

Orangeville Camera Club presentation

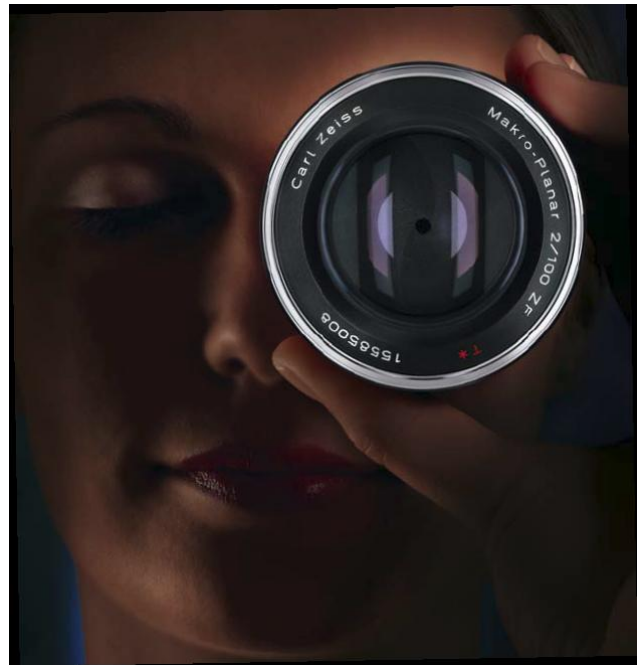
by Martin Lamprecht

The Creative Eye

Buyer's Guide to Building a DSLR Lens System

Lenses are the extensions of the photographer's eyes. They are also what the various types of brushes are to the painter – the tools for creativity that help produce compelling images.

The selection of an optimal lens system for the photographer's "tool kit" may be the most important equipment decision; more so than deciding on the camera body and other accessories. Over the course of several years, evolving technologies and expanded camera features may compel the photographer to replace camera bodies or add to his / her collection. But the lenses can have a much longer useful lifespan, to be used on a successive line of new camera bodies. Therefore, it pays to select carefully and opt for top quality and performance.



Generally speaking, it is easier to pick a good camera body, helped by the great number of camera reviews in photography magazines. Separating the good from the not-so-good is harder among the huge number of lenses that camera brands (i.e. Nikon, Canon, Pentax, Olympus, Sony, Leica) and third party lens manufacturers (Sigma, Tokina, Tamron, Zeiss) offer. Detailed tests are not always available or are harder to find (*see links on the last page*).

Interchangeable lenses are a main reason why amateur and professional photographers chose to buy a SLR / DSLR (Digital Single Lens Reflex) system. It is a major feature that sets this type of camera system apart from point-and-shoot and "bridge cameras" (with built-in super zooms). However, there are other types of cameras that feature lens mounts for interchangeable lens systems: rangefinder cameras (i.e. Leica M9) and rangefinder-style cameras (without rangefinder, but with a digital screen, like the Panasonic Lumix DMC-GF1 or Olympus E-P1) and professional, medium format cameras with sensors much larger than the 35mm film size sensor in Full Format DSLRs (i.e. Hasselblad).

Building a DSLR lens system – considerations for the selection of lenses:

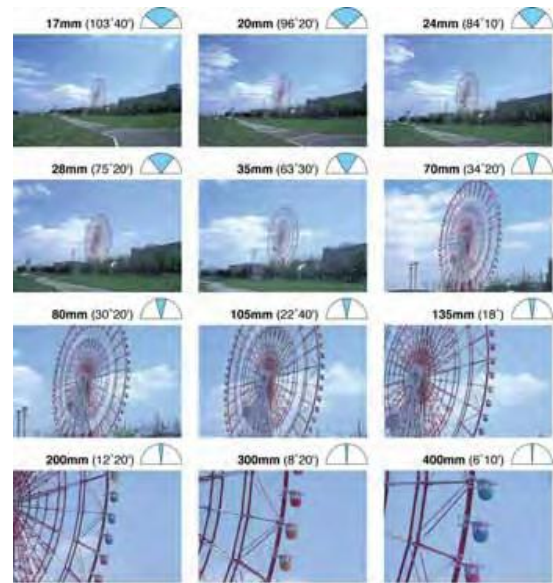
- **Camera Sensor size:** Full Frame (35mm equiv.), APS-C, Four Thirds
- **Focal lengths** – a range of options:
 - o Wide angle prime / zoom (mid-range & extreme)
 - o Standard prime / standard zoom (kit lenses)
 - o Telephoto prime / zoom (mid-range & extreme)
 - o Universal zoom ('all-in-one' / 'travel zoom')
 - o Macro lens (prime / zoom with macro setting)
 - o Specialty lenses (shift lens, mirror / reflex lens, etc.)
- **Zooms vs. prime lenses**
- **Quality:**
 - o Glass quality and optical technology for colour and focus correction
 - o multi-coating front lens surface
 - o Rounded diaphragm blades for a desirable bokeh (out-of-focus image elements)
 - o dirt repellent coating
 - o material and construction (i.e. metal mount vs. plastic)
- **Speed:** large max. aperture / continuous large aperture
- **Moisture and dust proof** construction
- **Image stabilization** (when not using cameras with body-side image stabilization - i.e. Canon and Nikon)
- **Internal focusing mechanism** (constant length of lens, non-rotating front element (filter does not rotate) during focusing. Important for polarizing filter.



