

ISO

ISO... What does it mean in digital photography? How does it affect your pictures?

Simply put, the ISO rating is a value that indicates the image sensor's (or film stock's) sensitivity to light. The same scale was taken directly from 'film speed'.

ISO, short for International Standards Organisation, is a numeric value that helps determine – along with the shutter speed and aperture — the necessary exposure value required to register an effective image and accurately reproduce what's in front of the lens. The ISO sensitivity value functions in such a way that the higher the ISO number, the less exposure to light is required and the lower the number, the more exposure required.

Just like with film, the higher or lower ISO also indicates how much “grain” is in the final image. When you select a higher ISO, you're cranking up the image sensor's sensitivity to light and an unintended result is the addition of more electronic noise into your photo (“noise” is any light signal that doesn't originate from your subject). The camera's engineers have designed the image sensor to perform best at the lowest ISO rating a given camera will allow. On most digital cameras this is ISO 100, some have ISO 50 others ISO 200.

A side note about the “grain” in a digital image; with film the graininess is sometimes used for artistic effect and can contribute to the overall mood of the final photograph. Whereas, digital noise is almost always undesirable as it appears as clumps of distracting multicoloured dots or freckles on your image (and it's difficult to find any artistic merit in it!).

If you're looking for smooth, appealing and colour-accurate images, then a lower ISO is required. But if you want to shoot in extremely low light conditions or stop fast-moving action, then you “dial up” the ISO rating. Since a lower ISO dictates a longer exposure time or a very wide aperture for a good image, you may have such a slow shutter speed that you'll get motion blur (and camera shake unless on a sturdy tripod) and a large aperture which will reduce the 'depth of field' – the amount of your image in focus.

In addition, the actual size of the image sensor determines what ISO rating the camera can use without being afflicted by unwanted noise. Image sensor size is not the pixel value; it's the actual physical size of the image sensor. Consumer cameras (or point-n-shoots) usually have a small image sensor, where ISO ratings of 400 or above produce high (almost always unacceptable) amounts of noise. However, with dSLRs the image sensor is much bigger, usually equivalent to the APS film size (23x15mm) and therefore the noise level is less.

Some expensive dSLRs have an image sensor the same size as a 35mm film frame (known as full-frame). On a larger sensor the pixels are also larger, so they can receive more light and thus require a lower ISO (i.e. less digital noise) to capture the specific image you want under potentially adverse lighting conditions. When reviewing a potential new camera it's worth noting the 'pixel density' – how close the light receptors are packed together. This close packing is another cause of digital noise, from interference.

So, if you are shooting on a sunny day or with adequate indoor lighting or maybe just a more static shot, by selecting a lower ISO you will end up with smoother, more appealing, reproducible and colour-accurate images.

Occasionally, when forced by low light conditions or having to have a fast shutter speed (for action, sport etc.) you can accept a little more noise than is ideal, you can rely to some extent on the camera's own noise-reducing capabilities (this is for Jpeg only) or try to remove some noise with software on your computer. It isn't ideal, as both methods tend, to some extent, to 'soften' the image. What is deemed an acceptable level of noise ultimately matters in the size of your prints or the final presentation display size.

The good news is that cameras made in since about 2011 (and all sensor sizes) have vastly improved their handling of digital noise – even an ISO of 3200 can be quite acceptable.