

How to prepare a file for output to make an ICC profile and how to use the profile

It's important to consider what we hope to accomplish by making an output profile. In essence we wish to fingerprint our output device and insure it produces accurate consistent prints. Always keep this in mind and the process and theory of profiling and calibrating (which are quite different) will be clear to you.

The key to getting this all to work is to keep two key concepts in mind:

Never alter the data (the test file) we need to print for creating the profile

Keep consistency in how we output files with the printer after profiling

In order to make a profile, you will output the supplied file from this web page. The RGB and CMYK test forms contain hundreds of colored patches of known color value. Therefore it is absolutely critical that you do not alter these files in any way! Do not convert the files when opening them in Photoshop. Do not resize the files as the distance between patches is critical. The only function that is allowed is to alter the resolution of the file (resample up or down within reason) while keeping the dimensions at 100%. Use "Nearest Neighbor" when resampling these targets.

The next concept to understand is that whatever method you use to output the file to your printer must be used after you receive the profile. The printer must remain consistently set to the settings used to print the test form. It is for this reason that it is a very good idea to set your printer defaults in a logical way. For example, if you have been altering the printer driver to alter the color to your liking, I would advice you set any such controls back to the default (None). The resulting profile will produce the desired fixes to color and density. If your printer driver has any settings over color, contrast, density or saturation, set those settings to factory default (zero or none). Never print the test form using any "Automatic" corrections in the print driver! Auto corrections virtually insure that the driver is altering the print data on a case by case basis. We want the printer to remain consistent so we can fingerprint it.

One area to keep in mind when using print drivers out of Photoshop 5.0 is "Printer Color Management" and the popup menu next to it (called "Color Management" in Photoshop 7 and part of the "Print with Preview command). In Photoshop 5 and 6, the controls are placed in the driver by Photoshop. Be sure you do NOT have Printer Color Management ON when you print out the test form. This will alter the colors! Leave the popup menu set to the default (RGB or CMYK depending on the file you are printing) In Photoshop 7.0 & 8.0, the Source Space should say "Untagged RGB" and the Print Space should be set to "Same as Source" (see following illustrations on page 7).

Calibration of a printer is a good idea if your printer supports it. For example the Fuji Pictography 3000 and 4000 have an on board calibrator. A special internal file is printed and measured on the Fuji calibrator and the printer is then set to "factory spec". This is excellent because it insures we can profile the printer once placed into a known state and always bring the printer back to that state (and hence keep our profile accurate and usable). If your printer has any such on board calibration, use it! Then output the test form. Also be sure you set both the printer and software the drives the printer to a default condition prior to calibration. The Fuji printers allow the user to move sliders in the software to alter color and density. Similar controls can be used on the control panel of this printer. Don't do this! Set all the controls to zero. Lastly, some print drivers have settings that attempt to al-

ter (improve?) the color. Using the Fuji printer once again as an example, they have an option called “ColorMatch” in the driver. Don’t be tempted to use any such settings on your printer! Try and place the printer and software into as close an “Idiot” condition as possible.

Once you get your profile back, in most cases you will leave the printer in an identical state as you placed it for printing the test form. There are exceptions. For example, in the Epson line of ink jet printers, you can select the custom profile directly in the driver (see figure). When you made the test print, hopefully you set the printer in the state known as “No Color Adjustment.” Some printers will allow you to use the profile directly in the print driver, others will not. IF you get poor results, set the printer in exactly the same state as you used to make the test form.

FOR EPSON (MAC) USERS:

There are 3 possible ways to use the custom profiles; only use ONE.

1. Profile to Profile in Photoshop 5.x/Convert to Profile in Photoshop 6.0, 7.0 & 8.0. You then must have all settings in the Epson driver set off (Printer Color Management check box OFF), NO color Adjustments in the Advanced settings. See illustration “Method #1.” In Photoshop 6/7/8 use the Convert to Profile command instead.

