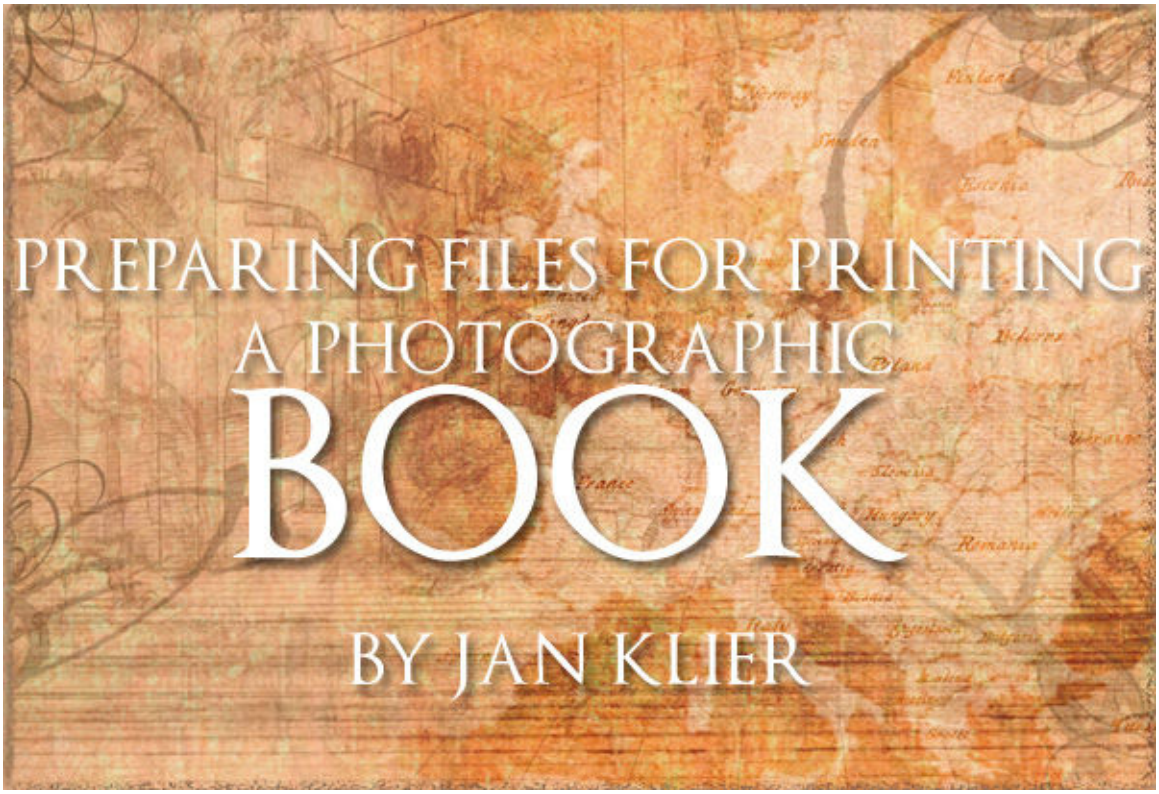
LIGHTING ESSENTIALS For Photographers



Preparing Photos for Book Printing by Jan Klier
Printed from Lighting-Essentials.com

With digital cameras, websites, online magazines, blogs, Facebook, Twitter - so many images live their entire life in electronic format. The constraints and techniques to reproducing the images in physical form aren't being practiced much anymore. As a result many printing service cater to this trend by accepting images in RGB format and taking it from there - with mixed results.

That's all good and convenient if you just need a quick print. The portrait photographer still delivers much of his product as a print, and has a wide choice of very capable photo printers to choose from. But if you cater to a commercial clientele, or if you print books, promo materials, or even just business cards printed on presses, then it's a good idea to dive into the techniques of proper press-prep. Even if you just do a headshot, your client may get it printed that way even if you're not directly involved. It can be considered an integral part of the craftsmanship of a commercial photographer, just like shooting to a layout that keeps the image's use in mind.

