

Photographer's

DOUGLAS PHOTOGRAPHIC

Grey Card

For accurate:

- Exposure measurement
- Contrast measurement
- Colour balancing
- White balance

An indispensable
part of the serious
photographer's
tool kit.



Douglas Photographic Grey Card

Douglas Grey Card - Densitometer Test Results


Transmission Values

	Red	Green	Blue	Average
White	88.72%	88.10%	93.11%	89.98%
Grey	18.11%	18.16%	18.11%	18.13%

Tests conducted on an X-Rite 310 densitometer

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Where sections are of particular relevance to the digital photographer they are preceded with the following symbol: 

Introduction

Grey cards have a number of functions including exposure measurement, contrast measurement, colour balancing and the setting of white balance. They are an indispensable part of the serious photographer's tool kit.

The **Douglas Grey Card** uses simple principles of science and new materials to provide better colour balancing of digital and conventional materials under a range of natural and artificial light conditions.

The card reflects the same proportion of all colours of light falling upon it including ultra-violet and the limit of visible red. It has a more neutral reflectance than the standard product under a wide range of sources of illumination including tungsten, daylight, flash and warm fluorescent tubes.

Manufactured in a tough plastics material it can be written on with a Chinagraph pencil or marker designed for wall planners, and cleaned off with a mild detergent or a spray cleaner designed for cleaning TV or computer screens.

Folded, the card is approximately A5/9" x 7" in size for fitting into a camera bag. Fully opened it is large enough to fill a 35mm camera viewfinder at 50 cm/1 ft 6 ins with a 50mm lens. The grey side has a reflectance value of 18% which represents a middle value of 5 in the Munsell system of colour notation and the middle tone (Zone V in the Ansel Adams Zone System) used for exposure determination, halfway between pure black and pure white. The grey side is used for exposure measurement when used for either digital, negative or colour transparency material, for colour balancing and for the setting of white balance. The white side is used for lighting contrast measurement and as an alternative method of exposure measurement for colour transparency material.



Meter Calibration

Exposure meters, whether TTL or hand held, should be used so that they only read from the grey card.

Meters are usually calibrated to an 18% reflectance, but this is not always the case.

The initial exposure should be made based upon the film manufacturer's recommended film speed, after which two or three exposures should be made (bracketed) either side of this 'correct exposure' in half-stop increments.

If you are using an exposure programmed camera, the quickest way to bracket is by turning the exposure compensation dial by the required + or - settings.

After processing (and printing, if applicable) the test film, the exposure that gave the best result can be used as a basis for calibrating the meter.



For example, if the exposure that gave the best result was one stop less than that indicated by the meter, the film speed setting would need to be increased by one stop.

A 200 ISO film would therefore need to be rated at 400 ISO.

A 400 ISO film would therefore need to be rated at 800 ISO.

If the exposure was 1/2 stop less than that indicated then:

A 200 ISO film would therefore need to be rated at 300 ISO.

A 400 ISO film would therefore need to be rated at 600 ISO.

Conversely, if the exposure that gave the best result was 1 stop more than that indicated by the meter, the film speed setting would need to be decreased by one stop.


A 200 ISO film would therefore need to be rated at 100 ISO.

A 400 ISO film would therefore need to be rated at 200 ISO.

If the exposure was 1/2 stop more than that indicated then:

A 200 ISO film would therefore need to be rated at 150 ISO.

A 400 ISO film would therefore need to be rated at 300 ISO.

 For users with a digital camera, where the built in meter is being used for calibration, it is not possible to take such variations into account as it is not possible to override the film speed.

It is possible, however, to use the exposure compensation feature, but to use this feature may not be convenient.

Exposure Measurement

The TTL meter used in SLR cameras relies on the fact that most scenes consist of a range of tones that will produce a combined tone of 18% grey when mixed together. Exposure problems occur when the subject has an excess of light or dark tones of which a snow scene is a good example.

To ensure that an exposure retains both the highlight and the shadow detail of the subject on the negative, transparency or digital material regardless of the proportion of light and dark tones, it is essential to peg the middle tone by using the **Douglas Grey Card**.

