

Soft Proofing Basics

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Background

We've touched on many aspect of color management in previous articles, but have not dealt with soft proofing until now. If you've read some of my prior articles on color management and you have started using a color managed workflow with accurate image, monitor, and printer profiles, you may have heard about or noticed a feature called "soft proofing". In this article, we describe what soft proofing can do for you and how it should be used in a color managed workflow.

What is soft proofing?

Soft proofing, available in some ICC aware software such as my own [Qimage](#) photo printing software and other high end photo editors, allows you to see how your printer will render the colors in an image by displaying a "simulation" of the print on screen. Seeing what the print will look like by viewing a simulation of the print on your monitor can be helpful as it may allow you to evaluate different printer profiles and rendering intents without wasting paper/ink. Anything that can improve our ability to make the right choice with respect to printer profile and rendering intent can save you time and resources. Keep in mind that soft proofing simulates how your printer will reproduce *colors* in an image, so we use soft proofing to compare color rendition not other aspects such as sharpness or fine detail. If you are viewing what a print should look like on your screen, how accurate can this simulation be? Read on to find out what factors are involved in getting an accurate soft proof.

Under the hood

Soft proofing of a print by viewing a simulation of the print on a monitor requires three things: an image profile, an *accurate* monitor profile, and an *accurate* printer profile. When you soft proof an image on screen, the ICC engine in the software you are using will follow these two steps to produce the soft proof:

1. First the image will be color converted from the image profile (the profile tagged on the image) to the printer profile.
2. Once colors have been converted to the printer profile, a second color conversion is performed that converts color from the printer profile to your monitor profile.

By converting to color used by the printer and then converting the printed color to the color used by the monitor, we can simulate the color of the print on the monitor. At this point, it should become clear that both the monitor and printer profile must be 100% accurate for soft proofing to be truly accurate. Since the printer profile is used twice in these color conversions, both the "forward" and "reverse" look up tables in the printer profile must be accurate and the monitor profile must be accurate as well. Any inaccuracies in either the monitor or printer profile will cause color errors in the soft proof and will cause the on screen "simulation" to differ from the actual print. Add in some metamerism (the fact that printed color might look different under different lighting) and the fact that your monitor cannot display all the colors that your printer can display (and vice versa), and you end up with some serious limitations in what soft proofing can accomplish.

Soft proofing in practice

Given that inaccuracies and gamut differences can add up to discrepancies between a soft proof and the actual print, what is the best way to utilize the information provided by a soft proof? Fortunately, if you have an accurate custom monitor profile created via a monitor colorimeter (device that attaches to the monitor to measure color and create a profile) and an accurate printer profile based on the specific printer, paper, and ink you are using, the soft proof simulation on screen will most likely look very much like the print with respect to color. There may be some differences brought about by certain lighting conditions or differences in color gamut such as the fact that your printer can produce yellows and cyan colors beyond the reach of your monitor, but overall, the soft proof should generally match the print. The unfortunate side of the equation is that few of us have both monitor and printer profiles that are so accurate that soft proofing results in an *exact* match.

The proof is in the printing

If you are having trouble getting your prints to match your screen, soft proofing is not going to work well for you by definition. A no-match condition between the print and your screen indicates that either the monitor profile, the printer profile, or both have inaccuracies that cause errors in color rendition. These inaccuracies will manifest themselves in a mismatch between the soft proof and the actual print. Since few of us really know how accurate our profiles are until we gain some experience with them, the best advice I can give is to *run some test prints!* I cannot stress this point enough, in that the true proof is in the printing. I can't count how many times I have gotten email from people who have been stopped in their tracks and refuse to print because their soft proof "doesn't look good" only to run a test print and find out that the actual print looks fine and the error was in the soft proofing, the monitor profile, or some other part of the process. Soft proofing is also unable to account for errors such as using the wrong paper, printing on the wrong side of the paper, switching to a different ink, clogged nozzles, or even having one obscure setting not set properly in the print driver.

Because there are so many factors involved, always run a test print to be sure your soft proof isn't telling you the wrong story. Once you've run a few test prints and have compared those to the equivalent soft proofs on screen, you'll be able to get an idea about how well soft proofing is working for you.

So by all means, use soft proofing if you like, but *never use it as a substitute for printing*. Soft proofing should be used only when you know you have accurate monitor and printer profiles and even then, only to judge overall "look and feel" of the color. Soft proofing can be helpful if you are working with a special image and you are wondering whether "perceptual" or "relative colorimetric" rendering intent would be better for that image. It is not a good tool, however, to determine which of four different printer profiles works best with the paper you are using: you'll need to produce test prints using each of the four profiles to make the best decision and to see the true subtleties that only the printer can print. Soft proofing is a useful tool for evaluating overall color but if you are working on specific aspects of color such as trying to get just the right shade for your friend's yellow sweater, be sure to print a small test print to be sure you aren't being fooled by differences between the soft proofed image and the actual print.