

Equipment Required.

Camera with Bulb or "T" shutter speed option.

ND Filters.

To achieve exposures of several minutes in daylight you will need at least 10 stops of ND filter.

I generally use a 10 stop + 6 stop or 3 stop to give me 16 stops or 13 stops of ND filter in total.

ND filters will give you some strange colour casts, the better the quality the more neutral they will be. B+W, Lee and Foramtt Hitech are amongst the most neutral and also the most expensive.

There are now 13 and 16 stop ND filters available from Foramtt Hitech called Firecrest.

Dust, keep the filters clean or you will get reflections on the image made worse when more than one filter is used.

Round or square? Both work, the square are easier to remove to reframe but are more prone to flare and reflections affecting the image.

Tripod.

A good tripod is essential, if it is not stable then you will be wasting your time.

Loupe.

If you are working on the camera screen to manually focus you may need a magnifier.

Remote Release.

Cable or electronic.

Black Tape.

Black electrical tape to cover any areas that may let in light. The distance window on the lens is one of the usual places that let light in.

- Timer:** Some method accurately measuring the exposure time is required. Some cameras have a timer built in. Otherwise use a watch, Stop watch on your phone, or get a remote release with a timer built in.
- Exposure Calculator:** A Paper chart or Smart phone app is needed to calculate the exposure once the filters are added. To find a suitable app for your phone search for Long Exposure Calculator.
- Viewfinder:** You need to keep light from entering the viewfinder. Some cameras have a blind fitted to the viewfinder which you can close, others have a plastic cover that fits over the viewfinder eyepiece.
- Hat.** Useful to put over the camera just to help keep more light out!

Tide time tables are very useful if you plan on taking coastal pictures.

Exposure

5mins @ f8 This appears to be the target exposure for moving clouds and calm water suggested by the “experts”.

Don't go too high up the f scale or sensor dust and lens refraction can become a problem.

ISO Use the lowest ISO that is possible to set on your camera.

Manual exposure. The filters play havoc with the metering system

Shutter Speed. Set the camera to bulb, if your camera doesn't have a Bulb or “T” setting you will be restricted to longest exposure time you can set the camera to.

Manual focus. Otherwise the camera will try to refocus when you press the shutter release!

Long Exposure Noise Reduction. Turn off or you will be waiting forever for the camera to catch up.

The Process.

Frame image.

Take a picture at your preferred f stop and lowest ISO, without the filters, to get a starting shutter speed, you can do this in Auto exposure, shutter priority.

Always take a frame without the filters, you may need a sharp well exposed frame to copy it in!

Using the exposure calculator determine the new shutter speed with ND filters. Beware of reciprocity failure. Even with digital cameras this can reduce your exposure by 50% but all cameras are different.

Put the filters on the lens.

Close the viewfinder blind or fit a cover.

Take your picture.

Check the histogram, adjust exposure if required and retake.

You may think this is quite straight forward, it isn't! The exposure chart is only a starting point, a fair amount of trial and error is required.

Patience. You will need lots of this, take something to read during the exposure, phone a friend, prepare a BBQ. This process does use up time, not just for the exposure but the time taken to set the camera up and for the number of exposures required to get it right.

Health & Safety

ND Filters don't float!

Water, especially salt water, and cameras don't go together well.

Be careful, water and slippery surfaces can be dangerous.

Check tide times, it is safer to work when the tide is going out rather than coming in so you don't get trapped.

Pictures.

Something must be moving.

Keep it simple.

F-stop reduction	Optical Density	Filter factor	1/8000s	1/4000s	1/2000s	1/1000s	1/500s	1/250s	1/125s	1/60s	1/30s	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	
0	0	0																					1m
1	0.3	2	1/4000s	1/2000s	1/1000s	1/500s	1/250s	1/125s	1/60s	1/30s	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m
2	0.6	4	1/2000s	1/1000s	1/500s	1/250s	1/125s	1/60s	1/30s	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m
3	0.9	8	1/1000s	1/500s	1/250s	1/125s	1/60s	1/30s	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m
4	1.2	16	1/500s	1/250s	1/125s	1/60s	1/30s	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m
5	1.5	32	1/250s	1/125s	1/60s	1/30s	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h
6	1.8	64	1/125s	1/60s	1/30s	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h
7	2.1	128	1/60s	1/30s	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h
8	2.4	256	1/30s	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h
9	2.7	512	1/15s	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h
10	3.0	1024	1/8s	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h
11	3.3	2048	1/4s	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h
12	3.6	4096	1/2s	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h	128h
13	3.9	8192	1s	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h	128h	256h
14	4.2	16384	2s	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h	128h	256h	512h
15	4.5	32768	4s	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h	128h	256h	512h	1024h
16	4.8	65536	8s	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h	128h	256h	512h	1024h	2048h
17	5.1	131072	15s	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h	128h	256h	512h	1024h	2048h	4096h
18	5.4	262144	30s	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h	128h	256h	512h	1024h	2048h	4096h	8192h
19	5.7	524288	1m	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h	128h	256h	512h	1024h	2048h	4096h	8192h	16384h
20	6.0	1048576	2m	4m	8m	15m	30m	1h	2h	4h	8h	16h	32h	64h	128h	256h	512h	1024h	2048h	4096h	8192h	16384h	32768h