How to print correctly
using an ICC-Printer-Profile under Adobe Photoshop

Before dealing with color profiles in detail, there is one thing you should be aware of:

Only if you are using color management throughout your whole color-workflow, you can be sure to receive high quality and reproducible results.

Colors on monitor ≠ Colors on printout

In general, people think that with a calibrated monitor and a matching printer profile, photos/pictures will print out the same way they appear on screen. This is not the case, but something can be done against it.

Currently, there is no printer available, which is able to reproduce all the visible colors you see in life or on your monitor screen. With the use of CMYK (Cyan, Magenta, Yellow and Black) inks, it is physically impossible, even if your printer uses six or more colors.

Below you see a graphic of two ICC profiles. This is showing a comparison of all the colors that can be displayed on the monitor (transparent) and the colors that can be printed with an inkjet printer (color) on glossy paper. So you can see very well that there are colors on the monitor, which the printer can't reproduce (e.g. yellow area).
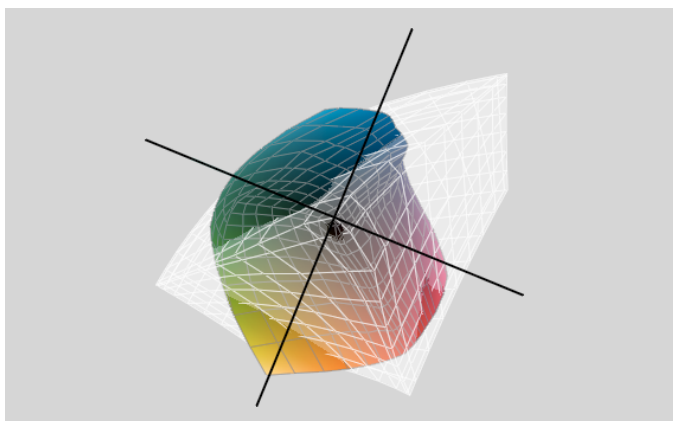
An ICC printer profile describes the color reproduction of the printer regarding its components (ink and paper). Through this information when printing, you can ensure that the correct and neutral colors to be rendered, so that for example gray is a neutral gray and has no tint.

The use of different paper and/or ink will cause different colors. This needs to be corrected with a new custom ICC printer profile.

Many printing services use profiled printing machines and you may request that ICC-Printer-Profile. If you are in the demand for a profile and as a response get a profile such as "sRGB", you should change the printing service provider, because the sRGB profile is not a machine-dependent profile, but rather describes a working space. This profile can't be used to view the color of the printer used by the printing service provider.

The following topics are explained in this summary:
- Soft-Proofing, printer simulated representation on a (calibrated) monitor
- How to print with an ICC-Printer-Profile

Soft-Proofing

Before looking at pictures in the soft-proof-mode, one must first make sure that the monitor is calibrated so that the correct colors will be displayed on the monitor. The screen should be calibrated at regular intervals (about 2x per month), because the color of the monitor will shift within time.

Soft-Proofing is the simulation of the print out of a picture on the monitor. This is in contrast to a proof, as you may know it from the Offset printing business, where you will get a pre-print on paper.

Some printer manufacturers directly supply, together with the printer drivers, profiles for different paper types. Well known paper manufacturers may also have profiles for your papers available, usually free of charge and online. Make sure that these profiles match your printer.

Such general ICC-Printer-Profiles already allow good printing results. However, all printers behave different due to the tolerance of the components used and therefore have their own characteristics.

Since these profiles have not been created on your unique printer, there will always be some variations. If you want to use the whole thing properly, or even use papers where there is no matching profile available, you have to use a professional printer calibration solution, the *SpyderPRINT.*

In order to view a simulated printout on the calibrated monitor, you need the appropriate ICC-Printer-Profile for your printer-paper-ink combination, or the one from the printing service, installed on your computer. If this profile is downloaded, you must save it under the following folder, to make it available on the computer:

Windows: C:/windows/system32/spool/driver/colors
Mac: HD/Library/ColorSync/Profiles

