

CHOOSING A LENS FOR A DIGITAL SLR BY MICHAEL SMYTH

This tutorial is designed to assist in the selection of lenses for a Digital SLR.

All cameras have a lens. The lens is used to focus the image onto the film/sensor. Chances are if you bought a camera with a lens, it will be a short zoom. These are a good starting point, but at some point you are going to want something with either a wider angle of view, or a longer telephoto.

DIGITAL SLR TYPES

Digital SLRs fall into two categories. Those with an "APS" size sensor make up the vast majority of models, from the entry level to semi professional types.

"Full frame" DSLRs have a sensor size that is the same size as 35mm film and these are the top end of professional models.

We need to know about sensor sizes for two reasons:

When looking at lenses, some models are only suitable for the APS size sensor, also called "DX" or just "Digital" lenses. These are designed to suit the smaller sensor size and if used on a full frame camera, some cropping of the image will occur.



The second reason we need to know about sensor size is because lenses are generally referred to in 35mm equivalents when labelled, however on a "DX" digital, the focal length is multiplied. If using a Canon DX camera, the multiplication factor is 1.6. On Nikon DX models, the factor is 1.5. This is due to the very slight differences in sensors.

Here is a comparison of sensor sizes. You can see that there is a difference between the DX sensor (Blue) and the full frame sensor in pink.

So if looking for a wide angle lens of, say 24mm focal length, be aware that when used on a DX sensor, you have effectively a 36mm lens. There is also a new Four Thirds digital system adopted by Olympus and Panasonic, that fits between the smaller compact camera sensor size and the DX format.

LENS TYPES

Lenses essentially come in two main types: "*Prime*" lenses and "*Zoom*" lenses.

"*Prime*" lenses have a fixed focal length and generally are available with a larger maximum aperture, which is helpful for shallow depth of field situations and low light. It was once thought that "prime" lenses were technically superior to zoom lenses, however with modern lens design and more critical digital imaging, there is little to choose between a good prime and a good zoom lens.

"*Zoom*" lenses are the most common lens type today and come in a wide range of models and qualities. Those with larger maximum apertures and technically superior design are aimed at the enthusiast or professional market, whereas the cheaper models are designed for "kit" lens sales with a body. Kit lenses can be quite good, but the old adage, that you get what you pay for is never more true than in lens choice.

In addition to "*Prime*" and "*Zoom*" lens choice, some lenses are designed only to work on DX format bodies. If one of these lenses is used on a full frame body, some image cropping will occur. Digital lenses are usually designated with a "DX" in the title, or "Digital".

APERTURES

All lenses have a range of available apertures. "*Prime*" lenses generally are available with larger maximum apertures as the design is not compromised by constraints of size and weight.

Most "*Zoom*" lenses are either fixed aperture throughout their zoom range, or variable aperture, where the maximum aperture varies from the widest angle to the longest zoom. These variable aperture lenses have come about as manufacturers try to save weight and money in the design of long zoom range lenses. Fixed aperture lenses tend to be very heavy, especially for longer focal lengths.



A lens is considered to be a "*Fast*" lens if it has a large maximum aperture, allowing use of a faster shutter speed for a given amount of light.

The lens on the left is a Nikon 70-200 f2.8 fixed aperture lens, costs approx \$2,500.00.



The lens below is a Nikon 70-300mm f/4.5-5.6G ED-IF VR variable aperture lens, costing about \$800.00. Obviously the top lens is technically superior, not only in the constant maximum aperture, but also in the ruggedness of the design.

Some older "*Prime*" lenses considered to be good quality when used with film, have turned out to be technically inferior to newer lenses designed around the more critical digital sensor.

PROPRIETARY OR THIRD PARTY LENSES

Often there is debate about the merits of using a manufacturer's branded lenses, or a third party lens, such as Tamron, Sigma etc. There is no hard and fast rule for this as all manufacturers make some very good lenses as well as some indifferent quality units. We recommend you refer to DP review for thorough reviews of lenses to assess their relative merits. DP Review can be found at: www.dpreview.com

VIBRATION REDUCTION (VR) OR IMAGE STABILISATION (IS)

Newer lenses from the main manufacturers are being supplied with a form of anti shake designed into the lens. This is a very clever technology that can help to minimise the effects of (unintentional) movement when shooting. If you have the choice of VR or IS, take it.

WIDE, ULTRA WIDE, TELEPHOTO LENSES

In talking about lens types, we always refer to 35mm equivalents, as a universal comparison method. Where appropriate I have given DX format equivalents as well.

A wide angle lens is generally considered to be anything wider than **35mm**, with extreme wide angles from **16 – 24 mm**. Telephoto lenses generally start from about **150mm** focal length, with long (or super) telephotos from **300 mm** upwards.

For buildings and wide angle landscapes it is generally recommended to have a lens with 28mm or less focal length, although many compact cameras only have around 35 – 38 mm equivalent.

For sports action, wildlife and other subjects there is really no limit on how long you can go. A lens longer than about 400mm will normally need a tripod or monopod for support as any camera movement will be magnified and the photo will probably be blurred by movement. A camera or lens with anti shake is a real benefit here.

FOCAL LENGTH COMPARISONS

The following pages show comparisons of different focal length lenses. All images were taken from the same spot using a DX format DSLR.



ULTRA WIDE ZOOM 12-24mm DX lens (18-36mm EQUIVALENT IN 35mm TERMS) This is a lens specific for DX format cameras. Actual 35mm focal lengths shown on the images.



SHORT ZOOM 18-200mm (27-300mm EQUIVALENT IN 35mm TERMS) This is also a DX format lens specific for DX format cameras. Actual 35mm focal lengths shown on the images



LONG ZOOM 80-400mm (120-600mm EQUIVALENT on a DX body) This is a full frame lens, designed to work on either a DX or full frame body. Effective focal lengths shown on the images.

Look for a lens with "IS" (Image Stabilisation on a Canon) or "VR" (Vibration Reduction on a Nikon)

In summary. No matter whether the lens is labelled for a DX size sensor or not, the focal lengths shown are the 35mm equivalents. Multiply by 1.5 or 1.6 to get the real focal length on DX format cameras.

SPECIALTY LENSES

Other lenses commonly used are:

"**Macro**" lenses are designed to focus very close to a subject. These lenses will produce an image on the sensor that is life size or larger. Macro lenses can also be used for normal photography, although they are usually fixed focal length. A 105mm Macro (157mm on a DX format) makes an excellent portrait lens, especially if the lens has a large maximum aperture that will allow the background to be thrown out of focus.

"**Shift**" or "**Perspective Control**" lenses are designed for architectural purposes where the natural convergence of receding lines is required to be corrected to parallel lines. These lenses have limited use other than for architectural photography.

SUMMARY

When looking at a possible lens to purchase, we recommend you look for:

- Largest maximum aperture possible, ideally a fixed aperture (budget permitting);
- "VR" or "IS" image stabilisation, if available;
- and lastly look at the weight.

If you are purchasing for travel, you are going to want to keep your weight to a minimum. The lens you want to buy is probably too expensive or too heavy, so some compromise is inevitable. Lastly, look at the reviews to see how technically good the lens is before you purchase.

In photography, as in life, everything is a compromise.