2. “Profile to Profile” using the driver (supplied by Adobe). Printer Color Management check box is off. What this check box does is tell us the source which is your Working Space; for example Color-Match RGB. Since you have specified an output profile, Photoshop will access the information about the Working Space. There is no harm in having the check box on but it’s not necessary in this case. In the popup menu you select the output profile. Then in the Advanced setting, you have No Adjustment set. Naturally you don't use Profile to Profile in Photoshop first. See Illustration “Method #2.”

3. Using ColorSync in Advanced settings. Printer Color Management check box is on. RGB Popup is set to RGB. In the advanced setting area of the printer driver, you pick the profile in the popup menu (where the default is Epson Standard, all other RGB output profiles will show up, pick the custom profile). Naturally you don't use Profile to Profile in Photoshop first. See Illustration “Method #3.”

All 3 options should produce nearly identical results but Method 3 is not recommended because you can't use the Adobe CMM (built in/ACE) so whatever CMM you selected in the ColorSync control panel (Kodak, Lino, Automatic) is used. You don't have access to Black Point Compensation which should be on.

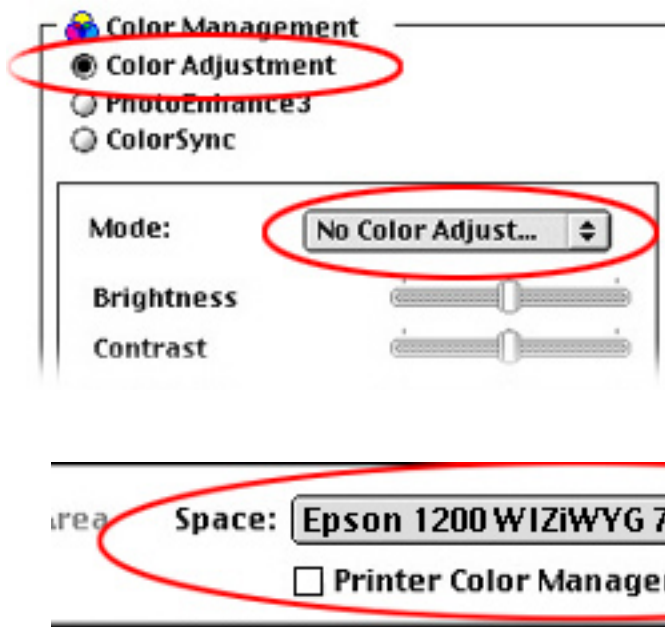
METHOD #1 SETTINGS FOR EPSON DRIVER



In the Epson driver, these are the settings that will produce NO color alterations to files printed for either output of the test form. Use this setting if you use Method #1 (Profile to Profile within Photoshop 5).

Photoshop 5.0 places this popup menu in the Epson Print driver. By picking "RGB Color," the data is being sent directly to the printer. Use this setting for printing targets to build a profile! See illustrations specific to the version of Photoshop you are using on following pages.

