

RGB OR CMYK ? WHICH IS RIGHT ?

Every digital camera or scanner is a RGB (Red, Green, Blue) device. All images start life in RGB – no exceptions!! However, most printing processes use CMYK (Cyan, Magenta, Yellow, Black) inks (sometimes adding additional ink colours). When printing an image, a conversion from RGB to CMYK will be required somewhere in the workflow. CMYK is “device dependent” meaning that each press / inkset / media combination has unique characteristics requiring a specific colour conversion.

QUIZ: How can one set of RGB values (R115, G103, B090) be equal to five different CMYK “recipes” as shown in the table below? Which one is right??

RGB Value (Adobe RGB 1998) 0-255	CONVERTED FROM RGB TO CMYK USING PROFILE BELOW (IN PHOTOSHOP CS, RELATIVE COLORIMETRIC, ADOBE ACE)	Cyan %	Magenta %	Yellow %	Black %
R 115 G 103 B 90	U.S. Web Coated (SWOP) v2	49	52	61	21
	U.S. Web Uncoated v2	41	44	52	25
	Euroscale Coated v2	53	49	56	22
	Euroscale Uncoated v2	41	45	57	31
	ISOwebcoated.icc	38	40	48	37

The answer is that each recipe above is correct *FOR IT'S PARTICULAR PRINTING PROCESS*. Each CMYK recipe above will produce an (almost) identical brown colour when printed on it's respective process.

In other words you will get the **same printed brown colour** on a printing press that is setup to U.S. Web Coated (SWOP) v2 standards with a recipe of C49, M52, Y61, K21 as you would on a press that is setup to Euroscale Coated v2 standards with a recipe of C53, M49, Y56, K22 as you would on a press that is setup to ISO web coated standards with a recipe of C38, M40, Y48, K37

CMYK is highly DEVICE DEPENDENT

THERE IS NO SUCH THING AS "GENERIC CMYK"

DIFFERENCES BETWEEN VARIOUS CMYK TECHNOLOGIES

Item	Example
Inks / dyes / pigments / toners	Printing press Cyan is NOT the same colour as inkjet Cyan
Media	Gloss, photo, art, outdoor media
Colorant / media interaction	<ul style="list-style-type: none"> Ink soaks INTO inkjet media Toner fuses ONTO media in a laser printer
Technology specific issues	<ul style="list-style-type: none"> Variance from one impression to next on a press Variance when printing uni or bi directional on an inkjet.

Because every CMYK print technology is different, as illustrated by the table above, each technology requires a different "recipe" of CMYK values to another CMYK print technology.

Example 1: A different recipe of CMYK is required for a press printing on gloss-art paper as you do for the **same press** printing on newsprint.

Example 2: To achieve a specific colour, an inkjet printer needs to put down quite a different CMYK recipe for each of gloss, matt, canvas, art paper etc.

RULE

Do NOT convert from RGB to CMYK until you know which device / process you are printing to & which CMYK recipe to prepare.

See Part Two below, for solutions

Part Two : How to work in RGB & CMYK simultaneously

Have your cake & eat it too !

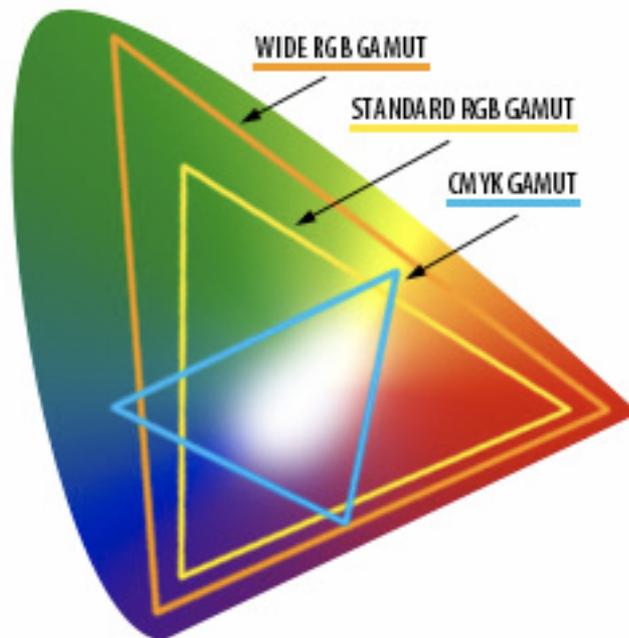
But first a little colour theory.....

You'll notice in the diagram that the two RGB colour spaces are much larger than the CMYK colour space.

Look closely and you'll also notice that it's the SATURATED colours that CMYK cannot reproduce.

