

Best Lenses For Compact Cameras

by The Backscatter Team

From the Caribbean to the Coral Triangle, the Backscatter team has spent hundreds of hours shooting compact cameras underwater. The team has shot and tested dozens of compact (a.k.a. point-and-shoot) cameras with accessory lenses to find the best match between performance, price and the goals of both aspiring and experienced underwater photographers. These top-performing lenses will enable compact cameras to capture stunning wide angle and macro images underwater. Here are our picks for the best underwater lenses for compact cameras in 2021.

Why Do Compact Cameras Need an Underwater Accessory Lens?

There are basically three types of underwater photo: Wide Angle, Fish Portrait, and Macro. Each type of photo requires a lens with different focal length, field of view, and reproduction ratio.

The built-in lens on a compact camera is set up for doing fish portrait shots right out of the box. The built-in lens isn't wide enough for true underwater wide angle, especially since a lens will lose 25% of its field of view when shot behind a flat port underwater due to refraction.

Some cameras have a "macro" mode that allows a camera to focus closer than in the normal focus mode, but this is still not enough to get into true macro territory underwater. By being able



The built-in lens of a compact camera may be great for fish portraits like this one, but it will require an accessory lens when it comes to shooting true wide angle or high-magnification macro.

Shot with Sony RX100 V and No Accessory Lens



A shipwreck is just about the largest object to shoot underwater. For a scene like this the widest possible lens available will yield the best image quality. By getting closer to the subject and eliminating as much water between the lens and subject, the image will have better contrast and clarity, and the light from the strobes will be close enough to reach the subject.

Shot with Olympus TG-6 and Backscatter M52 Wide Angle Lens



The Sony RX series has no built in macro mode, so all macro shots must be done with an external macro lens. Even with this relatively large nudibranch, a +5 lens is necessary to pull off the shot.

Shot with Sony RX100 VII and SAGA +5 Lens

to focus closer, the camera can get closer to the subject and increase the size of the image projected onto the sensor. By adding a macro accessory lens the camera can focus even closer than its minimum focus distance. This gets the camera closer to the subject, further increasing the size of the image on the sensor and filling more of the frame with the subject.

How to Pick a Wide Angle Lens

There are 3 different types of wide angle external lenses, listed here from narrowest to widest field of view.



CORRECTIVE

1. Corrective Dome

A corrective dome lens offers the narrowest field of view of any wide angle conversion lens. A corrective dome lens will restore the native topside (above water) field of view of the camera. Underwater it will compensate for the field of view lost due to refraction behind a flat port. Depending on the camera's lens, this can range about 75-84 degrees. This type of lens is typically the least expensive type of wide angle accessory lens.



FLAT

2. Flat Wide Angle Conversion Lens

Flat wide angle lenses are optical conversion lenses that will increase the field of view of the camera's lens. Because there is no dome, this type of lens will have its angle of coverage reduced from about 150-160 degrees topside to about 100 degrees underwater due to refraction. Without a dome, this type of lens can't get much more than 100 degrees of view. This type of lens is typically the next most expensive type of wide angle lens after a corrective dome.



DOMED

3. Wide Angle Conversion Lens With Dome

A wide angle lens with a dome port is a combination of a corrective dome and a flat wide angle conversion lens. The dome will cancel the narrowing effect of the refraction, allowing the wide angle conversion lens to have the same angle of coverage as it has topside, which is about 120 to 165 degrees. This type of lens is our top pick for wet wide-angle lenses since it creates the widest possible field of view, allowing the camera to get closer to large subjects for the best color, contrast, and clarity. This type of lens is typically the most expensive category of wide angle lenses.



The Panasonic LX100 II compact camera has a micro 4/3 sensor, which is the same size of sensor found in mirrorless cameras such as the Panasonic GH5 and Olympus OM-D E-M1 II. A larger sensor is less forgiving when paired with a wet mount wide angle lens when it comes to image quality, overall sharpness, and corner sharpness. The AOI UWL-09 PRO was designed with high grade optics to be used with compact cameras up to full frame mirrorless cameras to produce sharp high quality images. The uncompromising image quality comes at the cost of size, weight, and price.

Shot with Panasonic LX100 II and AOI UWL-09 PRO Lens



Wide Angle Lenses Might Require A Short Port

Some compact cameras, because of the long zoom range of the built-in lens, will need a shorter port that limits how far the lens can be zoomed in. A wet wide-angle lens needs to be up close to the front of the camera lens, so a shorter port is needed to eliminate any extra distance between the two.

There are different wide angle conversion lenses made specifically to be compatible with either 28mm or 24mm built-in camera lenses. Using the wrong lens can cause a vignetting effect, where the dark corners of the lens are visible in the frame. If using a lens designed for a 28mm lens on a 24mm lens, there will be vignetting that can only be avoided by zooming

in, thus sacrificing field of view.