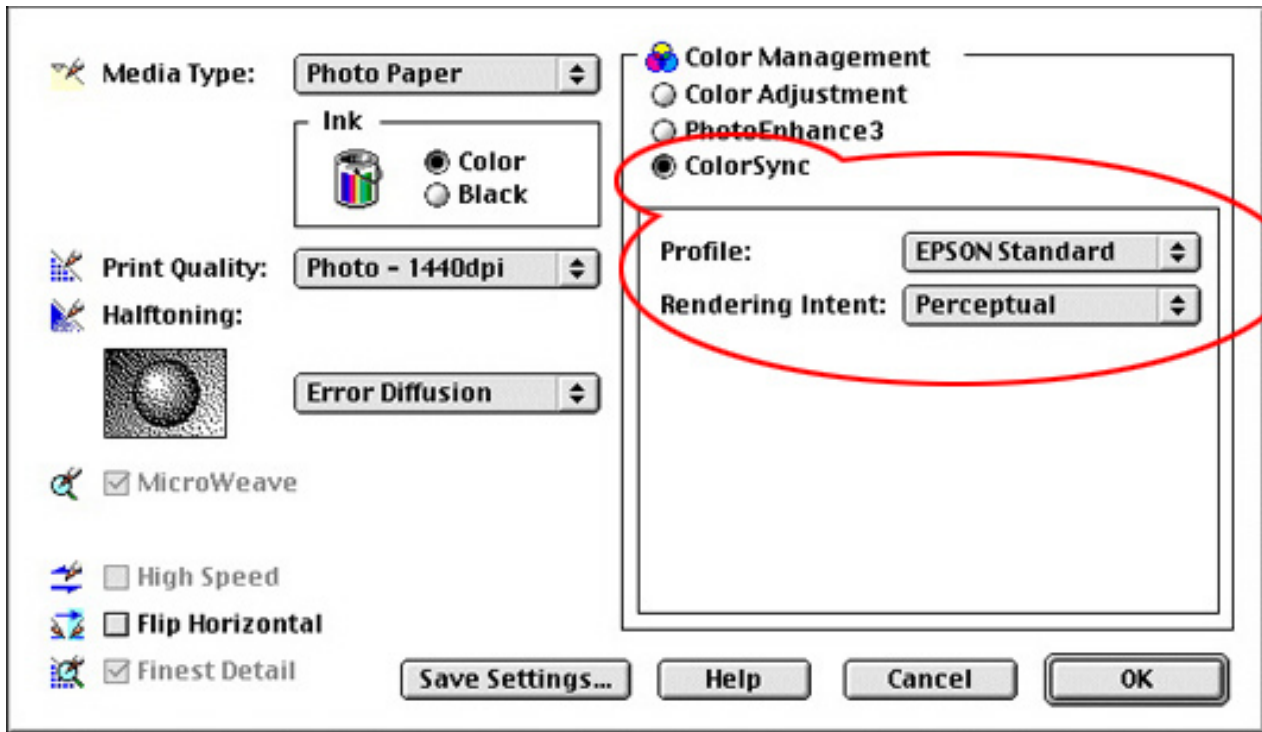
METHOD #2 SETTINGS FOR EPSON DRIVER



In the Epson driver, these are the settings that allow Photoshop 5 to use Profile to Profile *within* the driver (Method #2). Space is set in popup menu to specify the output profile as seen below. Printer Color Management check box can be off as Photoshop "knows" the RGB Working Space.

Photoshop 5.0 places this in the Epson Print driver. By picking an output profile, Photoshop will convert the file using the profile picked in the popup.

METHOD #3 SETTINGS FOR EPSON DRIVER

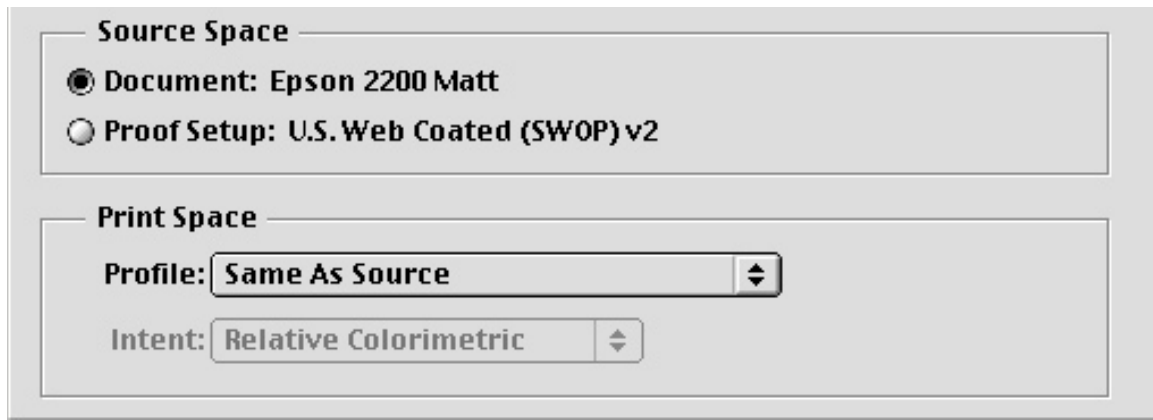


Photoshop 5.0 places this in the Epson Print driver. This method is not recommended.

