

## Setting the Desired Exposure

### Monday Morning Tip

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First, let's get one thing straight. There is no such thing as a *correct* exposure; there is only a *desired* exposure. Let that be your mantra. Whenever you start sweating about exposure, chant that mantra and all will be right with your digital world. I kid you not!

Next, understand that there are only three controls that you need to think about to set your camera to the desired exposure. By adjusting these three controls, you increase or decrease the amount of light that enters the camera through the lens and strikes the sensor. Only light which strikes the sensor is captured and recorded. Lighter areas reflect more light and create light areas on the sensor while darker areas reflect less light and create dark areas on the sensor. This, in a nutshell, is how a camera produces an image.

A large lens aperture allows more light to enter so less time is needed to capture the desired amount of light. The trade-off is that large apertures result in shallow depth of field (DoF). A slow shutter speed allows more light to enter so a smaller aperture can be used but, now, the trade-off is blur from either subject or camera movement. When you want a small aperture (for deep DoF) while using a fast shutter speed (to reduce blur), the third option is to increase ISO. Of course, there's always a trade-off and with high ISO, the trade-off is increased digital noise. A primary rule of photography is, "There ain't no free lunch!"

Aperture is the opening in the lens through which light enters the camera.



Large (f1.8)



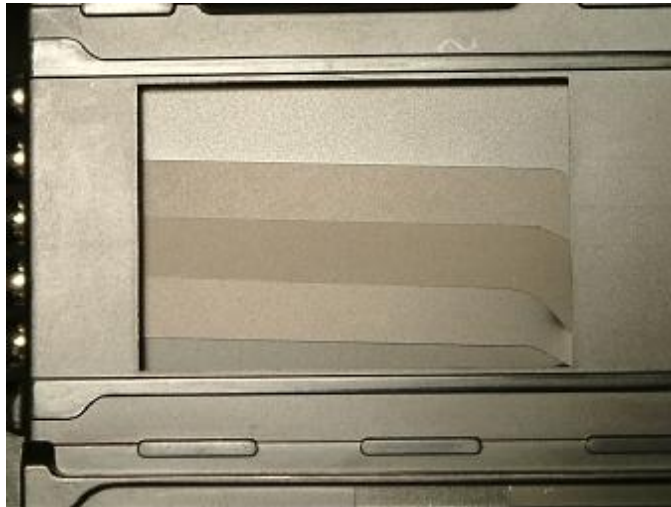
Medium (f8)



Small (f16)

The actual mechanism by which the size of the opening is controlled is called the diaphragm. That's what you see creating the hexagonal opening in the lens above. Most consumer lenses have 5 or 6 bladed diaphragms while more expensive lenses have 7, 8 or more blades to create a more rounded shape. Many pro lenses also use curved blades to produce a smoother circle. The smoothness of the aperture is a key factor in determining the smoothness of the lens' bokeh or background blur. The aperture is wide open most of the time to allow as much light as possible to enter the viewfinder and make it easier to compose your shots. Only when the shutter is released do the blades "stop down" to the selected aperture. As you can imagine, this little puppy moves very quickly when the camera fires. This literally happens in "the blink of an eye".

Aperture is designated as a ratio of the diameter of the opening to the distance to the film plane. Full *f*-stops are *f*1.0, *f*1.4, *f*2.0, *f*2.8, *f*4.0, *f*5.6, *f*8.0, *f*11, *f*16, *f*22... For most lenses, *f*1.8 to *f*2.8 is usually the “fastest” apertures available. Most consumer lenses typically start around *f*3.5 or *f*4.0. A fast lens is one that has a large opening and gathers more light. Many lenses also have ½ or 1/3 *f*-stops between full stops.



Shutter speed is the second control. By adjusting how fast or slow the shutter opens and closes, we control the amount of light that enters the camera. There are several shutter designs but most modern digital SLRs use a series of metal blades that move vertically.

Most modern digital cameras have shutter speeds that reach as fast as 1/4000 second while others are as high as 1/8000 second. At the opposite end, most digital SLRs have a Bulb setting that allows infinite time. As a rule, most handheld shots are probably taken between 1/30 to 1/1000 second.

