

Nauticam WWL-1 & Sony Full Frame

by Phil Rudin

The Nauticam WWL-1 is the first in a line of high quality wet-changeable wide angle conversion optics with a 130 degree field of view using 28mm (75 degree) equivalent lenses.

Wet-changeable lenses can be removed and reinstalled underwater in conjunction with the required Nauticam port for the supported lens in use.

The WWL-1 was first reviewed in the Nov/Dec 2015 issue #87 of UWPMAG.com by Peter Rowlands. At the time Peter was using WWL-1 with a Panasonic GX7, Panasonic M43 14-42mm Power zoom and Nauticam housing.

My first experience was with a WWL-1 prototype lens I used in March of 2015 while the lens was still in development. At the time I was using the WWL-1 with an Olympus EM-1, Panasonic Lumix G power zoom 14-42mm F/3.5-5.6 lens in a Nauticam housing. I have included images in this review of the prototype lens and bayonet mount as well as some of the images I shot with the Olympus system. I think it is very important to recognize the amount of time Nauticam takes in developing all of its water contact lenses.

Nauticam's water contact optics are all "clean slate" designs engineered as underwater corrective and conversion optics. Much like the classic Nikonos and Nikonos RS film lenses the WWL-1 is designed for underwater use and is not an adaptation of an in air designed lens.



The WWL-1 is also a full zoom through design working well through the entire zoom range of many consumer compacts including five Sony Cyber-Shot DSC-RX 100 cameras, three Canon PowerShot cameras and the Panasonic Lumix DMC-LX100. Contact Nauticam for compatibility with other compact cameras.

For Micro Four-Thirds cameras supported lenses include the Olympus 12-50 F/3.5-6.3 EZ, 14-42 EZ and the 14-42 II R from Panasonic 12-32, 14-42 power O.I.S., 14-42 II O.I.S. and the 14mm F/2.5 ASPH. All of the zoom lenses offer a power zoom feature.



Hawksbill Turtle, Cozumel Mexico. Sony A7R III, Sony FE 28mm, Nauticam NA-A7R III housing, WWL-1, two Inon Z-330 flashes, within 5mm of dome glass, ISO-1250, F/13, 1/250th sec



Dive Vessel Emerald, Jupiter, Florida, Olympus EM-1, Panasonic 14-42 PZ at 22mm, Nauticam NA-EM 1 housing, WWL-1, ISO-400, F/16, 1/320th, two Inon Z-240 flashes

The WWL-1 also supports a verity of APS-C cameras and lenses including Canon M cameras with EF-M 22mm F/2 and EF-M 15-45mm F/3.5-6.3 IS STM lenses. Fujifilm XC 15-45mm F/3.5-5.6 OIS PZ. Nikon Z DX 16-50mm F/3.5-6.3 VR. Sony E PZ 16-50 F/3.5-5.6 OSS and the Sigma 19mm F/2.8 DN IA for Sony E mount.

Some lenses require a zoom gear and most lenses will vignette if they are used beyond 28mm's at the 35mm full frame equivalent. Check

the Nauticam port charts for detailed information on lenses you may intend to use with the WWL-1.

When I first tested the Nauticam prototype WWL-1 I had a hard time wrapping my head around the idea that a \$350.00 Panasonic "kit" lens could out preform my \$1400.00 Olympus ED 7-14mm F/2.8 Pro lens and \$1400.00 Zen Underwater 200mm optical glass port. I had the same reaction when I tested the current WWL-1 and \$450.00 Sony FE 28mm against the \$1773.00 Sony



Schooling Cottonwick, Cozumel, Mexico, Sony A7R III, Sony FE 28mm, Nauticam NA-A7R III housing, WWL-1, two Inon Z-330 flashes, ISO-400, F/16, 1/250th sec

FE 12-24mm F/ G lens and \$2190.00 Nauticam 230mm optical glass fisheye port II.

If you are a skeptic as well and would like to understand the physics behind how water contact optics outpreform land lens and port combinations, I will not reinvent the wheel. I would instead suggest you to read Alex Mustard's outstanding articles on this subject in UWP back issues #99 and #100. Issue #99 "Nauticam's WACP" covers the physics of that wet lens as well as

the WWL-1 and #100 "Dome Free in Mexico" covers several other water contact optics.

Sony FE 28mm F/2

Currently the WWL-1 only works with one Full Frame camera system the Sony A7/A9 lines with the Sony FE 28mm F/2 lens. The Nauticam WWL-1 information page describes the Sony equipment as "Most impressive is the outstanding performance available with the full

frame Sony A7 series cameras using the Sony 28mm F/2 Prime lens. In our tests, this combo outperformed all of the Sony wide angle lenses behind dome ports, and is especially well matched to the demanding 42 megapixel sensor in Sony A7R II”.

