Color Management in Adobe Creative Suite v2.0

On completion of this module you will have developed an understanding of Adobe Creative Suite CS5 applications and some of the strategies that are used for color printing and color workflow.

The specific areas and applications which are covered:

Adobe Photoshop

Adobe Illustrator

Adobe InDesign

Adobe Bridge

Module Training Overview

Target audience will be:

Any technician who completed "Basic Color 2" module in Professional level, or is studying to become a color specialist. This module helps to develop an understanding of color management and printing strategies within Adobe Creative Suite CS5.

Attainment Targets:

- To understand the basic functions of Adobe CS5 applications.
- To understand color management policies of Adobe CS5 applications.
- To understand specifying profiles in Adobe CS5 applications.
- To understand proofing settings for Adobe CS5 applications.
- To understand print operations in Adobe CS5 applications.

Note: Some sections within this module are identical to the sections from “DTP Applications”. In order to have each module self-contained, duplicate information may be presented.


DTP Applications

This icon is an indication that the same information appears in “DTP Applications”.

Contents

1 Adobe Creative Suite

1.1 Configuration of Adobe CS5

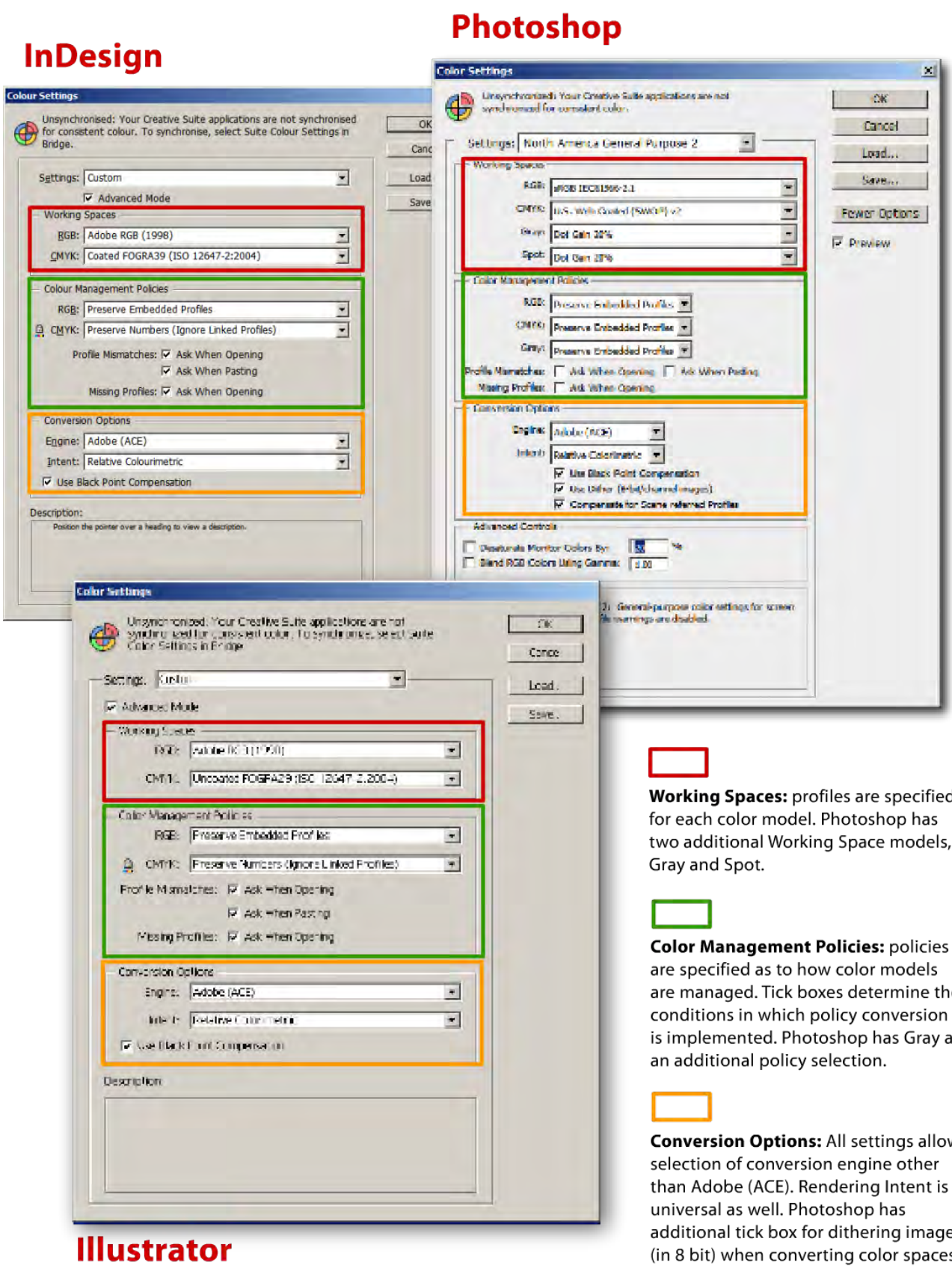
Adobe Creative Suite CS5 consists of a number of separate applications. There are four which focus on use in the graphics and DTP industry.

- Photoshop
- Illustrator
- InDesign
- Bridge

Adobe CS5 is used in this training material, being the current version at time of writing. Differences with Adobe products are pointed out when relevant.

1.2 Color Management Settings Overview

There are many similarities for the Color Management policies within the Adobe CS5 applications. This comparison screen (following page) is for orientating the reader to the main sections of each programs settings dialog box. Please refer to each section for more details.



Working Spaces: profiles are specified for each color model. Photoshop has two additional Working Space models, Gray and Spot.

Color Management Policies: policies are specified as to how color models are managed. Tick boxes determine the conditions in which policy conversion is implemented. Photoshop has Gray as an additional policy selection.

Conversion Options: All settings allow selection of conversion engine other than Adobe (ACE). Rendering Intent is universal as well. Photoshop has additional tick box for dithering images (in 8 bit) when converting color spaces.

1.3 File Formats which can be opened in Photoshop, Illustrator and InDesign

In the graphics environment, it is common to work with many different types of file formats. These varying file formats each have their own specialized uses in print, web, multimedia and video environments. Photoshop and Illustrator both have a comprehensive list of supported file formats, InDesign only has the option to open or place All Readable Documents.

Format	Photoshop				Illustrator			
	Open	Save	Place	Export	Open	Save	Place	Export
AutoCAD Drawing	✗	✗	✗	✗	✓	✗	✓	✓
AutoCAD Interchange	✗	✗	✗	✗	✓	✗	✓	✓
Adobe PDF	✗	✗	✗	✗	✓	✓	✓	✗
GIF89a	✗	✗	✗	✗	✓	✗	✓	✗
BMP	✓	✓	✓	✗	✓	✗	✓	✓
JPEG	✓	✓	✓	✓*	✓	✗	✓	✓
JPEG2000	✗	✗	✗	✗	✓	✗	✓	✗
Windows Metafile	✗	✗	✗	✗	✓	✗	✓	✓
Enhanced Metafile	✗	✗	✗	✗	✓	✗	✓	✓
Camera Raw	✓	✗	✓	✗	✗	✗	✗	✗
Cineon	✓	✗	✓	✗	✗	✗	✗	✗
CorelDRAW 5,6,7,8,9,10	✗	✗	✗	✗	✓	✗	✓	✗
CompuServe GIF	✓	✓	✓	✓*	✓	✗	✓	✗
Computer Graphics Metafile	✗	✗	✗	✗	✗	✗	✓	✗
Photoshop	✓	✓	✓	✗	✗	✗	✓	✓
Photoshop DCS 1.0	✓	✓	✓	✗	✗	✗	✗	✗
Photoshop DCS 2.0	✓	✓	✓	✗	✗	✗	✗	✗
EPS PICT Preview	✓	✗	✓	✗	✗	✗	✗	✗
EPS TIFF Preview	✓	✗	✓	✗	✗	✗	✗	✗
Filmstrip	✓	✗	✓	✗	✗	✗	✗	✗
Freehand 4,5,7,8,9,10	✗	✗	✗	✗	✗	✗	✓	✗
Large Document Format	✓	✓	✓	✗	✗	✗	✗	✗
Open EXR	✓	✗	✓	✗	✗	✗	✗	✗
Encapsulated Postscript	✗	✗	✗	✗	✗	✗	✓	✗

Format	Photoshop	Illustrator

	Open	Save	Place	Export	Open	Save	Place	Export
Generic EPS	✓	✗	✓	✗	✗	✗	✗	✗
PCX	✓	✓	✓	✗	✓	✗	✓	✗
Adobe Photoshop PDF	✓	✓	✓	✗	✓	✓	✓	✓
Photo CD	✓	✗	✓	✗	✓	✗	✓	✗
Photoshop Raw	✓	✓	✓	✗	✗	✗	✗	✗
Microsoft Word	✗	✗	✗	✗	✓	✗	✓	✗
Macromedia Flash	✗	✗	✗	✗	✗	✗	✗	✓
Microsoft RTF	✗	✗	✗	✗	✓	✗	✓	✗
SVG	✗	✗	✗	✗	✓	✓	✓	✓
SVG Compressed	✗	✗	✗	✗	✓	✓	✓	✓
Illustrator	✗	✗	✗	✓	✓	✓	✓	✗
Illustrator Template	✗	✗	✗	✗	✗	✓	✗	
Illustrator EPS	✗	✗	✗	✗	✓	✓	✓	✓
PICT File	✓	✓	✓	✗	✓	✗	✓	✓
PICT Resource	✓	✓	✗	✗	✗	✗	✗	✗
Pixar	✓	✓	✓	✗	✓	✗	✓	✗
PNG	✓	✓	✓	✗	✓	✗	✓	✓
Portable Bit Map	✓	✓	✓	✗	✗	✗	✗	✗
Radiance	✓	✗	✓	✗	✗	✗	✗	✗
Scitex CT	✓	✓	✓	✗	✗	✗	✗	✗
Targa	✓	✓	✓	✗	✓	✗	✓	✓
Text	✗	✗	✗	✗	✓	✗	✓	✓
Windows Metafile	✗	✗	✗	✗	✗	✗	✗	✓
TIFF	✓	✓	✓	✗	✓	✗	✓	✓
Wireless Bitmap	✓	✗	✓	✗	✗	✗	✗	✗

Open and Save File Formats.
Note: Illustrator Export formats are included in Save column. Place and Import are methods of bringing an image into an existing open document.

Macintosh only * Save for Web

2 Adobe Photoshop

2.1 Color Settings

2.1.1 Setting Color Preferences

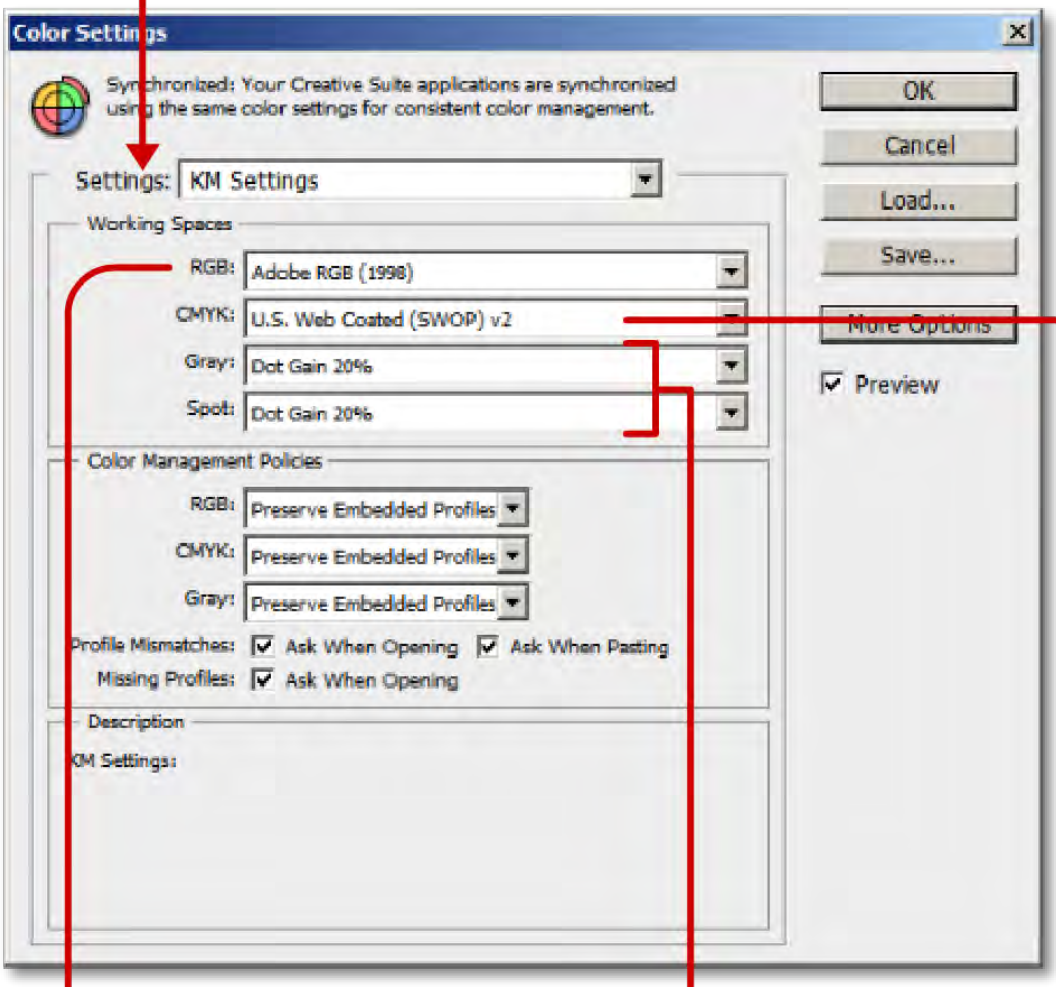
You can set Color Setting preferences within Photoshop to have images automatically convert (or not) into a specified Color Space; this is referred to as the Color Policies. This is done in the Color Settings dialog box shown in the following page.

The Working Space is an intermediate color space that is used to define and edit color in Adobe applications. In general, it's best to choose Adobe RGB (1998) or sRGB, rather than the profile for a specific device (such as a monitor or scanner profile). sRGB is recommended for preparing web images, because it defines the color space of the standard monitor that is used to view images on the web. sRGB is also a good choice for images in consumer-level digital cameras, because most of these cameras use sRGB as their default color space.

Adobe RGB (1998) is recommended when preparing documents for print, as it's gamut includes some colors that can't be printed using sRGB, (cyans and blues in particular). Adobe RGB (1998) is also a good choice for images from professional-level digital cameras, because most of these cameras use Adobe RGB (1998) as their default color space.

The CMYK Working Space profiles are device dependent; they are optimized for actual ink and paper combinations and are based on standard commercial print conditions. Therefore the choice of CMYK color space should be selected based upon the actual printer you intend to send your documents to for output. This profile is also used as an assumption for all untagged CMYK documents.

Settings: select from preset settings or user defined custom settings.



CMYK: this profile should reflect the actual printer you intend to send your document to for output.
This profile is used as an assumption for all untagged CMYK documents.