If you have created a profile with our *SpyderPRINT*, it will be saved automatically after the profiling process in the appropriate folder.
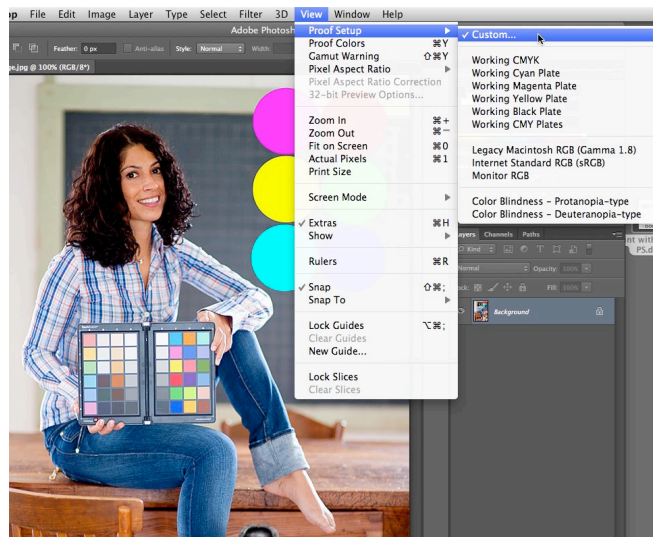
As shown in the screenshot above, click on "View" -> "Proof Setup" and after that on "**Custom**...".
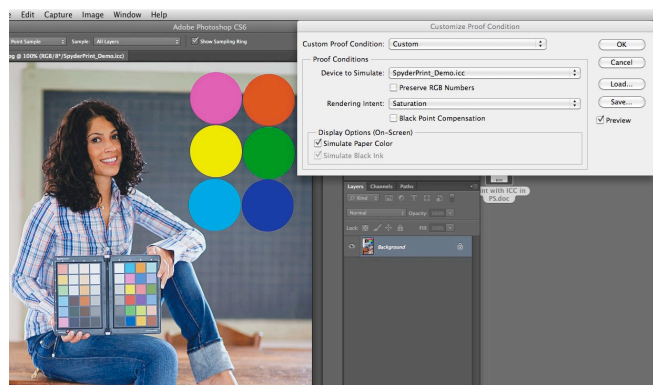
In the next window called "**Customize Proof Condition**" choose the corresponding printer profile under "**Device to Simulate**". For "**Rendering Intent**" select the appropriate settings. Besides "Saturation" – which we recommend for the use with profiles created by our *SpyderPRINT-solution* – "Perceptual" and "Relative Colorimetric" may also be used. You may switch back and forth between the different modes/views and directly see in the soft-proofing-view which setting suits your image and needs best.

The "Rendering Intent" describes the behavior with which the colors from the large working space of your image will be transferred and converted into the smaller color space of your printer. It also defines what will happen with color, which the printer is not able to reproduce (also called Gamut mapping).

We recommend to turn off "**Black Point Compensation**" and to turn on "**Simulate Paper Color**".

Unlike screen colors, which are additive and glow, inks are subtractive and "lit" only by reflecting light. That is why the contrast between black and white on the monitor is much

larger compared to a printout. To compensate these differences as good as possible, one is also using the function "**Simulate Paper Color**". This ensures that paper white will be simulated and contrast range will be reduced.
Your screen is now showing the simulated view of your printout, which also appears in the title bar of the image. With key combinations CMD-Y on Mac or Ctrl-Y on PC, you can switch between the image-view and the soft-proofing-view. Like this you're able to see which colors your printer isn't able to display. You may even adjust your image directly under the soft-proofing view, for example by changing the brightness. These changes will immediately be implemented in the soft-proofing view. Be sure to create a backup of the original file when making changes under a SoftProof.

You may now compare the dry printout of your picture with the soft-proofing view on your (calibrated) screen. You will see that these two images match **(depending on the quality of the used profile and light source).**

To be able to judge the quality of your printout, you will have to use a so-called standard light box, which uses light with a fixed color temperature of 5000/6500 Kelvin. In addition, lights will be completely identical in the entire visible light spectrum, so that no color distortion occurs (metamerism). If you use a different light source such as for example halogen, a colorcast may occur.

