

AN INTRODUCTION TO BASIC COLOUR SPACE AND COLOUR PROFILES

This is my third attempt in writing this article on Colour Profiling the reason being is this subject can get VERY complex in fact sometimes I think you need a University Degree in Maths and or Science to really understand the whole concept. So as I was trying to figure out the best way to describe colour profiling was to remember the old adage of KISS ie: Keep It Simple Stupid so I will endeavour to do so in this rewrite. I will also list a number of good sites to go to if you want further information.

Ok so basically a colour **space** describes a range or **gamut** of colours. Devices in your workflow such as cameras, printers, monitors etc have different colour gamuts in which they record, store, edit and output images. A colour profile defines a colour space so the devices and software you have in your workflow know how to manage and convert colours in your image. Briefly a colour space describes the transformation or flavour of colour as identified by a device. Therefore it can be seen that each device whether it be camera, monitor, printer etc has its own distinct colour space.

In most digital cameras these days and also within most photographic software such as the most popular Adobe Photoshop and Adobe Elements but also within free to use software such as GIMP and Picassa, there is an ability for the photographer to choose a specified colour profile. This is important to understand as the chosen profile can and will effect your output ie: your hard copy print or your on screen image.

So what are these profiles ? Well there are dozens of them. There are some for cameras, there are some for software, there are some for printing papers and there are some for the whole range of different types of printers. There are however 'standards' used by the photographic industry via the International Colour Consortium (ICC) to enable the ease of use, across the board standardization to not only save the sanity of photographers and others using this system but also to allow a controlled environment whereby colour management conversions can occur throughout devices such as cameras, scanners, printers, TV screens, monitors etc. So what you see through the camera should remain pretty much the same from capture of the image through to printing. If you like we can call these basic colour spaces and their associated colour profiles which allow the spaces to communicate over a variety of devices "Generic". Of course there heaps of buts and what ifs however, it is not my intent within this article to delve too deeply into the black art of Colour Management.

To enable the electronic conversion of colour the colours of Red, Green and Blue (RGB) were used to form a seemingly never ending array of colours (spaces) by adding different amounts or values of one or more colours to another. As previously mentioned each device has or should have its own ICC colour profile which describes the appearance of their RGB values. Although the spaces are RGB they have values ranging from 0 to 255, the colours reproduced by those values will be different and will be described by an appropriate ICC colour profile. I hope your still with me !

For Photographers there are four 'generic' profiles generally accepted for use within the industry. These are **sRGB**, **Adobe RGB** and **ProPhoto RGB** (these form the generic RGB colour space) and **CYMK** (Cyan, Yellow, Magenta and Black). These profiles can be sorted into Source and Working Colour Spaces.

Note: The letter 'K' in CYMK stands for Black to save any confusion with the 'B' for Blue in RGB.

Source (or Input) Colour Spaces.

Most cameras save the image in the 'generic' colour space of either sRGB or Adobe RGB. In the past most point and shoot cameras only had one option that of sRGB however these days most now have the option of either using sRGB or Adobe RGB as is the case with Digital Single Lens Reflex (DSLR) cameras. The colour space (ICC Profile) can be chosen via the cameras Menu, check the cameras Operating Manual to see how to do this on your device. The default is usually sRGB. If you have a device in which the profiles cannot be changed then you can do this later within the photo-editing software.

Note: The 's' in sRGB means simple RGB but I prefer to call it screen RGB as I usually only use this profile for on screen display or when I know that a printing company, such as the one used by Red Bubble for instance, uses sRGB for display and print. On this occasion this is for easier workflow by all concerned as the displayed prints can be purchased straight from the screen without a need for anyone to later change profiles. They insist though that submitted images have a large pixel count so that quality is maintained.

The sRGB gamut (space) is a fairly small colour gamut used, as stated above, by older, simpler cameras (and Phones) and the default profile set on most cameras. **It is also the recommended profile for images that are to be displayed on screen, projection and for use on the web** (and preferably in e:mails if it is important that the receiver gets the best representation as possible).

Adobe RGB is a much wider colour gamut therefore contains much more colour information. Your camera should be set to this profile **particularly if you intend at some point later to print your image**. The Adobe RGB profile can always be changed later to RGB for on screen use within the photo – editing software. It is much better to use the larger profile first then go back to the smaller profile rather than visa versa. Just remember to Save the new file with a different name. For example: Old House.jpg (original file) to Old House_sRGB.jpg (new profile file).

Think of sRGB being a home outside spa. It's small, contains a little amount of water but it's great for its intended use, it does the job particularly if you do not have another choice.

Now think of Adobe RGB as a swimming pool located in the family home. It contains a lot more water and you can do a lot more with it.

Working Colour Spaces.

sRGB - This space can be called the consumer colour space as virtually all digital cameras, inkjet printers, photo-editing software etc use or support this colour space. It was developed by Microsoft and Hewlett Packard to get more consistent colour for personal computer users. Because the RGB space is small this profile should **ONLY** be used as a working space if you are **ONLY** producing images for the web or on screen display. It is the absolute best choice for on screen and web use. Remember the 's' in sRGB means simple it contains a small amount of colour information. Using the above analogy it is our outside spa.

Adobe RGB – Is the suggested profile to use when working on images within photo – editing software due to its much larger colour space (gamut) therefore it contains much more colour information. This profile has for many years been the profile of choice for professional photographers and if you are submitting work for print or publication it is still the best choice. Remembering our above analogy it is the family sized swimming pool.

CYMK – This colour space is mainly used for work that is to be printed on commercial offset printers for the likes of magazines, packaging etc. It is a space that requires specialized profiles.

ProPhoto – Is an extremely large colour space which is being used more and more by professional photographers particularly those shooting with larger format cameras and those printers who have machines capable of supporting a very large colour gamut. Using our analogy think of ProPhoto as being an Olympic sized swimming pool. It is very big and contains a huge amount of water and is usually only used for specific speciality reasons.

Changing Colour Profiles.

The method I use here for changing colour profiles is for the software I currently use that being Photoshop CS5. There should be a way of changing profiles contained in ALL photo-editing software. If you are not sure of where your softwares method for changing profiles lies then use the application Help file, the applications Home Site, youtube contains a vast array of photo how to videos or try just Googling it.

AFTER you have done whatever you have wanted to do to your image and it is saved with an appropriate file name;

Go to: Edit – Assign Profile – From the drop down list choose the required profile – Click Ok – Save As (call it a different file name) - Save.

Summary.

In short it is generally accepted that the colour profiles listed are used for the following purposes:

1. sRGB – for digital projected images and for use on the Web.
2. Adobe RGB – for input devices such as cameras, working space and output/ printing.
3. CYMK – for commercial offset printing.
4. ProPhoto – for larger format cameras and larger printers.

It is highly recommended that you check with the printing company that you are using to ensure that the files you are about to submit to them for printing have the profile they can use to produce the best printed image. It is only a matter of communication that can help stop a lot of heart ache.

If you are doing your own printing then ensure that the profiles you are using are consistent and match whatever paper, ink and printer you are using.

For digital projected images submitted for NEPG competitions they should have a profile suitable for consistent screen projection that being sRGB.

Useful Web Sites.

<http://www.w3.org/Graphics/Color/sRGB.html>

<http://www.colourphil.co.uk/colour-management-intro.html>

http://en.wikipedia.org/wiki/RGB_color_model

Peter Evans - 02 Mar 2013