Topic 6 - Lens Filters: A Detailed Look

Learning Outcomes

In this lesson, we will take a detailed look at lens filters and study the effects of a variety of types of filter available today. By the end of this lesson, you will begin to think about what use your type of work might have for lens filters and which ones best suit you.

Lens Filters: A Detailed Look

UV/ Clear/ Haze Filter

The purpose of UV / Clear / Haze filters today is to simply protect the front element of a lens.

In the past, these filters were used to block UV from hitting the film. All digital camera sensors have a UV/IR filter in front of the sensor, so there is no more need to

use UV filters on DSLRs. Many photographers use these types of filters for protection, because it is easier and cheaper to replace a filter than to try to repair a scratched or broken lens element.

One thing you have to make sure before you purchase a clear filter is that you buy high quality glass with special multi-resistant coating (MRC). The worst thing you

can do is mount a low-quality filter in front of an expensive lens. Not only will it affect image quality, but it will also add nasty reflections, ghosts and flares to your images.

B+W F-Pro MRC filters are quite expensive, but you can also purchase other great alternatives from Tiffen, Hoya and other manufacturers.

Should you use a clear filter permanently on your lenses? This question brings up heated debates between photographers. Many believe that adding a piece of glass in front of lenses only hurts images and does very little to protect them, while others use them for peace of mind and easier cleaning. Some lenses with threaded front elements like the Nikon 50mm f/1.4G can be difficult to clean, so a clear filter would make lens maintenance less cumbersome.

Lens Filters: A Detailed Look

To avoid vignetting and other problems, UV filters should never be stacked with other filters.

Polarizing Filter

There are two types of polarizing filters – linear and circular.

Linear polarizers should not be used on DSLR cameras, because they can result in metering errors.

Circular polarizers, on the other hand, are perfect for DSLRs and do not cause any metering issues due to their construction. Circular polarizing filters are essentially linear polarizers, with a second glass element attached to their back that circularly

polarizes the light, giving accurate exposure results when the light hits the light meter.

When the two elements are aligned at the right handle and orientation from the sun, the captured image could have more saturated colours, bluer skies, less reflections and higher overall contrast. Polarizing filters can also reduce haze, which is very useful for landscape photographers.

When photographing landscapes, many photographers use a polarizing filter to spice up the colours, darken the sky and reduce haze.

Without filter With filter

Lens Filters: A Detailed Look

Polarizing filters are a must when photographing waterfalls or other wet scenery with foliage.

Without filter With filter

There are a couple of potential issues that you need to understand when using a polarizing filter:

1. There is a minimum and a maximum effect of polarization, depending on the filter alignment. You should rotate the filter every time you compose for best results. Take a look at this example of minimum and maximum effect of polarization:

2. The effect of polarization changes relative to the sun. The maximum effect of polarization is achieved when the lens is pointed 90 degrees from the sun (in any direction).

3. Avoid using a polarizing filter on ultra-wide-angle lenses. You might end up with a partially dark sky that will be tough to fix in post-processing. Here is an example of what happens when using a polarizer on a wide-angle lens:

4. In some cases, the maximum effect of polarization can result in an unnatural-looking dark blue sky as shown here:

5. There is a loss of approximately 2 stops of light when using polarizing filters, so you should watch your shutter speed when shooting with a polarizer hand-held. Singh-Ray polarizing filters are better than others in this regard and only lose around 1 stop of light.

6. Polarizing filters are typically thicker than regular filters and therefore can result in unwanted vignetting.

To avoid vignetting, polarizing filters should not be stacked with other filters. Due to light loss, you should also use a polarizing filter only when needed. In some high-contrast situations it might be necessary to stack a polarizing filter with a neutral density filter.

Lens Filters: A Detailed Look

Neutral Density (ND) Filter

The purpose of neutral density filters is to reduce the amount of light that gets to the camera and thus decrease the shutter speed and increase exposure time. These types of filters are particularly useful in daytime, because of the abundance of light that cannot be significantly reduced by stopping down the lens aperture and decreasing ISO.

For example, if you are photographing a waterfall and your starting point is ISO 100, f/2.8, 1/2000 that results in good exposure, stopping down the lens to f/22 will only slow down the shutter speed to 1/30 of a second. This would be too fast to create a “foggy” look for the falling water.

By using an 8 stop neutral density filter, you could slow down the shutter speed all the way to 2 seconds while keeping lens aperture at f/11 instead of f/22 (using apertures beyond f/11-f/16 in normal lenses decreases image quality due to diffraction).

Neutral density filters are also useful for flash photography. If you were photographing a model at 1/250 of a second at f/2.8 on a bright sunny day with flash to create a dramatic effect, you would most likely end up with an overexposed subject.