Please take a look at the next section: How to print your picture. If you want to use a printing service for printing your image, please make sure that the picture is still in Adobe RGB (1998) or sRGB color space. **Never convert the original image into the printer-profile!**

How to print with a printer ICC-profile

To print your image, click on "**File**" then on "**Print**"…
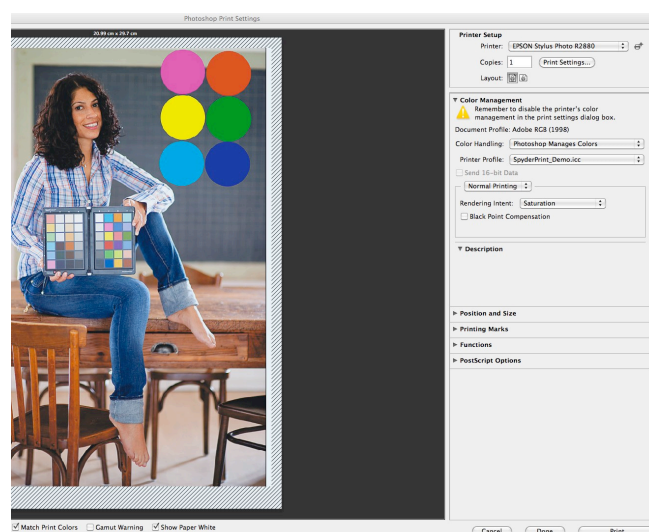
As shown in the screenshot above, choose the following settings in the window **"Photoshop Print Settings".**
- Color Handling: "**Photoshop Manages Colors**"
- On the left side, under the print preview, activate "Match Print Colors" and "Show Paper White".

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- Printer Profile: choose the corresponding profile for your Printer-Paper-Ink-Combination
- Rendering Intent: choose "**Saturation**" for profiles created with our *SpyderPRINT-Solution*. For profiles from other manufacturers, choose "Perceptual" or "Relative Colorimetric".
- Black Point Compensation: set it inactive (unclick it)

Now for Photoshop CS5 or older, click on "Print" to access the printer settings. In Photoshop CS6, before clicking on "Print", please click on "Print Settings".
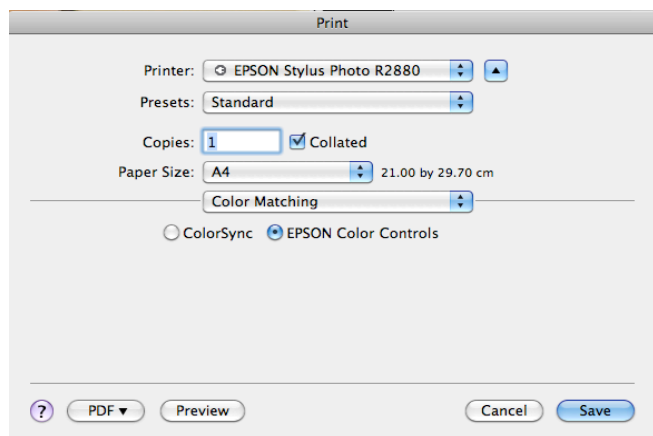
The following screen shots will help you to find the correct settings for your printer:
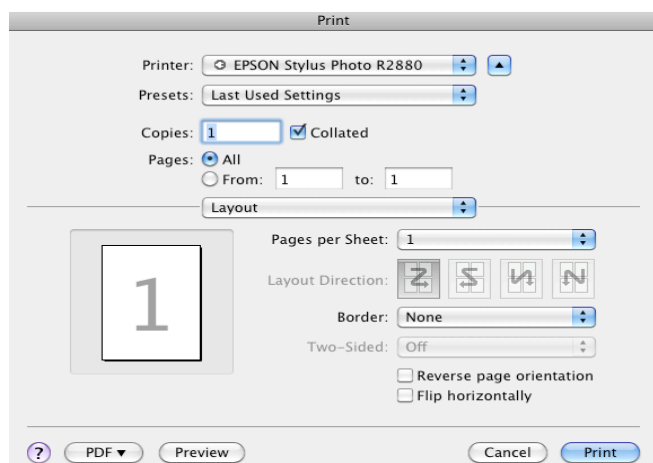
First of all, click in the field "**Layout**"...
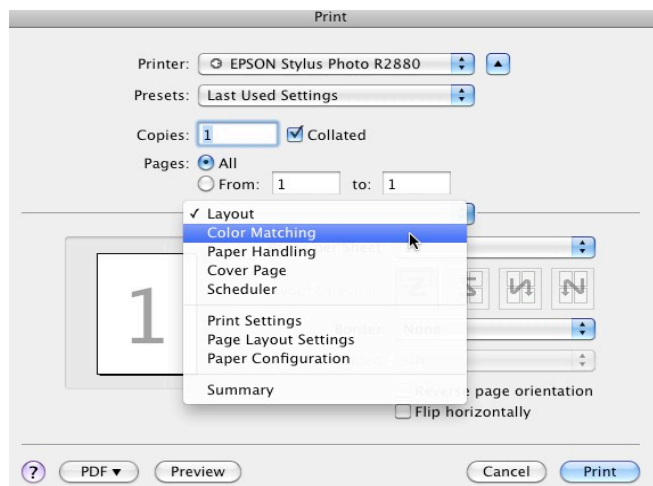
...and choose "**Color Matching**".