I recently printed a new book and new promo materials and will use these as illustration for the process. There are several components that we'll look into: color selection, soft proofing, test prints, CMYK conversion, and file prep. I use Photoshop and InDesign for my work, but most of this will also apply to other software available out there.

Once you know where you will be printing your materials you need to do some research. At a minimum you want to find the ICC profile for your printer's press. Most reputable printers will publish this somewhere on their website. I'm currently relying on Modern Postcard (www.modernpostcard.com) for my

small printing needs and Blurb (www.blurb.com) for the book printing needs. I have been very satisfied on my recent print jobs. Most printers will also provide templates for the various software such as InDesign that includes the trim and safety guides. Modern Postcard has all their info posted here: http://www.modernpostcard.com/knowledge/preparing-materials/you-build-your-layout . Ideally you also want to get more information about their press performance (more during CMYK conversion). That isn't always published, but you can ask their customer support if it's not published and they may be able to help.

Color Selection & Soft Proofing

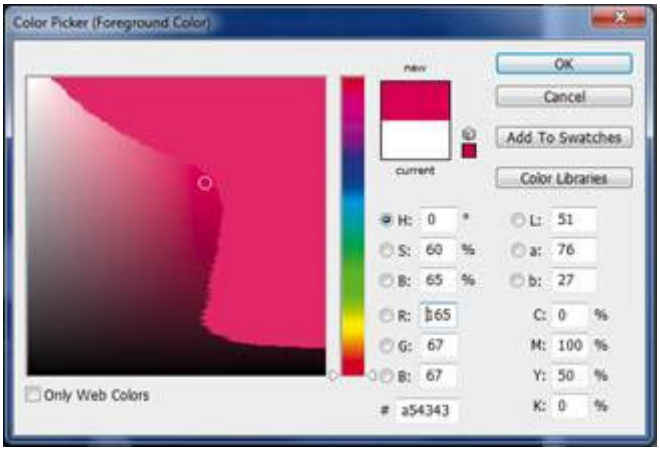
There are entire books written about color management, going way beyond what I can recap here. A really good detailed handbook is Dan Margulis' Professional Photoshop (http://www.amazon.com/Professional-Photoshop-Classic-Guide-Correction/dp/032144017X). You should get a copy of this if you intend to study this topic in more detail. His companion book about Lab color is also a treat for those who enjoy advanced retouching.

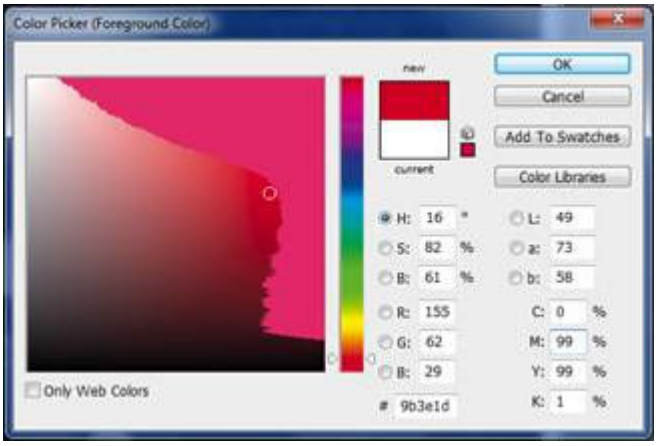
What we do need to know is that our camera and our monitor can handle colors that will not print. With so many of the images being handled on our computer, we often end up with some that are much richer in color than what can be printed. This first step is to make sure that the colors we have can actually print the way we intend them or how we saw them. Keep in mind that the capabilities of each printer are different, so this process will be done with a specific printer in mind. That's what the ICC profile is for - it describes in full detail what colors a printer can handle.

Photoshop has functionality specifically designed to facilitate this process. If you were able to obtain your printer's profile, you want to make sure it is loaded into Photoshop. You only need to do this once per printer. Go to 'View' and 'Proof Setup', select 'Custom' and 'Load' to load your ICC profile into Photoshop and give it a proper name. Keep in mind that a printer might use multiple presses, so pick the right one. Once your profile is loaded, you want to make sure it has the checkmark next to it under 'View' / 'Proof Setup'. Next you want to select 'Proof Colors' in the 'View' menu. Your image will change in feel, most likely it will look a lot flatter. This is Photoshop's attempt to simulate your printer's colors. Keep in mind that this is still a monitor display of a printer reproduction, so it's closer but not quite the same yet.

