

# ISO

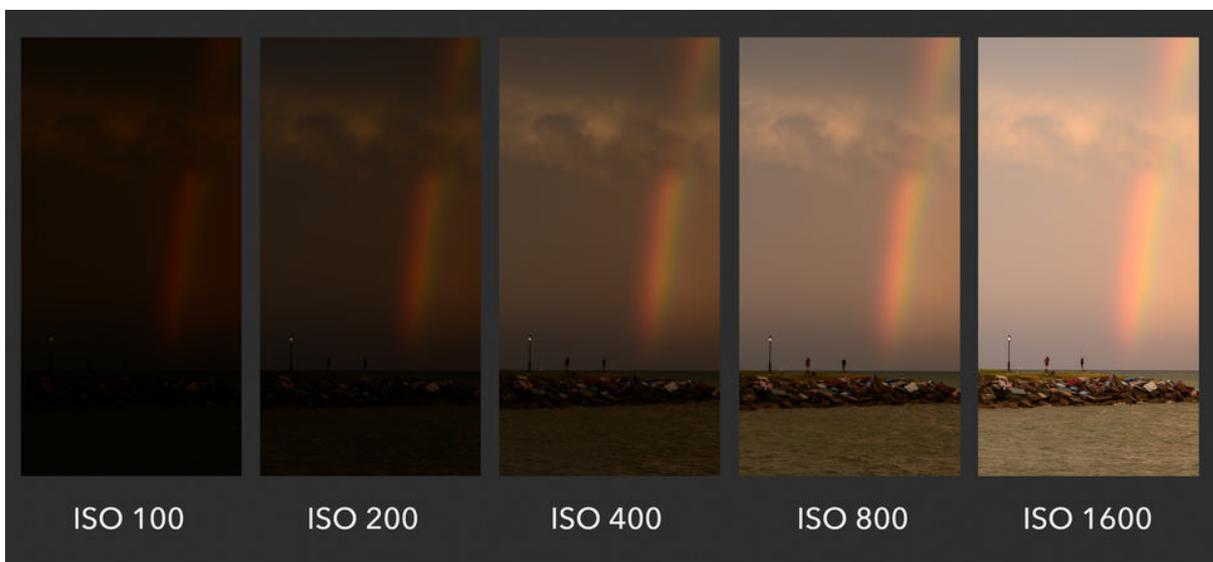
## What is the ISO standard and what does it mean to photographers?

ISO is short for International Organization for Standardization. In the photographic world, ISO is most commonly referred to as a film rating system. Think film photography, not the movies. In terms of film, ISO is used as a rating system to tell you how sensitive the film is to light, or how *fast* the film is. The lower the ISO number (i.e. 64 or 100) the more time the film needs to be exposed. **The faster the ISO film speed, less light is required to take a picture.**

## Common ISO Values

Every camera has a different range of ISO values (sometimes called *ISO speeds*) that you can use. A common set is as follows:

- ISO 100 (low ISO)
- ISO 200
- ISO 400
- ISO 800
- ISO 1600
- ISO 3200
- ISO 6400 (high ISO)



## What is the Best ISO?

The Lowest possible ISO in any given situation, except for some high-speed situations, is the simplest answer. But consider the points below.

## When to Use Low ISO

You should always try to stick to the lowest ISO (base ISO) of your camera, which is typically ISO 100 or 200, whenever you can. If there is plenty of light, you are free to use a low ISO and minimize the appearance of noise as much as possible.

Even in dim or dark environments, you still might be able to use a low ISO. For example, if you have your camera mounted on a tripod or sitting completely still on a table. In that case, you can safely use a low ISO and brighten your photo via a long shutter speed instead, since you won't introduce camera shake.

Many photographers understand the basics of ISO, but they aren't sure which ISO value to actually pick in the field. In practice, there's a reason why your camera allows such a wide range of ISO settings: Different situations call for different ISOs.

The bottom line is that you should increase the ISO when there is not enough light for the camera to capture a sharp, bright photo any other way. When I shoot handheld photos indoors without a flash, I always set my ISO to a higher number to capture the moment without introducing blur. Or, when photographing ultra-fast action like in the bird picture above, raising your ISO is often necessary.