To completely deactivate the printerdriver's colormanagement, choose "**Epson Color Controls**".

However, sometimes it's not possible to turn off "**ColorSync**". This option is then greyed out but activated. Solution: Include the profile "GenericRGB.icc" in the ColorSync settings. Here is a short video description on how to do that: http://youtu.be/yALLJM3wu2U
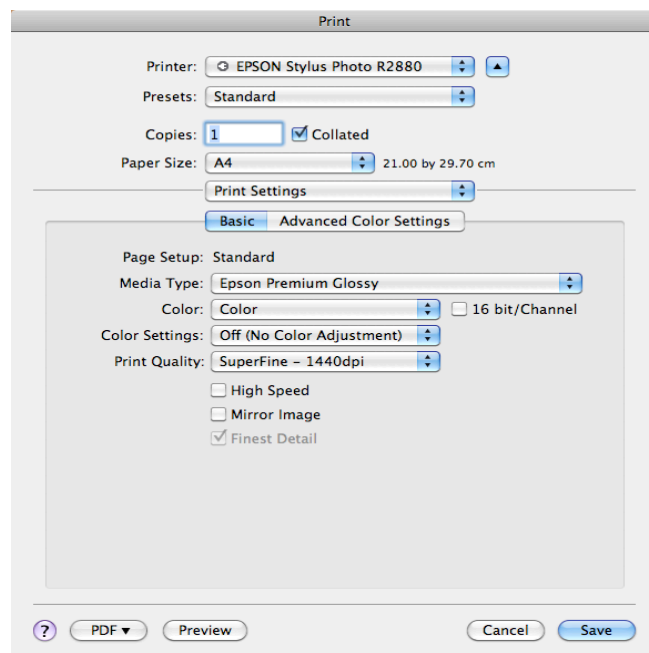
After that, go to "**Print Settings**"... and under "**Media Type**" choose the appropriate paper. For "**Color**" choose "Color" and set "**Color Settings**" to "Off" (No Color Adjustment).
Set "**Print Quality**" to the appropriate setting corresponding to the used Media Type.

If you previously have been profiling your printer by using *SpyderPRINT*, make sure to use **STRICTLY** identical settings, with which you have printed out the color charts to profile your printer.

Even when using manufacturer profiles, you manually need to turn Color Management completely off in your printer driver. Only that way you will get the unmodified and linear colors of your printer!

After reviewing, checking and finishing all the necessary settings, click on "Print". Your image-file will now be printed correctly by using the appropriate printer profile.

The procedure to turn off color management in the printer driver is similar for Windows and Macintosh. However it may be different depending upon the brand of printer (e.g. Epson, Canon, HP...) and possibly even the version of the printer driver software being used.

It is always a good idea to use the latest printer driver version for your printer and operating system. Directly check this at the printer manufacturer's website.

Issues related how to turn off color management may also directly be addressed to the printer manufacturer's technical support.

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If you got questions and comments regarding our Spyder products, please get in touch with our support:
http://support.datacolor.com

We are also happy to provide you additional information on Color Management and related subjects.

Keep on having fun when printing your images and dealing with color and Color Management.

www.datacolor.eu

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