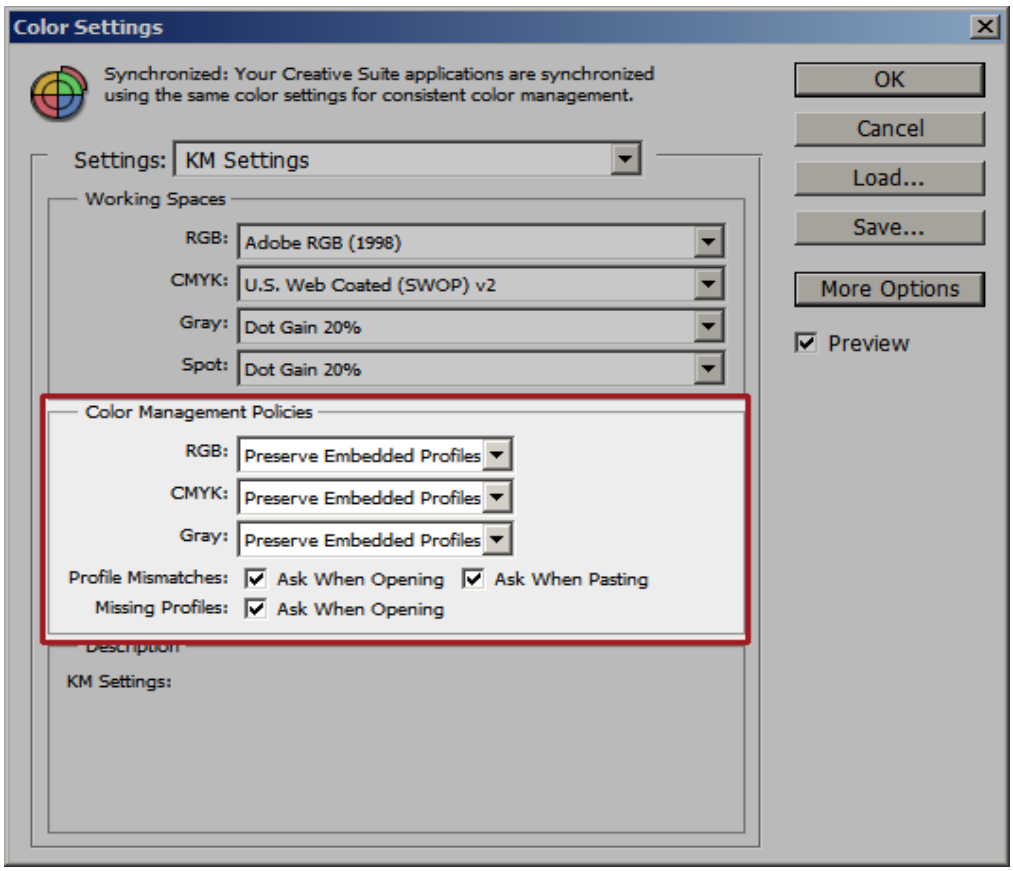
RGB: this is the working space for the application, it is best not to choose a profile based on a specific device as it may have a limited gamut.
Recommended choices are Adobe RGB (1998) and sRGB.
The profile is used as an assumption for all untagged RGB documents.

Gray: For setting the preferred grayscale working space for either print or screen usage. The dot gain presets are for outputting to a grayscale printer with a known value. A custom dot gain setting can be built using the Custom Dot Gain option. For screen use, choose either Gamma 2.2 (Windows) or 1.8 (Macintosh).
Spot: For setting a dot gain when simulating spot colors. If you know the dot gain for a spot color then those values should be inserted using Custom in the pop-up menu, otherwise use the appropriate preset. This option is of no use when printing process colors on a press or composite laser printer.

2.2 Color Management Policies

The ramifications of opening, pasting and drag and drop of images which may have different color spaces are addressed in the Color Management Policies. The question of what to do with the color numbers, whether to convert or retain them is dealt with here.

There are three policies for color handling: *Off, Preserve Embedded Profiles* and *Convert to Working (RGB/CMYK/GRAY)*. To provoke a color space change, three conditions must be met based on a user action - *if there is a profile mismatch*. If the conditions are ignored (the checkboxes are left empty), the policies will automatically affect the document. It is prudent to keep the check boxes ticked to avoid color space conversions being applied without a warning.



These are the conditions which are in the optional warning boxes.

1. **Profile Mismatches:** Ask When Opening

When the color space of a newly opened document does not match the existing color, you will need to determine your intentions for conversion. The warning dialog box names the Embedded profile and the Working profile, and asks how you wish to proceed. The options are: Use the Embedded Profile, Convert to the Working Space Profile or Discard the Profile and don't color manage. The last action is not recommended as results can be unpredictable. If you convert from a color space which has a large gamut (like Adobe RGB 1998) to one which has a smaller gamut, a slight decrease in image quality is possible.

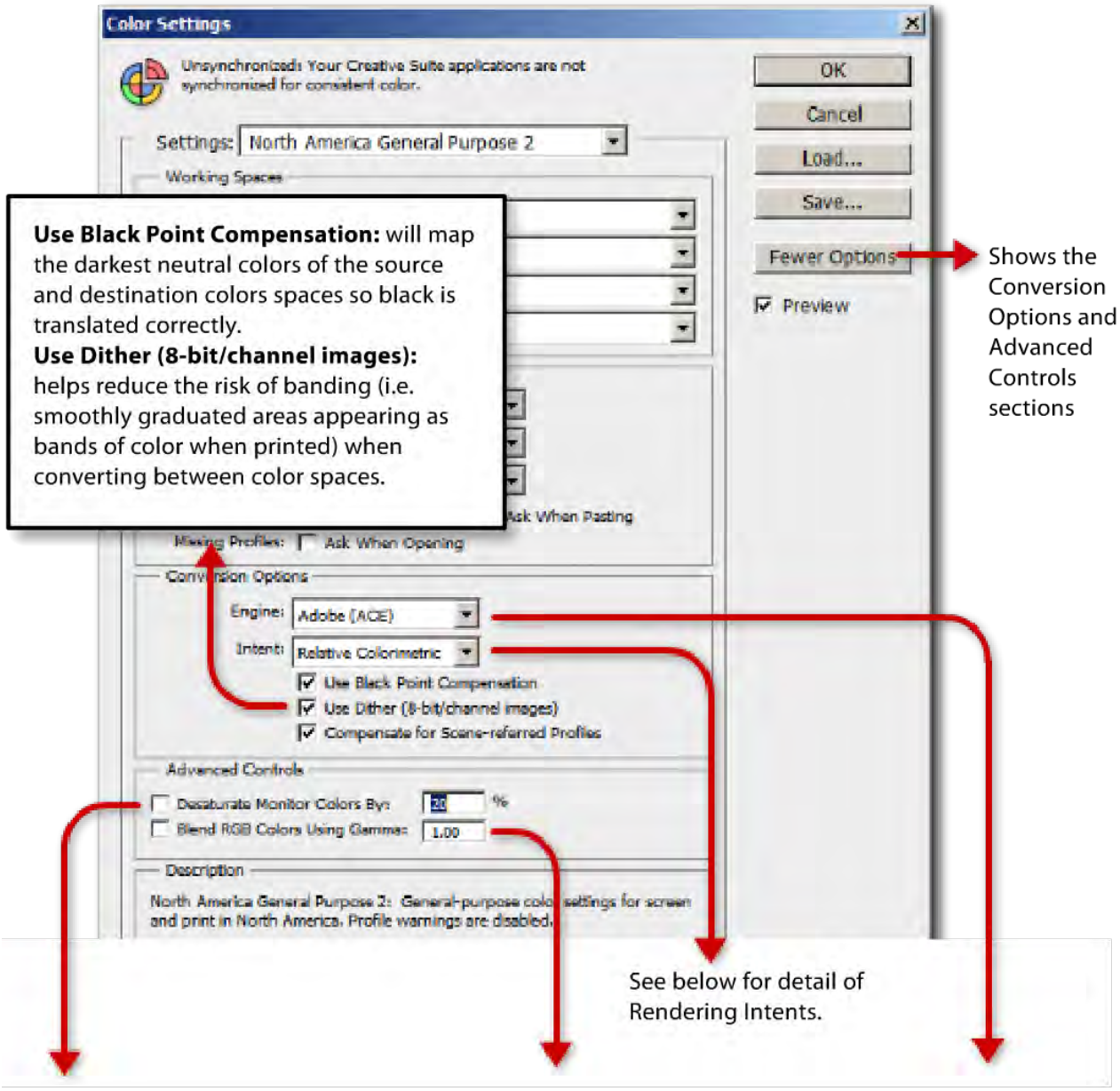
2. **Profile Mismatches:** Ask When Pasting

When the user pastes a clipboard image into a document, the profiles may not match. In which case a warning dialog box will name the Embedded profile and the Working profile, and then ask how to proceed. The options are: Convert (preserve color appearance) and Don't Convert (preserve color numbers). In most cases it is advisable to retain the original color appearance.

3. **Missing Profiles:** Ask When Opening

When an image is untagged i.e. has no profile assigned, the user gets three options: Leave as is (don't color manage), Assign Working RGB (this is the declared working space in Color Settings) and Assign Profile. The last action will show a pop-up menu to choose a profile.

More Options (note: this appears as Advanced in Photoshop CS5).



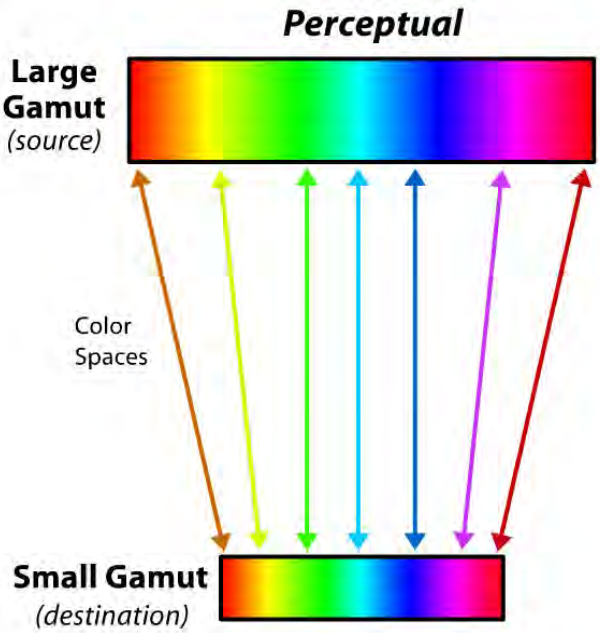
Allows the user to specify how much the preview is desaturated in an effort to deal with images in a color space whose gamut is larger than the monitor gamut. This allows colors outside the monitor gamut to then become visible but in doing so the preview image is not an accurate representation of how it would print.

Allows the user override the default color blending behavior. When two colors are blended using layers, the edges can be lightened or darkened for trapping if desired. This can create a halo effect where the top layer's edges appear lighter as the Gamma number increases.

The Engine pop-up menu allows the user to pick the CMM (Color management module) for the color space conversion. The Adobe (ACE) setting is recommended when working within Adobe applications, however you may see a number of CMMs depending on the operating system and software products installed.

2.3 Rendering Intents

When there is a profile conversion from a larger color gamut to a smaller (such as RGB to CMYK), not all colors can be expected to have a direct equivalent in the conversion process. This translation is determined by the rendering intent. There is no "one size fits all", each conversion method must be selected for the likely intended use. Select the Preview tick-box whenever possible to view the result before applying.

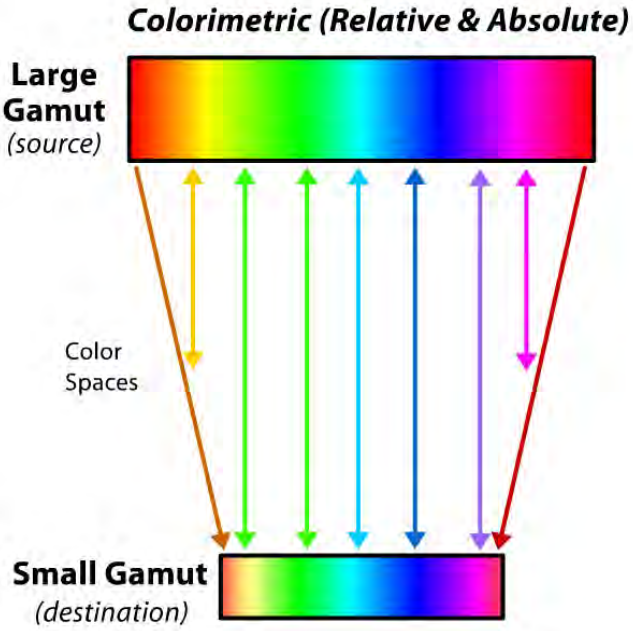


Perceptual

Compresses out-of-gamut colors and some in-gamut colors to preserve a visual relationship.
Maintains low saturation colors (which aren't out-of-gamut) and gradually compresses those which are highly saturated.
Perceptual rendering delivers a good translation for photographic images and maintains white and black points.

Saturation

Preserves the saturation of out-of-gamut colors at the expense of hue and lightness. This will help keep the colors looking as vivid as possible at the conversion. Best suited for business graphic presentations where retaining bright colors is important. Some applications call this rendering intent "Presentation".



Relative Colorimetric

Clips out-of-gamut colors at the more extreme range but maintains in-gamut colors. Overall more accurate than Perceptual except for those colors which will be clipped.
Maintains white and black points.
This is the default intent for Photoshop.

Absolute Colorimetric

Clips out-of-gamut colors the same as Relative Colorimetric. Maps colors exactly with no regard to white or black points. Designers may use this to retain accuracy for logos and corporate colors.

2.4 Color Modes

DTP Applications

Photoshop has 8 separate color modes. However the 2 most common are RGB and CMYK. Each color mode utilizes a particular gamut and is suitable for different purposes.

- Bitmap provides the smallest file size but only allows for two colors (black & white) it shows no tonal values.
- Grayscale allows for the full tonal range from black to white and is suitable for printing to a non-color printer.
- Duotone is for pre-press output where Spot color is used. The most common colors used are blue, yellow, browns and reds.
- Indexed Color is for web output.
- RGB Color is standard monitor display. All additive color devices such as scanners, cameras and monitors are RGB devices.
- CMYK Color separates the image into 4 distinct channels which represent the cyan, magenta, yellow and black plates of commercial printers.
- Lab Color separates the image into 3 channel of Luminance, A and B. Not appropriate for the office environment.
- Multichannel builds alpha channel information and has specialized applications.

RGB: each channel of Red, Green and Blue are shown. Useful for editing and screen use (presentations, web). Can print directly to inkjet printers.

CMYK: four channels each of Cyan, Magenta, Yellow and Black. This color mode has a narrower gamut than RGB yet produces a larger file. Useful for color printing to laser and commercial presses.

Grayscale: only one channel of information, thus a smaller file size. Suitable for printing to B&W printers.

LAB: used as an internal color conversion model when converting from one mode to another or when switching profiles. Not used as an editing color space or for printing. Specialised use only.

