Doing the splits

by Phil Rudin

As many of our loyal UwP readers may know I am normally reviewing photography equipment for the magazine but during the past three months COVID-19 has kept many of us out of the water and access to test equipment has shrunk. As a result I will shift my focus a bit to writing more about mastering different disciplines of underwater photography along with the equipment and techniques involved.

I thought a great place to start would be at the surface with split shots which take us from the terrestrial world into the underwater world we all love so much.

Splits allow us in some cases to identify the location in which we are photographing, to capture wildlife and human activity at or near the surface plus much more. Many splits, also called Over/Under shots, are regularly awarded winners in a number of prestigious international photography contests held around the world.

During the 2020 UPY Underwater Photographer of the Year contest featured in UwP issue #113 out of the 5500 images entered by some 500 photographers fifteen of the winning shots were splits distributed over a verity of contest categories. In the 2020 DPG/Wetpixel Masters Imaging Competition the Best of Show and Wide Angle Unrestricted Winners were split shots.

Back in 1990 to be exact, David Haas, Ruth Petzold, myself and four others were lucky enough to attend a workshop in south Florida with celebrated underwater photographer David Doubilet.

Model Roman, Pool shot, Sony A7R II, Sony FE 16-35mm F/4 at 16mm, Nauticam NA-A7II housing, Nauticam 180 mm dome port, Ambient light, ISO 100, F/4, !/1000 sec

Among the many pearls of wisdom I took away from that week is that both the over and the under parts of a split shot need to be interesting if you want to engage the viewer. Ideally this involves bringing together several elements, first would be having both the top and bottom half of the image in focus. The prevailing wisdom in this regard is to use very wide rectilinear lenses or fisheye lenses, a very large dome port 200 mm or more and high F/numbers in the F/13 to F/22 range.

The next issue is getting a proper exposure for both the top and bottom parts of the image. The third issue is keeping the top half of the dome as free from water spots as possible. Next issue is to have a high enough shutter speed to freeze the subject and the surface water which is always in motion. Subject selection, location and water conditions should also be taken into consideration.

Car Wash Yucatan, Mexico, Sony A7R III, metabones adapter with Canon 8-15mm F/4L fisheye at 8mm, Acquapazza APSO-A7R3 housing with Inon Dome Port II with shade removed, two Ikelite DS-161 flashes, ISO 200, F/6.3 at 1/250th

Devils Ear Springs, Florida, Florida Freshwater Turtle, Canon EOS R, Canon 8-15mm F/4L fisheye at 15mm, Ikelite housing with eight inch dome port & Ikelite DS-161 flashes, ISO 400, F/13 at 1/200th sec, Notice the curved water horizon of the fisheye lens

Lens Selection

In the film days we were limited mainly to 18 mm to 20 mm rectilinear lenses of 100 degrees and 94 degrees respectively. These lenses were able to focus using an 200 mm (eight inch) port without needing a close-up lens of +2 to +4 diopter.

Zoom lenses at the time needed magnification to focus on the virtual image making them useless for splits. Many dome shades were built in so they would need to be shaved down for use with fisheye lenses.

In todays digital age we have a number of excellent super wide rectilinear zooms in the 11 mm to 14 mm range that will all focus in a large dome port without needing a closeup lens. We also have excellent fisheye and fisheye zoom lenses that focus down to a few millimeters and a verity of excellent dome ports with removable shades.

I have also been using 24 mm 84 degree AOV lenses or lenses zoomed to 24 mm for shooting splits of people. I find this AOV less distorting when very close to the subject.

Several of the lenses I have used for splits include for M43 Olympus 12 mm F/2, Olympus 12-40 mm F/2.8, Olympus 7-14 mm F/2.8 and Panasonic 7-14 mm F/4, Olympus 8 mm F/1.8 fisheye, Panasonic 8 mm F/3.5 and with full frame Canon 8-15 mm F/4, Nikon 8-15 mm F3.5-4.5, Sony 12-24 mm F/4, Sony 16-35 mm F/4, Sony 20 mm F/1.8, Sony 24 mm F/1.4 plus several more I can't recall at this moment. All of these lenses can get the job done when mated with the proper size dome port.

