

# Choosing a colour space: sRGB, Adobe RGB and ProPhoto RGB

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Once you start working with images you will quickly encounter different options for working colour spaces. These spaces are responsible for a range of tone and colour the image produces. The larger the space the more of a range the image can potentially portray. I am being asked quite frequently “what colour space should be used” and “why not just use the biggest”? The answer to this question is not as straightforward as one might hope it would be, and it largely depends on photographer’s preferences, workflow and mode of image distribution.

## Colour spaces

There are three most common colour spaces: sRGB, Adobe RGB and ProPhoto RGB. Each has a different range of tones, brightness and colours it is capable of operating with and each is used for different applications.

sRGB (aka sRGB IEC61966-2.1) – is a colour space produced by HP and Microsoft in the late 90s. Since this colour space was backed up by industry leading giants it quickly became popular with all image driven mediums such as cameras, monitors, scanners and printers. sRGB has the smallest range of tones and colours (about 35% of the full International Commission on Illumination (CIE) range) out of the three most popular colour spaces, but it is the most versatile and widely used. It is supported by all cameras, screens and image viewing software, so if you just want to keep things simple and avoid colour shift problems during editing or sharing, your best bet would be to shoot and edit files in this colour space.

Adobe RGB (1998) – as you can probably tell by its name, this colour space was created by Adobe in late 90s for suitable implementation of full colour management in their Photoshop software. Because of wide use of Photoshop this colour space quickly became popular and extensively supported. This is a wider colour space, which encompasses around 50% of all visible colours (as defined by CIE); it is a good choice for editing in 8-bit or 16-bit modes and typically carries more information for print. However, there are some complications associated with using this colour space that you should be aware of.

First of all, Adobe RGB is not supported by all browsers. If you intend to place your images online it is most likely that people viewing your images will see them in slightly different colours if the file is in Adobe RGB colour space.

Secondly, Adobe RGB compresses colours and only special image viewing software's can expand it back to reproduce all the colours in full gamut, all of the rest of the programs do not support this colour space and will make the image look dull. So when you share your images, remember to convert them to sRGB. This creates an additional step in your workflow.

Finally, if you send your images to a print lab, most of them work with sRGB colour spaces (unless they specifically mention a different colour space) which will mean your prints would have incorrect (dull) colours, if printed with Adobe RGB profile.

ProPhoto RGB – was created by Kodak for advanced image reproduction on print. This colour space covers the largest range of colours and even goes beyond of what our eyes can see. To achieve this range you must shoot in RAW format and open your digital negative with ProPhoto RGB colour space in 16-bit mode. If you start editing in 8-bit mode you will most likely run into banding or pasteurization problems because with only 256 levels per colour channel in 8-bit mode gradient steps are larger. Additionally you will not be able to save the file as JPEG because it only supports 8-bit mode. You will have to store the file in a format that supports 16-bit such as PSD or TIFF, and your printer will have to support this format. Therefore this colour space is only recommended for photographers who have a very specific workflow and who print on specific high-end inkjet printers which can take advantage of such a high range of colours.

## So which colour space should I use?

As I have mentioned before, it all depends on your preferences and character. If you are planning on sharing your photos online, printing them at conventional mini labs or providing them to clients who have no idea what a colour space is, then your best choice is sRGB. This is the most versatile colour space and the use of it eliminates any hassle of converting and having extra steps in your workflow, giving you more time to actually shoot more images and focus on your creativity. Remember that most colour problems occur when you start messing with colour spaces other than sRGB



On the other hand, if you are the kind of person who likes to control every aspect of your workflow and print your images at home on an advanced inkjet printer, then you should consider using Adobe RGB colour profile. Additionally, sometimes specific clients, especially in publishing business, will explicitly ask you to provide images in Adobe RGB colour space, because theoretically it has a wider colour range. In that case you would want to use Adobe RGB and carefully monitor each of the transfer steps in your workflow.

Finally, if you are a complete perfectionist who prints on high-end inkjet printers and wants to make use of the entire colour range visible to human eye and even some imaginary colour (yes, there are imaginary colours employed by this colour space) then you should go for ProPhoto RGB. This will, however, force you to use very specific steps in your workflow, such as shooting RAW (ProPhoto RGB is native space for Camera RAW) and only using 16-bit files.

## Assigning colour space in camera

Most modern digital camera support sRGB and Adobe RGB colour spaces. You can usually specify which colour space you want your camera to use when saving JPEG files on a memory card. To choose it go to menu and look for colour space option. Please refer to the user's manual for your specific camera instruction.

