

# NEUTRAL DENSITY FILTERS

How do you turn an everyday scene into an atmospheric masterpiece? Lee Frost may well have the answer and it comes in the form of a humble neutral density filter. Prepare to be inspired!

WORDS & PICTURES: LEE FROST



**Eilean Donan Castle**

"A ten-stop ND filter allowed me to get a 67-second exposure, which recorded motion in the clouds and a warm cast."

## Neutral Density filters

**T**HE ONLY DOWNSIDE to being a landscape photographer in the UK is the weather. It's about as reliable as a politician. So, what often happens is you get your kit all packed and ready the night before, put your muddy boots by the front door, set your alarm clock nice and early and creep out to shoot the sunrise. Trouble is, more often than not, the sunrise fails to materialise and you head back home with an empty memory card, wishing you'd stayed in bed.

Don't you just hate it when that happens? I know I do. I'm an impatient son of a gun. I like the odds of success, not failure, to be stacked in my favour, especially when sleep has to be sacrificed. And so, over the years, I've made it my mission to find ideas and techniques that I can use to make successful shots possible no matter where I am or what the weather's doing. Digital infrared, pinhole, HDR, exposure merging, converting to black & white – I'm like Inspector Gadget with a camera. Drop me anywhere and I'll guarantee you a great photo.

### MEASURED DARKNESS

The most recent addition to my creative arsenal is a strong neutral density filter. As most of you will already know, neutral density filters (not to be confused with neutral density graduate filters) are designed to reduce the amount of light entering your lens so you can use a slower shutter speed or a wider lens aperture – or both. For example, if you use a 0.6ND filter, which has a filter factor of 4x and increases the exposure by two stops, 1/4sec becomes one second. If you use a 0.9ND filter, which has a filter factor of 8x and increases the exposure by three stops, 1/4sec will become a two-second exposure.

All very nice, very safe. But I like to take things to the extreme, so while the majority of photographers are happy using modest ND filters like the above to add a bit of blur to shots of waterfalls and the like, mine is so dark you can't see through it, so dense metering systems blow a fuse trying to take exposure readings. It has a filter factor of 1,000x and increases exposures by ten stops, which in plain talk means an unfiltered exposure of one second becomes 1,000 seconds – almost 17 minutes. I know, it's crazy but that's just how I like to live my life!

This isn't the first time I've extolled the virtues of measured darkness. A year ago to this very issue I wrote an article about using a ten-stop ND filter to create fine-art black & white 'motion studies'.

That's because initially, all the shots I took through it ended up black & white. I mainly used the ten-stop ND on drab, grey, damp days, you see, so the colour Raw files looked as flat as a flatulent frog. But occasionally, an image would pop up on the LCD monitor that worked well in colour so it stayed that way, and slowly a collection of colour ten-stop images began to materialise.

The turning point came when I realised that my ten-stop ND filter wasn't actually neutral at all (see 'Extreme ND filters' panel) and tended to add an obvious warm cast to images shot in 'normal' daylight conditions. So instead of sending it back and demanding a refund, I started to use it specifically for that effect.

Of course, it wasn't just the warm cast that made the image, you can create that effect by tweaking White Balance during Raw file

### Extreme ND filters

The ten-stop ND filter I used for all these shots is called a ND-110 (3.0) SH Filter, made by B+W. Your local dealer most likely won't have one in stock but should be able to order one for you. Demand for this filter has snowballed in the last year – anyone seeing the effect just has to have one – so they're not always available at stores in the popular sizes and you may need to wait several weeks before you can get your hands on one. Prices have also gone up too. I paid around £56 for my 77mm filter but the same one will now cost you closer to £80. There are, however, other strong ND filters available. B+W makes a 1.8ND that gives a six-stop exposure increase, while Heliopan makes a 3.0 (ten-stop) ND like B+W's, as well as a 4.0 (13-stop) ND, while Hoya has an ND400 (nine-stop) filter. There's also a Singh Ray Vari-ND filter that offers variable neutral density from two to eight stops, all you do is twist the front section like you do with a polariser to achieve different densities.

As I haven't used any of these filters, other than the B+W 3.0, I can't vouch for their colour balance. Neutral density filters get their name because they're supposed to be neutral; they block light without changing colours. However, the super-strong ND filters are designed more for industrial and scientific use where neutrality is less important, so they aren't always perfectly neutral.

My B+W ten-stop ND is far from neutral, which is why it adds a wonderful warmth, and why I enjoy using it. Other brands and densities of strong ND may not give the same colour shift, so if you want warmth as well as motion it might be worth sticking with the devil you know – the B+W 3.0ND, which also seems to be the most readily available. When it's in stock.

Finally, remember that all these ND filters are circular screw-in types and attach direct to the lens. If you have lenses with different filter thread sizes, buy an ND filter to fit the biggest thread, then stepping rings, which cost about a fiver each, to adapt it to fit smaller thread sizes.