In the images attached to this review you will want to note the differences between shooting splits with rectilinear lenses and fisheye

lenses. Fisheye lenses both full frame and circular suffer from “barrel distortion” where subjects at the centre of the frame appear to bulge outwards, and straight lines curve wildly. With fisheye lenses the horizon (waterline) is much more noticeably curved either upward or downward as you move toward the edges of the frame. Wide rectilinear lenses also suffer the same distortion behind a dome but it is far less severe. As a result when I intend to shot splits in the vertical (portrait) orientation I always chose a rectilinear lens because the fisheye curvature is even more pronounced across the narrower frame.

Ginnie Springs, Florida, My Family Snorkeling, Olympus E-M1 Mark II, Olympus 8mm Fisheye, ISO-400, F/11, 1/250th sec, Ikelite Housing, Ikelite four inch dome, Two Underwater Ikelite DS-161 Strobes with Dome Diffusers, Notice the curved water horizon of the fisheye lens

Cenote Guide Miki, Das Ojos, Yucatan, Mexico, Acquapazza housing APSO-A7R3, 170mm dome port, Sony A7R III, Sony FE 16-35mm F/4 ZA lens at 17mm, two RGBlue System 02-2 lights, ISO 6400, F/9, 1/30th sec

Dome Port Selection

Since the film days the recommendation for splits has always been to use the largest dome port you have available. While most of us own dome ports in the 170 mm to 230 mm range much larger domes in the 300 mm to 600 mm (12” to 24”) range and beyond are being custom made specifically for shooting splits.

In the film days 35mm was the gold standard for underwater photography. Now we have a broader range of sensor sizes with the smaller sensors being more forgiving with smaller domes because of the greater depth of field they provide.

The reasons large ports are favored over smaller ones is that the larger the port the greater the surface area along the water line between the top and bottom half of the image. More surface area allows the water to flatten and smooth out resulting in a more natural transition between air and water. Even if you are shooting in less than flat waters the water motion is less obvious in the frame.

Larger ports extend the depth of the virtual image allowing greater distance between the lens and apparent subject increasing the corner sharpness. I have used dome ports as small as 100 mm to shoot splits with a fisheye lens and while fisheye lenses suffer less from corner sharpness issues all other problems associated with splits remain. I have also used both high quality acrylic ports and high quality optical glass ports and I have noticed more issues with reflections (ghosting) using acrylic ports than with glass. The most common issue is flare and having the engraved information on the front of the lens reflect back onto the sensor. Several manufacturers are selling flat black rings that thread onto different

thread size lenses or paste on to mitigate this issue.

I have used the lenses listed above with ports from the following manufactures Athena, Aquatica, Ikelite, Inon, Nauticam, Saga, Sea & Sea, Seatool and Zen Underwater in sizes from 100 mm to 230 mm.

When selecting a dome port for splits I would highly recommend getting one that has a removable dome shade. This may not present an issue with your current lenses but if you ever intend to use a circular fisheye lens you will be happy you invested in a removable shade. Every circular fisheye lens I am aware of will vignette in the dome port corners if the shade is not removed. Also some shades need to be removed prior to entering the water while others can be removed and reinstalled underwater.

While large acrylic dome ports are less expensive than equally sized optical glass ports they are also less than half the weight. This is an advantage for travel but problematic for splits because acrylic ports tend to turn nose up at the surface. Adding weight to the bottom of the dome shade will help resolve this issue by pulling the port down into the water.