A fast shutter speed helps freeze movement such as athletes in motion, birds in flight or speeding vehicles. Slight blurring caused by deliberately slowing down the shutter speed can impart a sense of action or vitality to an image such as moving water or wind blown leaves. Don't assume every photo needs to be frozen in place. For example, children's hands, feet and hair are often blurred to add movement to the photo. As an aside, if your camera starts producing images that are black along the bottom, that's usually a sign of impending shutter failure. That's caused by the vertical blades failing to clear the film (sensor) and leaving the bottom edge unexposed.

ISO (International Standards Organization) is a measure of sensitivity to light. Film with high ISO rating is more sensitive to light and, therefore, needs less light to capture a scene. Film with low ISO is less sensitive to light and, therefore, needs more light to capture a scene. Sensors replace film in digital cameras but the concept is the same. As ISO is increased, less light is needed while more is needed when using a low ISO.

## ISO 400/800



Typical consumer-grade films range from ISO 100 to 400 although there are some like Fujifilm X-TRA 800. Starting at ISO 100, each doubling results in twice the sensitivity to light. Therefore, if there's enough light for an exposure of *f*8 at 1/250 second when using ISO 200 film, changing to ISO 400 film (double the ISO) will let us set aperture to *f*11 or a shutter speed of 1/500. Either setting will result in half the light since the film now has double the sensitivity. The reason I'm using film examples is because it's easier for people to relate to tangible objects like film instead of an intangible concept like sensor sensitivity but the basic idea is the same.

## ISO 200

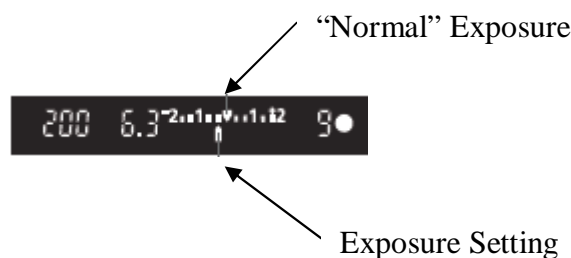


To set a desired exposure, first consider what kind of light you're working with and set your ISO accordingly. For a bright sunny day with lots of light, set your ISO to 100. For overcast days or in shade, bump up ISO to 200. For dark, dreary days or indoors, use 400 but don't be afraid to go to 800 or 1600. A real advantage of digital is that you're not limited to whatever film you have in the camera. ISO can now be adjusted "on-the-fly". Also, with Canon dSLRs, you have a truly usable ISO 1600 and 3200 while other cameras are often limited to 800 by excess digital noise.

Next determine how much motion is involved. For static or slow moving subjects such as portraits, landscapes or still life, you can pretty well use any speed down to as slow as you can steadily handhold the camera. Of course, a tripod is always preferable but most people would rather put up with blurry photos than haul around a tripod. Most people can handhold down to about 1/30 second while a few super-humans can handhold down to 1/8 or even 1/4 second. For fast moving subjects, take a few practice shots to see how fast a shutter speed you need to get the desired effect.

Now, decide how much depth of field you want in the image. If you want deep DoF, set aperture to f16 or greater. If you want shallow DoF, set it to f4 or less. Keep in mind that DoF is controlled by focal length and distance to subject as well as aperture. Keep a DoF calculator in your camera bag until you develop a sense for DoF from experience.

Finally, adjust aperture and shutter speed until your meter is centered, indicating a proper exposure. If your exposure setting is below the "Normal" setting, your photo will be dark (underexposed), if it is above the "Normal" setting, your photo will be light (overexposed). You can move the Exposure Setting by adjusting aperture, shutter speed or ISO but, generally, for fine adjustments of less than 1 stops, the exposure can be fine tuned with the Exposure Compensation (EC) control. Move the EC control up or down until the Exposure Setting mark is lined up with the "Normal" Exposure mark. This display is usually available in both the top LCD and along the bottom of the viewfinder.



One last point. I wrote this as a serial process to make it easier to follow. In reality, all these decisions are being made in parallel. While I'm assessing the light to decide what ISO to use, I'm also thinking about the desired DoF and evaluating the amount of subject movement. Then, I decide which is more important, controlling DoF or controlling motion blur. When I have a basic exposure dialed in, I start composing the image and fine tuning the exposure. If you're a serial thinker, you need to get out of that habit and start processing parallel streams of data.

*N.B. This MMT applies to cameras with PASM controls (Program, Aperture Priority, Shutter Priority, Manual). If your camera doesn't have PASM controls, you can't apply these tips.*