

## BASIC CAMERA EXPOSURE SETTINGS

Your camera calculates proper exposure based on three settings: ISO, aperture, and shutter speed. This lesson discusses each of these settings then how they work together to determine exposure.

ISO –What is it? ISO settings change the light sensitivity of the camera.

- Typical digital ISO settings are 100, 200, 400, 800, 1600, 3200, 6400, etc. Doubling the ISO setting increases the brightness of the photo by double the amount.
- The lower the ISO number, the darker the photo when no other settings are changed. The higher the ISO number, the lighter the photo when no other settings are changed.
- The lower the ISO number, the better the image quality because of less noise. The higher the ISO number the noisier the image quality. Noise looks like tiny spots or irregularities throughout the photo.
- For best image quality use the lowest possible ISO number if there is enough light to take the photo without blur.
- When there isn't much light, you can increase your ISO number to decrease blur from camera movement, but you will also increase noise which decreases quality.



**Noise - ISO 12800 Cropped from a larger photo**

ISO – When should the setting be changed? It is best to use the lowest ISO number in bright light, but if you are in a dark place, increase your ISO to take a brighter photo without blur from camera movement.

Aperture – What is it? Aperture settings change the size of the lens opening, called f-stops.

- Typical aperture settings are f2, f2.8, f4, f5.6, f8, f11, f16, f22, etc. Notice that there is a progression where each number is roughly doubled two steps up the line. Not every lens has every number and some lenses have more numbers, but this illustrates the basic sequence.
- Every step to a higher number represents a smaller lens opening and reduces exposure by half, for example from f8 to f11, making a darker image if no other settings are changed.
- Aperture also controls depth of field, which is the amount of the photo in focus from front to back. The larger the f-stop number, like f16, the greater the amount in focus.
- Lenses are usually sharper and less distorted near the middle of the aperture scale, so a photo taken at f8 is likely to have fewer faults than one taken at f2.8 or f22.

Aperture – When should the setting be changed? It is best to use an aperture toward the middle of the scale for good lens quality, but if you want an out of focus background “open up” to a large aperture like f2.8 and if you want a sharp background “stop down” to a small aperture like f16.



**f4**



**f16**

Shutter Speed – What is it? Shutter speed controls the length of exposure, usually measured in fractions of a second.

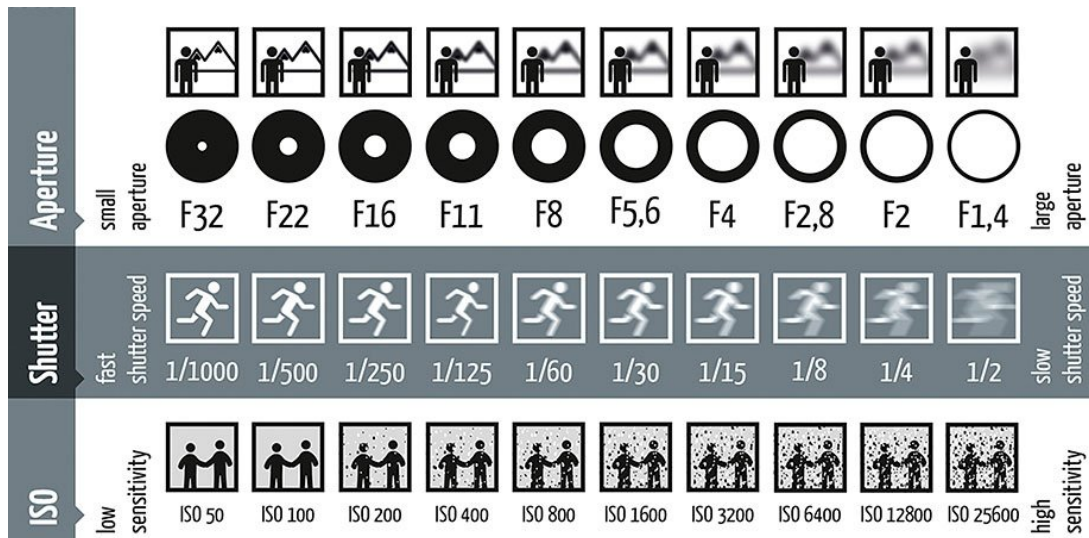
- Typical shutter speeds include 1/30, 1/60, 1/125, 1/250, 1/500 and many more. Notice that each step is roughly double the previous step.
- Each step is a shorter exposure time decreasing the length of exposure by half since it is a fraction of a second.
- These fractions are usually displayed as whole numbers on the camera. For example 1/250 is shown as 250. Shutter speeds 1 second or longer may be shown as 1”.
- Shutter speed controls camera shake that can occur during too long an exposure. As a general rule an exposure longer than the focal length of the lens (without a tripod or image stabilization) will likely be blurry because of camera shake. For example, with a 100 mm lens a shutter speed of 1/60 will likely be blurry, but 1/125 will be OK
- Shutter speed can be used creatively to show subject movement or intentional camera movement (ICM)

Shutter Speed – When should the setting be changed? Change to a faster shutter speed like 1/1000 when your current setting will cause too much camera shake or to “freeze” motion. Change to a slower speed like 1/15 (on a tripod) for intentional blur or to allow use of a small f-stop.



**1.3 seconds**

How do the three settings work together? When your camera is on Auto, these three elements are adjusted automatically and hopefully you get the correct exposure but have little or no control over noise, depth of field, or camera shake. Choosing another mode such as Aperture Priority allows adjustment of these settings.



**When any one of these three elements is doubled, either of the other two can be halved and the exposure will be unchanged. And, when any one of these three elements is halved, either of the other two can be doubled and the exposure will be unchanged.** In aperture priority mode the camera takes care of this for you.

Example 1 – You want to increase depth of field: Starting settings: ISO 100 Aperture f8  
Shutter Speed 250

Manually change aperture to f16 (2 stops less). The camera changes the shutter speed to 60 (2 stops more). ISO is unchanged.

Example 2 – It is getting dark and the camera settings will cause camera shake because of the long exposure needed:

Starting settings: ISO 100 Aperture f4 Shutter Speed 30

Manually change ISO to 800 (3 stops more). Camera changes shutter speed to 250 (3 stops less). Aperture is unchanged.

Example 3 – You want a long exposure to blur a waterfall: Starting settings: ISO 100 Aperture F8  
Shutter Speed 125

Manually change aperture to f22 (3 stops less). Camera changes shutter speed to 15 (3 stops more) ISO is unchanged. (Use a tripod because of the slow shutter speed).