PSF) pattern consists of a series of lines within each layer separated by 150 µm. Layers are laterally offset from the layer above by 25 µm.

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Technical Specification

Environmental	
Operational Temperature	0°C to +50°C
Humidity	5% – 95%, non-condensing

Physical	
Mass	10 grams (in storage box 300 grams)
Dimensions	40 x 40 x 3 mm
Dimensions of Substrate	25 x 30 x 2 mm
Dimensions of Patterns	13 x 4 mm
Dimensional Tolerance	+/- 2 µm within zones A+B (diagram 1)
Substrate Material	Silica
Refractive index of substrate	1.45
Lateral Width of Lines	< 2 µm

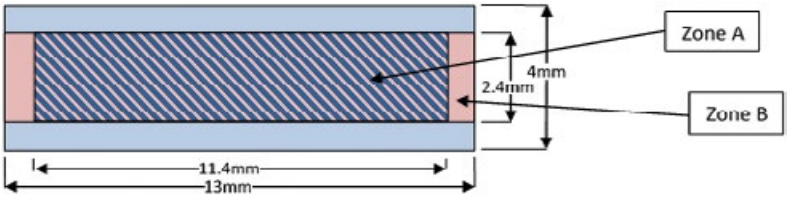

Diagram left: For the Distortion Pattern the space within Zone A (dark blue hatched area) should be used. Within this area the inter line dimensional tolerance is +/- 0.8µm. For the other patterns the space within Zone B (light orange area) and Zone A should be used. Within this area the inter line dimensional tolerance is +/- 0.8µm. These tolerances are the 2σ standard deviation of the inter-line spacing measurements.

Ordering Information

Product	
APL-OP01	OCT Phantom APL-OP01 consists of 4 test patterns Point Spread Function, Sensitivity, Lateral resolution and Distortion. Supplied in wooden storage box.

For North American sales enquiries call **(727) 478-2651** or email us on **sales@ardenphotonics.com**

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