For this review I used the Sony A7R III with V2.10 firmware update. The A7R III has the same 42 megapixel sensor as A7R II with almost like performance but with much better battery life and much better auto focus drive speed.

Based on my experience with WWL-1 I would expect it to work equally well with the current A7R IV’s 61.2 MP sensor. My reviews of Sony A7R II, A7R III and A7R IV cameras with a verity of housings can be found in the UWP’s back issues section and all are free PDF downloads.

The Sony FE 28mm F/2 prime lens is a compact and light weight at 200g (7oz) design for Sony full frame cameras. The lens has an aluminum finish with three aspherical lens elements and two ED glass elements which assist with edge to edge sharpness.

The nine circular aperture blades provide excellent bokeh for a lens at a retail price point of \$450.00/£339.00.

The FE 28mm is one of Sony’s older entry level lenses that does not have the current G or GM lens designs. The lens does include dust and moisture-sealing along with a linear internal autofocus motor for silent video performance.

This lens provides excellent sharpness and image quality above the F/2 to F/2.8 range. The minimum focus distance is 0.29m or 11.42 inches which is close for a wide lens but has a magnification ratio of only 0.13X or 1:7.7 which is not well suited for macro even with a closeup lens attached.



The lens ships with front and rear lens caps and lens hood but no lens pouch for protection. Sony also offers a 16mm FE Fisheye conversion lens for the FE 28mm which provides a 180 degree fisheye perspective when mounted to the lens. The fisheye conversion lens reduces minimum aperture to F/3.5 and minimum focus distance to 22 cm (8.8 inches) at a budget price of around \$298.00.

I have had limited use of the FE 28mm/fisheye combo and it performed better than I would have expected but this is by no means a recommendation. Minimum focus distance is about twice what you would expect from a dedicated fisheye lens. I would much prefer to see an Sony FE 8-15mm fisheye zoom offering like the outstanding Canon and Nikon 8-15mm fisheye zooms.

Nauticam WWL-1

The Sony FE 28mm F/2 lens has a 75 degree angle of view which increases to 130 degrees when



Felipe Xilotencati Wreck (C-53), Cozumel Mexico, Sony A7R III, Sony FE 28mm, Nauticam NA-A7R III housing, WWL-1, two Inon Z-330 flashes, ISO-4000, F/11, 1/250th sec

using the WWL-1. The WWL-1 is constructed of 6 precisely ground elements of highly refractive optical glass. All internal elements are coated with a broadband anti reflective coating to keep flare and internal reflections to an absolute minimum.



Cenote Hicte-Ha, Yucatan, Mexico, Sony A7R III, Sony FE 28mm, Nauticam NA-A7R III housing, WWL-1, two Inon Z-330 flashes, ISO-320, F/10, 1/250th sec

The WWL-1 at 130 degrees sits in a sweet spot for underwater photography between the 180 degree full frame fisheyes with it and the 107 degree 16mm end of most 16-35mm rectilinear full frame lenses.

Nauticam from the beginning of the design process targeted the 130 degree coverage area as the ideal coverage area for a verity of uses from big animals, wide reef scenes and fish portraits to close focus wide angle shots.

The WWL-1's stunning field of view has extremely high overall

sharpness and contrast making it very well suited to high resolution cameras like the A7r III and IV. WWL-1 also lacks the extreme distortion associated with fisheye lenses and the poor corner and edge sharpness associated with wide rectilinear lenses behind dome ports.

I have repeatedly advocated in past full frame camera reviews with wide rectilinear lenses starting at F/13 and above to reduce blotchy and distorted corners and edges. With WWL-1 F/8 and above offered the same reduction in blotchy distorted



Large crop to show WWL-1 sharpness

corners. In the center of the frame sharpness is outstanding even at high levels of magnification. The Sony 28mm and WWL-1 combination also focuses very close to the front glass making it an excellent choice for close focus wide angle use.

Using WWL-1 with M43 and APS-C zoom lenses allows you to zoom through from the wide end of the lens to the long end of the lens. This allows for greater coverage of subjects from large too small. With the accessory bayonet mount you can switch between WWL-1 and one of

Nauticam's excellent SMC or CMC closeup lenses.

The Nauticam WWL-1 is available from your local authorized Nauticam dealer at a retail price of \$1320.00/£1132.00 (with VAT).

Field Testing WWL-1

My WWL-1 and Sony 28mm were on loan from Nauticam USA during a 2019 trip to Mexico. This was the only wide angle kit I used with my A7R III and Nauticam housing for this trip.