The next step is where a lot of the work happens - one more time in the 'View' menu click on 'Gamut Warning' and tell Photoshop to mark colors that your printer will be unable to handle. If that is the case, Photoshop will overlay individual pixels (often entire regions) with a colored mask. That mask is red by default, but that color can be changed in the preferences dialog to a color that stands out clearly (hard to spot a red mask on an image with a lot or red in it). Every pixel that is out of gamut (marked in the overlay) cannot be printed in that exact color by your printer. If you leave it as is, the printer will use various techniques to deal with it and will print some color. You could leave it up to the printer to do a best effort, but it may not be exactly what you saw. It's a question of how much control you want to have on the outcome of your final image. If you're still reading, I assume you do care and won't leave it to the software to do best effort.

Now what? Well, that depends on where the colors come from that are troublesome. If your print is a photo and your subject had a very colorful shirt on, you will have to selectively fix the troublesome colors. Usually it's the most saturated colors that are difficult for the printer. The simplest fix is to add a vibrance adjustment layer and reduce the vibrance until all the gamut warnings disappear. Most likely by the time they're all gone, your image has lost much of its color - it was the sledge hammer approach to fixing it. A better way is to add a mask to the vibrance layer and then paint at lower opacity into that mask, gradually and selectively reducing vibrance in problem areas only, making sure that the transitions still work. In some areas a single stroke at 10% or 20% will be sufficient. In other areas you may have to take several strokes before the problem is fixed. If you have a good command of the color and it's components, you may also be able to do localized curves adjustments of individual channels instead of just reducing vibrance.





At other times it may be a logo that is the issue. The last print of my book was the first one with my new logo which has some very strong orange in it. It was way out of gamut for the printer. In that case, because it wasn't a photo but a vector graphic, I had the chance to just change the color altogether. But which color to choose? We can play trial and error. Better yet, Photoshop actually provides us a good tool to hand-pick workable colors and making the trade-off between feel and printability a design choice.

With the color proof setup in place, if you go into the color picker dialog in Photoshop it actually will apply the same overlay mask in the color field and show what is out of gamut. With that you can move the color picker right up to the edge of what your printer is capable of. This is a good time to understand all the different color spaces (RGB, HSB, Lab, CMYK). With that information, you will follow that the gradient on the left has saturation on the x-axis, brightness on the y-axis, while hue is on the slider to the right (or in the numeric fields of the HSB values). In the first example I picked the brightest and most saturated pink the printer could do (top right corner of the printable color range. By moving the hue you might be able to find more saturated values. The second example shows a color picker with a slightly shifted hue. You can experiment by either moving through different hues, or by entering different ink combinations. The HSB and CMYK color spaces are much more intuitive on that front than RGB.

OK, so where are we now? We now do have a file that consists entirely of colors that your designated printer can reproduce accurately. And you have a preliminary view of how your image will reproduce on screen.

Test Prints

But light emitting displays like your monitor still look much brighter than what your print will look like. If you have optimal conditions (few of us do, nor will the end consumer of the image) you would have your monitors brightness calibrated and dialed down, and you would be viewing your prints in a special viewing booth with optimal lighting conditions and the two would indeed appear identical next to each other.

Forgoing optimal conditions for reality, it's best to create a test print of your image to get a feel for how the image looks on paper. For that reason it's helpful to have a decent photo printer of the smaller variety. Even if I get my prints done at Modern Postcard or Blurb, I will take a few images and print them on my Epson 4880 on a 8.5x11 photo paper to get a feel. The Epson printer's color characteristics are quite different than the press, so what I'm looking for here is less color accuracy but more tonal appearance as a print. You will often find that your print looks darker than you expected. A curves adjustment layer that pulls up the upper mid-tones is a good way of addressing that. That preservers the tonal range of the image, but improves the overall appearance on a passive display surface.