Lens properties (sources: Tokina and Sigma lens brochures)

Angle of View

The range across the sensor or film surface onto which the subject is exposed is expressed as an angle, called the angle of view. Wide-angle lenses with their short focal lengths have a wide angle of view, which means the exposure range is wide. Conversely, telephoto lenses, which have long focal lengths, have a narrow angle of view, making the exposure range narrow. So a wide-angle lens is used to take a wide area of a subject nearby whereas a telephoto lens is used to take only part of a subject located further away. A single zoom lens, meanwhile, can function as a number of lenses with different focal lengths, enabling you to smoothly alter the angle of view and quickly frame the shot. You can select your lens to create the effect of distance or depth of field, or to suit the location and surrounding conditions.



Depth of Field

When you focus on a subject, there is part of the subject that is in focus and parts in front and behind which are not in focus. This range in which the object is seen to be sharply in focus is called the depth of field. If the focal length is kept the same, the depth of field gets deeper (the range in which the subject is sharp gets wider) as the aperture is stopped down, and it gets shallower (the range in which the subject is sharp gets narrower) as the aperture is opened. Even when the aperture stop is the same, the depth of field gets shallower as the subject distance gets shorter, and deeper as the subject gets further away. Furthermore the depth of field is deeper with a short focal length wide angle lens, and shallower with a long focal length telephoto lens.



Perspective

Perspective is the visual effect of moving a subject which is in the foreground closer to or further from the background. If you take photographs with lenses of different focal length while keeping the size of the subject in the foreground constant, the background appears to be further away and the sense of perspective is exaggerated with a short focal length wide angle lens. With a long focal length telephoto lens, the background appears to be closer to the subject and the sense of perspective is lessened. You can greatly change the feeling of presence even with the same subject by using this sense of perspective.



Fisheye lens – extreme perspectives

AF10-17mm f/3.5-4.5 Fisheye



Picture Comparison A - Tokina AT-X 107 DX Fisheye || Picture Comparison A - Standard Wide angle (10mm)

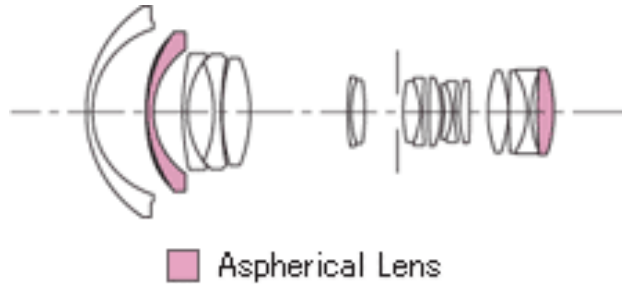
Common wide-angle lenses for a full-frame 35 mm camera are 35, 28, 24, 21, 18 and 14 mm. Many of the lenses in this range will produce a more or less rectilinear image at the film plane (though some degree of barrel distortion is not uncommon here).

Extreme wide-angle lenses that do not produce a rectilinear image are called fisheye lenses. Common focal lengths for these in a 35 mm camera are 6 to 8 mm (which produce a circular image). Lenses with focal lengths of 14 to 16 mm may be either rectilinear or fisheye designs.

Wide-angle lenses come in both fixed-focal-length and zoom varieties. For 35 mm cameras, lenses producing rectilinear images can be found at focal lengths as short as 12 mm, including zoom lenses with ranges of 2:1 that also begin at 12 mm.

Lens Technology

Standard lenses are made from a combination of spherical lens elements. However, there can be problems with such lenses when light entering at the edges of the lens may not be perfectly focused at the same point as light entering at the center. That presents limits to performance in wide aperture and super wide-angle lenses. Lens manufacturers use aspherical glass elements in many of its lenses. In addition to correcting spherical aberration, these lenses fully correct light quantity and distortion at the edge of the image and provide excellent results when used in combination with floating elements.



[Links to websites with a large number of critical and detailed lens reviews:](#)

Digital Photography Review™ <http://www.dpreview.com>

Popular Photography <http://www.popphoto.com/Reviews/Lenses>

