

Intro to Digital Photography: Filters Notes

*** Slide 3 The goal of filters are to modify the light coming into the lens before it reaches the lens and eventually the sensor. This modification can be very subtle or obvious, depending upon the type of filter you're using.

One of the primary purposes of a filter is to protect the front lens element from weather such as rain and blowing sand; it is much cheaper to replace a \$20 filter than it is a \$400+ lens due to scratches in the front lens element.

There are two types of filter construction: filters that physically screw onto the front of the lens (note: some lenses have very large front elements -- too large to put filters onto them, in which case the filter is put into the lens at the rear next to where it attaches to the camera body) or filters that slip into mounts that are attached to the lens. We will be looking at both type of filter construction.

Filters can be broken down into four types, any of which are of use here in New Mexico. They are the UV filter, sometimes called skylight; polarizer; neutral density; and filters that do special effects such as prisms, diffusers, and colors. Filter cost is determined by the size of the filter and what it does: UV filters are relatively inexpensive while polarizers are not so cheap.

*** Slide 4 The UV/skylight filter is one that cuts down on UV haze / blue casts. It is typically the least expensive of all the filters and is used as a general all purpose filter to protect the front lens element. This is a very useful filter to have, especially here at our elevation where we get a lot of UV light.

*** Slide 5 Polarizer filters. Light coming into the lens is unpolarized--the waves of light are coming into the lens in different rotations. A polarizer allows light of only a certain rotation to pass through, all other rotations are canceled out. Many early digital cameras had problems using linear polarizers: the autofocus on most digital cameras work by contrast and available light and the linear polarizers were cutting down on the contrast. This was solved by putting in a quarter wave plate behind the linear polarizer; this plate causes the light to once again rotate, but in a known direction. These polarizers are called circular polarizers and are the predominant polarizer in use.

The goal of the polarizer is to cut down on glare and reflections, such as the specular highlights off water or the brightness of snow (or sand).

*** Slide 6 Polarizers are also used to darken the sky. In this case they work best when the camera is pointed 90 degrees to the sun. You simply turn the polarizer until the image in the viewfinder is the darkest.

The polarizer is perhaps the most useful of filters to use here in New Mexico, for it dramatically cuts down the very bright sunlight.

*** Slide 7 Neutral density filters come in an assortment of types: solid, graduated, and variable density. Neutral density filters do not alter the color of the light (thus the neutral part of the name) but they do cut the amount of light. Polarizers can alter the color of the light (see the blue sky example) as well as cut the amount of light.

Neutral density filters are used for a variety of purposes where the amount of light coming in needs to be cut. A solid density filter might be used to photograph a waterfall on a bright day, cutting down the amount of light allowing you to drag the shutter (extending the shutter speed) so as to blur the motion of the water. A graduated neutral density filter allows you to expose for the land on landscapes and knock out some of the brightness in the sky. Neutral density filters are also used to knock down light in extreme brightness environments, such as a snowfield, where you can't get the shutter speed down fast enough to take an on exposure photograph; using the neutral density filter you can knock down the amount of light by several stops, ensuring an on exposure photograph that has detail.

*** Slide 8 Neutral density filters have a rating that cuts light in one stop increments. These ratings are 0.3, 0.6, 0.9, and 1.2 for 1 stop, 2 stops, 3 stops, and 4 stops respectively. You can combine ND filters, such as a 0.3 and a 1.2 to get 5 stops of light reduction.

*** Slide 9 Graduated neutral density filters have the ND at top and they gradually transition to clear at the bottom. Primary use is for landscapes where you want to expose for the land and knock out some of the brightness in the sky (in general when shooting landscapes, the sky will almost always be brighter than the land; a properly exposed land might have a blown out sky).

*** Slide 10 Variable neutral density filters are really two circular polarizers that as you spin them knock out light. Some variable ND filters can knock out up to 8 stops of light. However, variable ND filters are very expensive.

*** Slide 11 Filters can be used to create special effects. There are diopter filters that work like a magnifying lens, allowing you to do close-up (but not macro) photography. There are filters that will color the incoming light, or take points of light and form them into starbursts. There are filters that create bokeh, a Japanese term for the soft out-of-focus areas. Warming filters add a yellow-orange to warm skin tones, especially when using flash; cooling filters add blue to cool down skin tones. There are filters that will enhance color, such as fall foliage; and filters that will diffuse an image slightly, giving a pleasant blur.

For those who shoot point-and-shoots, Cokin makes an adapter for point-and-shoots that allow you to use any of their

A-series filters with your camera. Cokin filters are an inexpensive way to launch yourself into the realm of using filters as a creative addition to your photography toolkit. Most Cokin A-series filters run about \$20 to \$25 (their P and Z series are more expensive). Cokin filters for digital SLRs have a mount that screws into the front of the lens where filters normally go, and then you slide the filters onto the mount. The Cokin mounts allow you to use two filters at a time, so for example you could use a diffuser to soften the image along with a colored gradient, such as the tobacco which works very nicely on sunsets to throw in some golden-orange color.