### Assigning colour space in Camera RAW



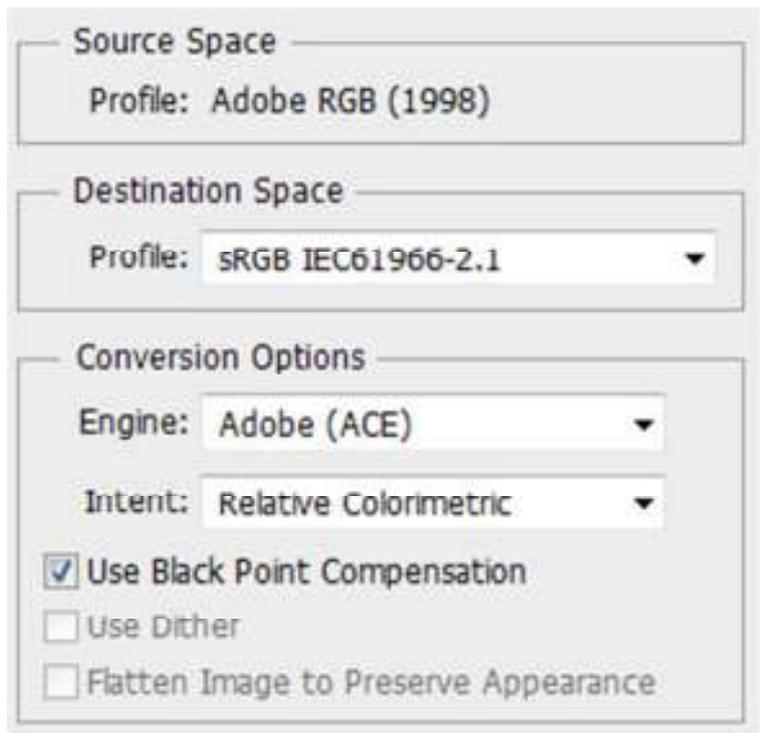
If you shoot in RAW, then you can choose a specific colour space when opening a file in RAW software. In Camera RAW, which comes standard with Adobe Photoshop, you can do this by clicking on bottom link in the middle of a window and selecting a colour space from a Space drop down box. Remember to also select 16bit/Channel depth if you are choosing ProPhoto RGB or even Adobe RGB colour space.

## Setting up Photoshop colour setting

When working in Adobe Photoshop also remember to select appropriate colour settings. You can do this by going to Edit>Colour Setting on the top Navigation Panel. Once there, select RGB working space and make sure to check boxes that will prompt you if there is a profile mismatch to avoid any inconsistencies.

## Switching between colour spaces

Sometimes you might want to switch between different colour spaces. This can be done with several editing programs. Remember that you don't want to just assign a new colour space, but want to convert to it using advanced algorithm in order to correctly preserve all the colours. I will use Adobe Photoshop as an example. To convert colour space, go to Edit>Convert to Profile on the top Navigation Panel. New window will show you your current colour space and give you an option to select which profile you would like to convert to. This conversion can be done through four different



methods (Perceptual, Saturation, Relative Colorimetric, and Absolute Colorimetric). If the description of these methods below seem overwhelming just know that you are better off just using Relative Colorimetric conversion method for your photos.

Perceptual mostly focuses on keeping good correlation between out-of-gamut colours, but it may negatively affect the relationship of in-gamut colours. This is sometimes effective when converting to CMYK colour space.

Saturation, as the name implies, is focusing on maintaining good saturation of colours. It is usually used when converting to wider colour space. But it is typically not recommended for digital photography, because it doesn't preserve realistic colours.

Relative Colorimetric focuses on accurately producing in-gamut colours, but it sometimes sacrifices out-of-gamut colours. This is the best rendering option for photos and is most used for screen and print.

Absolut Colorimetric is typically used for proofing. It tries to reproduce all original colours, but does not take into consideration for the illuminated or light source. This usually causes wide colour shifts when viewed under different lighting. Therefore, this method is not recommended for photography.

## Colour Proofing

Additionally you can use colour proofing to see how the image might look like on different mediums. Remember, however, your monitor should be properly calibrated to present colours close to real results. To set colour proofing in Adobe Photoshop go to View>Proof Setup on the top Navigation Panel and select whichever medium you would want to see it in. Make sure Proof Colours is active at View>Proof Colours to see results.

## Final thought

Personally, I use sRGB colour space exclusively for all my projects. This allows me to share, post and sell images without ever thinking about end user seeing noticeable colour shifts; unless their monitor colours and gamma are way off by default, but in that case they see all images like that and are probably used to it. I know many of my colleagues use Adobe RGB to maintain a larger range of gamut but I keep on hearing all kinds of stories from them how that gets them into problems. And honestly I can't see such a quality difference between a print from sRGB and a print from Adobe RGB to justify to myself to go through all the hoops.