As each color mode uses a varying number of channels the file sizes could vary considerably. A 15MB RGB file will become 5MB when converted to Grayscale (one channel as opposed to three), and will become 20MB as a CMYK file (four channels). This of course could impact on printing speed, so it is best to match the color mode to the intended type of printer, i.e. Grayscale > black and white laser, RGB > inkjet, CMYK > color laser/pre-press.

Converting from a wide gamut color space such as RGB, to a narrower gamut space like CMYK can result in a visual dulling of some colors in the spectrum as the limitations of the printer are displayed. Additionally it will add one extra channel of information, which will make the file

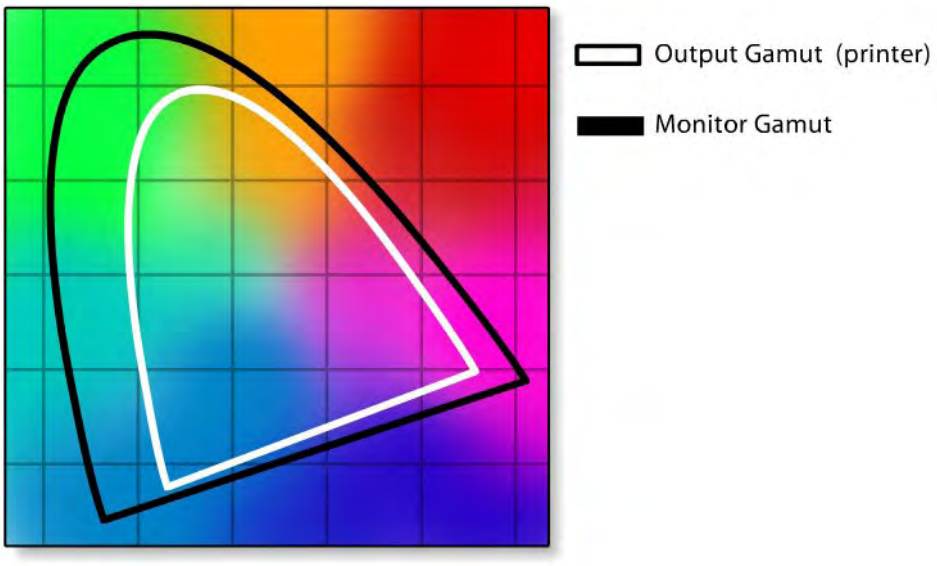
size larger. Converting to CMYK is recommended for professional pre-press applications. Many desktop printers have excellent capabilities for converting files internally, please refer to the printer's manual for specific instructions. It is best to convert to CMYK at the end of an editing session, because of the smaller file size and Photoshop's ability to process RGB data more efficiently. To simulate the image as CMYK, select View > Proof Setup > Working CMYK.

2.5 Color Profiles DTP Applications

2.5.1 Color Management using ICC Profiles

Color management is the process by which you attach a specific color appearance to otherwise ambiguous RGB or CMYK devices (e.g. digital camera, scanner, monitor or printer). These devices produce color using different methods; therefore, they may display the same color values differently, or may not display all the same range of color values.

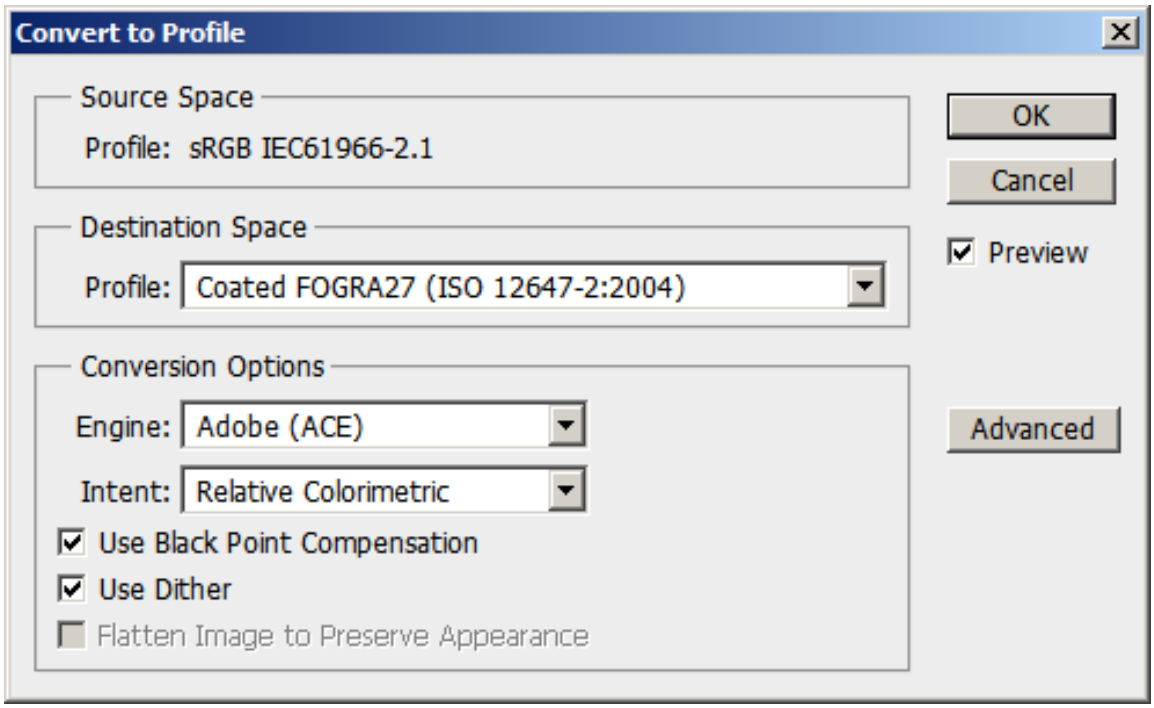
Adobe uses **ICC color profiling** (derived from the **International Color Consortium**) which is simply a look-up table that describes the properties of a color space. The color space itself is a means of defining a total range of colors (called a gamut) that a scanner can see, a copier/printer can print, or a monitor can display. Each gamut has a theoretical limit and may be more suitable for a particular device or use. It is recommended to assign appropriate color profiles in the workflow to achieve consistent results.



A typical simulation showing the limitations of certain color spaces. The boundary represents the total usable colors of the Gamut within the theoretical maximum of human vision.

2.5.2 Converting Profiles

It is a simple matter to convert a profile. For example, an image may be imported from a digital camera, a scanner or a newly generated file which uses an input profile. This image is intended for pre-press output, so the appropriate pre-press profile is determined as the Destination Space. Sometimes there is a noticeable shift in the display colors, as the new profile gives alternate information when describing color numbers.



Convert to Profile is found in the Edit menu.

2.6 Print Settings DTP Applications

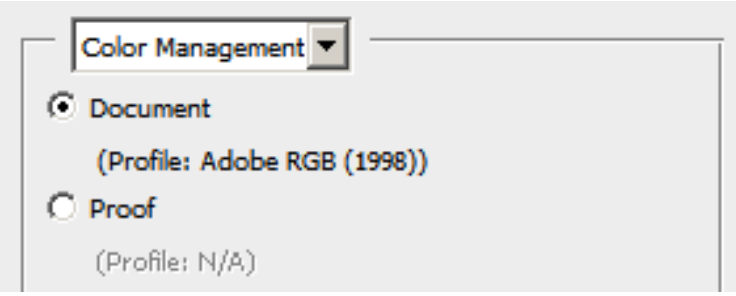
2.6.1 Printing in Photoshop

Photoshop has multi-layered printing dialog boxes with many options. The recommended approach is to select Print with Preview. This gives a thumbnail view of the image and how it would fit within your pre-defined page size, as well as position, scaling and color management. *Print One Copy* will print only one copy of a file without displaying a dialog box. Page Setup and Print will display options specific to your printer, printer driver and operating system. Print Online will send your file to a third party online service.

Page Setup...	Shift+Ctrl+P
Print with Preview...	Alt+Ctrl+P
Print...	Ctrl+P
Print One Copy	Alt+Shift+Ctrl+P
Print Online...	

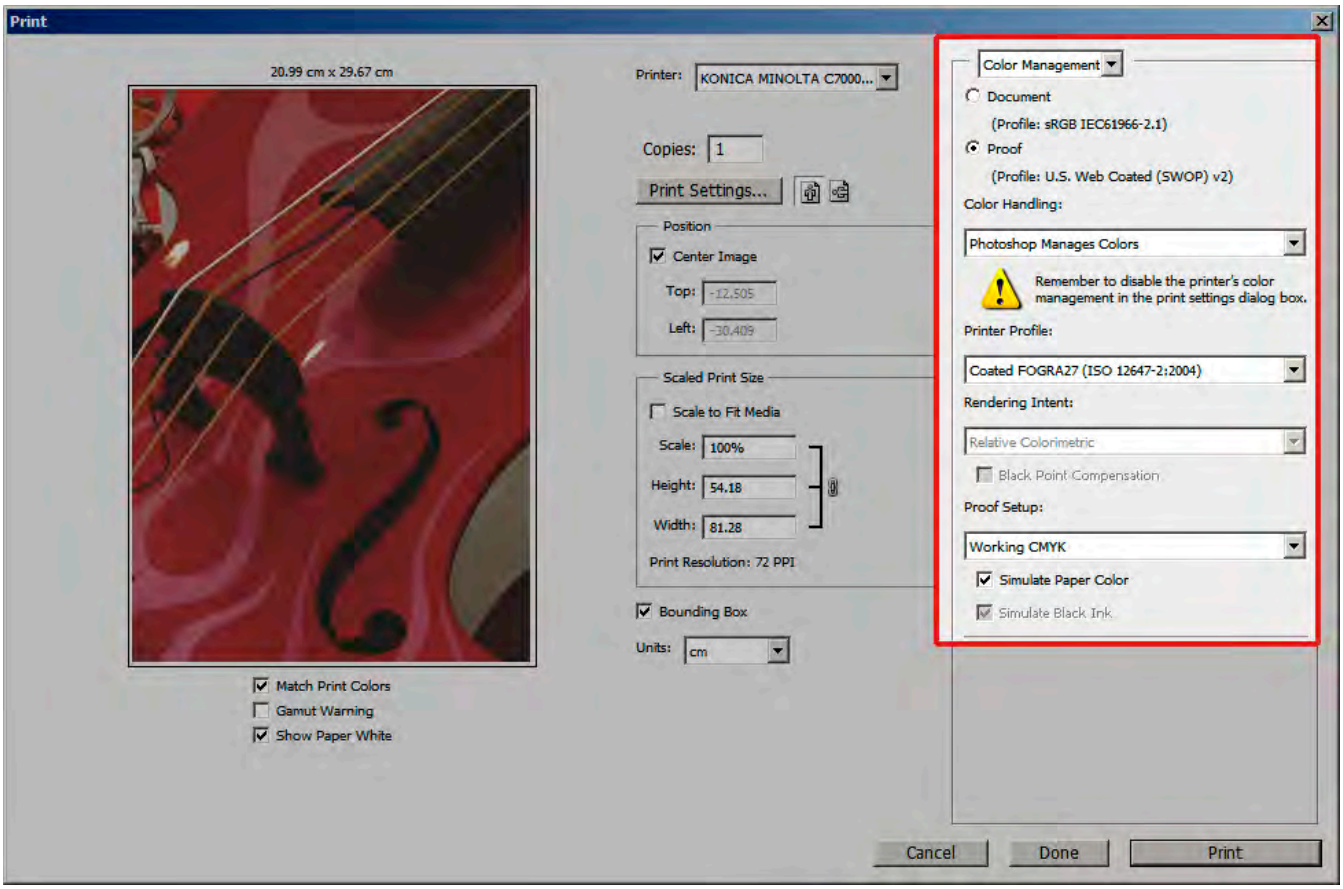
Print options (File menu).

There are two options under the Print section:



1. **Document** – The profile name is shown in brackets. When no profile is embedded in the document, this shows the profile as specified in the Color Settings dialog box. If *"Let Photoshop Determine Colors"* is selected, make sure to set the profile for the printer in the Printer Profile pop-up menu.

2. **Proof** - Prints the document by emulating how it would output on another device, such as a printing press. If *"Let Photoshop Determine Colors"* is selected, set the profile for the printer in the Printer Profile pop-up menu. The Proof Profile shows the name of the profile used to convert colors to the device you are trying to simulate.



Print dialog box showing print settings to be for a Proofing device

2.6.2 No Color Management

When the Color Handling pop-up is set to No Color Management it turns off any output profiles from being used. This sends the image directly to the printer untouched. Use this method in the *Same as Source* option.

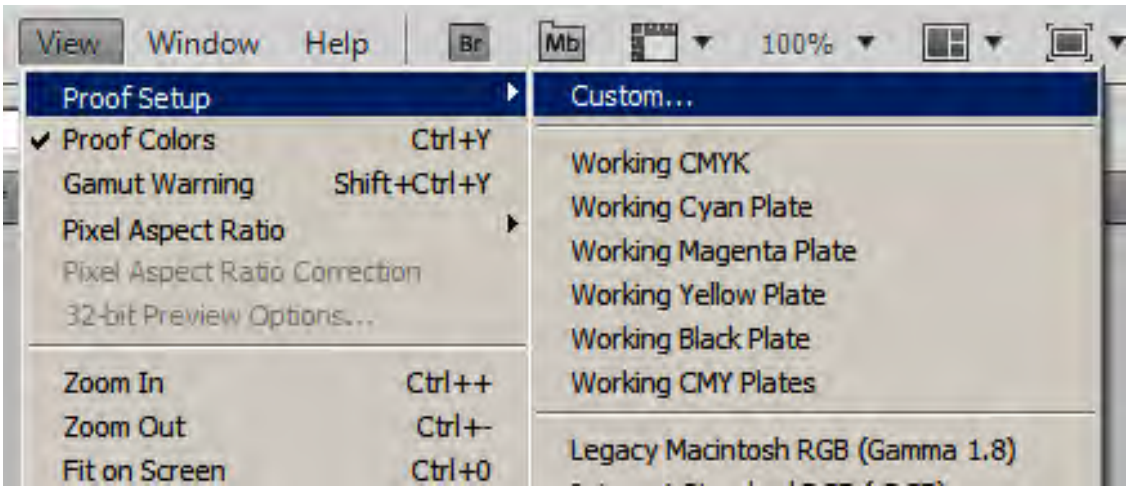
Rendering Intent:
Perceptual Intended for photographic images, aims to preserve the visual relationship between colors so it's perceived as natural to the human eye.
Saturation Good for graphics and presentation material, tries to produce vivid colors.
Relative Colorimetric maps white in the source color space to white in the destination color space. It reproduces all in-gamut colors exactly and clips out-of-gamut colors to the closest reproducible hue.
Absolute Colorimetric differs from relative colorimetric in that it doesn't map source white to destination white, but it simulates the white of the source. It's designed mainly for proofing, where it simulates the output of one printer, including the white point, to another printer.

If you don't have a custom profile for your printer and paper type, you can let the printer driver handle the color conversion. If you choose this option, it is very important that you set up printing options and turn on color management in your printer driver.