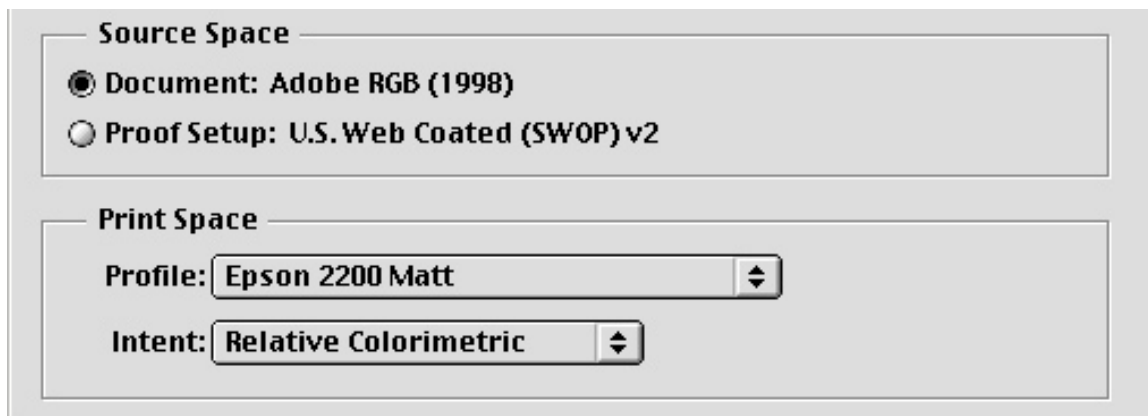
Here are settings you can use to apply the output profile within the Epson driver. ColorSync radio button is active. Profile Popup menu allows any RGB output profile to be selected (here the Epson Standard profile supplied by Epson is set). Printer Color Management check box is ON which specifies the RGB Working Space the file you wish to print is currently set to (other wise your monitor profile loaded in ColorSync is used, this isn't a good idea!). Space is set to RGB. Of course you would NOT use Profile to Profile inside of Photoshop first if you used these settings. Using this method #3 provides no control over Black Point Compensation nor can you use the Adobe CMM (Built in). The CMM is picked through the Colorsync control panel.

Note to Windows users. I highly recommend you use the 2nd method (Profile to Profile in Photoshop 5.0 or Convert to Profile in Photoshop 6.0,7.0,8.0 to apply the profiles for output to your printers. An excellent web page for information on Windows and the use of ICM profiles is <http://www.computer-darkroom.com>.