(Far right) The Pit, Yucatan, Mexico, Sony A7R III, Sony FE 28mm, Nauticam NA-A7R III housing, WWL-1, A/V light, ISO-640, F/6.3, 1/125th sec

(Right) CFWA, Giant Anemone, Cozumel Mexico. Sony A7R III, Sony FE 28mm, Nauticam NA-A7R III housing, WWL-1, two Inon Z-330 flashes, within 5mm of dome glass, ISO-400, F/18, 1/250th sec

The port for the NA-A7R II/III/IV housings is the N100 Flat Port 32 which I used with the M67 bayonet mount converter. I also used the accessory buoyancy collar which offsets the 1.5k (3.3lb) weight of the WWL-1 and gives your system better balance.

Trust me when I say that the WWL-1 is much easier to maneuver and swim with than the same housing with a 180 or 230 mm dome port all else being equal. As a tool for video this is a much more fluid system than one with a large port.

Traveling with the WWL-1 used up about a third of the space my Zen 230mm port requires and about half the weight. WWL-1 easily fits into a shoulder or roller bag for carry-on and is much less conspicuous when luggage is inspected.

Image quality differences between WWL-1 and Olympus 7-14mm zoom with the 16MP Olympus EM-1 were evident at all f/stop settings. With the 42MP Sony A7R III the WWL-1 crushed any of the lenses I have tested with the Sony cameras. I expect the noticeable differences were a result of the larger much higher megapixel full frame sensor.

I have tested Sony 12-24, 16-35, Zeiss 18mm batis, Rokinon 15mm and more with the 230mm port and WWL-1 out preformed them all and at wider apertures.

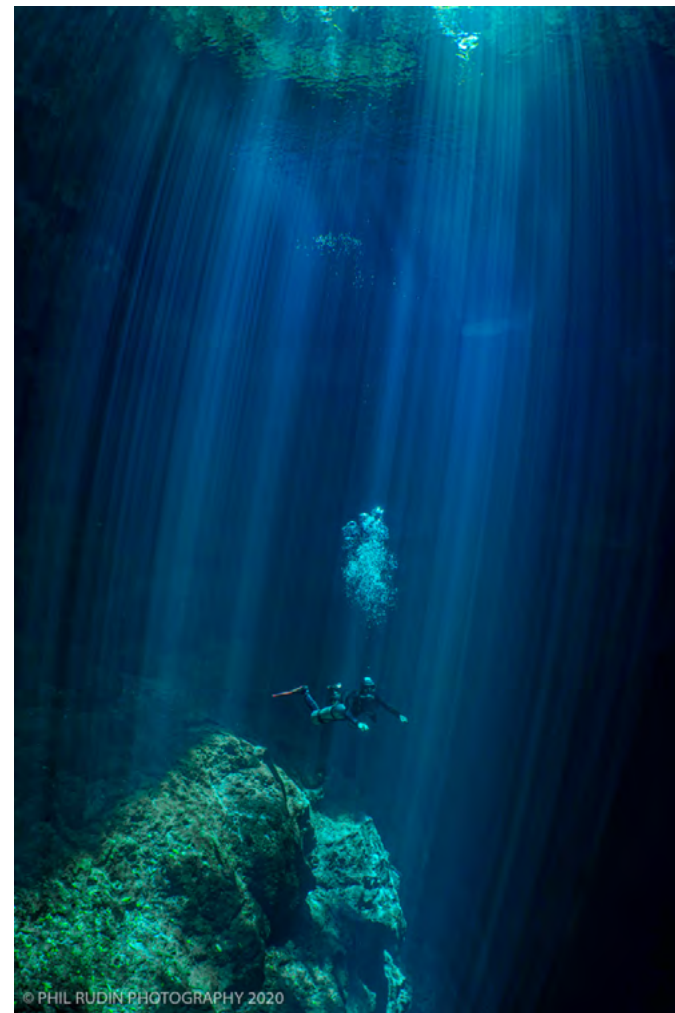
About the only downside with the WWL-1 is



that it is not well suited to over/under images. It will work above water but splits are difficult at best.

The WWL-1 does an excellent job of controlling the distortion associated with ultra wide lenses. Lens flare and chromatic aberration are also well controlled when shooting up in bright sunlight.

Nauticam WWL-1 allows you to use Sony high megapixel full frame cameras for extreme wide angle without the compromises of full frame wide rectilinear lenses and dome ports. I am hoping to see



compatibility with Canon and Nikon FF mirrorless cameras soon.

I would once again like to thank Nauticam USA for both equipment and technical assistance for this review.

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