### Dunstanburgh Castle

"As the light was weak, I used a ten-stop ND filter to add warmth and to turn the sea misty with a two-minute exposure."

**"I'm an impatient son of a gun. I want the odds of success, not failure, to be stacked in my favour – especially when sleep has to be sacrificed!"**

processing, or adding a filter effect in Photoshop. No, it was that wonderful warmth combined with the other characteristic you get when using a strong ND filter – motion.

As we've already established, in situations where you'd normally be using an exposure of a fraction of a second, the ten-stop ND turns it into minutes. My record so far is 15 minutes. I don't have the patience to wait any longer, though generally I shoot in the two to five minute range and the effect works brilliantly.

Two or three minutes may not sound like very long, but when your shutter's open, a hell of a lot can happen. Drifting clouds are transformed into gentle brush strokes of colour. The sun comes and goes. Moving water turns to milk. People and traffic passing through the scene disappear completely,

which is great if you want to capture busy urban scenes in a way no one has ever seen them before – deserted.

Atmosphere is the best word to describe what you get when using a ten-stop ND. Feeble sunrises and sunsets are brought to life in a way you could never mimic using a computer, while in overcast weather scenes are simplified and small splashes of colour take centre stage.

I often use my ten-stop ND filter when I'm leading photo workshops, and the response is always the same when an image appears on my camera's screen: "Wow!" Quickly followed, with notepads and pencils at the ready, by, "Which brand, how much and where from?" Shame I didn't buy a bulk load instead of just the one – I'd be a millionaire by now! ➤



"This pair of images shows how the use of a strong ND filter can totally change the feel of an image. The straight shot is dark and dramatic while the image with a long exposure is warm and atmospheric."

### ND filters & Live View

If your DSLR has Live View, it could make life a lot easier when using a ten-stop ND filter. That does depend on how old your DSLR is, because Live View has become much better in the last couple of years. My Canon EOS-1DS MkIII can just about see through a ten-stop ND filter when set to Live View, but the EOS 5D MkII seems much more sensitive and gives an image that's clear enough so you can compose shots and align grads while the ten-stop ND is on the lens. This saves a lot of time and hassle because normally you have to remove the ND filter from the lens, re-compose, then refit the filters every time you move the camera. The best solution is to try Live View on your camera with the ND filter in place and see what happens.



**Below: Beadnell Hut**

"When the clouds are moving, a ten-stop ND filter really comes into its own for capturing the dynamic movement."

**Right: Kimmeridge Bay**

"A long exposure has made this dusk scene moody and the blurred water has highlighted the foreground interest."



**Using a ten-stop ND filter**

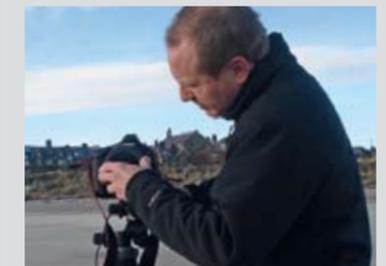
Time to put all this theory into practice as Lee Frost shows you how to use this useful filter in the field...



**Step 1** Firstly, mount your camera on a sturdy tripod and compose the scene without the ND filter on the lens. Take an exposure reading at an aperture of f/8 or f/11 and make a note of it.



**Step 2** Switch focus from AF to M and manually focus the lens. Set the shutter to B (bulb) and attach a remote release to the camera. Attach a filter holder to the lens and align your ND grad to cover the sky.



**Step 3** Remove the filter holder and ring from the lens, taking care not to move the grad. Attach the ND filter to the lens then fit the filter holder and grad – don't move the grad or it will be knocked out of alignment.



**Step 4** Calculate the required exposure using the chart on page 133 or a calculator. Trip the shutter and lock it open with the remote release for the required time. At the end of the exposure, close the shutter.

**Calculating your exposure**

To save you the hassle of working out the correct exposure when using a ten-stop ND filter, we've done it for you. Simply take a meter reading without the ND filter in place, locate it on the chart below then read across to find the exposure you need to use once the ten-stop ND is in place.

Unfiltered exposure	Exposure with ten-stop ND
1/500SEC	2 SECONDS
1/250SEC	4 SECONDS
1/125SEC	8 SECONDS
1/60SEC	16 SECONDS
1/30SEC	32 SECONDS
1/15SEC	1 MINUTE
1/8SEC	2 MINUTES
1/4SEC	4 MINUTES
1/2SEC	8 MINUTES
1 SECOND	16 MINUTES
2 SECONDS	32 MINUTES
3 SECONDS	48 MINUTES
4 SECONDS	1 HOUR

**NDcal on iPhone**

An excellent app you can download that calculates your exposure depending on which filter you are using. It counts down and sounds an alarm when it's shutter-closing time!