Some wide angle conversion lenses will produce effects of varying quality based on the camera it is being paired with. The degradation in quality is usually most noticeable in the corners of the image where more extreme blurring and image distortion will occur. The lower the quality of the lens, the more pronounced the corner blurriness will be. In order to achieve the sharpest corners with any wide angle lens a high aperture must be used. Setting an aperture of at least f8 will ensure decent corner sharpness on most systems, and increasing that aperture value will make it even sharper.

Understanding Macro Magnification

A wet-mounted macro accessory lens is a type of lens called a diopter. These are commonly referred to as 'close-up' lenses in underwater photography. Technically speaking, a macro lens is not a magnifying lens. It works by allowing the camera lens to focus closer than its minimum distance, which makes it so the camera can get closer to the subject, and therefore the subject to appear larger in the frame. However, a macro lens doesn't just shift the minimum focus distance closer, it shifts the entire focusing range of the camera's lens closer. The higher the power of the macro lens, the less working distance from closest focus to furthest focus. This is why there are multiple powers of macro lenses. A really strong power (such as +15) is more suited for the smallest critters on the reef, but won't be able to focus when the camera needs to be backed up for a larger subject. Depending on the camera and lens combination, 2 or 3 different macro lenses are generally needed to cover the full size range of macro critters.

One lens to rule them all? Not quite. Multiple powers of macro lenses are needed to cover the full



Left: no accessory lens. Center: +5 power. Right: +10 power

The SAGA Trio is a great “do it all” macro lens. With 2 levers a shooter can have no macro lens, a +5, a +10, or a combined +15. As you can see in these examples, more reproduction ratio leads to less depth of field and softer focus, heavy bokeh backgrounds. While this is a cool effect to help separate the subject from the background, higher diopter powers require increasingly more skill from the photographer to shoot as the depth of field becomes razor thin.

Shot with Canon G7X II and SAGA Trio Lens

range of size of macro critters. The SAGA Trio has 2 different powers of lenses than can also be stacked for a +5, +10, or +15 configuration in one unit. Double flip holders for multiple macro lenses are also available to make it easy to swap lenses on the fly.





Compatibility Between Cameras, Housings, & Lenses

Keep in mind that the design of some cameras and housings may limit choices on compatible lenses. For example, some lenses may have a different thread size than the housing. Some wide angle lenses are designed for specific focal lengths of compact cameras, so a wide lens designed for a 28mm compact camera lens will vignette with a 24mm compact camera lens. In our favorite lens picks, some compatible cameras are listed with each lens. If a specific camera isn't listed below, or if it is unclear what is compatible with any specific camera and housing, please give the team at Backscatter a call to answer any questions and discuss all options.

Choosing The Backscatter Favorites

The Backscatter team will always pick the lens that is best suited for the task at hand. These favorite lenses were picked according to certain criteria in this order:

1. Pick the right tool for the job

When shooting wide angle, it's recommended to go for the lens with the widest field of view. This helps eliminate as much water as possible between the lens and subject for better contrast, clarity, color, and image quality. When shooting at a closer distance, more light from the strobes will reach the subject. Wide angle lenses will allow some level of built-in lens zoom-through, so there's no

downside to going with the widest lens right from the start.

For macro, the right tool will depend on the size of the macro critter.

2. Image quality and sharpness

Pixel-peepers want the most resolution and clarity out of a lens. Less expensive wide angle lenses usually don't have as wide of a field of view, may not be as sharp, and may have chromatic aberrations or soft corners. That being said, sometimes the favorite lens for a particular camera may not always be the most expensive lens. There can be a number of tradeoffs in size, weight,

and price that might make one lens a better choice over another. Every lens in this selection is one that has been vetted through rigorous underwater testing and has provided more than satisfactory image quality.

When it comes to shooting macro look for overall sharpness, chromatic aberration, and edge sharpness. A clear sign of a cheaply made macro lens is how sharpness fades off from the center to the edges. The best lenses are barely noticeable in sharpness falloff.

Our Wide Lens Favorites

Backscatter M52 Wide Angle Lens 120° Angle of View



The Backscatter M52 Wide Angle Lens was designed with the Olympus TG series 1 through 6 of cameras in mind. With a 120 degree angle of coverage, sharp corners, no vignetting at 24mm, and an affordable price, this lens is the perfect combination for the wide angle shooter with a TG camera.

Best Choice Lens for Olympus TG-6.

\$449.00

[Check for current price](#)

Nauticam WWL-C Wet Wide Lens 130° Angle of View



As the versatility and capability of compact cameras increases, Nauticam has developed a smaller and lighter water contact wide-angle lens tailored specifically to the compact camera user. Designed from the ground up to match the compact camera's form factor without sacrificing optical quality, the Nauticam WWL-C is a powerful addition to not only Nauticam compact housings but also, via an optional adapter, to those from other manufacturers such as the Olympus TG-6 and Olympus PT-059 housing.