The most saturated colours reside furthest from the centre of the diagram.

RULE: CMYK printing devices have a smaller colour gamut than the RGB working space you set in Photoshop.



What we need is a mechanism to predict the gamut-mapping (compression) from the large working space to the smaller printing colour space. That mechanism is called soft-proofing (or proofing in software) and it is one of Photoshop's most powerful features.

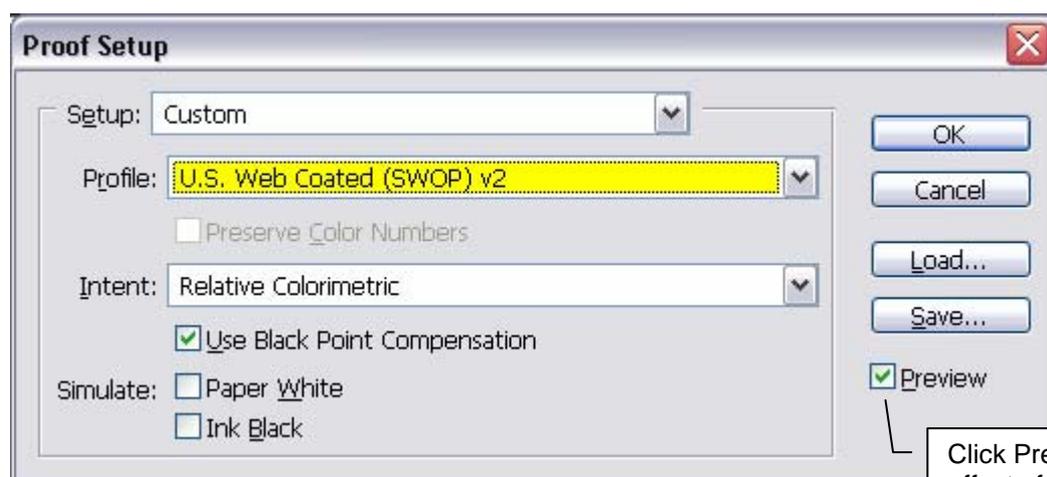
PHOTOSHOP SOFT-PROOFING

Before you attempt to soft proof, please calibrate your monitor with a quality measuring instrument.

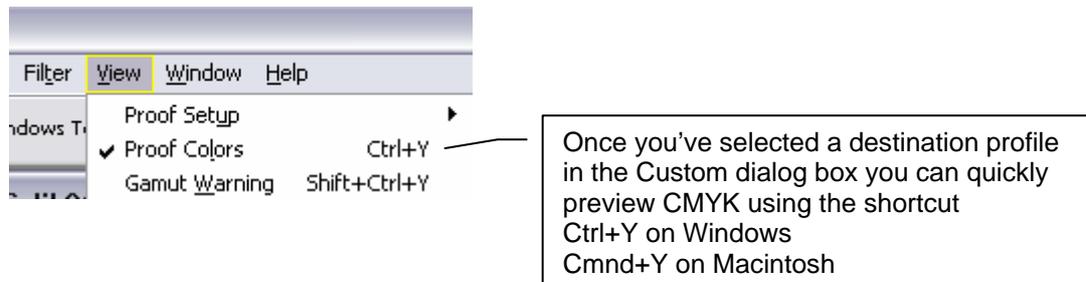
In Photoshop (V5 or later) open an image which some saturated colours. You may download a test image at http://www.pixelperfect.com.au/pics/lowres_test.jpg if your image has no out-of-gamut colours.

In Photoshop, go to menu View > Proof Setup > Custom.

Click the Profile: drop-down arrow and select a CMYK profile like U.S. Web Coated (SWOP) v2



Click Preview on or off to see the effect of the CMYK conversion. When the box is ticked you are previewing what your image will look like when printed to your selected CMYK destination.



IMPORTANT NOTE : The demonstration above uses U.S. Web Coated (SWOP) v2. You will need to select a VALID profile for your proposed printing process. Discuss getting a valid profile with your printing press or colour consultant.

The Gamut Warning shortcut is also very useful to identify **where** in your image you have out-of-gamut colours. The gamut warning colour can be changed (from the default grey) under Preferences > Transparency & Gamut.

CONCLUSION

Gamut Warning : indicates **where** in your image you have out-of-gamut colours.

Proof Colours : also called soft-proofing, indicates how out-of-gamut colours (in your selected working space) will map to colours in your selected CMYK destination.

So enjoy the best of both RGB **AND** CMYK : edit your image in RGB whilst soft-proofing it to the smaller-gamut CMYK space.

You are now enjoying a device-independent workflow.