How to print correctly

using an ICC-Printer-Profile under Adobe Lightroom

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

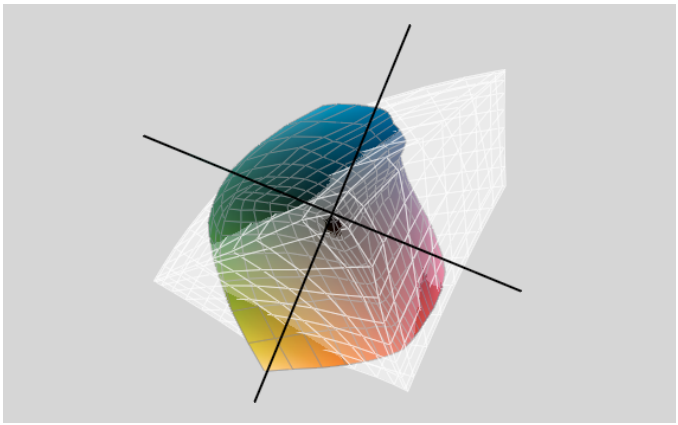
Only if you are using color management throughout your whole color-workflow, you can be sure to receive high quality and reproducible results.

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 are rendered, so that for example gray is a real 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.

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 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 an image directly 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.

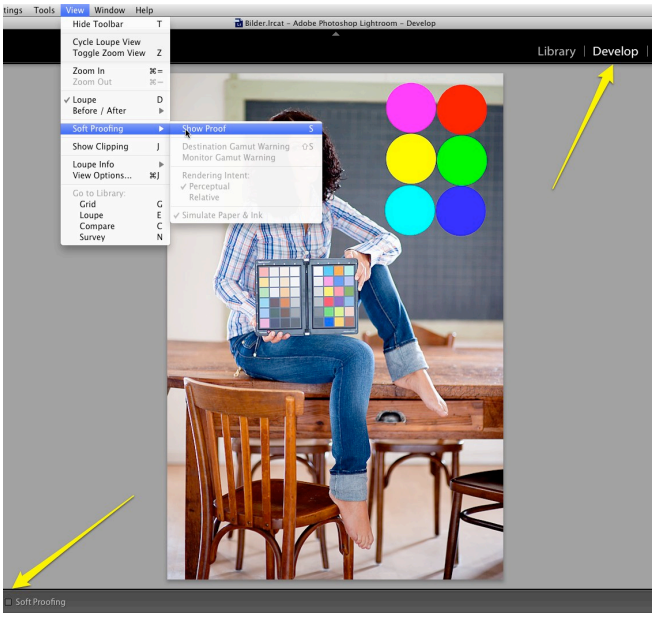
Such general ICC-Printer_Profiles already allow good printing results. However, all printers behave different due to the tolerance of the components used and therefore have their own characteristics.

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.***

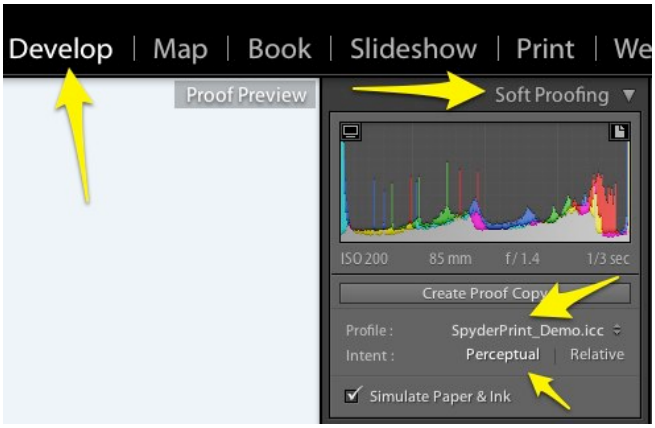
In order to view a simulated printout on the calibrated monitor, you need the appropriate ICC-Printer-Profile for your printer-paper-ink combination, or the one from the printing service, installed on your computer. If this profile is downloaded, you must save it under the following folder, to make it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



As shown in the screenshot above, open the image in "Develop" mode, click on "View" -> "Soft Proofing" and after that on "Show Proof". Or directly click on **"Soft Proofing"** at the lower left in the **Toolbar**.



At the upper right, next to the histogram it is now shown, that Soft Proofing is activated. Under "Profile:" choose the printer profile and under "Intent:" the Rendering Intent of your choice. You may switch back and forth between the different modes/views and directly see in the soft-proofing-view which Rendering Intent 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. Different rules apply when using different Rendering Intents to adjust the source colors. Colors that are located within the target gamut, either remain unchanged or adapted, to transmit them into a smaller color gamut in order to keep the original optical relationships.

Furthermore, we recommend to use the option **"Simulate paper and ink"**.