CMYK Conversion

Now that we have an image with colors that can be reproduced, and we're sure that the image will look ok on paper, it comes time to prepare the image for the designated press. Most big presses print with CMYK inks (also known as 4-ink process). There are also spot colors, but that is likely beyond what most of us will use.

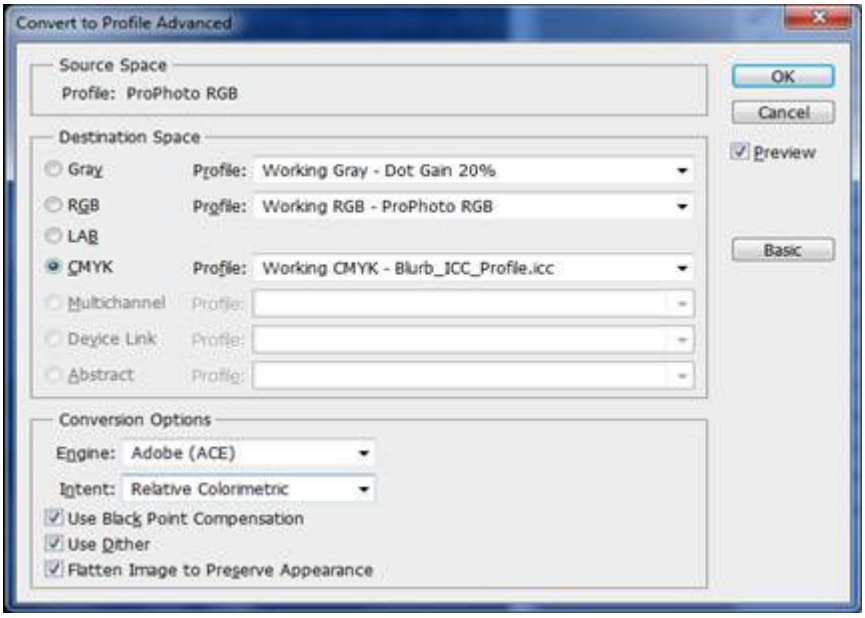
Now most of our images are captured by the camera in AdobeRGB, which is the richest color space supported by most cameras and is adequate for their sensors. It's not uncommon to import images at the even wider ProfotoRGB color space for editing, for similar reasons as you edit in 16 bit - avoiding unnecessary data loss during editing. This will also be a good time to point out, that you should always retain your original file in the original color space and bit depth for various uses. All press prep is always done on a separate copy for a specific deliverable, just as you usually export for website use, converting to sRGB and JPG at appropriate resolutions.

So most likely your image is still in one of the RGB color spaces at this point. Somewhere between now and the physical printer these colors have to be translated into the CMYK values the printer will use. You can either submit your file as RGB and leave it up to the printer to do it using some algorithms, or you can do it yourself and proof the result. Again, if you're still reading, I assume you want to do it yourself.

There are a few things we need to know about CMYK - for the full and detailed explanation refer to a book like the one above - this is just the short version. Essentially in RGB every color has a single unique value in which you can describe it. But once you get to CMYK there are different ink combinations that result in the same final color. That leaves us some choices. Darker colors can be achieved either by mixing high amount of C, M, and Y inks, or simply by using small amounts of C, M, and Y for color and black ink (K) to darken the whole thing. The reason that matters is that on a press a high amount of ink doesn't dry fast enough and results in poor print quality. While a full application of ink on an individual pixel would result in 400% ink (100% of C,M,Y, and K respectively) most presses max out at 300%, and depending on press and paper even less such as 280% or even 240%. So this is an important limitation to manage to get the right print quality yet accurate color reproduction. The second limitation we have to manage on a printer is dot gain - the amount a dot of ink will grow while drying. This impacts the amount of tonal gradation the printer can handle in an area at high quality. A default dot gain is 20%, but individual presses may vary.