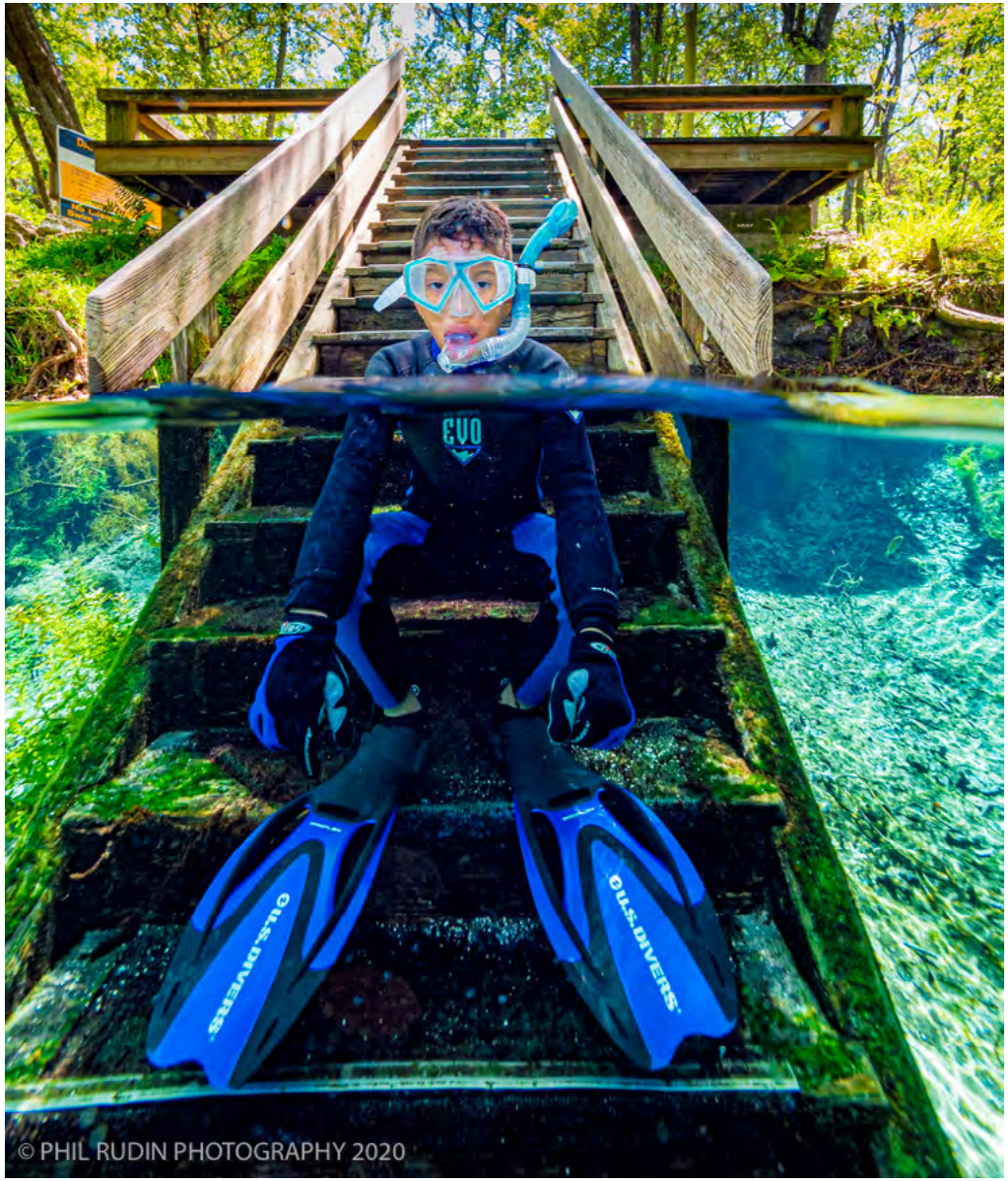
Depending on the lens and dome port combination chosen you may need to use port extensions between the port and housing. These port extensions will also effect the balance between housing and dome port requiring trim weights to be added for better balance. With smaller dome ports water spots on the top half of the dome will appear larger in the frame than the same size water spots on a large port. This is the result of forced perspective where the water spots are closer to the image sensor making the drop look bigger in the frame.

Getting Started Shooting Splits in Open Water

The ideal place to start shooting splits is in very calm, shallow, protected waters with excellent visibility. While I have shot thousands of splits in the open ocean the lion's share were of divers and dive boats world wide.

With all new underwater photography techniques and equipment I recommend starting the learning process in a swimming pool. The pool is a great place to experiment with camera settings, lenses, port sizes, extensions and lighting techniques. These pool sessions allow you to discover which of your equipment configurations work best and to master the skills needed to move on to open water.

As I mentioned above the prevailing wisdom when shooting splits is to use very wide rectilinear or fisheye lenses, a very large dome port



Model Roman, Little Devil Springs, Florida, Olympus E-M1 Mark II, Olympus 7-14mm F2.8 at 7mm, sec, Ikelite Housing, Ikelite eight inch full dome,Two Underwater Ikelite DS-161 Strobes with Dome Diffusers, ISO 320, F/6.3, 1/60th

Diver Selfie at Ginnie Springs, Florida, Canon EOS R, Canon 8-15mm F/4L fisheye at 8mm, Ikelite housing with eight inch dome port & Ikelite flashes, ISO 800, F/22 at 1/200th sec, Notice the curved water horizon of the fisheye lens in this case bowed towards the center of the lens

of 200 mm or more and high F/numbers in the F/13 to F/22 range on full frame. You can get away with F/numbers in the F/11 and above range for sub-full frame sensors. Let me reiterate that using high F/numbers with super wide lenses and large dome ports will, in a perfect world present the best case scenario for nailing focus both above and below the waterline. This combination should offer the best opportunity for that award worthy image that many dream about.

