White Balance and Colour Calibration Workflow In Adobe Photoshop with the X-Rite ColorChecker Passport

White Balance an the Temperature of Light

One of the basic ways of controlling colour when we are taking a photograph is to know what the lighting conditions were when the image was taken.

All digital SLR cameras have what is termed a ‘White Balance’ (WB) setting this is generally a preset (Direct Sunlight, Flash Cloud, Shade, Auto, etc) that can be set from either a button on the camera or within the on-screen menus. By default this is set to Auto. In this case the camera will assess the scene and set what it thinks is the appropriate white balance for the individual shot.

White balance can also be termed as color temperature and has a very important effect on how your images look when processed through a graphics application. The images below are all the same but for the white balance that has been applied when converting the RAW images through Adobe applications.

Which one is correct?

As you can see each one of the images has a different colour tone from warm to cold and visually it is difficult to know which to use to give the correct skin tone etc on the image.

Even the ‘auto’ setting is probably not getting the image correct.

The only way of knowing that the white balance truly reflects the color temperature of the light that the image was shot in, is to use a neutral grey card and capture an image of it in the lighting conditions.
The images above again illustrate how different camera white balance settings can have a profound effect on the colour tones you view on your computer screen when editing. The only image that truly reflects the color temperature of the lighting conditions the image was shot in is in the centre. The central image has had its white balance set using one of the neutral greys in the bottom strip of the ColorChecker Passport using an initial image taken at the start of a typical shoot. Other neutral grey cards are available, so if you require a larger target (for landscapes etc) they can be used in the same way.

As the bottom strip shows neutral greys, any light falling on the patches will reflect the temperature of light falling onto the subject. So when the white balance tool in either Adobe Lightroom or Camera Raw (see images below) is placed over a patch and clicked, it informs the application that this is the desired neutral for the image and the correct temperature compensation is set for the shot.

### Applying Custom White Balance in Photoshop

#### Within Adobe Camera Raw

Open the RAW image and select the ‘White Balance Tool’ from the icons in the top menu strip.

Click the tip of the eye dropper on the neutral grey and then this will be selected as the white balance for the image.
Applying a White Balance to Multiple RAW Files in Adobe Camera Raw.

Usually in a shoot you will take a number of shots in a setup. You may then wish to take a selected number of shots and apply a single white balance across them all to then open them up in Photoshop for processing.

The easiest way to do this is to first use Adobe Bridge and select all the images you wish to open (making sure you include the image containing the grey reference), then open them in Photoshop. This will automatically open the images into Adobe Camera RAW (ACR).

Once opened you will see a similar screen to the one above, that shows all the selected images as thumbnails down the left hand side.

To apply a single white balance across all the images:

1 - Single click the image thumbnail containing the grey reference (ColorChecker Passport in this case) to set it as the active image.

2 - Click the ‘Select All’ drop down (at the top of the Filmstrip pane) this will then select all the images but leave the reference shot as the active image in the main window.

3 - Click on the white balance dropper.

4 - Click the neutral grey patch (on the ColorChecker Passport the 4th patch along is an 18% neutral grey that is ideal for white balance setting).

On default settings this will apply and synchronise the white balance across all the images selected. The synchronise settings can be altered depending on the adjustments you wish to apply to the other images. Just click on the ‘Syncronize’ button to access the settings selection form.
As you can see, setting the correct white balance in your images can really help to get correct basic colour in your workflow and save a great deal of time when processing your photographs within the Adobe applications.

Many other image editing applications have similar white balance tools, so the Adobe workflow described above can be easily adapted for the specific software. There are also many different neutral grey charts and cards available which can also be used in the same way.

**Camera Calibration in Photoshop with ColorChecker Passport Photo**

Creating DNG Camera Profiles in Adobe Photoshop (Adobe Camera RAW) and Lightroom

The ColorChecker Passport comes with a plugin for Adobe Lightroom and a stand-alone application for use with Photoshop and Adobe Camera RAW.