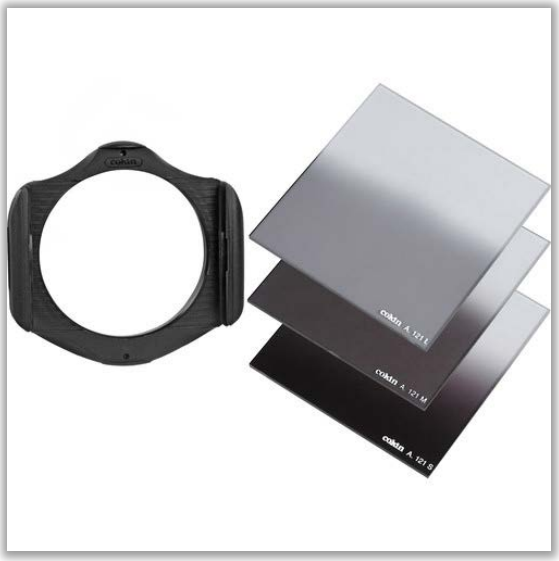
You cannot increase the shutter speed because flash sync speed limits you to 1/250 max, so your only option is to stop down the lens aperture to a larger number. Let's say that number is f/11. But then what if you want to isolate your subject from the background and still have nice bokeh? Without using high speed sync, your only option is to use a neutral density filter to reduce the amount of light that makes it to the camera.

Neutral density filters can be both circular and rectangular. There are no benefits to having a rectangular neutral density filter, so it is best to buy a circular ND filter for size and portability benefits.

Lens Filters: A Detailed Look

It is sometimes necessary to stack neutral density filters to decrease the shutter speed even more. Try not to stack ND filters with wide-angle lenses to avoid vignetting.

Neutral Density (ND) vs Graduated Neutral Density (GND) Filter



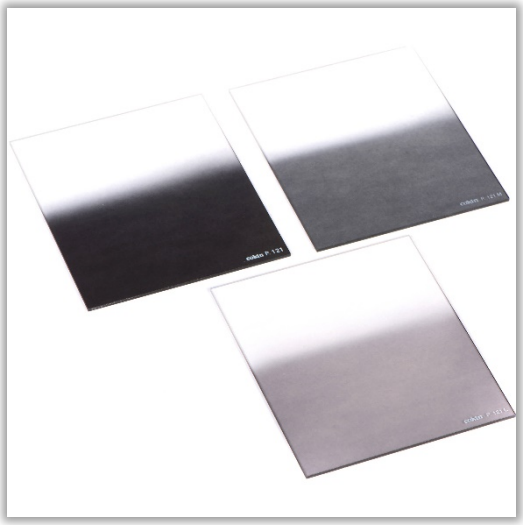
The difference between neutral density and graduated neutral density filters is that the latter is half clear. Because the size of sky versus the foreground can change depending on the composition, most GND filters are made in a rectangular shape. Therefore, these filters must be either used with a filter holder system, or must be held by hand in front of a lens.

Lens Filters: A Detailed Look

The advantage of using a filter holder is that you can stack multiple filters and you do not have to worry about alignment issues. The disadvantage of using a filter holder is that it can add vignetting, so you have to be careful when using wide-angle lenses with focal lengths below 35mm.

Hard-Edge Graduated Neutral Density (GND) Filter

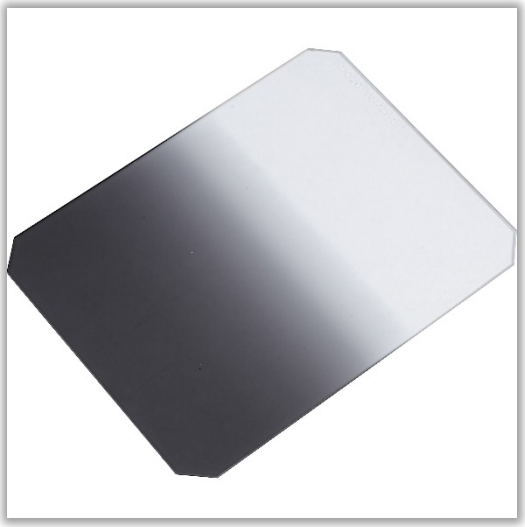
Hard-edge graduated neutral density filters can be very useful in high-contrast situations, where the sky is very bright compared to the foreground and the horizon is flat (due to hard transition from dark to clear). While photographing, the hard edge in the centre is aligned with the horizon. The sky is then darkened depending on the intensity of the filter. A two or three stop hard-edge GND filter is often sufficient to balance the shot.



The problem with hard-edge GND filters is that the horizon is rarely flat, so soft-edge GND filters are often more useful.

Be careful when stacking hard-edge GND filters in high contrast situations – both filters should be properly aligned to avoid nasty transitions.