For those wanting to learn how to shoot splits for fun the parameters can be expanded a great deal to include most equipment capable of focusing above the waterline. This would not include water contact optics like Nikonos film lenses and wide conversion lenses designed specifically for underwater use only.

A great way to start learning is to use the equipment you already own that allows the widest AOV with the largest port you own. I would suggest starting in a pool photographing family and friends. Several of the issues you can master are selecting the best F/stop, shutter speed and ISO to give you the most depth of field while at the same time achieving proper focus and exposure while also freezing the action.

Remember you will have much more light at the surface than you do at depth so lowering ISO while maintaining a proper shutter speed is not hard.

I often switch from manual camera settings to

Model Rossina, Angelina Cenote, Yucatan, Mexico, Sony A7R III, Sony FE 12-24mm F/4 G zoom at 24mm, Nauticam housing, Zen 230mm dome port, two Inon Z-330 flashes, S-Turtle flash trigger, ISO 64, F/4, 1/125th sec

aperture priority settings using ISO 400 and an F/number of 16 to 22. This will normally get you into the 1/125th second or above range. This works quite well in open ocean water where you and the subject are always in motion.

I always attempt to have the sun at my back to avoid flare into the lens and for more even lighting. If you are using strobes push them down as far as you can into the water. The surface lighting is often going to be two or three stops brighter than the

underwater exposure.

I tend to meter for the above water exposure rather than the U/W part of the image. It is much easer to recover the under exposed side of the image than it is to deal with a two or three stop over exposure.

Regardless of what lens and port combination you are using one side of the image is likely to be a bit softer than the other side of the image. Choosing which side of the image you want to favor

Waiting to board, Cozumel, Mexico, Olympus E-M5, Panasonic Lumix 7-14mm F/4 at 7mm, Nauticam NA-EM5 housing with Zen 170mm dome port, two Inon Z240 flashes, ISO 200, F/10, 1/200th sec, Olympus Creative Pop Art Filter applied in camera

is important. With a model in the foreground I will always focus on the model and if the background is soft the model will still pop in the frame. I have used this technique with F/numbers as low as F/1.8 while shooting splits with models. If you have a beautiful shallow reef in the foreground and a distant island above focus for the reef.

With more static subjects like piers or other structures both sides of the image should be in proper focus if you get close.

Shooting sunsets with a foreground subject will require flash fill for the under side or for both sides if the subject is close to the lens like a shark at sunset from the dive platform.

Water droplets

Since the early days I have heard of dozens of ways to keep water droplets off the dome port. From Lemon Pledge on acrylic domes to spit and potato chunks rubbed on optical glass.

One solution for water droplets is to keep the top half of the dome port dry. This is much easer said than done but in controlled situations like a swimming pool or calm spring it can be done.

I have seen several split shooters using a child's life vest to support the housing and keep it above the waterline. Float arms pushed under the water also provide bouyancy to assist with keeping the housing raised above the water.

Inevitably the dome is going to get wet and

water droplets will form. After the potato or spit is applied I have found the most consistent way to remove the spots is to dip the entire dome under the water and then start shooting as you raise the dome back above the water level. For the first few seconds the water will shed off the dome before forming spots.

When relaying solely on ambient light I have even set the frame rate to 3 to 5 frames per second to catch the sweet spot where the water is shedding off the port. In the end you are likely to see water spots in your images at some point.

In post some water spots can be removed but others just can't without being obvious. In the end water spots should be thought of like backscatter where a bit is tolerable while too much is not worth dealing with. Also in post, shadow recovery and graduated filter tools can come in very handy for retrieving a more balanced exposure between the water and air sides of the image.

Whether your goal is to shoot splits for competition or just for fun in the pool with family these shots are always crowd pleasers and they allow you to tap into the more creative side of the brain.

I hope to be back in the water soon for more reviews of the latest underwater photography equipment for all skill levels and budgets.

Phil Rudin

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