Photoshop 6.0's "Printer Color Management" in print dialog

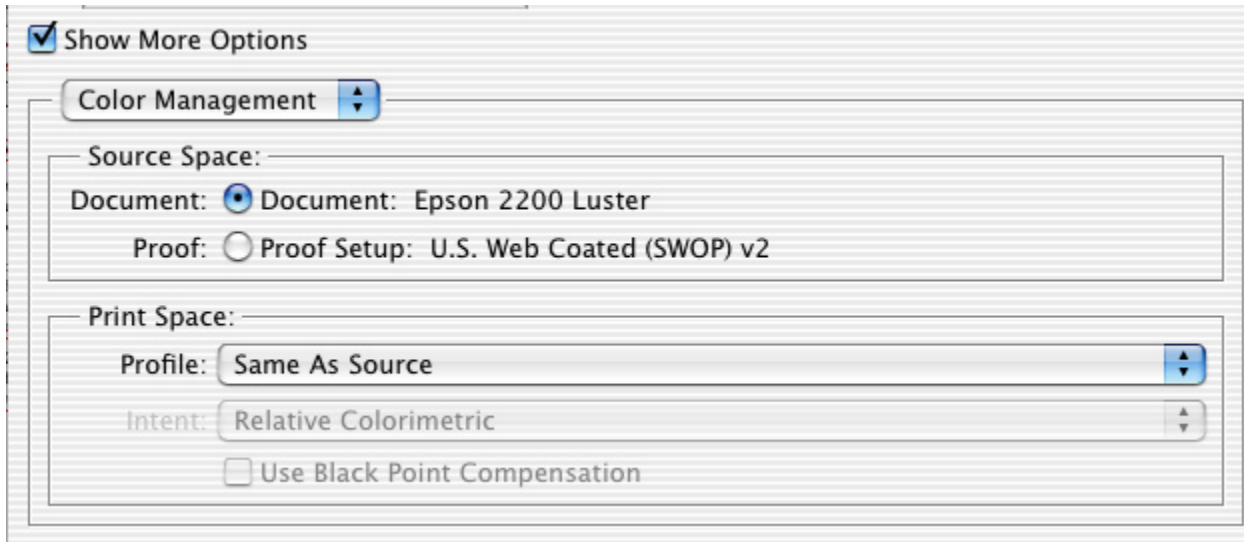


In Photoshop 6.0-8.0, the driver is still the place to control the color but it is much different than seen on the last page in Photoshop 5.0. Source Space describes the colorspace of the actual document. Print Space allows the user to convert on-the-fly to the printer based on the profile picked in the popup menu. Here the document was converted using "Convert to Profile" for Epson 2200 Luster. When "Print Space:" is set to "Save as Source" the color managed data goes straight to the printer. Never select an output profile in the bottom popup or the file will get a double dose of the profile!

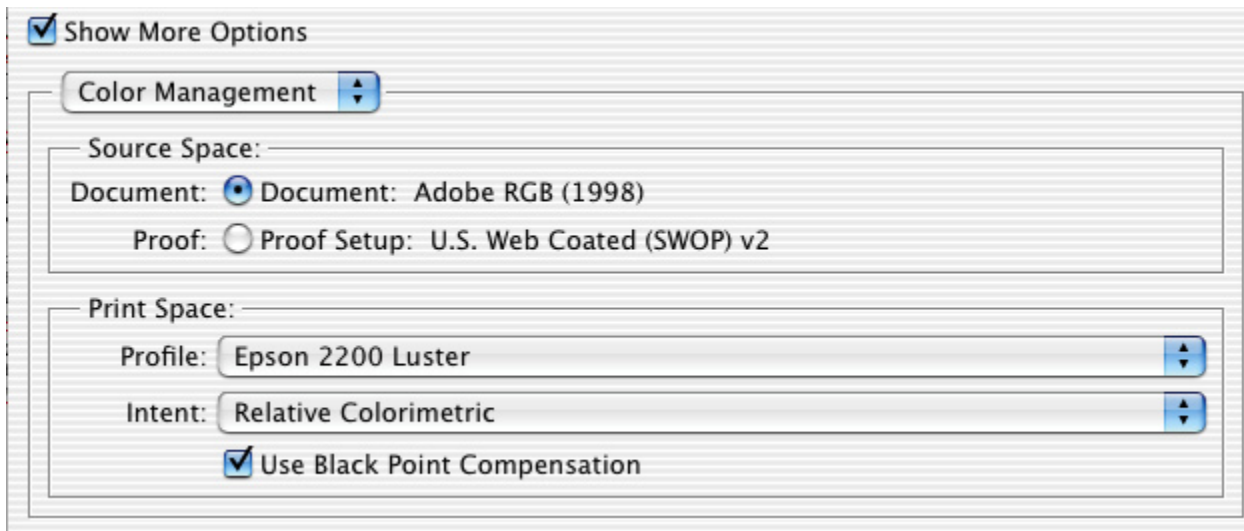


Here, the document was NOT converted using "Convert to Profile" and is in the RGB Working Space (Adobe RGB). "Print Space" is set to Epson 2200 Luster so a conversion will take place on the fly to the printer. Be sure NOT to use "Convert to Profile" however or the file will undergo a double dose of the profile!