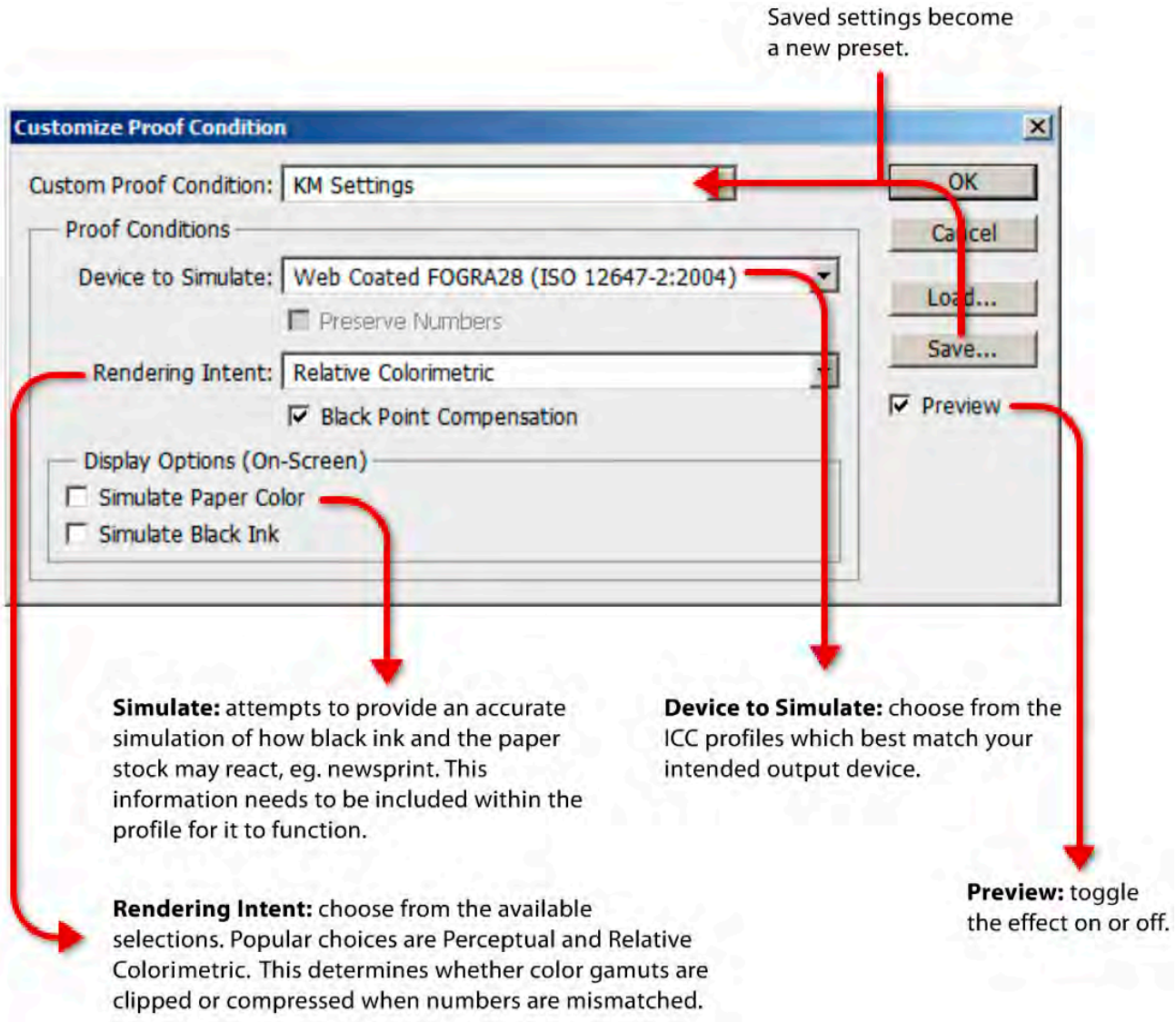
If you have a custom color profile for a specific printer, ink, and paper combination, letting Photoshop manage colors may produce better results than letting the printer manage colors. If you choose this option, it is very important that you disable color management in your printer driver.

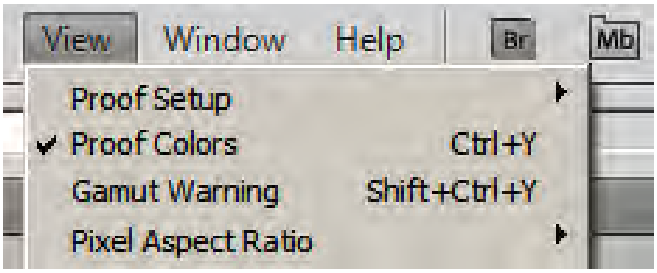
2.7 Monitor Proof

Also referred to as “Soft Proofing”, is a method to simulate the eventual output of your document on the computer screen. The real power of the soft proof is found when using the Custom submenu in Proof Setup. Here you can pick any ICC output profile that resides on your computer and save these settings to quickly produce a soft proof.



To customize the Proof Setup for your own output device.





Use Proof Colors (View menu) to turn on soft proofing.

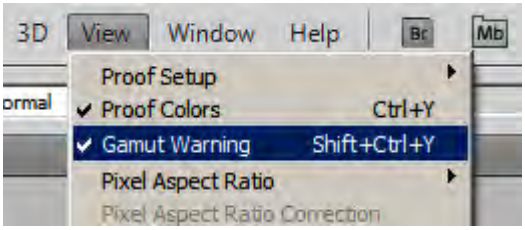
Color-managing spot colors, provides a close approximation of a spot color on your proofing device and monitor. However, it is difficult to exactly reproduce a spot color because many spot color inks exist outside the gamut of those devices. Some examples are metallic, gold, silver and fluorescent colors.

2.7.1 Gamut Warning

A gamut is the range of colors that a color system can display or print. A color that can be displayed on an RGB monitor may be unprintable on a CMYK device because they have different gamuts.

Photoshop automatically brings all colors “into gamut” upon conversion of an RGB image to CMYK. How this will occur is based Rendering Intent settings made in the Color Settings preferences. However you might want to identify the out-of-gamut colors in an image or correct them manually before converting to CMYK.

To change the gamut warning color: Do one of the following: In Windows, choose Edit > Preferences > Transparency & Gamut. In Mac OS, choose Photoshop > Preferences > Transparency & Gamut. Under Gamut Warning, click the color box to display the Color Picker. Then choose a new warning color, and click OK. For best results, use a color that is not already present in the image. Enter a value in the Opacity text box. Values can range from 0 to 100%. Use this setting to reveal more or less of the underlying image through the warning color. Then click OK.



Activating Gamut Warning (View menu).

The visual results of the Gamut Warning. This shows the colors which will be affected when converting to CMYK.

2.8 Spot Color

Spot colors are pre-mixed inks used instead of, or in addition to, process color (CMYK) inks. Each spot color requires its own plate on the press. When planning to print an image with spot colors, create Spot Channels to store the colors. To export Spot Channels, save the file in DCS 2.0 format or PDF.

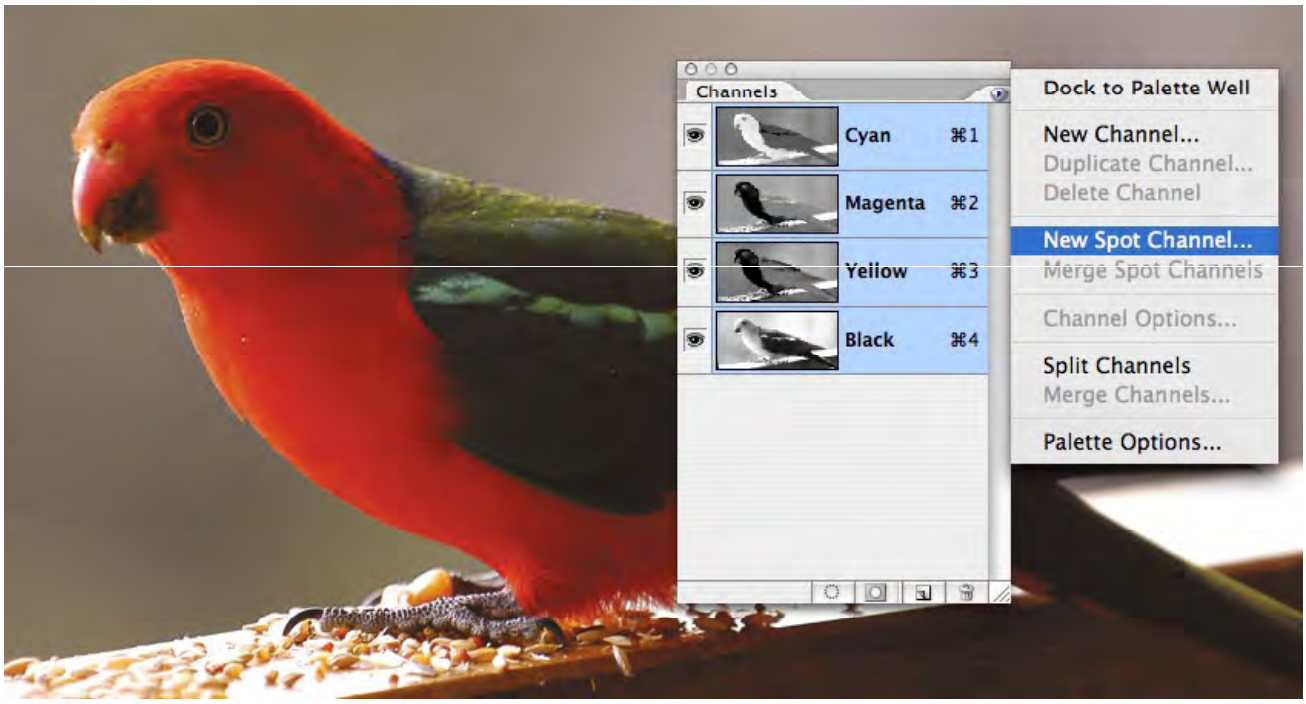
To choose a spot color, use the Swatches Palette (Window menu). The pop-out menu selects the spot color palette of your choice (e.g. Pantone, TOYO, Trumatch etc).

2.8.1 To create a Spot Channel

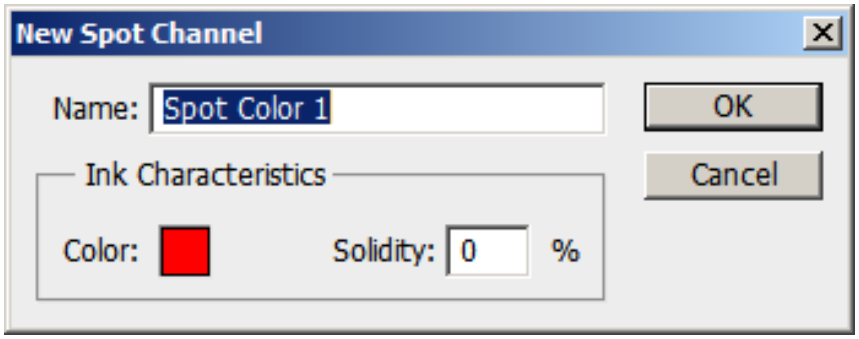
You can create a new Spot Channel or convert an existing alpha channel to a Spot Channel. First choose Window > Channels to display the Channels palette. Do one of the following to create a channel:

- Ctrl-click (Windows) or Command-click (Mac OS) the New Channel button in the Channels palette or click the pop-out menu in the Channels palette.
- Choose New Spot Channel from the Channels palette menu.

For Solidity, enter a value between 0% and 100%. This option lets you simulate on-screen the density of the printed spot color. A value of 100% simulates an ink that completely covers the inks beneath (such as a metallic ink). 0% simulates a transparent ink that completely reveals the inks beneath (such as a clear varnish).



To create a Spot Color Channel, click the pop-out arrow in the Channels Palette.



Creating a new Spot Channel.

The new channel will print out as a fifth plate (CMYK + Spot) when sent for separations.

3 Adobe Illustrator

3.1 Color Settings  DTP Applications

3.1.1 Setting Color Preferences

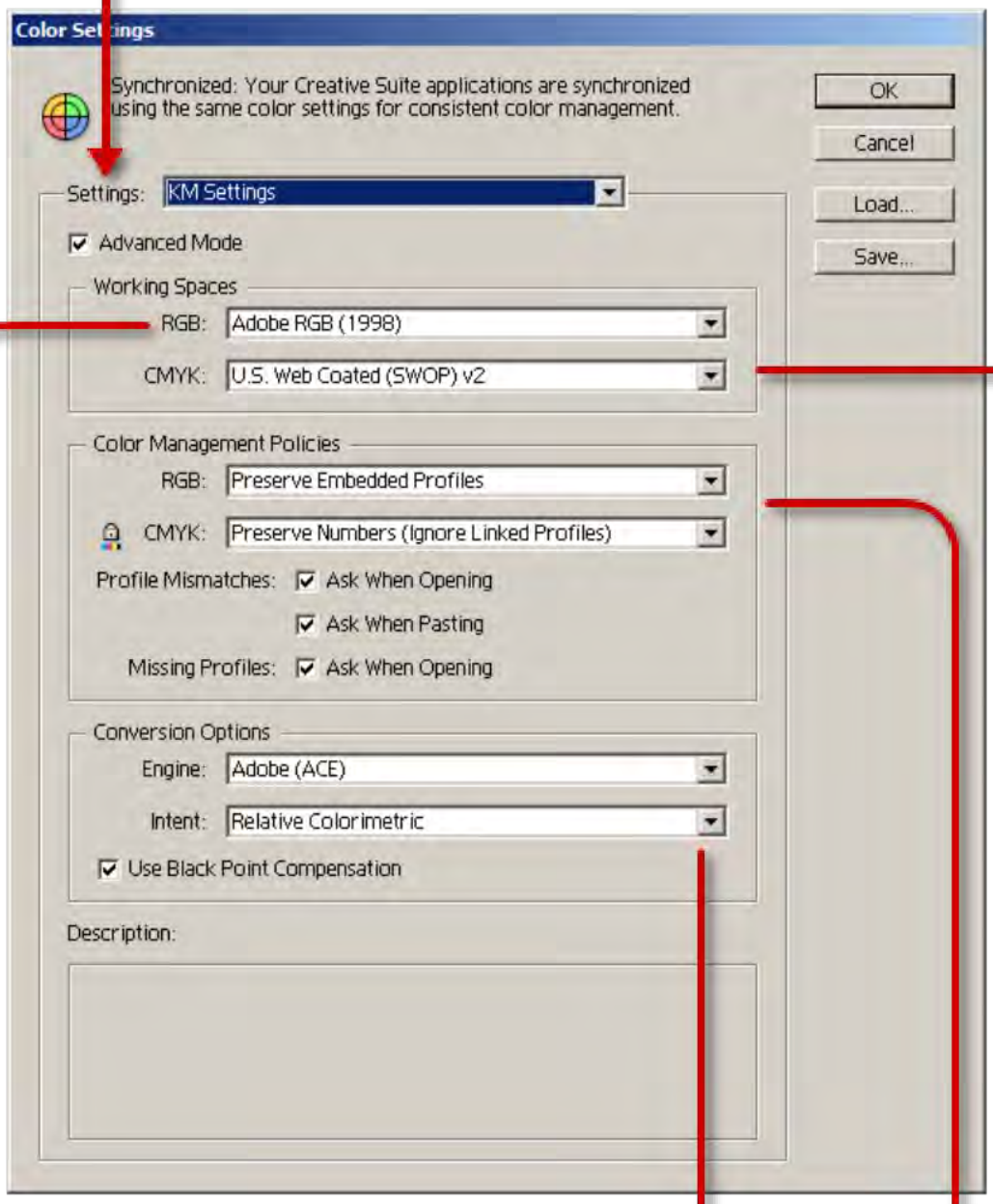
You can set the preferences within Illustrator to have images automatically convert (or not) into a specified Color Space; this is referred to as Color Policies. This is set in the Color Settings dialog box shown in the following page.