If you fill the frame of your viewfinder with the **Douglas Grey Card** taking care not to allow any shadow to fall on it, and making sure that the card is illuminated by the same light as the subject and that there are no brightly coloured objects reflecting light upon it, the meter will then record the middle tone of 18% grey. Correct exposure will then result regardless of the balance of tones of the subject.


When using a hand held meter it is essential to ensure that the meter is only reading from the grey card. Check your instruction book for the meter's angle of acceptance, in the absence of such information the meter should be held at 30 cm/12 ins from the card.



An alternative to using the grey card when metering for **colour transparency film**, is to use the white side as a substitute subject highlight.

This provides a basis for the determination of correct exposure for the majority of subjects using colour reversal film.

The reading obtained will need to be increased by between two and three stops so that the highlight records as white rather than mid grey on the film. The precise amount of increase will depend upon the contrast of the film in use and your preference in slide density. Once you have conducted tests to establish your particular highlight key you will achieve a degree of consistency that no other system can offer.

 Digital sensors, unlike film, cannot tolerate overexposure. In addition they are noisy in very dark areas of exposure. As the ISO of the sensor is increased the quality of the image deteriorates resulting in greater noise in the image.


An understanding of exposure will provide better digital images.

Lighting Contrast Measurement

To establish a lighting ratio, the Douglas Grey Card should be folded to form a right angle and stood on end with the white side pointing towards the camera.

A close up reading should be taken at each of the two faces of the folded card for comparison in order to arrive at the difference in f-stops between the two readings. The table below shows the lighting ratio for the number of f-stops difference. The other table shows recommended lighting ratios for various subjects for optimum results. Adjustments can be made to the lighting when this is under the control of the photographer. In instances where there is only one light source, reflectors can be used to lighten the side of the card that is in shadow.



 Although digital cameras can have a much wider latitude than conventional film, this is not always the case, so that the above test is essential to confirm the latitude of the digital image.

Subject Recommended Lighting Ratios

High key portraits - colour or black and white	1:1
Normal colour portraits	1:3
Low key colour portraits	1:4
Normal black and white portraits	1:8

Stops Difference Ratio

0	1:1
0.25	1:1.1
0.5	1:1.3
0.75	1:1.7
1	1:2
1 1/4	1:2.4
1 1/2	1:2.9
1 3/4	1:3.4
2	1:4
2 1/4	1:4.7
2 1/2	1:5.6
2 3/4	1:6.8
3	1:8

Colour Balancing

To achieve the most accurate colour balance either for digital or negatives that are to be printed, it is good practice to include in the scene (perhaps outside the printing area or on a separate frame), a grey card lit in the same manner as the subject.

For conventional photography, the image of this will provide a suitable middle-tone reference area that can be used by the processing laboratory for assessing the printing characteristics of the negatives. This can assist the printer to determine the proper colour filtration by means of the red, green and blue density readings of the colour negative who can then achieve the proper balance

between the exposing light and the colour sensitivity of the paper.

 For the digital photographer a number of imaging software applications have the facility to set the grey point.

The image shown here has a blue cast as it has been shot against a blue background.

We can correct this with Adobe® Photoshop® by going to **Image > Adjustment > Levels**.

Click on the eye dropper that says "Set Gray Point", position the dropper over the grey card and click when you will see an instant change of colour.



