

The Photographic Gray Card

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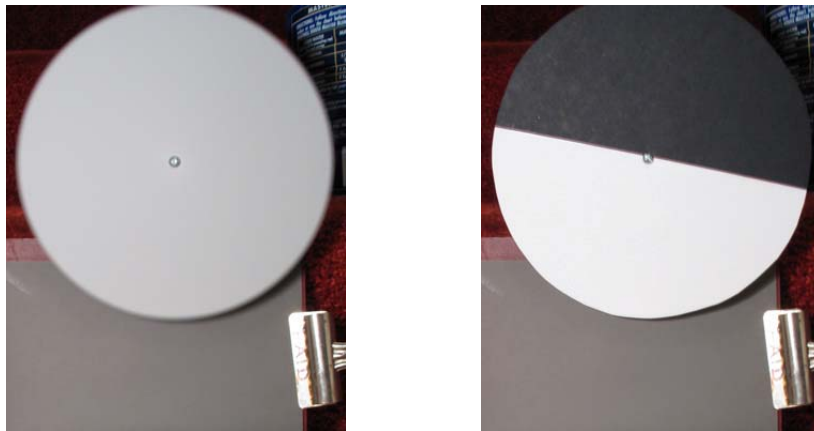
The Gray Card is used by the "serious" photographer to obtain more exact exposures and more accurately balanced color.

What is a Gray Card?

Gray Card Specifications

The Kodak Standard Gray Card should have a reflectance of 18% and should be neutral - i.e., it should not have any unbalance among the primary colors - red, green and blue are represented equally, with no one color being at a higher level of luminance than the others. The 18% reflectance theoretically provides, for a given illumination, that brightness which is interpreted by Ansel Adams as "middle gray".

The following two images - one showing a spinning disk and the other showing the same disk, stationary, illustrate the basis for the Gray Card.



Both images also show a Standard Kodak Gray Card. In theory, the black disk should not reflect any light, but in practice it does. Also, the white half should reflect 100%, but in practice it does not. Nonetheless, it seems to exhibit exactly the characteristics described by Ansel Adams in his explanation of his interpretation of "middle gray". He says that the spinning disk does not appear as middle gray - instead, its tone appears between Zones VII and VIII of the exposure scale. According to Ansel, the middle step of tone of a full-scale glossy print - would have a reflectivity of about 15% and relates to Zone V of the exposure scale. The spinning disk in the accompanying image is clearly 2 steps lighter in tone than Zone V (the Standard Kodak Gray Card).

Why Use a Gray Card Instead of Letting the Camera Meter the Scene Itself?

A scene can consist of all very bright objects or surfaces, all very dark objects or surfaces, or any combination of objects of any shade. This leads to errors in the exposure settings, and that is because the light meter is very unintelligent - in fact a light-meter is as dumb as a rock. It knows only how to determine an exposure to provide an image that averages to middle gray. That means that the inside of a coal bin or the bright snow on a sunny day will each produce an image of middle gray - not very smart! Do not be deluded into thinking that the sophisticated metering pattern of your expensive DSLR is going to improve upon that! A picture of a white wall and a picture of a black wall will still produce images of middle gray.

Using the Gray Card for Exposure

When used to determine the correct exposure, the gray card should be read with the light meter and an aperture and shutter speed determined for a given ISO speed setting. It does not matter whether the light meter is an internal camera meter or a separate, external meter. The important thing is that the reading be recorded for use during the actual shot of the scene. Equally important is the need to obtain a reading from the gray card - not nearby or background surfaces. In order to be certain, the gray card should fill the viewing angle of the metering device - otherwise the reading may be in error. If the user is knowledgeable in the use of the spot meter mode, that is the preferred technique for getting an accurate reading. The next best mode is one which emphasizes the center region.

Position and Orientation

When using the gray card for exposure, there is no need to place a gray card in the scene. Once the reading has been taken from gray card and recorded, that's it. However, in order to make sure that the reading will be useful, the card should be receiving the same illumination as the subject during the shooting, and the card should be facing directly into the camera. If there are to be shots from different vantage points, there should be recordings of the correct exposure from each of those vantage points, because the light can vary dramatically from different vantage points or directions.

Using the Gray Card for Color Balance

Why Use a Gray Card for Color Balance Instead of Letting the Camera Determine It Automatically?

Real scenes can have any possible colors imaginable. The lighting for a given scene can be of any possible color temperature. An automatic color balance system in a camera can only make a simple-minded determination, at best. If the scene is illuminated by ordinary Tungsten (incandescent) lighting, then white objects will invariably look yellow or

yellow-orange in the digital image. If the camera is configured specifically for Tungsten lighting, then the white objects will look less yellow than they would in Automatic White Balance (AWB). However, when you use a gray or white card to do a Custom White Balance, the white objects of the scene will look white in the virtual image. A similar situation exists for outdoor lighting. So, there is a significant advantage in using a Gray card or a White card to help in establishing a correct color balance.

Position and Orientation for Color Balance

White or Gray Cards used for Color Balance can be used in two completely different modes. They can either be embedded in the scene or they can be used for setting a Custom White Balance.

Embedded Cards for Color Balance

Place the card in the scene at a point where it catches the same light as does the subject and also face the card toward the camera. Since the card would usually be an unwanted intrusion, place it where it can be easily cropped out of the scene during post processing. There is a variation of the embedded card and that is when the card may be placed prominently in the scene, because the picture taken with the card embedded is dedicated solely to the purpose of determining the color temperature of the illumination. In summary, the embedded card can remain in the scene for use during post processing, or it can be embedded in a "Calibration Shot" and removed from the remaining shots, depending upon how the post processing will be done.

Post Processing of Embedded Cards

During post processing the embedded card must be identified in the scene and a color sample can be taken from that spot. We know that the embedded card is either white or some shade of neutral gray. That means that if the sampled spot does not have equal, or near equal, values of the primary colors (R,G, and B), then a color correction must be applied to the scene to compensate. Compensation of images that have embedded cards can be done on each image individually. Compensation of images on the basis of a single "Calibration Shot" should begin with recording the amount of compensation required for the "Calibration Shot" and then applying the same compensation, blindly, to each of the images of the group.

Using the Card for Setting Custom White Balance (CWB)

The principles of CWB are the same across all cameras, but the specific steps are often different from camera to camera. So, refer to the User's Guide for your camera for details. The general approach is to place the card, as usual, and come in close with the camera to

be sure that it is centered on the card. Then perform the CWB setting steps appropriate for your camera. So long as you leave the White Balance configured to Custom White Balance, all subsequent shots will use that setting. The important thing here is that the card does NOT remain in the scene, whereas it does remain in the scene for the embedded mode.