Unlike screen colors, which are additive and glow, inks are subtractive and are only reflecting light. That is the reason 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 & Ink"**. 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 (Proof Preview).

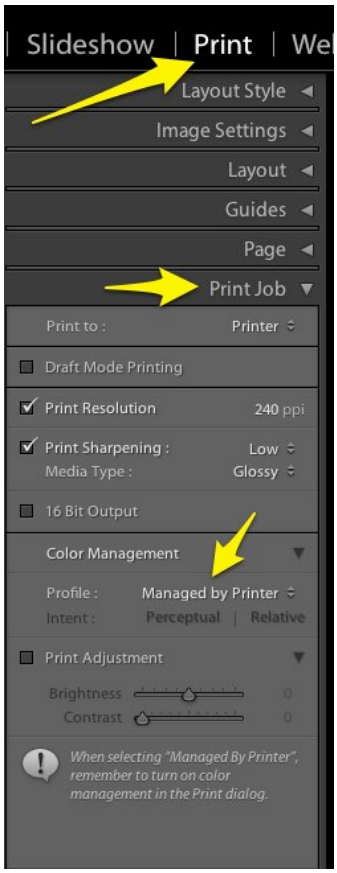
You may now compare the dry printout of your picture with the soft-proofing view on your (calibrated) screen. You will see that these two images match **(depending on the quality of the used profile and light source).**

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.

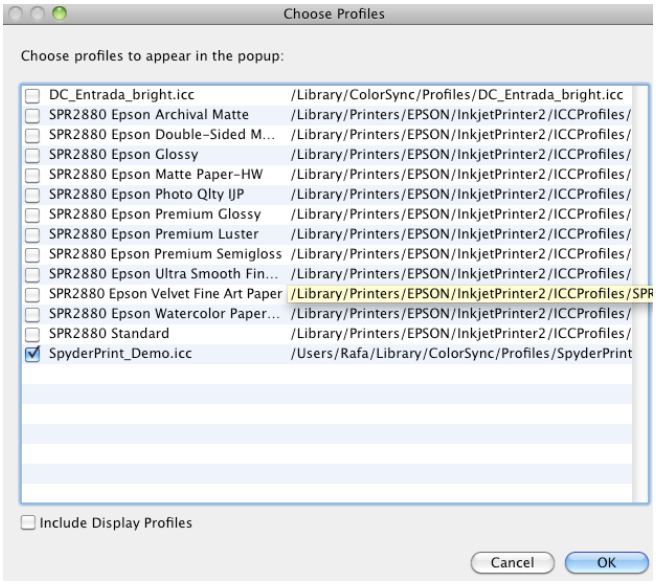
Please take a look at the next section: How to print your picture. If you want to use a printing service for printing your image instead, please make sure that the picture is still in Adobe RGB (1998) or sRGB color space. **Never convert the original image into the printer-profile!**

How to print with an ICC-Printer-Profile

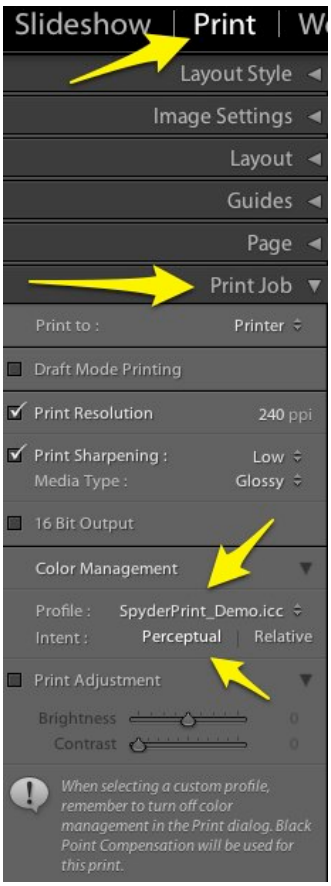
Open your picture in Lightroom...



...and click on **"Print"** at the upper right. Now select **„Print Job"**. For Profile please click on: **„Managed by Printer"** and choose **„Other..."**.



Now you will see the window **"Choose Profiles"**. In here, choose the corresponding profile and confirm with **„OK"**.

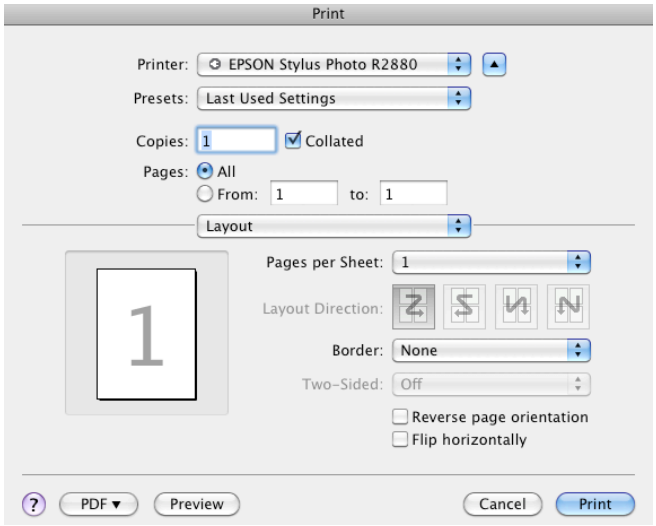


After that, the selected icc printer profile is already activated under **"Profile".** Last but not least, set **„Rendering Intent"** to **„Perceptual"** and click on **„Print..."**.