The Working Space is an intermediate color space that is used to define and edit color in Adobe applications. It is best to choose Adobe RGB (1998), or sRGB rather than the profile for a specific device. sRGB is recommended when preparing images for the web, as it defines the color space of the standard monitor used for this purpose. sRGB is also a good choice when working with images from consumer-level digital cameras, as most of these camera use sRGB for their default color space.

Adobe RGB (1998) is recommended when preparing documents for print, as it's gamut includes some colors that can't be printed using sRGB, (cyans and blues in particular). Adobe RGB (1998) is also a good choice for images from professional-level digital cameras, because most of these cameras use Adobe RGB (1998) as their default color space.

The CMYK Working Space profiles are device dependent; they are optimized for actual ink and paper combinations and are based on standard commercial print conditions. Therefore the choice of CMYK color space should be selected based upon the actual printer you intend to send your documents to for output. This profile is also used as an assumption for all untagged CMYK documents.

Settings: select from preset settings or user defined custom settings.



CMYK: this profile should reflect the actual printer you intend to send your document to for output.
This profile is used as an assumption for all untagged CMYK documents.

RGB: this is the working space for the application, it is best not to choose a profile based on a specific device as it may have a limited gamut. Popular choices are Adobe RGB (1998) and sRGB.
This profile is used as an assumption for all untagged RGB documents.

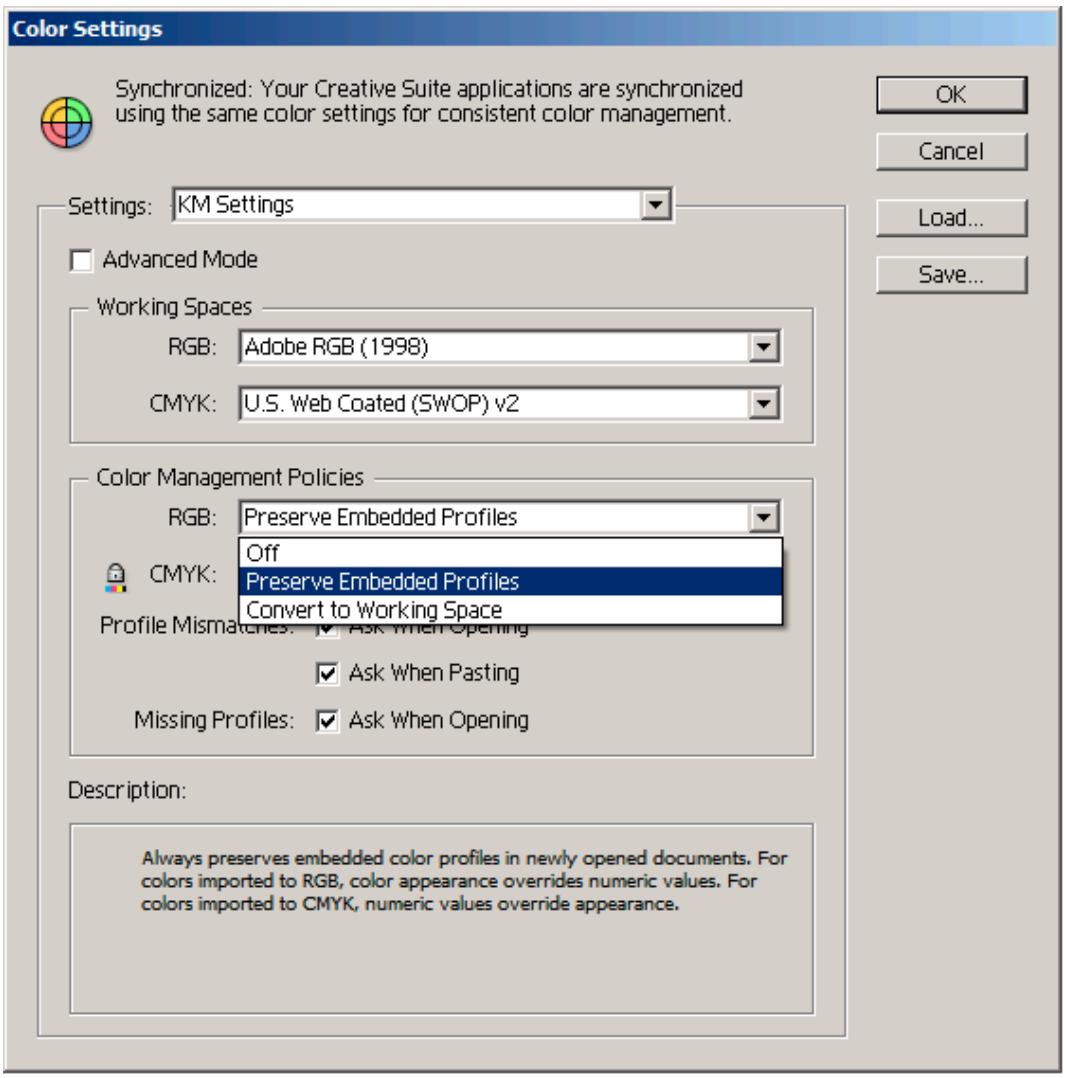
Conversion Options: choose the Color Engine for conversion and Rendering Intent.

Color Management Policies: determines user settings when there is a mismatch of profiles and for the choice of converting or preserving profiles when opened or pasted.

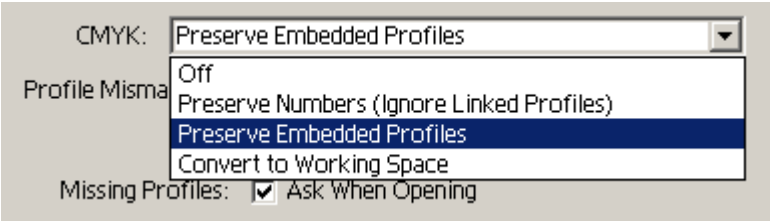
3.2 Color Management Policies DTP Applications

The ramifications of opening, pasting and drag and drop of images which may have different color spaces are addressed in the Color Management Policies. The question of what to do with the color numbers, whether to convert or retain them is dealt with here.

There are three policies for RGB color handling: *Off, Preserve Embedded Profiles* and *Convert to Working Space*. The CMYK options for color handling are: *Off, Preserve Numbers (Ignore Linked Profiles), Preserve Embedded Profiles, Convert to Working Space*. To provoke a color space change, three conditions must be met based on an action the user decides should be taken *if there is a profile mismatch*. If the conditions are ignored (the checkboxes are left empty), the policies will automatically affect the document. It is prudent to keep the check boxes ticked to avoid color space conversions being applied without a warning.



Color Setting options with RGB selections



Color Setting options with CMYK selections

These are the conditions which are in the optional warning boxes.

Profile Mismatches: Ask When Opening

When the color space of a newly opened document does not match the existing color, you will need to determine your intentions for conversion. The warning dialog box names the Embedded profile and the Working profile, and asks how you wish to proceed. The options are: Use the Embedded Profile, Convert to the Working Space Profile or Discard the Profile and don't color manage. The last action is not recommended as results can be unpredictable. If you convert from a color space which has a large gamut (like Adobe RGB 1998) to one which has a smaller gamut, a slight decrease in image quality is possible.

Profile Mismatches: Ask When Pasting

When the user pastes a clipboard image into a document, the profiles may not match. In which case a warning dialog box will name the Embedded profile and the Working profile, and then ask how to proceed. The options are: Convert (preserve color appearance) and Don't Convert (preserve color numbers). In most cases it is advisable to retain the original color appearance.

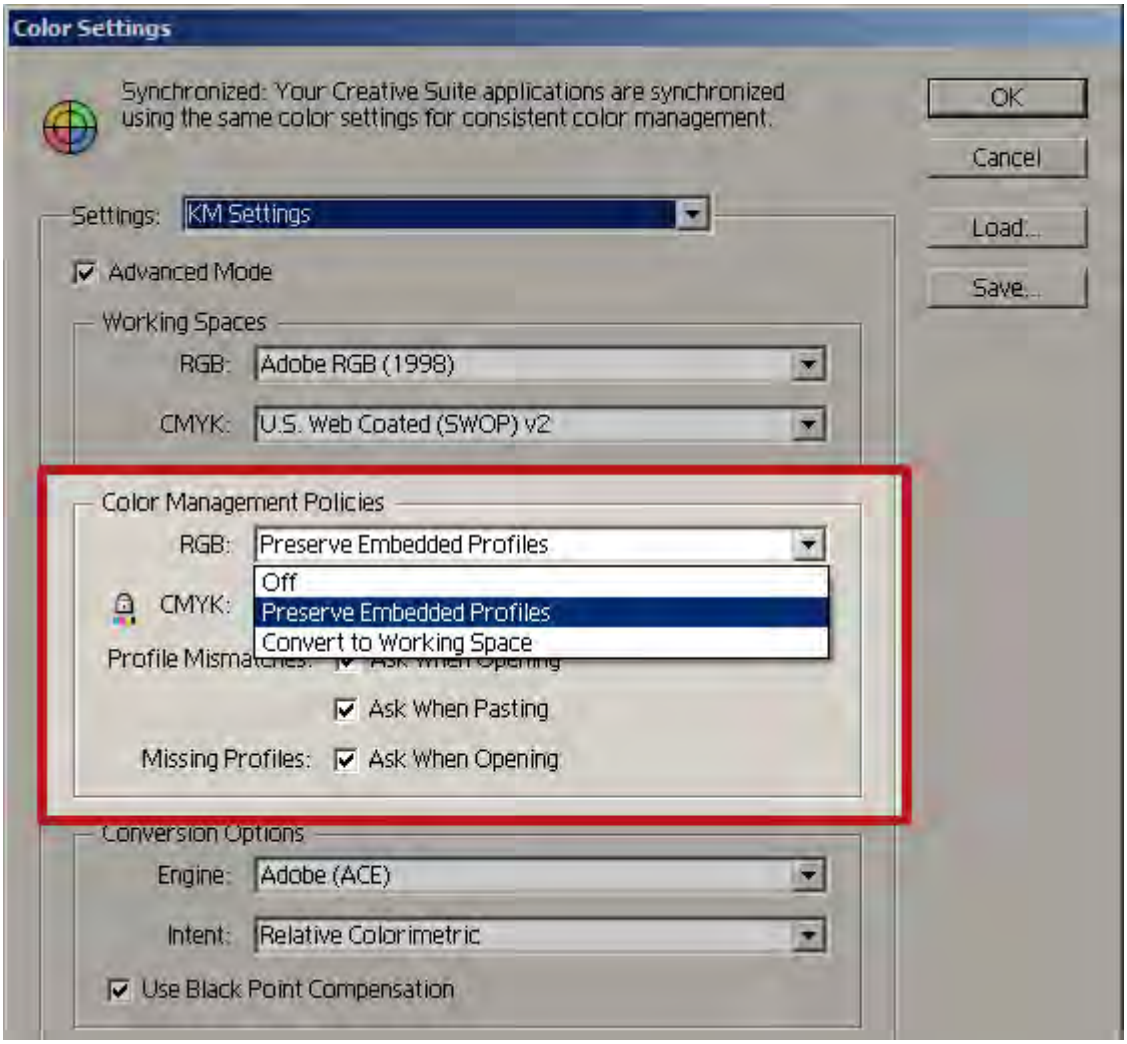
Missing Profiles: Ask When Opening

When an image is untagged i.e. has no profile assigned, the user gets three options: Leave as is (don't color manage), Assign Working RGB (this is the declared working space in Color Settings) and Assign Profile. The last action will show a pop-up menu to choose a profile.

3.2.1 CS5 Color Management

The entire Adobe Creative Suite contains synchronized color management capabilities. Illustrator uses the same Color Setting preferences as Photoshop and handles profiles in the same manner.

One particular feature in Illustrator is the option to preserve the numbers within a profile to override its appearance on the screen. Illustrator can preserve CMYK numerical values when importing graphics. This way, you can keep color management enabled, but you won't have to worry about shifting colors on imported CMYK images.

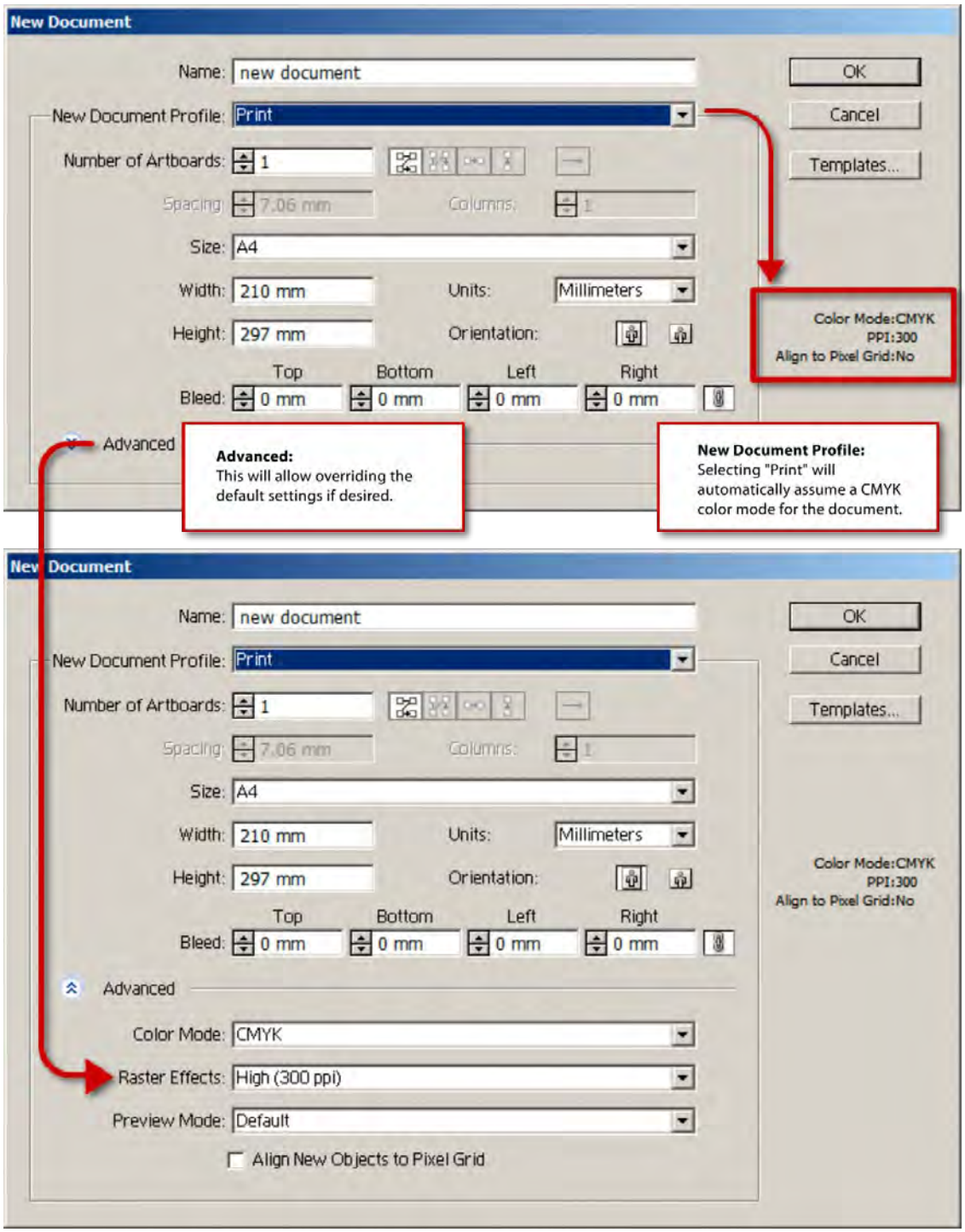


The Color Settings dialog box (Edit menu), showing the Working Spaces and the Policies for converting or preserving Profiles.