## When to Use High ISO

Even though it is ideal to use low ISOs, there will be plenty of times when a high ISO is necessary in order to take a good photo in the first place. The simple reason is that you are often fighting against *motion blur*, and you will need to pick between a sharp photo at a high ISO, or a blurry photo at a low ISO.

On most cameras, there is a setting for [Auto ISO](#), which works great in low-light environments. The beauty of this setting is that you input the *maximum ISO* you are willing to use, so that the camera does not cross that limit. Personally, if I want to limit the amount of noise in a photo, I will set my maximum ISO to something like ISO 800, 1600, or 3200. The downside is that the camera will start using progressively longer shutter speeds if it reaches these ISO limits, which leads to more motion blur. Everything is a trade-off!

## How to Change ISO

Changing your ISO varies from camera to camera. Here are some common ways to change ISO:

- To start, enter a mode that lets you select the ISO yourself. Get out of Auto mode, and go to [Manual](#), [Shutter Priority](#), [Aperture Priority](#), or [Program](#) (we tend to prefer Aperture Priority or Manual).
- For entry-level DSLRs and mirrorless cameras, you probably need to open a menu (possibly the "quick menu") and find the section for ISO. Select the value you want or set it to Auto.

- For higher-end cameras, there may be a dedicated “ISO” button on the camera. Press it while spinning one of the wheels to change your ISO setting. If you don’t see a button labelled “ISO”, it is still possible that your camera will let you program one to perform this task.
- Other cameras may have a dedicated wheel that already has various ISO settings marked. This makes things even easier.

Check your camera manual if you still aren’t sure. However, it is worth being very familiar with how to change your ISO setting quickly, since it’s something you will likely be adjusting quite often, especially if you shoot in low light conditions without a tripod or flash.

## Low vs High ISO Noise Visibility

To give an example of two photos taken at different ISO values, take a look at the comparison below. Pay attention to the level of noise (graininess and blotchy colours) in the images:



## Minimizing Noise and Maximizing Image Quality

Some photographers think that the best way to capture high-quality images is to use Base ISO 100% of the time. However, as demonstrated above, that simply is not true. Sometimes, you’ll be in dark environments when you have no choice but to use a higher ISO.

You should only use base ISO when there is enough light to do so. Don’t try to force ISO 100 in a dark environment, or your photos will come out way too dark. Similarly, if you’re using a fast shutter speed to capture action, it’s essentially the same as taking pictures in a dark environment (since you strictly limit the amount of time your camera sensor is able to capture light). So, for certain types of sports and action photography, a high ISO might be your only option.

To maximize your image quality, here are the four steps you need to follow:

1. Select the aperture setting that will provide your desired [depth of field](#).
2. Set your ISO to its base value, and put your shutter speed to whatever setting provides a proper exposure.

3. If your subject is blurry, progressively raise your ISO and use a faster shutter speed until motion blur disappears.
4. If your ISO is getting too high and you still have the ability to use a wider aperture, open it up until the ISO gets to a more manageable level, even if it means sacrificing some of your desired depth of field.

## Common ISO Myths and Misconceptions

ISO has a lot of myths surrounding it, including some that are quite common to hear. In this section, we will quickly address some of those concerns so that you are not misled about this topic in the future.

### Is ISO “Sensor Sensitivity”?

This is the most common myth related to ISO. It is something you will see all over the web (and in print). However, although it may help you to think of ISO as “acting like” camera sensor sensitivity, that’s not what it actually does. Instead, digital sensors only have a single sensitivity, regardless of your ISO. It is more accurate to say that ISO is like a *mapping* to tell your camera how bright the output photo should be, given a particular input exposure.

### Is ISO Part of Exposure?

No, ISO is not part of exposure. Shutter Speed and Aperture brighten your photo by **physically capturing more light**. ISO doesn’t do that; instead, it essentially brightens the photo you already captured. So, photographers don’t consider it to be a component of exposure.

### Is Raising ISO Just Like Brightening Your Photo on a Computer?

Brightening a photo on your computer can act in many ways like raising your ISO, since it does make noise more visible (and it leads to a brighter image). But the simple difference is that raising your ISO in the camera nearly always provides better image quality than brightening a photo on your computer. In other words, it is better to use ISO 800 when necessary, rather than brightening an ISO 100 photo to a huge degree in post-processing software like Lightroom!