HOLE INSPECTION OPTICS

360° INSIDE VIEW IN PERFECT FOCUS

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HOLE INSPECTION OPTICS have been developed by OPTO ENGINEERING® to enable the perfect viewing of holed objects, cavities and containers.

Unlike common optics or so called "pinhole lenses" which can only image flat fields of view, Hole Inspection Optics are specifically designed to image both the bottom of a hole and its vertical walls.

Thanks to the large view angle (>82° degree) and innovative optical design, these lenses are compatible with a wide range of object diameters and thicknesses. Hole Inspection Optics are therefore the solution of choice to inspect a variety of different object shapes such as cylinders, cones, holes, bottles or threaded objects.

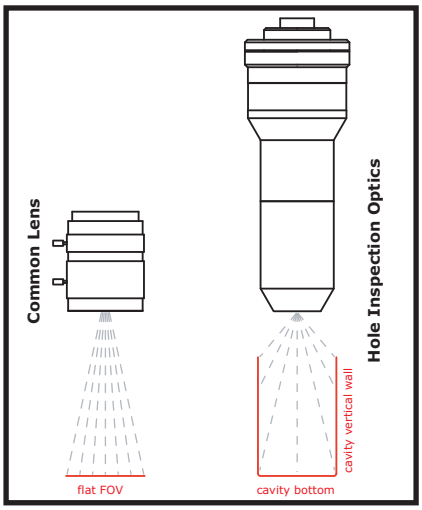
KEY ADVANTAGES

1) Perfect focusing of holed objects: both the walls and the bottom of a cavity are imaged in high resolution

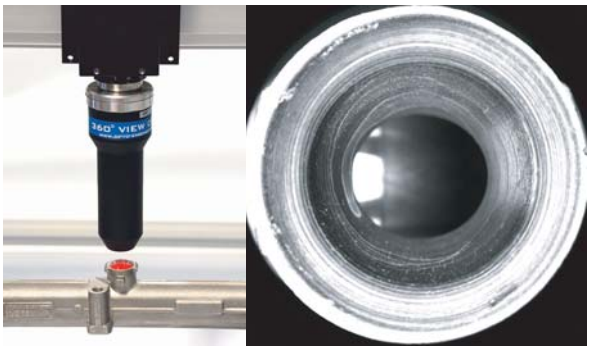
2) Cavity inspection from the outside: no need to put an optical probe into the hole

3) Very High Field Depth: objects featuring different shapes and dimensions can be imaged by the same lens

4) Wide viewing angle: sample surfaces are unwrapped by the lens under a convenient perspective to clearly display their features.

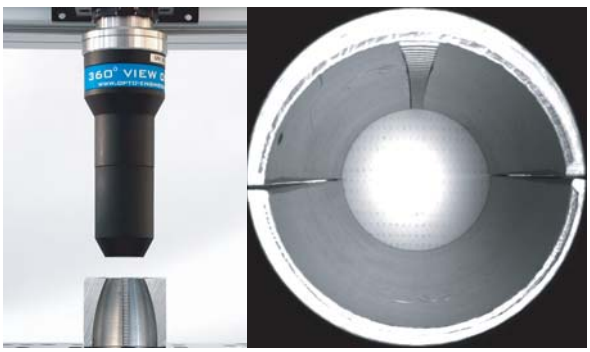


Examples of images taken with Hole Inspection Optics:



Perfect focusing is maintained throughout the entire depth of a hole.

Writings inside a cavity, as well as scratches and tiny defects are easily imaged



Conical cavity inspection is possible from both sides.

Square, polygonal or irregular cross section objects can be inspected.

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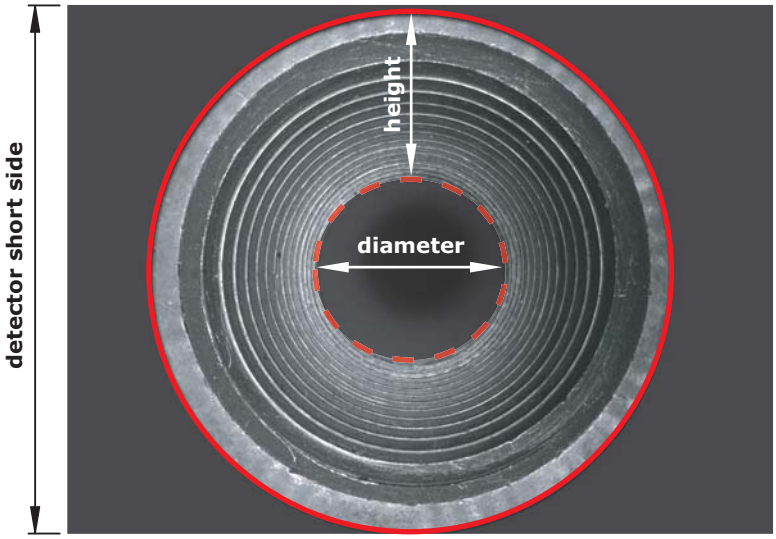
P/N		PCHI013	PCHI012
Detector Size		1/3"	1/2"
min. FOV (diam x height)	*(mm x mm)*	10 x 10	10 x 10
max. FOV (diam x height)	*(mm x mm)*	70 x 100	70 x 100
Wavelength range	*(nm)*	450 .. 650	450 .. 650
Working distance	*(mm)*	5 .. 35	5 .. 35
CTF @ 50 lp/mm	*(%)*	> 40	> 40
F-number		4,7	5,8
Diameter	*(mm)*	28,0	28,0
Length	*(mm)*	102,0	104,0
Weight	*(g)*	250	250
Mount		C	C

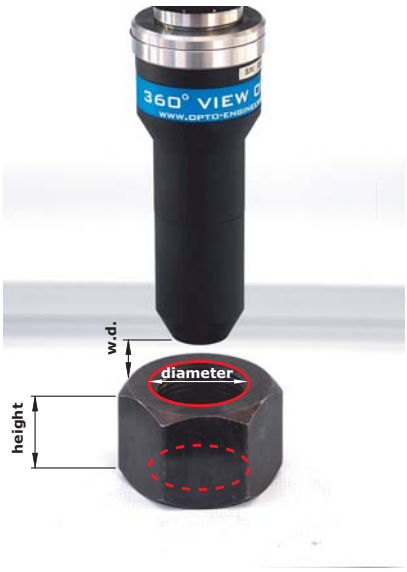


r (%) = height/detector short side

Hole Inspection optics can image cavities whose diameters and thicknesses span over a wide range of values.

For a given *hole diameter*, the table below lists the maximum *cavity height* allowed for both *high resolution imaging* (small pixel sizes) and *normal resolution imaging* (> 5 micron pixels) applications; the *r* ratio indicates how much of the detector area gets covered by the image of the hole inner walls.

The listed working distance values ensure that the object image is exactly inscribed into the short side of the detector, thus maximizing *r* ratio and image resolution.



PCHI013 and PCHI012: FIELD OF VIEW SELECTION CHART

hole diameter (mm)	high res. Imaging cavity height (mm)	high res. Imaging r ratio (%)	normal res. Imaging cavity height (mm)	normal res. Imaging r ratio (%)	working distance (mm)
10	6	20	10	27	5
15	8,5	22	14,5	28	6,5
20	13	25	22	32	9
25	18	25	31	32	11
30	22	25	37	32	14
40	31	26	53	33	18
50	40	27	68	33	23
60	50	28	85	33	29
70	60	28	102	33	35