To create a good quality DNG profile with either software it is best to start off with a well exposed RAW image that contains the Color Checker Passport. The main target should take up at least 20% of the frame and be evenly lit by the same light that is falling on your main subject. (see image below).

As mentioned above it is important to get a well exposed RAW image of the target. This can be difficult due to time constraints and conditions, so it is advisabe to bracket the exposures on the images containing the target. So once back home editing the images you can be sure that you have the correct information to create the best DNG profile possible.

As a rule of thumb the 4th neutral grey from left to right on the bottom strip (circled in the image) should be exposed to 50% RGB in Lightroom and 128 RGB in Adobe Camera RAW. This can easily be checked by placing the cursor over the 4th neutral grey and looking at the histogram to see the RGB values and selecting the image closest to the ideal readings.

Once you have taken the initial bracketed shots of the target you can then go ahead and shoot the rest of the images in that lighting setup. NB - If the light changes re-shoot the target.
Creating and applying profiles in the stand-alone application Adobe Camera RAW

The ColorChecker Passport comes with its own stand-alone application that, once installed, will create a DNG profile that can be used in Photoshop through Adobe Camera RAW.

Recommended Workflow.

As discussed in the Lightroom workflow ensure that you have a well lit and exposed RAW image of the Passport target.

The software only uses the Adobe Digital Negative format (DNG), so the first thing to do is to convert your initial RAW image of the ColorChecker Passport target into a DNG file. This can be done very simply in Adobe Camera RAW with a few clicks. This conversion is only needed for the RAW image containing the target so you do not have to convert all your RAW images taken on the shoot. The conversion is totally lossless so will not effect the original image.

It is recommended that Adobe Bridge is used for this (see below) as it provides a good visual interface to assess your pictures and makes it easier to select multiple images and open them in to Adobe Camera RAW.

DNG Conversion

To convert the image just double click your preferred passport image and it will open in Adobe Camera RAW. Once opened immediately save it as a DNG file with the settings indicated below.

Once saved the DNG file can then be used to create the profile.
The next stage is to open the ColorChecker Passport application. Once the application is opened it is a simple job to drag the converted DNG file into the application window.

As you can see from the screen shot the software will initially analyse the image, find the colour target and place a sample grid over the patches. Once it has placed the grid over the colours click the ‘Create Profile’ button and give the profile a name.

Name the DNG profile (i.e. camera name Date Shoot etc), making sure you do not use any special characters in the text as this can confuse the Adobe applications and your new profile may not be seen by the software (underscores are OK if you want to separate names etc).

Once the DNG profile is created it’s back to Bridge to then look at applying the DNG profile to a single or group of images. The DNG file has now done its job and for the rest of the process you can just use the original RAW files from the shoot.

As before open Bridge and select either a single image or group of images you want to apply the profile to.

Once selected double click and all the images will be opened together in Adobe Camera RAW.

Just make sure all the images chosen are shot in the same lighting conditions and you include the image that contains the ColorChecker Passport as this can be useful if you want to combine setting the white balance with applying the profile.
Adobe Camera RAW will then open and show all the opened images in the left hand pane. Initially select the image containing the ColorChecker and then click the ‘Select All’, drop down (at the top of the Filmstrip pane) this will then select all the images but leave the reference shot as the active image in the main window.

The DNG profile can then be applied to all the images selected by clicking on the Camera icon on the right hand pane of Adobe Camera RAW (see image below). Select the correct profile in the drop-down and it will be applied to all the selected images.

Applying the DNG color profile can be combined with setting the white balance or any other Camera RAW adjustments required.

Once the profile is applied and any other adjustments made within Adobe Camera RAW the images can then be opened into Adobe Photoshop.

As you can see the ColorChecker Passport is easy to use and will assist you in adjusting white balance and creating custom DNG profiles for your cameras. This can save a great deal of time in the initial stages of editing, allowing you to achieve a standard base level for all your images wherever you take them and whatever conditions they are taken in.

Ashley Bowman - June 2016