Photoshop 7.0 & 8.0 "Print with Preview" command

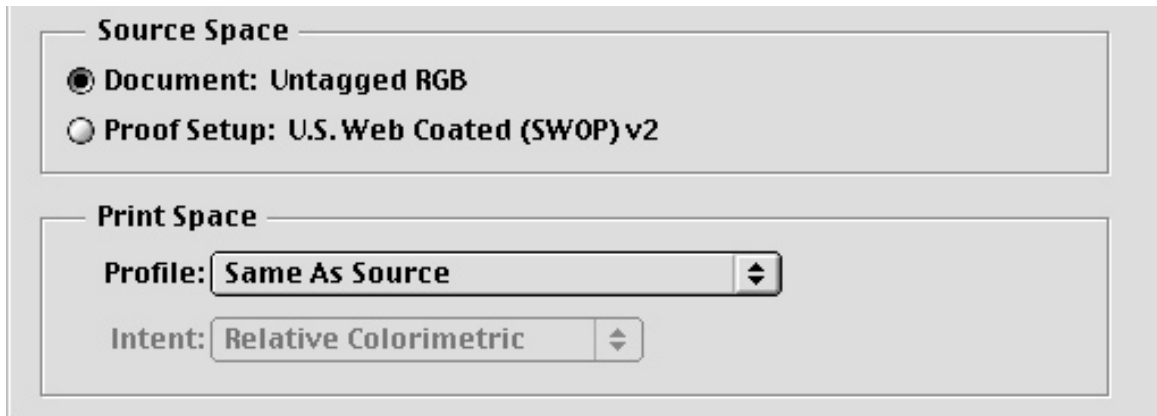


Using the new "Print with Preview" command in Photoshop 7.0 & 8.0, the document was converted using "Convert to Profile" for Epson 2200 Luster. When "Print Space:" is set to "Save as Source" the color managed data goes straight to the printer. The dialog above is no longer part of the actual print driver like shown in Photoshop 5.0 and 6.0!

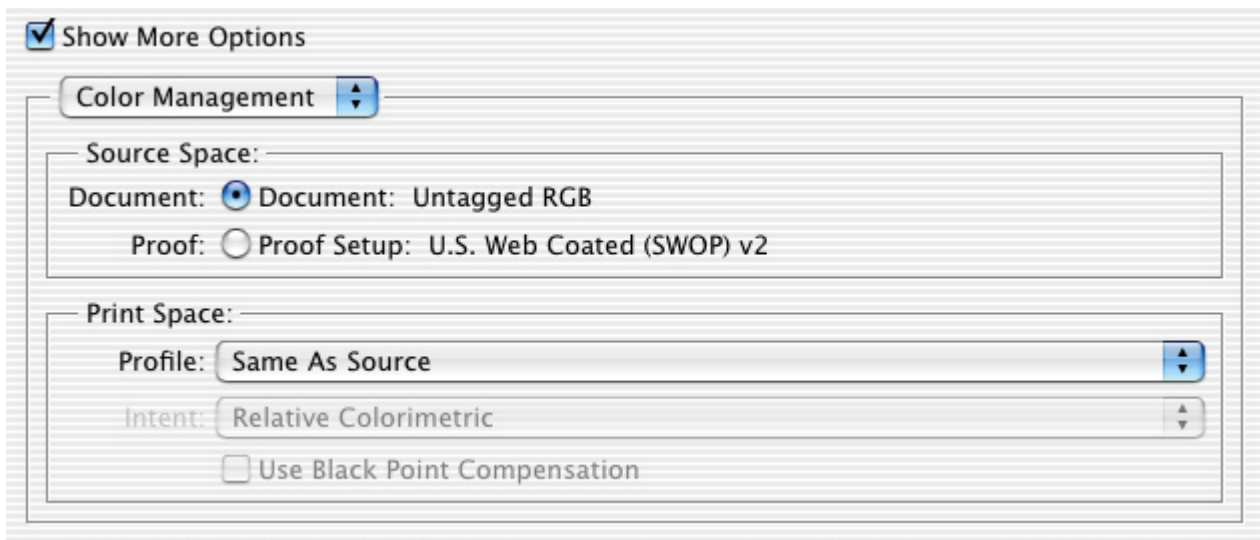


In Photoshop 7.0, the document was NOT converted using "Convert to Profile" and is in the RGB Working Space (Adobe RGB). "Print Space" is set to Epson 2200 Luster so a conversion will take place on the fly to the printer.

Settings for printing out the Profile Targets



In Photoshop 6.0, the target files are untagged. In this case, the RGB target is shown in the top portion of this dialog. Source Space is Untagged. Print Space is "Same as Source" which will send the data directly to the printer. Be sure to set the Epson driver to "No Color Adjustment" as seen on the previous page.