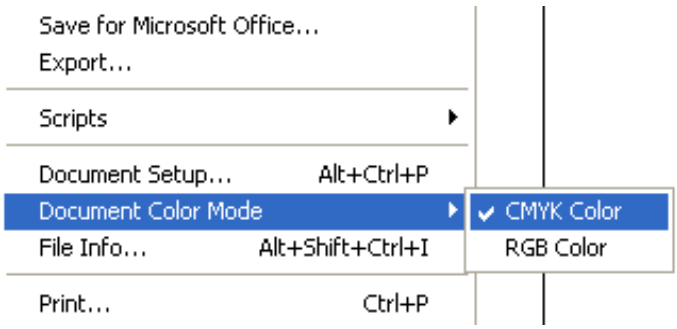
It is recommended to follow the steps that are outlined below in “Color Synchronizing Adobe CS5 Suite”, for consistent results across Adobe CS5.

3.3 Color Mode of Document

The Color Mode can be set to either CMYK or RGB, however CMYK is recommended for print. This is from the Color Mode section of the New Document dialog box. If the color mode requires changing after the document has been created, it can be converted using the Document Color Mode pop-out menu to select another mode.



Defining the Color Mode when creating a new document (File menu).

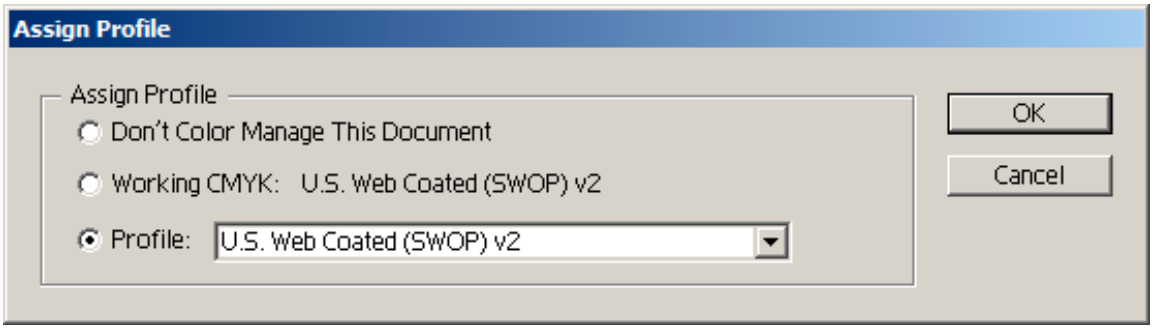


Converting the Color Mode (File menu).

3.4 Profile Specification

When assigning a profile to a document, there are three choices:

1. **Don't Color Manage this Document:** This untags any profile attached and assumes the Working Space as the source profile.
2. **Working (RGB/CMYK):** Assigns the Working Space profile to the document.
3. **Profile:** Assign any profile from the pop-up menu, this will override any existing profile or tag one to an untagged document.



Assign Profile, (Edit menu).

3.5 Print Settings

3.5.1 Printing with Color Management

Color management options for printing, let you specify how to print colors consistent with what you see on the monitor. Your options for printing color-managed documents depend on the Adobe application in use, as well as the output device selected. In general, you have the following choices for handling colors during printing:

Let the printer determine colors.

Let the application determine colors.

3.5.2 To let your printer determine colors when printing

Choose File > Print.

Select a PostScript printer from the Printer menu. To create a file instead of a print, select Adobe PostScript® File or Adobe PDF.

Select Color Management on the left side of the Print dialog box.

For Color Handling, choose Let PostScript® Printer Determine Colors.

(Optional) Set any of the following options. In most cases, it is best to use the default settings.

Rendering Intent Specifies how the application converts colors to the destination color space.

Preserve RGB Numbers (for RGB output) or Preserve CMYK Numbers (for CMYK output) Determines how Illustrator handles colors that do not have a color profile associated with them (for example, imported images without embedded profiles). When this option is selected, Illustrator sends the color numbers directly to the output device. When this option is deselected, Illustrator first converts the color numbers to the color space of the output device.

Preserving numbers is recommended when you are following a safe CMYK workflow but not recommended for printing RGB documents.

Click Setup (Windows) or Printer (Mac OS) at the bottom of the Print dialog box to access the operating system print settings.

Access the color management settings for the printer driver by doing one of the following:

- In Windows, right-click the printer that you are using, and select Properties. Then locate the color management settings for the printer driver. For most printer drivers, color management settings are labeled Color Management or ICM.

- In Mac OS, select the printer that you are using, and select the color management option from the pop-up menu. For most printer drivers, this option is labeled ColorSync.

Specify the color management settings to let your printer driver handle the color management during printing. Every printer driver has different color management options. If it's not clear how to set color management options, consult your printer documentation.

Return to the Illustrator Print dialog box, and click Print.

3.5.3 To let Illustrator determine colors when printing

Choose File > Print.

Select Color Management on the left side of the Print dialog box.

For Color Handling, choose Let Illustrator Determine Colors.

For Printer Profile, select the profile for your output device.

The more accurately the profile describes the behavior of an output device and printing conditions (such as paper type), the more accurately the color management system can translate the numeric values of the actual colors in a document.

(Optional) Set the Rendering Intent option to specify how the application converts colors to the destination color space. In most cases, it is best to use the default rendering intent. For more information on rendering intents, search in Help.

Click Setup (Windows) or Printer (Mac OS) at the bottom of the Print dialog box to access the operating system print settings.

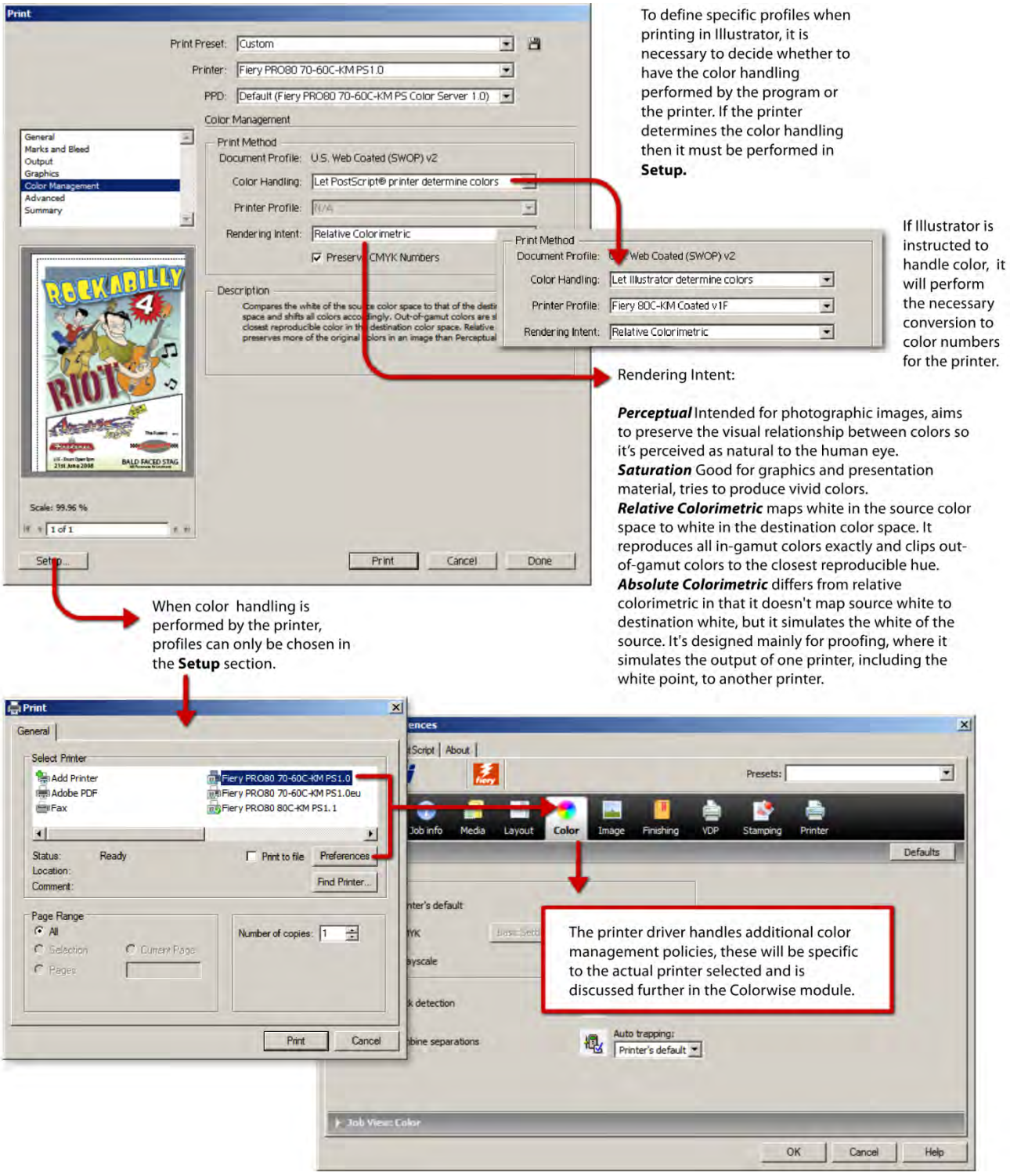
Access the color management settings for the printer driver by doing one of the following:

- In Windows, right-click the printer that you are using, and select Properties. Then locate the color management settings for the printer driver. For most printer drivers, color management settings are labeled Color Management or ICM.

- In Mac OS, select the printer that you are using, and select the color management option from the pop-up menu. For most printer drivers, this option is labeled ColorSync.

Turn off color management for the printer driver. Every printer driver has different color management options. If it's not clear how to turn off color management, consult your printer documentation.

Return to the Illustrator Print dialog box, and click Print.



To define specific profiles when printing in Illustrator, it is necessary to decide whether to have the color handling performed by the program or the printer. If the printer determines the color handling then it must be performed in **Setup.**

If Illustrator is instructed to handle color, it will perform the necessary conversion to color numbers for the printer.

When color handling is performed by the printer, profiles can only be chosen in the **Setup** section.

Rendering Intent:

Perceptual Intended for photographic images, aims to preserve the visual relationship between colors so it's perceived as natural to the human eye.
Saturation Good for graphics and presentation material, tries to produce vivid colors.
Relative Colorimetric maps white in the source color space to white in the destination color space. It reproduces all in-gamut colors exactly and clips out-of-gamut colors to the closest reproducible hue.
Absolute Colorimetric differs from relative colorimetric in that it doesn't map source white to destination white, but it simulates the white of the source. It's designed mainly for proofing, where it simulates the output of one printer, including the white point, to another printer.

The printer driver handles additional color management policies, these will be specific to the actual printer selected and is discussed further in the Colorwise module.

Print dialog box (File menu) with options for color handling.

3.5.4 Limitations and known issues when printing:

Rasterizing all artwork during printing

When you print to a low-resolution or non-PostScript printer, such as a desktop inkjet printer, you can choose to rasterize all artwork during printing. This option is useful when printing documents that contain complex objects (such as objects with smooth shading or gradients) because it reduces the possibility of errors.

Choose File > Print.

Select the Advanced menu on the left side of the Print dialog box.

Select Print As Bitmap. This option is only available if the printer driver for the selected printer supports bitmap printing.

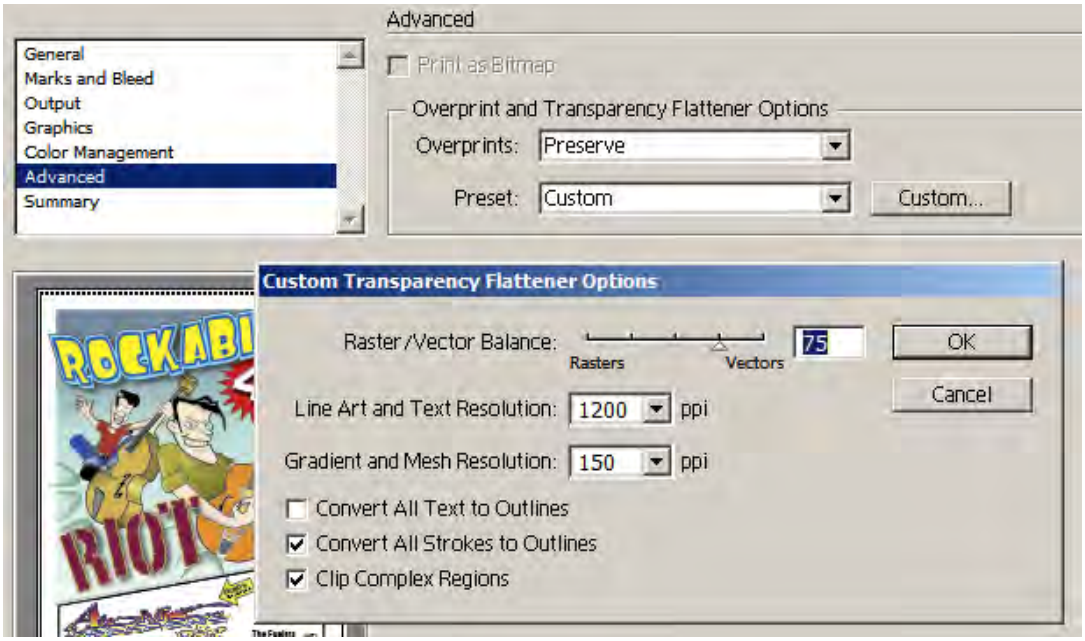
Transparent objects within Illustrator

When a file is sent to a printer which doesn't understand Illustrator's native transparency, the program needs to flatten the artwork.

