

BOB PEARSON FRPS

GETTING THE BALANCE RIGHT

Bob Pearson, Secretary of the DI Group, outlines his approach to the tricky area of White Balance, explaining how to ensure your images have as near as possible a faithful rendering of the original colours of the scene by carrying a relatively inexpensive tool in your camera bag.

One of the characteristics of light is its colour temperature. One of the unfamiliar controls that a photographer finds when changing from a film to a digital camera is that called *White Balance*, perhaps better understood as *Colour Temperature Correction*. Daylight Films were balanced so that a white object was rendered white when the colour temperature of the incident light (the light falling on the subject) was about 5500 degrees Kelvin; Tungsten Film was balanced for an incident light temperature of 3200 degrees Kelvin. Without colour correction filters on the lens daylight film would produce a bluish image on a cloudy day but enhance the warmth of a sunset. Unlike film, the sensor of a digital camera has no inherent colour balance: this is determined by the processing of the data from the sensor. By default, a digital camera is set to *Auto White Balance*, that is the processing tries to render a white object as white, irrespective of the colour temperature of the incident light. Under such circumstance it can be disconcerting how sunsets lack the warmth that we had become used to when using Daylight Film.

If the processing is done in the camera (that is, producing a jpeg file) then it is the camera's white balance setting that determines the final colour balance of the image.

Typical options for white balance presets are shown in the table alongside. The more sophisticated cameras offer many more settings under the general heading of fluorescent, covering all types from sodium vapour lights to high temperature mercury vapour lights.

To replicate the result of a film camera leave the setting fixed at a value between 5200 - 5500 degrees. To deliberately achieve a slightly warmer image set the colour temperature slightly higher than its normal setting, that is, set it to cloudy for direct sunlight conditions.

If a digital negative is created by shooting in RAW mode then the colour temperature is not 'baked in' to the image until the point of development. There are many software programs available to execute this development, either specifically provided by the camera manufacturer or generic such as Adobe Camera Raw (ACR). When choosing the parameters to be used for this conversion from the raw image it is certainly possible to use the colour temperature that was set on the camera

at the time of exposure: the 'as shot' setting. Much more importantly, at this point the white balance can be set to any value that the photographer chooses. On many images it is desirable to move away from the 'as shot' value to increase the aesthetic appeal of the image.

The algorithm to determine the white balance of an image in the camera's Auto mode has become increasingly complex. In the early days the algorithm was little more than averaging the colours in the image and setting the colour balance to produce an average grey, a method clearly prone to error where there was a very predominant colour in the image. As an example of current sophistication, in the latest Nikon cameras white balance is part of the scene recognition system and it is only possible to hint at the complexity of this system. Nikon has for some years used a separate dedicated 1005 pixel RGB sensor to evaluate the scene from a store of tens of thousand of images. In order to improve the accuracy of this system a diffraction grating (which acts like a prism) has now been introduced. This splits the light so that mostly only the red light is incident on the red filter of the sensor, similarly for the green and blue light. The type of scene, the colour and brightness of the scene are extracted. This integrated system determines the colour of the incident light very accurately. Nikon claim that the system can decide whether the light incident on a scene is from a mercury vapour lamp for example. When the system detects the scene is lit by tungsten lighting it will leave the scene slightly warm, as human eyes see the scene.

Option	Colour Temp (Degree Kelvin)	Description
<i>Auto (Default)</i>	3500 - 8000	<i>Adjusted automatically</i>
<i>Incandescent</i>	3000	<i>For Incandescent/Tungsten lighting</i>
<i>Fluorescent</i>	4200	<i>For cool white fluorescent lighting</i>
<i>Direct Sunlight</i>	5200	<i>For subjects in full sun (1000 - 1600)</i>
<i>Flash</i>	5400	<i>For flash lit subjects</i>
<i>Cloudy</i>	6000	<i>Use under overcast skies</i>
<i>Shade</i>	8000	<i>Use in daylight when subject is in the shade</i>
<i>Choose</i>	2500-10000	<i>Choose colour temp (deg K) setting</i>