**FADE TO BLACK**

Using a super-strong ND filter is straightforward enough, but you do have to take a few things into account. First and foremost, because you can't see through the ND filter clearly – well maybe just, at a push, in bright sunlight – you need to compose the shot before screwing it onto your lens, and accept that once the filter is in place the viewfinder will be plunged into darkness. Unless, of course, your camera has Live View (see panel). It goes without saying that you'll need a tripod, so don't even think about leaving home without one.

The density of the filter also creates problems with focus and metering. It's highly unlikely that your camera's AF system will work with the ND in place, so switch to manual focus and focus the lens before fitting the filter.

As for metering, when I first used a ten-stop ND I tried metering through it with my DSLR set to aperture-priority, but exposures were all over the place and images were always underexposed. Also, the longest metered exposure you can usually achieve with this mode is 30 seconds, and if you try to keep exposures within that range you're defeating the object of using a super-strong ND. So switch to manual exposure mode and scroll through the shutter speeds until you get to B (Bulb), which allows you to open the shutter for as long as you like.

Also, attach a remote release so you can hold the shutter open without having to keep the shutter button pressed down with your

finger, which will most likely lead to camera shake (as well as finger cramp!).

So how do you calculate correct exposure? One option is to take a meter reading before you fit the filter then work back from there. For example, if the meter says 1/30sec unfiltered, with a ten-stop ND on the lens it will be 32 seconds, one-stop is 1/15sec, two stops is 1/8sec, and so on.

To save you the hassle of working this out, make a copy of the chart on the left and keep it in your gadget bag. Alternatively, use a calculator to work it out – 1/30 x 1000 is 33.3333. Me? I'm far too flash for that – I have an App for my Apple iPhone called NDcalc, which works out the exposure for any ND filter from a 0.3 (2x) to a 6.0 (1,000,000x) then counts down the time for you and sounds an alarm so you know when to (wake up and) close the shutter. Failing that, you can guesstimate. I tend to do a guesstimated test shot based on experience. So, with the camera on a tripod, the scene composed, the lens focused, the ND filter in place and the shutter set to Bulb, I'll make, say, a two minute exposure at f/8 and ISO 100, check the image and the histogram and increase/reduce the exposure accordingly.

Canon DSLRs have a count-up timer on the top plate so I don't have to worry about keeping an eye on my watch or counting elephants. I leave that to Nikon users, then start a conversation when they're about halfway through so they get confused and have to start all over again. Ha ha!

**"One of the great things about this technique is that Raw files rarely need much work in Photoshop to get the final image and a perfect shot for your wall!"**

**BEST PRACTICE**

I generally shoot at ISO 100 and stick to f/8 or f/11 for optimum image quality, using the exposure duration as my main variable. However, when ambient light levels are quite low, such as at dawn and dusk, I may increase the ISO to 200 or even 400 so the exposure with the ND filter in place isn't too excessive – I try to keep them within five or six minutes. If I don't need lots of depth-of-field – when shooting from a high viewpoint, say – I may open up the lens to f/4 or f/5.6 instead.

Noise is more of an issue when using long exposures – especially hot pixels, which glow like pin-pricks of light. Some DSLRs offer Long Exposure Noise Reduction (NR) to combat this, but it works by making a second exposure the same duration as the first with the shutter closed, so shoot a five minute exposure and you'll have to wait five more minutes before the image appears on the LCD monitor. I'm far too impatient for that, so I make sure my camera's NR is turned off and I clone out any hot pixels in Photoshop, which only takes about a minute.

Finally, remember to use an ND grad filter to prevent the sky from overexposing, just as you would when shooting without an ND filter. I screw my B+W ND onto the lens then attach

a 77mm wide-angle adaptor ring from my Lee Filters kit. A filter holder is then clipped into the adaptor ring as normal so I can slot ND grads into it. The main difference, of course, is that you can't see through the lens with the ND filter in place, so you can't align ND grads by sight. One option is to attach the filter holder to the lens before fitting the ND filter, slot in the grad, align it, remove the holder (with the grad still in place), fit the ND filter on the lens, pop the filter holder over the ND (with the grad still correctly aligned) and Bob's your uncle. Your other option is to guess! Compose the shot, peer through the viewfinder, determine how much of the image is sky (a quarter, third etc) – screw the ND filter into place, fit the filter holder over it then slot a grad in the holder so the ND part covers the top portion of the lens. If you don't quite get it right, you'll know when you see the first image on the LCD monitor and the grad can be adjusted accordingly.

One of the great things about this technique is that Raw files rarely need much work in Photoshop to get the final image. OK, you may need to zap a few hot pixels and if the light was really flat, boost the contrast, but that's about it. So, within minutes you can be printing another masterpiece for the wall!