Choose File > Print.

Select the Advanced menu on the left side of the Print dialog box.

Select a flattening preset from the Preset menu, or click Custom to set specific flattening options.



Custom Transparency Flattener is found in the Print dialog box, (File menu).

3.5.5 Printing long, complex paths

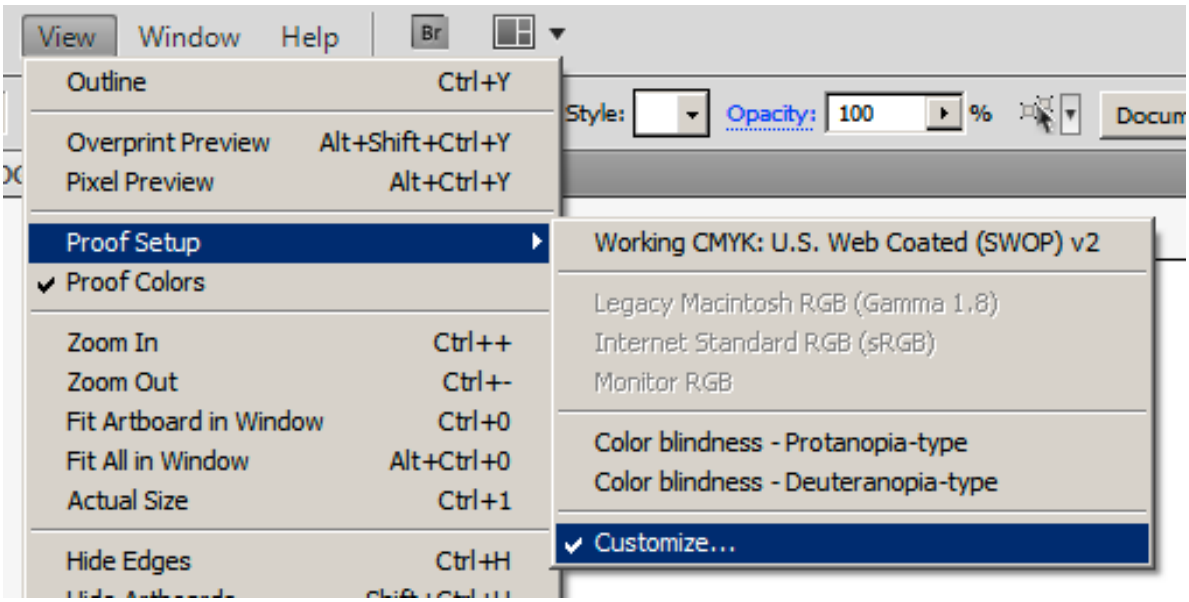
If you are printing Adobe Illustrator files containing overly long or complicated paths, the file may not print and you may receive limit-check error messages from your printer. To simplify long, complex paths, you can split them into two or more separate paths. You can also change the number of line segments used to approximate curves and adjust the printer resolution.

Keep in mind the following hints when splitting paths:

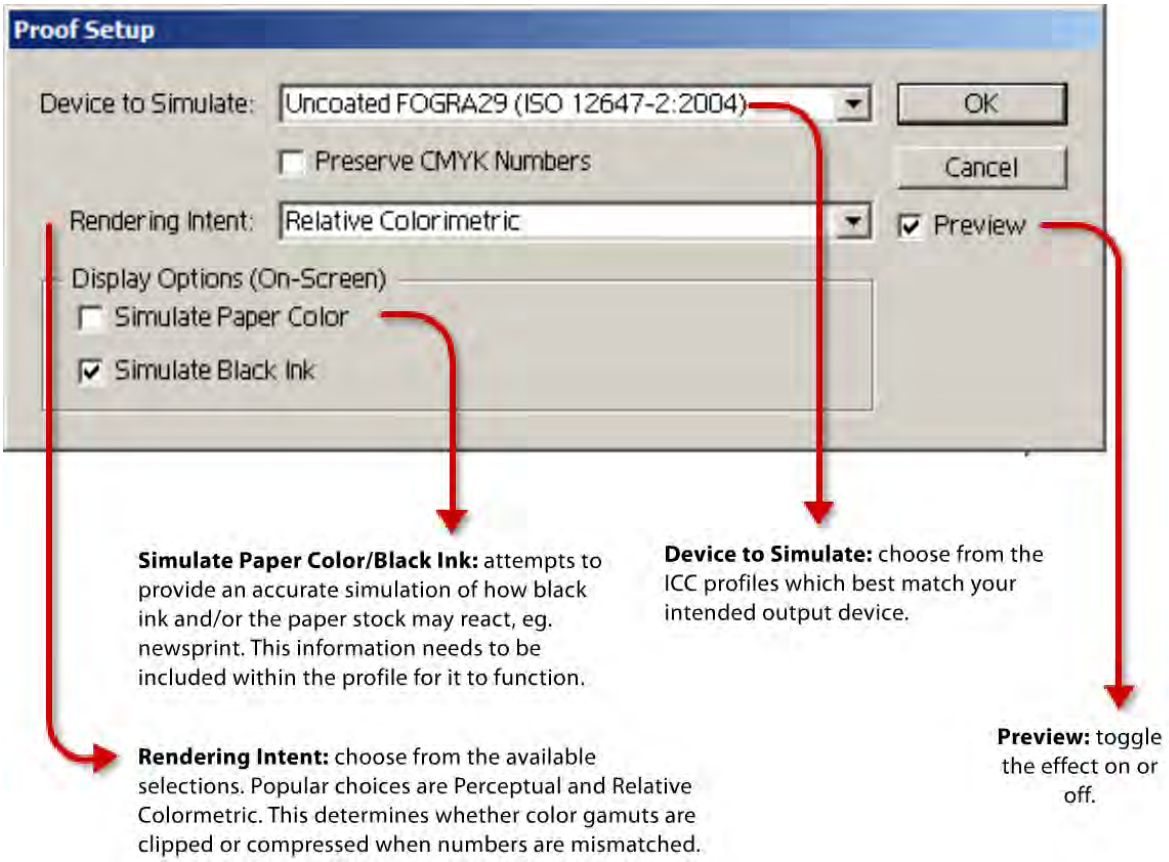
- Illustrator treats split paths in the artwork as separate objects. To change your artwork once paths are split, you must either work with the separate shapes or rejoin the paths to work with the image as a single shape.
- It's a good idea to save a copy of your original artwork before splitting paths. That way, you still have the original, unsplit file to work with if needed.

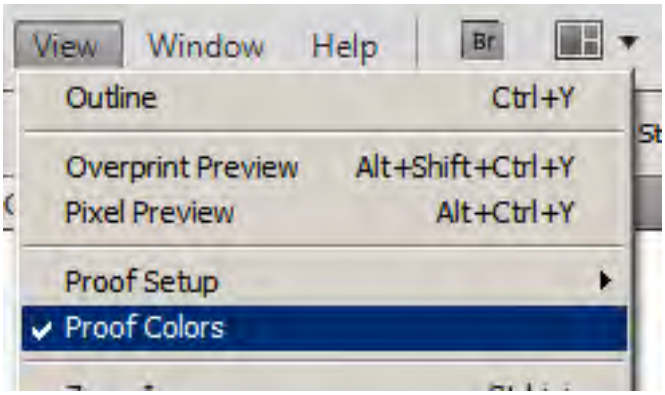
3.6 Monitor Proof

Also referred to as "Soft Proofing", is a method to simulate the eventual output of your document on the computer screen. The real power of the soft proof is when using the Custom submenu found in Proof Setup. Here you can pick any ICC output profile that resides on your computer and save these settings to quickly produce a soft proof.



To customize the Proof Setup for your own output device use Customize. The saved settings will then be available as a menu option.





Use Proof Colors, (View menu) to turn on soft proofing.

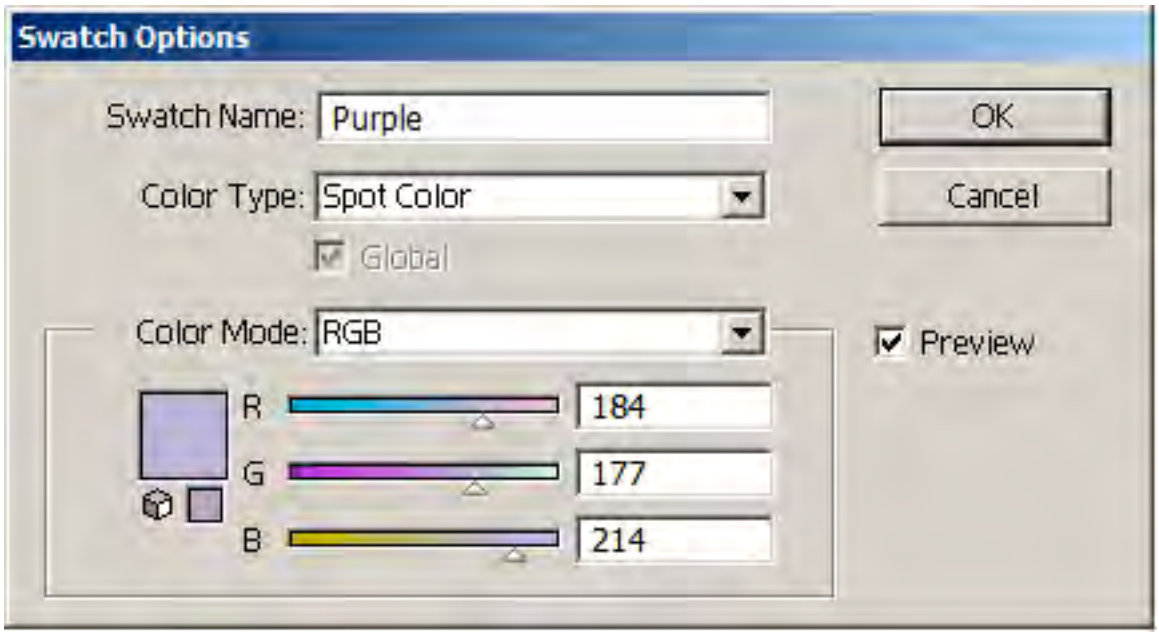
Color-managing spot colors provides a close approximation of a spot color on your proofing device and monitor. However, it is difficult to exactly reproduce a spot color on a monitor or proofing device because spot color inks exist outside the gamuts of many of those devices. Some examples are metallic, gold, silver and fluorescent colors.

3.7 Spot Color

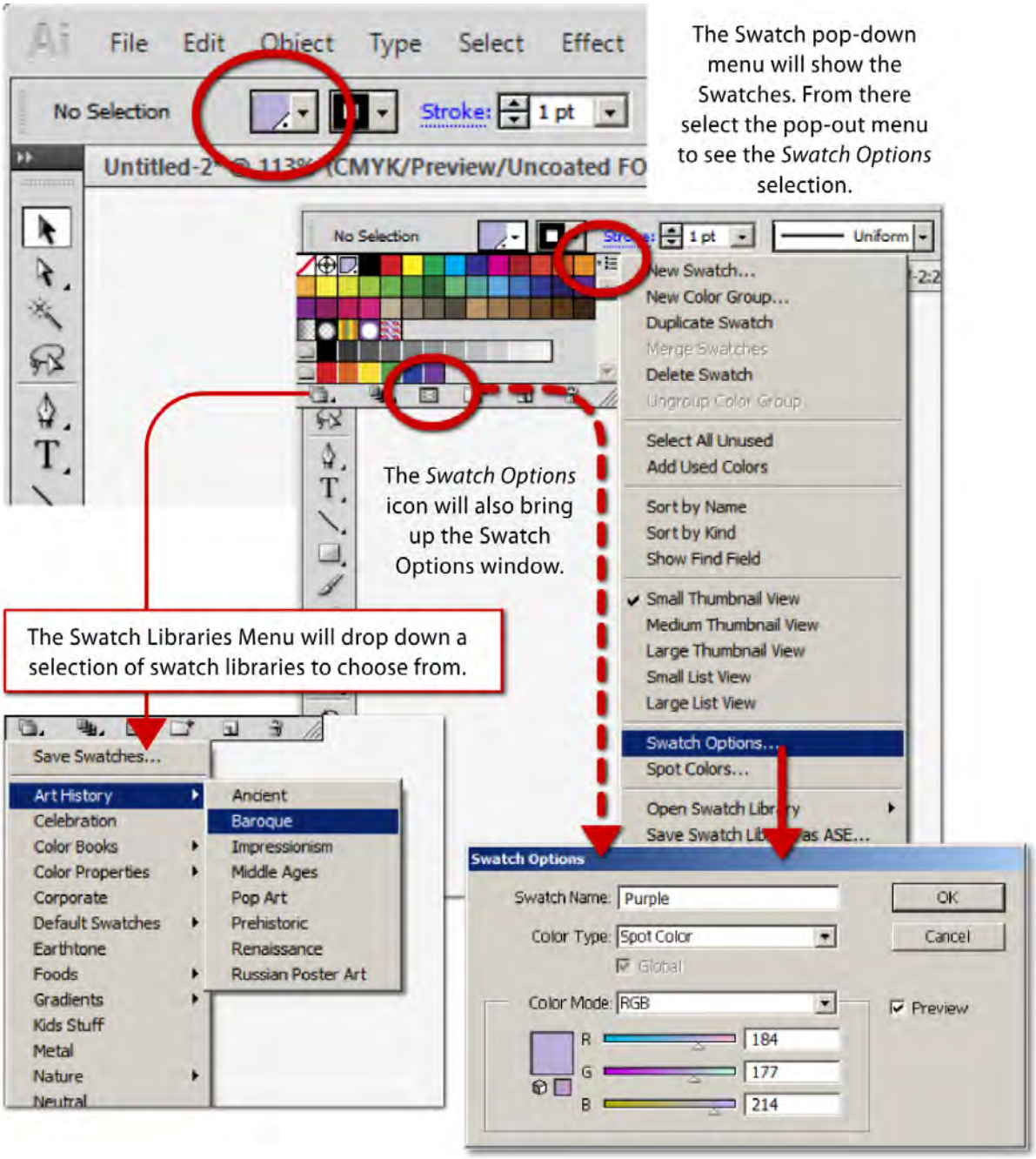
Spot colors are special pre-mixed inks that are used instead of, or in addition to, the process color (CMYK) inks. Each spot color requires its own plate on the press.

