

Back to basics

Artificial light

by Peter Rowlands

Water acts as a strong filter which mutes and alters the natural colours of underwater subjects. Artificial light, in the form of electronic flash or strobe, is added to counteract this and restore the colour and detail.

Artificial light sources

Electronic flash/strobe is the most widely used artificial light source in still photography. These devices give a bright pulse of light which, when timed to coincide with the shutter being open, gives the impression of the photograph being taken by daylight. The typical duration of the flash is around 1/1000th of a second and will be even faster with TTL systems used at wide apertures.

This bright pulse of light must be taken into account when calculating the correct exposure and the aperture you choose will depend on:

- A. The power of the flash
- B. The flash to subject distance.

The power of a flash is denoted by its GUIDE NUMBER. The higher the guide number, the more powerful the flash. Most modern guide numbers are quoted for use with 100asa film at flash to subject distances measured in metres.

To find the correct aperture, the following formula is used:

$$\text{APERTURE} = \text{GUIDE NUMBER} / \text{FLASH TO SUBJECT DISTANCE}$$

For example, if you are taking a picture with a flash with guide number 32 of a subject 2 metres from the flash, the aperture required will be $32/2 = F16$.

The same subject 3 metres away would require $32/3 = F11$ (figures rounded up for simplicity).

The underwater guide number will depend on the water clarity but as a general guide for use in clear water, the guide number should be divided by 3 which will effectively mean an aperture three stops wider than on land. This is a broad generalisation and will vary considerably depending on the water conditions.

Most flashguns are supplied with an exposure scale but, if not, it is easy to calculate one by using the GUIDE NUMBER formula:

UNDERWATER EXPOSURE CHART FOR A 32 GUIDE NO LAND FLASH

Land guide no is divided by 3 for the "water factor".so Underwater Guide No = 10.67

Flash distance (m)	Guide No	Nearest aperture
3	3.56	4
2.5	4.27	4
2	5.34	5.6
1.5	7.11	8
1	10.67	11
0.5	21.34	22

Flashgun manufacturers test their flashes under optimum conditions to give the best results so be advised to do an exposure test for your particular flash. A swimming pool will do with the subject in mid water away from the sides of the pool.

Always remember that the aperture will depend on the reflectance of the subject and you may need to make adjustments to take this into account.

Using different film speeds

To select the right aperture if film speed is altered, first calculate the difference in film speed i.e. 50asa is 1 stop slower than 100asa so all apertures will need to be opened up by 1 stop.

Similarly going from 100asa to 200asa is a 1 stop increase so all apertures have to be closed down 1 stop.

Multi power flashguns

Some flashes have variable power settings and they are usually:

Full = Full output
1/2 = 1 stop less
1/4 = 2 stops less
1/8 = 3 stops less
1/16 = 4 stops less

TTL flashguns

The output of TTL flashguns is controlled by a sensor in the camera which reads the amount of light falling on the film during the exposure. When enough light has fallen on the film the output of the flash is stopped and the remaining charge stored for the next exposure. In this way, at small flash to subject distances, a TTL flash will give many more times the number of flashes than at full power.

TTL flashguns almost eliminate the need to make any manual calculations. All you need to know is the flash to subject range over which the TTL will operate correctly for a given aperture.

Auto flashguns

These are very similar to TTL except that the sensor is in a separate housing and reacts to the amount of light being reflected from the subject rather than the light falling on the film. In practice they tend not to be as accurate as TTL.

Slave flashguns

These flashguns have an additional sensor which triggers the flash

when there is an impulse of light i.e. from another flash.

They are useful at short flash to subject distances for adding more light or light from a different angle to achieve a more pleasing result.

Angle of coverage

For general use you should use a flash which covers at least the same angle as the lens you are using. Using a wider angle flash than the lens you are using will reduce the need to point the flash precisely.

Exposure for two flashguns

An additional identical power flashgun, when fired from the same position as the first flash, will result in 1 stop more exposure.

Placing the flash in a different position will vary this slightly but for simplicity's sake always close down by 1 stop when using another flash of similar power.

Balanced light exposures

The most effective shots are taken with balanced light where the available light and artificial light are arranged to give the same exposure.

To do this requires the following:

1. Take a light reading of the background
2. Estimate the flash to subject distance of the foreground subject

Then either

1. Move your position so that the flash to foreground subject will give a similar aperture as that for the background or
2. Without moving, adjust the power of the flash to achieve the correct aperture

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Guidelines for contributors

The response to UwP has been nothing short of fantastic. We are looking for interesting, well illustrated articles about underwater photography. We are looking for work from existing names but would also like to discover some of the new talent out there and that could be you!

The type of articles we're looking for fall into five main categories:

- Uw photo techniques** - Balanced light, composition, etc
- Locations** - Photo friendly dive sites, countries or liveaboards
- Subjects** - Anything from whale sharks to nudibranchs in full detail
- Equipment reviews** - Detailed appraisals of the latest equipment
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**If you have an idea for an article,
contact me first before putting pen to paper.**

E mail peter@uwpmag.com

How to submit articles

To keep UwP simple and financially viable, we can only accept submissions by e mail and they need to be done in the following way:

1. The text should be saved as a TEXT file and attached to the e mail
2. Images must be attached to the e mail and they need to be 144dpi
Size - Maximum length 15cm i.e. horizontal pictures would be 15 cm wide and verticals would be 15cm.
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(glenn.ostle@metso.com) or (phadfield@carolina.rr.com)

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Email jestaylor@hotmail.com

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Bdmelliott@aol.com

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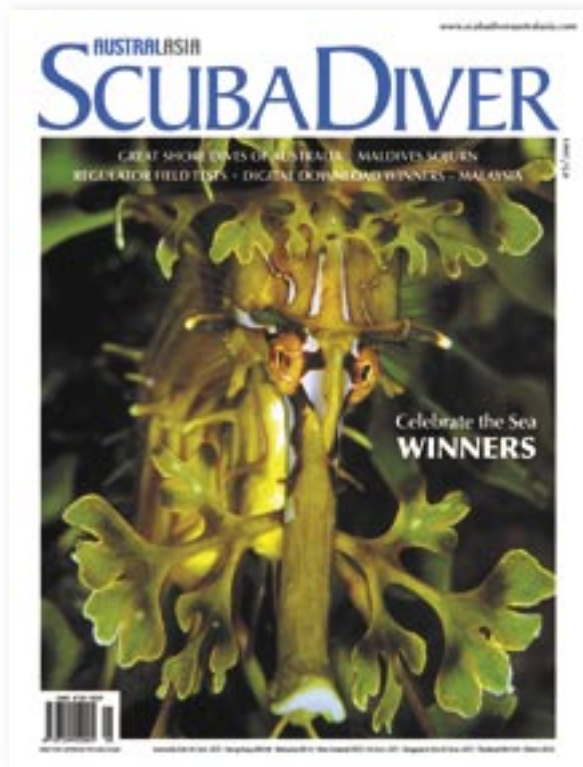


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