Best Choice Lens for Panasonic LX10,
Panasonic LX100 II & Sony RX100 VII.

\$1,182.00

[Check for current price](#)

AOI UWL-09 PRO Wide Angle Lens 130° Angle of View



The AOI UWL-09 PRO is one of the sharpest externally mounted 67mm threaded lenses available. When paired with the AOI Quick Release System it allows one to easily rotate the lens on and off of the housing using a simple twist-and-click bayonet mount. The quality of this lens is so good that it will likely stick with the photographer as the compact camera is eventually outgrown and gets upgraded to a mirrorless or SLR system. When ultimate compact camera image quality is on the line, this is the go-to wide angle accessory lens. It is a bit heavy underwater, so adding a buoyancy compensating float collar is a good idea.

Best Choice Lens for Panasonic LX10,
Panasonic LX100 II & Sony RX100 VII.

\$1,129.00

[Check for current price](#)

**Inon UWL-95 C24 M67 &
Inon dome unit
95° Angle of View**



The Inon UWL-95 is a flat wide-angle lens that increases the camera's field of view to 95 degrees. When combined with the optional dome unit it increases to 141 degrees. The glass elements of this lens make it a bit heavy underwater. This is a great pick when other lenses may not be compatible with a particular camera.

Best Choice Lens for Canon G7X III & Sony RX100 VII.

\$435.00

Check for current price

Inon Dome Lens Unit IIIA

\$140.00

Check for current price

**Our Macro Favorites
Nauticam CMC-2 Macro Lens**



With up to 2:1 reproduction ratio and a comfortable working distance, the Nauticam CMC-2 lens has outstanding optical clarity and image resolution across the entire frame. The Nauticam CMC-2 was designed specifically for compact cameras. It is the lightest lens in our top picks with this much magnification power, making it a perfect fit for streamlined compact camera macro shooters wanting to capture the smallest critters on the reef.

Best Choice Lens for Panasonic LX10, Panasonic LX100 II, & Canon G7X III.

\$413.00

Check for current price

AOI UCL-09 Macro Lens



The AOI UCL-09 has a diopter power of +12.5 and a reproduction ratio over 2:1 with an SLR macro lens. This lens was originally designed for use with SLR lenses so not only is it powerful, the image quality is outstandingly sharp, but also on the heavier side.

Best Choice Lens for Panasonic LX10, Panasonic LX100 II, Canon G7X III & Sony RX100 VII.

\$360.00

Check for current price

**Saga TRIO Variable Power
Macro Lens**



The SAGA Trio is a unique macro lens that features up to 3 different powers of macro magnification. Simply drop in either the +5 or +10 diopter, or stack the lenses for +15 power. This is the best choice for quickly and easily capturing multiple subjects of different sizes, or capturing the classic wide-medium-tight shot sequence of a single subject for video. The outstanding versatility of this lens is tempered by its size and weight, as it is by far the largest and heaviest lens in our top picks.

Best Choice Lens for Panasonic LX10, Panasonic LX100 II, & Canon G7X III.

\$816.20

Check for current price

Reefnet SubSee +5 & SubSee +10 Macro Lenses



The SubSee Plus 5 & SubSee Plus 10 lenses are less expensive alternatives to the AOI UCL-09 and Nauticam CMC-2. The Subsee lenses come in +5 and +10 diopter powers giving a shooter the versatility for more subjects of different sizes.

Best Choice Lens for Panasonic LX10, Panasonic LX100 II, Canon G7X III & Sony RX100 VII.

SubSee Plus 5 \$195.00

SubSee Plus 10 \$225.00

Check for current price

Inon UCL-165M67 Macro Lens



The Inon UCL-165M67 lens has the least macro magnification power, but it is also the least expensive option and is a great tool for shooting larger macro subjects that are still too small for the camera's built-in lens.

Best Choice Lens for Panasonic LX10, Panasonic LX100 II, Canon G7X III & Sony RX100 VII.

\$140.00

Check for current price

Conclusion

There is no “magic bullet” compact camera conversion lens that is perfect for every situation. It will always be up to the photographer to select the best tool for the task at hand. When in pursuit of ultimate image quality when shooting a compact camera, consult this guide for the go-to recommendation.

The Backscatter Team
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“Macro lens?!?! I don’t need no stinkin’ macro lens!!!” says the TG series of cameras from Olympus. The Olympus TG series of cameras have the best built in macro capability of ANY camera out there in the water, no external macro lenses needed.

Shot with Olympus TG-5 and No Accessory Lens