Soft-Edge Graduated Neutral Density (GND) Filter

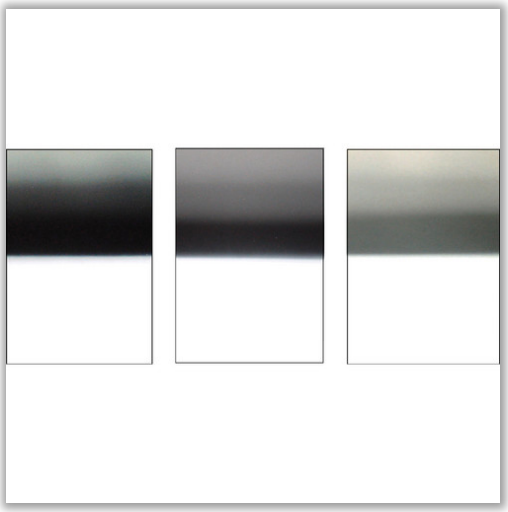


Compared to hard-edge GND filters, soft-edge graduated neutral density filters gradually transition from dark to clear, allowing photographers to use these filters when photographing a non-flat horizon. While mountains, hills and other objects above the horizon can be problematic for hard-edge GND filters, soft-edge GND filters work much better in those situations instead, due to the gradual transition.

Lens Filters: A Detailed Look

Stacking soft-edge GND filters is sometimes necessary in high-contrast and other rare situations

Reverse Graduated Neutral Density (GND) Filter



Reverse graduated neutral density filters are relatively new. When compared to regular hard/soft-edge GND filters, they are dark at the horizon (hard-edge) and gradually soften towards the top. Reverse GND filters are very useful for sunset shots when you shoot against the sun and it is near the horizon.

A common problem with such sunsets is that the sun is much brighter than the sky. If you use a hard-edge GND filter, the sky might get too dark and if you use a soft-edge GND filter, the sun will be overexposed. The solution is to use a reverse GND filter, which balances the sun and the sky in the frame, resulting in a more balanced exposure. Stacking reverse GND filters is sometimes necessary in high-contrast and other rare situations.

Colour/ Warming/ Cooling Filter

Colour / Warming / Cooling filters are generally used to alter camera white balance. There are two types of colour filters – colour correction and colour subtraction. The former is used for correcting white balance, while the latter is used for absorbing one colour while letting other colours through.

These filters were quite popular for film, but are rarely used for digital photography, since colour effects and white balance changes can be easily accomplished in post-processing software like Lightroom and Photoshop.

Lens Filters: A Detailed Look

Close-Up Filter

Close-up filters are generally called close-up lenses, because they are more lenses than filters. They attach to lenses just like filters, which is why we are listing them as filters. Close-up lenses are primarily used for macro photography to be able to get closer to the subject, decreasing minimum focus distance of the lens. Close-up lenses are a cheap way to convert your normal lens to a macro lens, although they do negatively affect image quality. For best results, it is recommended to use a macro lens instead. Stacking close-up filters is acceptable, although image quality is hurt even more.

Special Effects Filter

Special effects filters can produce some cool effects, but since most effects can be easily produced in Photoshop, these filters pretty much lost their popularity. Digital photographers rarely carry these filters as the star filter can be easily created in Photoshop through a couple of steps using the “Motion Blur” filter, softening glow can also be easily done through a couple of steps with the “Gaussian Blur” filter and most other filters can also be done in Photoshop. The only filter that cannot be reproduced in Photoshop is a bokeh filter, because the highlights cannot be easily changed through post-processing techniques.

Lens Filters: A Detailed Look

Filter Material – Glass vs Resin Filters

Filters can be made from glass, plastic, resin, polyester and polycarbonate material. Glass filters are typically of the highest quality, but they are very expensive and tend to easily break, especially of square or rectangular type. Plastic and resin filters are much cheaper than glass and do not easily break – they are the top choice for graduated neutral density filters.

Polyester filters are much thinner than glass or resin and are of very high quality, but are prone to scratches and hence not very practical on the field. Polycarbonate filters are very tough, scratch-resistant and are a good alternative to plastic/resin filters.

Step-Up / Step-Down Rings

Because filters can be expensive, it is much cheaper to buy a single standard filter (for example 77mm) and buy step-up rings for lenses that have smaller filter threads. Step-down rings can cause vignetting and other problems, so always try to use step-up rings instead. You can buy step-up rings for both circular and square filter holder systems in various sizes.

Lens Filters: A Detailed Look

What have we learned in this lesson? A Summary

In this lesson, we have had a thorough study of lens filter types and what they are capable of doing and when they should be used. Every great photographer will have at least one or two in their kit bag. This is much like the way every great photographer will own a prime lens or two. Every situation is different, but by having a basic understanding of what these lens filters can do, it will give you more range and skill when taking photographs.