

Auto exposure, understanding its limitations.

## *Introduction*

With all it's gee whiz electronics, it's tempting to think that the modern camera is an infallible image capturing machine. Indeed that concept is promoted by camera manufacturers and marketers themselves, "*just point and shoot for perfect pictures every time!*". The reality is that a camera is still, as it has been since its invention in the mid 19th century, a light proof box which allows the transmission of light via a lens onto a light sensitive recording surface. True, that recording surface is now likely to be a digital chip backed up by some impressive electronic controls rather than a film requiring processing in toxic chemicals. However the fundamental hasn't changed. The decision about how much light to allow through to the sensor/film in a particular circumstance, in particular lighting conditions and with a particular subject, still rests with the photographer if the desired or expected results are to be obtained. An analogy can be made to the motor car which has developed technically over the decades to an extent that would amaze it's early pioneers. Despite the advances, the car is still reliant on a competent driver to steer it around corners safely.

## *Auto exposure.*

One attribute of the modern camera is auto exposure. No longer is it necessary for a photographer to carry a light meter to determine correct exposure, the modern camera is fitted with a built in light meter which will measure the light that enters the camera via the lens. In addition, the camera is capable of automatically setting the exposure ie; the combination of aperture and shutter speed, necessary to achieve what it's programmed to deem appropriate for the conditions. This however raises the question, what is "appropriate", or correct, exposure? In order to achieve acceptable exposures in the greatest possible number of pictures taken, cameras are designed to assume that what's in view is a mid tone grey. This equates to caucasian skin tones, or scenes with lots of grass or foliage, when captured in middle of the day sunlight. Years ago Kodak produced an exposure test card with a midtone or 18% grey which became the standard that camera manufacturers work to. What this means is that with auto exposure the camera will use that aperture and shutter speed combination which will record the scene as close as possible to the 18% grey tone standard regardless of the actual tonal values present in the scene.

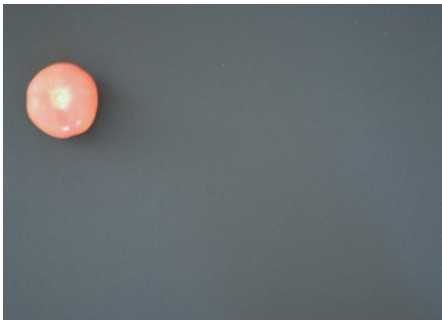
## *Examples.*

Below (page 2) are a series of examples. The subject is an almost fully ripe tomato and was photographed in the same light conditions with the same camera and lens. The same aperture was used in each shot, only the shutter speed was changed to effect the different exposures. In the top three pictures, the tomato was placed on a black background. In the first shot the exposure used was that indicated by the auto exposure of the camera. The camera assumes that the scene in front of it should be mid grey and exposes accordingly. The black background is not recorded as black, the scene is heavily overexposed, the tomato is far lighter in tone than it should be.

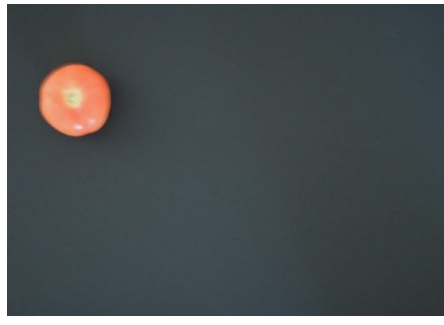
In the second shot the exposure was manually over ridden, exposure was reduced by one stop, in other words, half the exposure. In the third shot, 2 stops of exposure compensation was given so 1/4 of the exposure that the camera's auto exposure system indicated. The background is now it's true black and the tomato is correctly displayed.

In the lower three examples the same tomato was photographed only this time on a white background. Once again the first shot is the camera's auto exposure selected settings. Again the camera interprets the scene as 18% (midtone) grey. The white background is no longer white and the tomato is far darker than it is in reality.

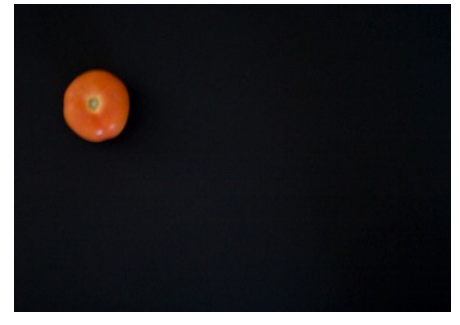
The second bottom shot is with an extra 1 stop of exposure, in other words the shutter has been left open for twice as long. In the third shot there is 2 stops of additional exposure given, so 4 times the amount of light as was indicated by the camera's meter and selected by auto exposure. In this final shot the white background is, if not pure white then getting close and the tomato is correctly exposed.



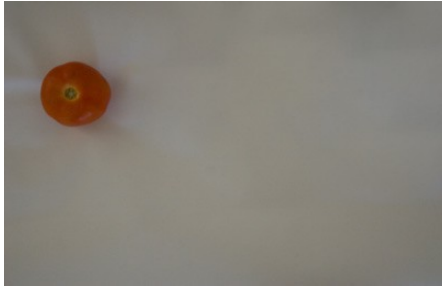
Black background camera on auto exposure 2 seconds.



Black background exposure compensation -1 stop exposure 1 second.



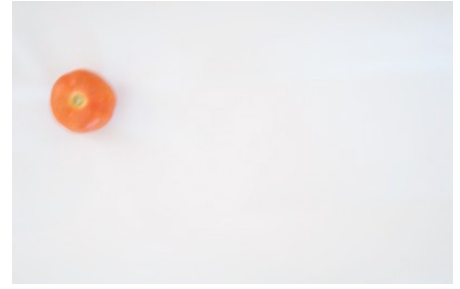
Black background exposure compensation -2 stops exposure 1/2 second



White background camera on auto exposure 1/8 second.



White background exposure compensation +1 stop exposure 1/4 second.



White background exposure compensation +2 stops exposure 1/2 second.

Now the important point out of this is that the exposure in the third shot and the sixth shot are the same, 1/2 second. At this exposure the tomato has the same tonal values in each shot, the backgrounds are the correct values as well, black is black, white is white, neither is 18% grey nor anything approaching it.

#### *Real life applications?*

Well, I guess it's possible that one day you may wish to photograph a tomato on a white bench, but more likely that you'll want to photograph your child playing in the snow, or the moon in the dark night sky. In both cases the shots entrusted to auto exposure are likely to disappoint. Make sure that white subject is white by increasing the exposure, make sure that black is black by decreasing the exposure. How much exposure compensation is enough? Well that will depend on a number of factors, what percentage of the scene is considerably off midtone and to what extent? And also what light metering modes do you have available on your camera and hence what are you metering? Spot metering will, as its name suggests, meter off a small area of the scene only, giving a metering of only that spot. Evaluative metering on the other hand will meter a broader area within the scene.

#### *Conclusion.*

Back to my motor car analogy, the car is well designed and engineered to go around corners but it's dependent on you the driver to turn the steering wheel. Likewise with the camera, it's capable of great results but blindly relying on its automatic functions such as auto exposure is a trap. Your camera is almost certainly fitted with exposure compensation and/or manual control. Explore these capabilities, you're in the driver's seat with the steering wheel in your hands, take control!

Kevin Dowie November, 2008.

All images and text copyright Kevin Dowie. Comments are welcome via email [kd@kevindowie.com](mailto:kd@kevindowie.com). Or visit me at [www.kevindowie.com](http://www.kevindowie.com)