Colour Balancing

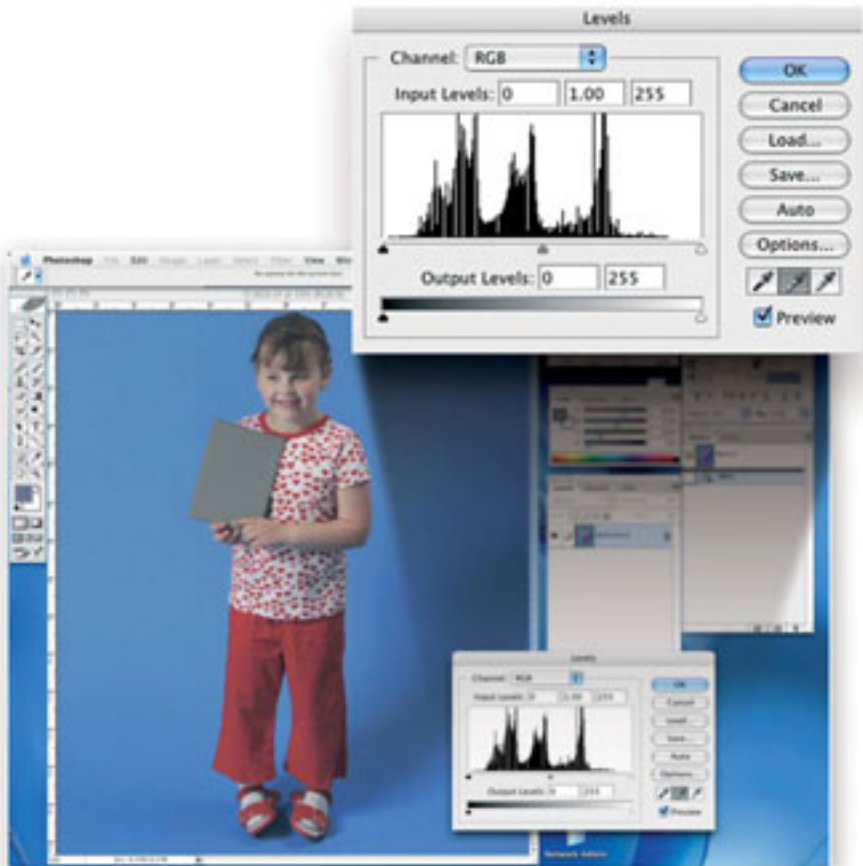
It is possible to save this "white balance adjustment", so that it can be used again with other shots in similar lighting conditions without having to use the card in each and every shot.

Since no two light conditions are the same, the best results will be obtained by taking a grey card shot at the beginning of each shooting session for each light condition.


These pictures illustrate the process and its simplicity.

The enlarged view below shows the corrections made to the original histogram.

It is important to note that Colour Balance needs to be applied to digital imaging just as much (if not more so) than traditional film.



White Balance

 As we know, the colour of light not only varies with the time of day but with the source of the light.

Digital camera users, both still and video, have an advantage over those using film, as they have the ability to control the colour balance automatically by using Automatic White Balance (AWB).

However, these systems are often fooled, especially if there is a particular colour dominating the scene. In such cases, and provided that the camera has the option to override the AWB setting, we can instruct the camera to use a particular colour temperature so that colours that appear white when viewed also appear white in the image.

However, some digital cameras are more susceptible to this problem than others, so that it is worthwhile making a test to establish how well your camera does.

Firstly take a picture of some colourful subject such as the one here using the camera's AWB.

Next, using the grey side of the **Douglas Grey Card**, which should be lit in the same manner as the subject and should fill the frame of the camera with any highlights or reflections being avoided, activate the **Manual*** white balance setting.

The camera will now be set for the prevailing lighting conditions and will retain this setting until another white balance is performed or the camera is reset to AWB.

We should now take another picture of the same subject so that we can compare the two.


*Some cameras have a **Manual** option, others call it **One-Touch**, others have a different method of setting the white balance to the prevailing lighting conditions.



A common belief is that electronic flash is neutral in colour balance.

As in tungsten lighting, a flash tube can alter its colour balance the older and/or the amount of use it gets. Flash tubes from different manufacturers can also vary slightly in colour balance - tubes that are U.V. coated can differ from uncoated tubes.

Unless an image that has been generated with a digital camera, using electronic flash and put through an average monitor has had the benefit of being 'neutralised' in Adobe® Photoshop® or other imaging software using a **Douglas Grey Card**, it does not stand a chance of being printed correctly with all of its correct colours or tones.


 For more about colour balancing see page 5.

The Douglas Grey Card is an invaluable tool for determining proper exposure and colour balance when photographing paintings, artwork and old photographs.

To make an exposure reading for copying work, place the **Douglas Grey Card** in the same plane as the original to be copied.

Use the normal film speed value and calculate the exposure directly with the light reading made with the camera's built-in light meter or by using a hand held meter.

If the subject is closer than eight times the focal length of the lens, you should allow for the decrease in aperture due to the lens extension unless your camera makes the reading through the lens and compensates automatically.

 For more about colour balancing see page 5.



Also available from Douglas Software



www.photo-software.com



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