Photoshop 7.0 introduces the "Print with Preview" command where color management is controlled instead if in the print driver. Here the dialog is set correctly for printing out a target with NO color management. The file is untagged as seen in the "Source Space" area of the dialog. What is critical is having the "Print Space" set as "Same as Source." This insures that the file undergoes no conversions and goes out to the printer correctly (untagged). Same with PS 8.0. Note that various print profile names are used through out this tutorial for illustration only.

Q: Where do my profiles get installed?

Depends on the operating system you are using but be sure that after you download the profile that you decompress the file. Certain browsers and service providers can alter the files, so be sure to confirm that the file is not corrupt.

Here are the appropriate applications to decompress the files If you do not already have them:

Macintosh - Stuffit Expander -

<http://www.stuffit.com/mac/expander/download.html>

Windows/PC - Winzip - <http://download.winzip.com/winzip81.exe>

Macintosh Running OS 9

You can simply drag and drop the uncompressed profile over your System Folder and it will automatically be placed in the ColorSync folder. Note that if you do NOT get a message that the ICC profile is automatically being placed in the correct location, you may not have uncompressed the file correctly. You can also just open the System Folder and place the profile in the ColorSync folder. No need to restart.

Macintosh Running OS X

There are two locations where profiles can be placed and it does not matter which you choose. We would suggest you place them here:
/Users/Library/ColorSync/Profiles/

Windows

On Windows 98 the correct path is Windows/System/Color Directory

On Windows 2000 and XP the path is
WinNT/System/Spool/Drivers/Color Directory

For more information about color management in Windows, visit:
<http://www.microsoft.com/whdc/hwdev/tech/color/default.mspx>

Q: I'm working on a PC and you built the profile on a Macintosh. Is this a problem?

No, not at all. Notice that we have placed the .icm extension on all profiles we build so your PC will know what to do with the file. No extension is needed under Mac OS 9, but it does not hurt to have it there.

Q: The name of the profile you built isn't what I want. I changed the name but it is not showing up for some reason.

Profiles have two sets of names; Internal and External. The name you see (and are changing) is the External name but most software products (including Photoshop) use the internal name when displaying the profile in a list. There are number of utilities that can do this name change for you depending on what platform you are running.

Q: The profile you sent is a very large file and all my other profiles are much smaller, why?

When building a profile, we have the ability to sue more data points in the profile for better quality and that is why the profiles are so large.

Q: What is the best way to test my new profile?

Use a file that has good, known color to run a test. We suggest you download the Printer Test file from Profiles page.

The files is in "Colormatch RGB" which is fine for testing the quality of the output profile. It has "memory colors" (skin, blue sky and more importantly our dog "Tosh"). use this file to evaluate the quality of the profile or if you have issues with color and need to discuss them with us. Since we have output this file thousands of times, its best used to discuss issues you may have.

Q: The print made using the profile does not match my display?

There are several factor to keep in mind. First, use the "Printer Test File" referenced above for testing so we know the issue isn't in the file itself. Next, be sure your display is calibrated using some kind of hardware device and that Photoshop is actually seeing this profile for preview! Go into Photoshop's Color Settings and click on the Pop-down menu for RGB working space. Towards the top you should see a listing that says "Monitor RGB:XXXX" where XXXX is the name of your profile. If your custom display profile isn't being shown here, you need to investigate why. Try profiling the display again.

In Addition, it is critical to view the print under a D50 lightbox! Holding the print up to a window isn't going to cut it! The entire CMS assumes that the display is calibrated (we suggest a white point of 6500K) and that prints are viewed under a D50 lightbox (preferably with a dimmer.)

In addition, you must setup a soft proof in Photoshop using the custom profile you just downloaded. Just viewing the file in the RGB working space is not going to preview the image for your output device. There is a tutorial in the article section as a PDF that explains how to use the Custom Proof Setup in Photoshop.

One last thing...be aware that a transmissive display and a reflective print will NEVER match 100%. They should however be in the high 90% range when the display is accurately calibrated and profiled and when the print is correctly viewed. Ambient light in the viewing area is also critical