If you want to see how your image is fairing on this front, go into Photoshop and make sure that the 'Info' window is open (part of the histogram). Then select the eye dropper tool and an appropriate sample size (5x5 or 11x11). In the right hand corner of the info window you will see the Greek Sum symbol and the eye dropper drop-down. Set it to 'Total Ink' and it will show the total ink used in percent based on the sample area of the eye dropper and the currently active CMYK profile. The shadow areas of your image will be the trouble spot, so sampling different areas will give you an idea where your image is at.

So now we're getting to converting the image files. The key function for this is in Photoshop. By going to 'Edit' and 'Convert To Profile' you will get a dialog box that displays the current source space an profile as well as various conversion destination options:



Now it may be logical to pick the ICC profile you obtained from your printer as the destination space. Unfortunately that is not necessarily the right answer. These profiles describe the printer's color capabilities, but may not have the correct parameters for CMYK conversion. To do that you may actually have to create a custom CMYK profile.

After a bit of research I determined that Blurb does all their printing on HP Indigo presses. And HP's website had a document describing the proper CMYK parameters for it:

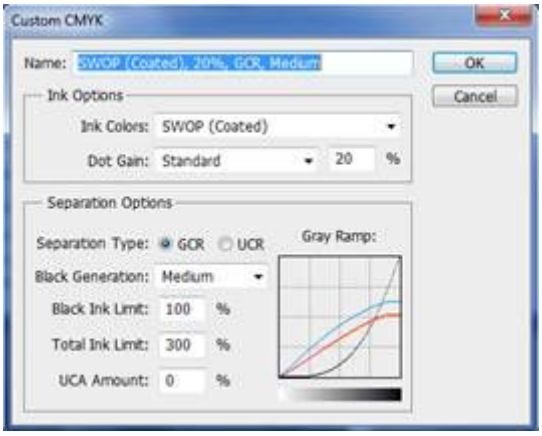
Dot Gain: 14

Medium GCR

Black Ink Limit: 100%

Total Ink Limit: 300%

So with these parameters in hand we can create a custom CMYK profile to use in the conversion process. To do this, you actually want to save it as a profile for later re-use. Go to 'Edit' and 'Color Settings'. Then under 'CMYK Working Space', you select 'Custom…' which should take you to this dialog, which is where you can enter all these values for Dot Gain, GCR, and ink limits (PS: GCR is the method by which dark colors are generated with color inks vs. black ink).



After you give the profile a name and are back in 'Color Settings' and the 'CMYK' drop down, there is a 'Save…' option that allows you to save this setting as a file. Now in the 'Edit' / 'Convert To Profile' dialog this new custom profile should show up as a choice in the CMYK drop down. After selecting this, your file will now be in CMYK colors matching the capabilities of your designated printer. A sanity check with the eye dropper should confirm this.

An alternative to this conversion method is a manual adjustment of the tonal range of your image. That would involve a more straight forward conversion to CMYK and then tweaking individual channels an areas to manage the total ink in the shadows.

With the final image in hand, it's a good idea to make one final check with the soft proof of the printer's ICC profile to make sure everything looks good.

File Prep

Now with a properly converted CMYK file in hand, it's time to put the image into your layout. InDesign (my preferred software for that) has a handy 'pre-flight' function that helps to make sure your images as laid out are ready for print. You should setup a custom pre-flight profile. The key things to check for are proper proportions and resolution. In the preflight profile you can specify the minimum print resolution for your image (e.g. 240dpi or 300dpi).

Particularly on a double truck in a larger book, it's quite possible that the resolution of your image is insufficient without some adjustment. InDesign will help you spot those cases. If needed, Photoshop is great at up-ressing the image at high quality. This is also best done on the print copy, not the original, such as not to compromise your original data and because the up-ressed file can be quite large and awkward.

The other gotcha the pre-flight will detect: accidentally compromised image ratios resulting in something slightly askew (you probably would have noticed a major issue by just viewing it, but minor variations are harder to spot).

With all that in place, you're ready to submit your files to your designated printer and hopefully will have a satisfactory, predictable, and repeatable result.

Happy publishing.

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