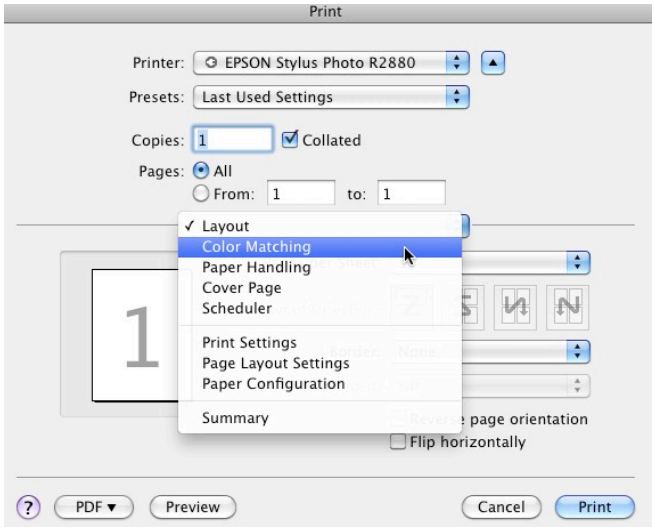
Unlike in Adobe Photoshop, the rendering intent „saturation" is not available in Adobe Lightroom.

Now you only need to check the settings in your printer driver and change them if necessary.

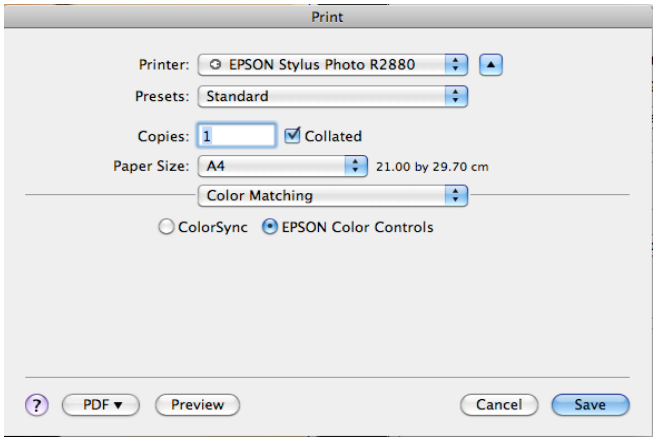
The following screenshots will help you to find the correct settings for your printer:



First of all, click in the field **„Layout"**...



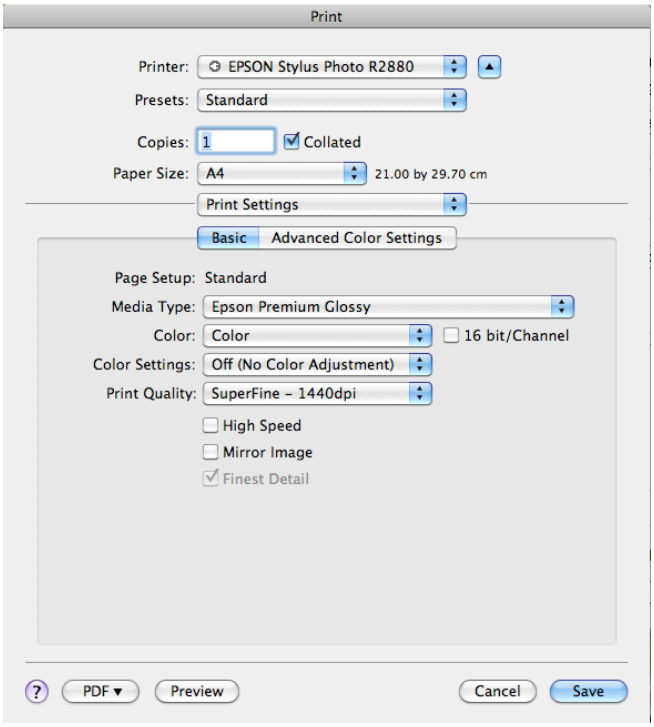
and choose "**Color Matching**".



To completely deactivate the printerdriver's color-management, choose **"Epson Color Controls"**.

However, sometimes it's not possible to turn off **"Color-Sync"**. 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.

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.