To choose a new spot color do one of the following:

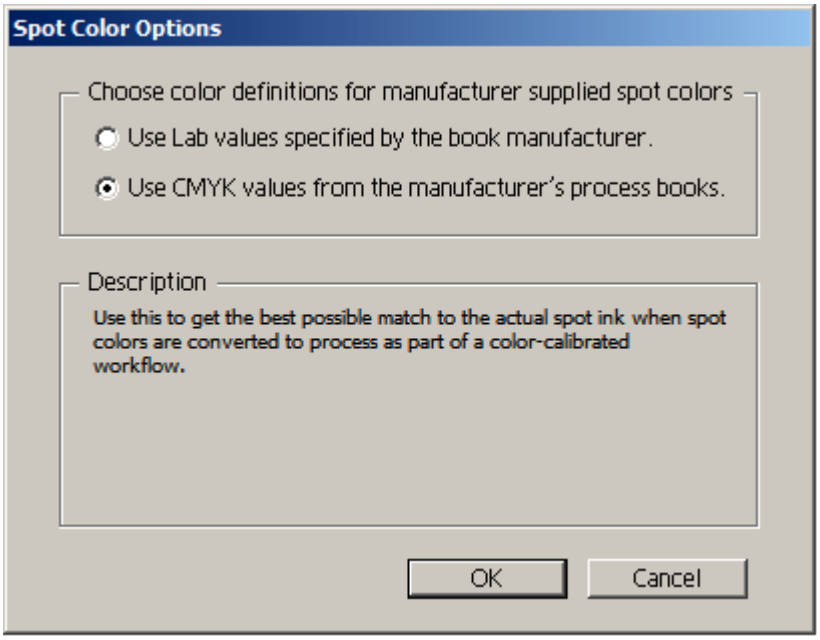
- Ctrl-click (Windows) or Option-click (Mac OS) the New Swatch button in the Swatches palette.
- Ctrl-drag (Windows) or Command-drag (Mac OS) the color from the toolbox or Color palette to the Swatches palette. Or, if you selected an object, Ctrl-drag (Windows) or Command-drag (Mac OS) the object to the Swatches palette.
- Select New Swatch from the Swatches palette menu. Select Spot Color for Color Type. Set additional swatch options if needed and click OK.



Swatch Options (Color Palette pop-out menu) can be used to specify a Spot Color.

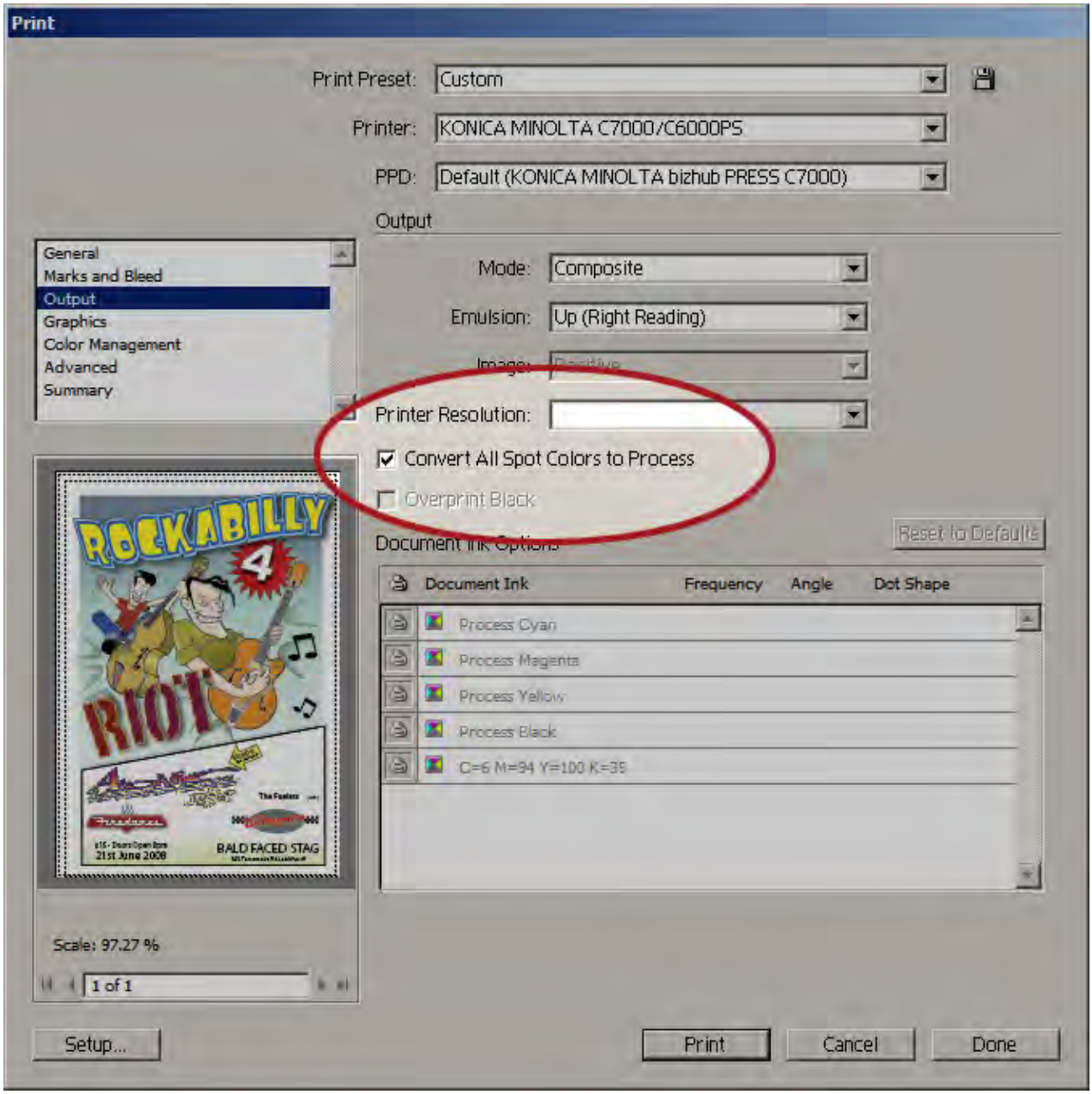


Some predefined spot colors, such as colors from the TOYO, PANTONE, DIC, and HKS libraries, are defined using Lab values. For backward compatibility with previous versions of Illustrator, colors from these libraries also include CMYK definitions. The Swatches palette lets you control which values Illustrator uses to display, export, and print these spot colors: Lab or CMYK.



To specify how Illustrator defines Spot Colors, choose either Lab (best possible match) or CMYK (reasonable match) from the Color Palette pop-out menu.

To convert spot colors to process colors at print time, select the Output menu (on left) then tick the Convert All Spot Colors to Process.



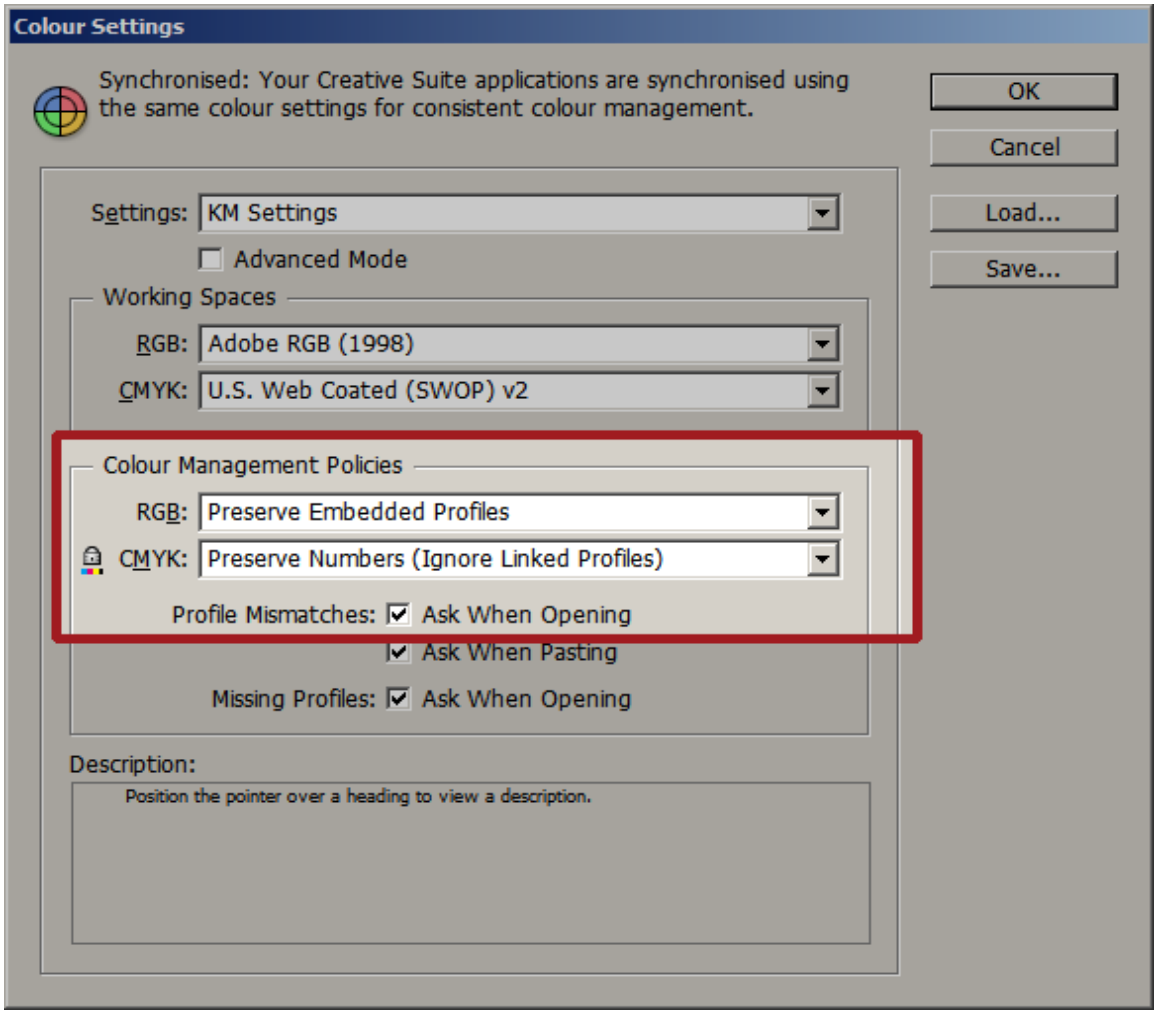
4 Adobe InDesign

4.1 Color Settings

4.1.1 Setting Color Preferences

You can set Color Setting preferences within InDesign to have documents automatically convert (or not) into a specified Color Space; this is referred to as the Color Policies.

There are three policies for color handling: *Off, Preserve Embedded Profiles* and *Convert to Working (RGB/CMYK)*. To provoke a color space change, three conditions must be met based on an action the user decides should be taken *if there is a profile mismatch*. If the conditions are ignored (the checkboxes are left empty), the policies will automatically affect the document. It is prudent to keep the check boxes ticked to avoid color space conversions being applied without a warning.



These are the conditions which are in the optional warning boxes.

1. **Profile Mismatches:** Ask When Opening

When the color space of a newly opened document does not match the existing color, you will need to determine your intentions for conversion. The warning dialog box names the Embedded profile and the Working profile, and asks how you wish to proceed. The options are: Use the Embedded profile, or Convert to the Working Space profile. Be aware that if you convert from a color space which has a large gamut (like Adobe RGB 1998) to one which has a smaller gamut, a slight decrease in image quality is possible.

2. **Profile Mismatches:** Ask When Pasting

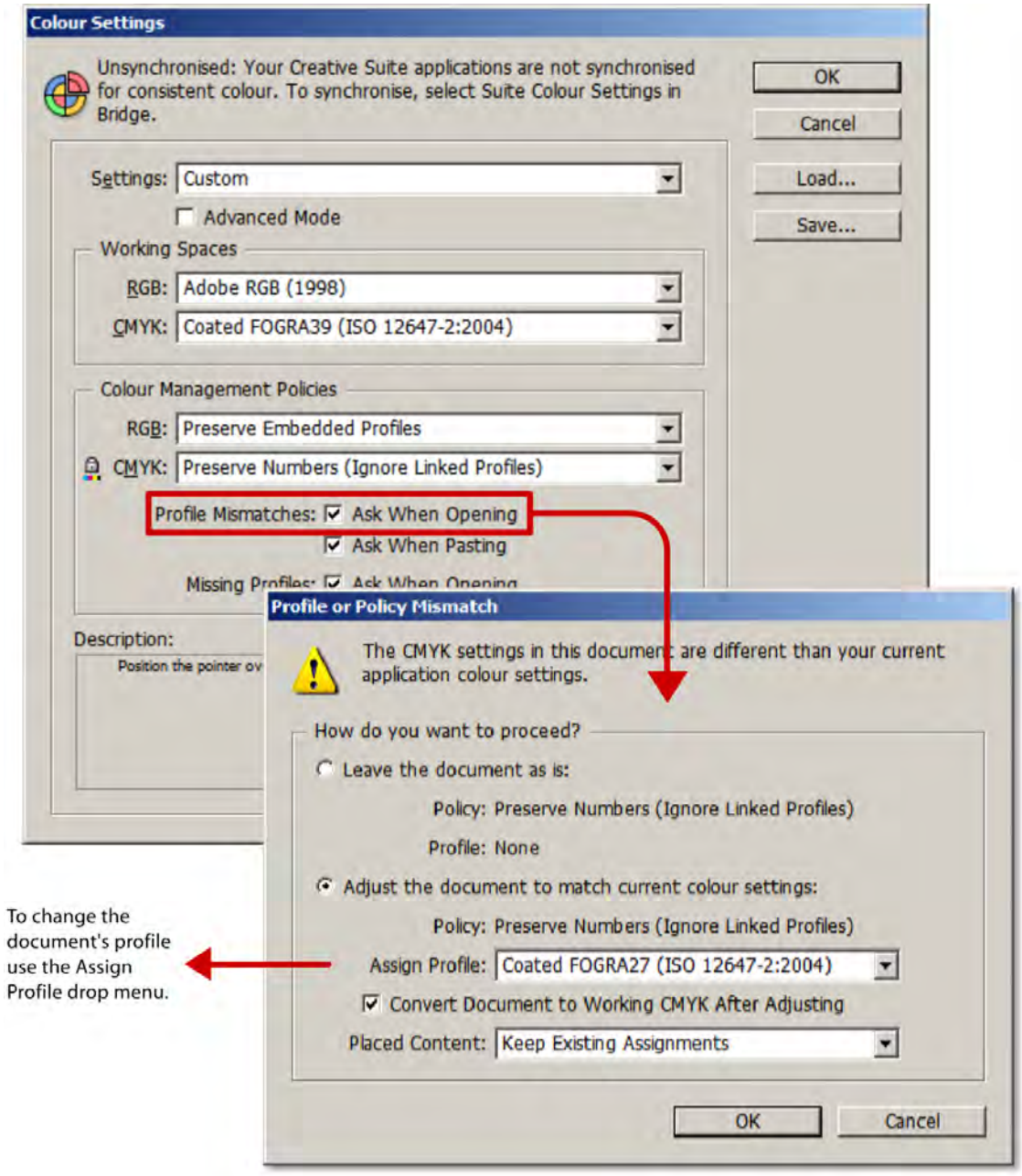
When the user pastes a clipboard image into a document, the profiles may not match. In which case a warning dialog box will name the Embedded profile and the Working profile, and then ask how to proceed. The options are: Convert (preserve color appearance) and Don't Convert (preserve color numbers). In most cases it is advisable to retain the original color appearance.

3. **Missing Profiles:** Ask When Opening

When an image is untagged i.e. has no profile assigned, the user gets two options that are given on the warning message: Leave as is, or Assign profile. The last action will show a pop-up menu to choose a profile.

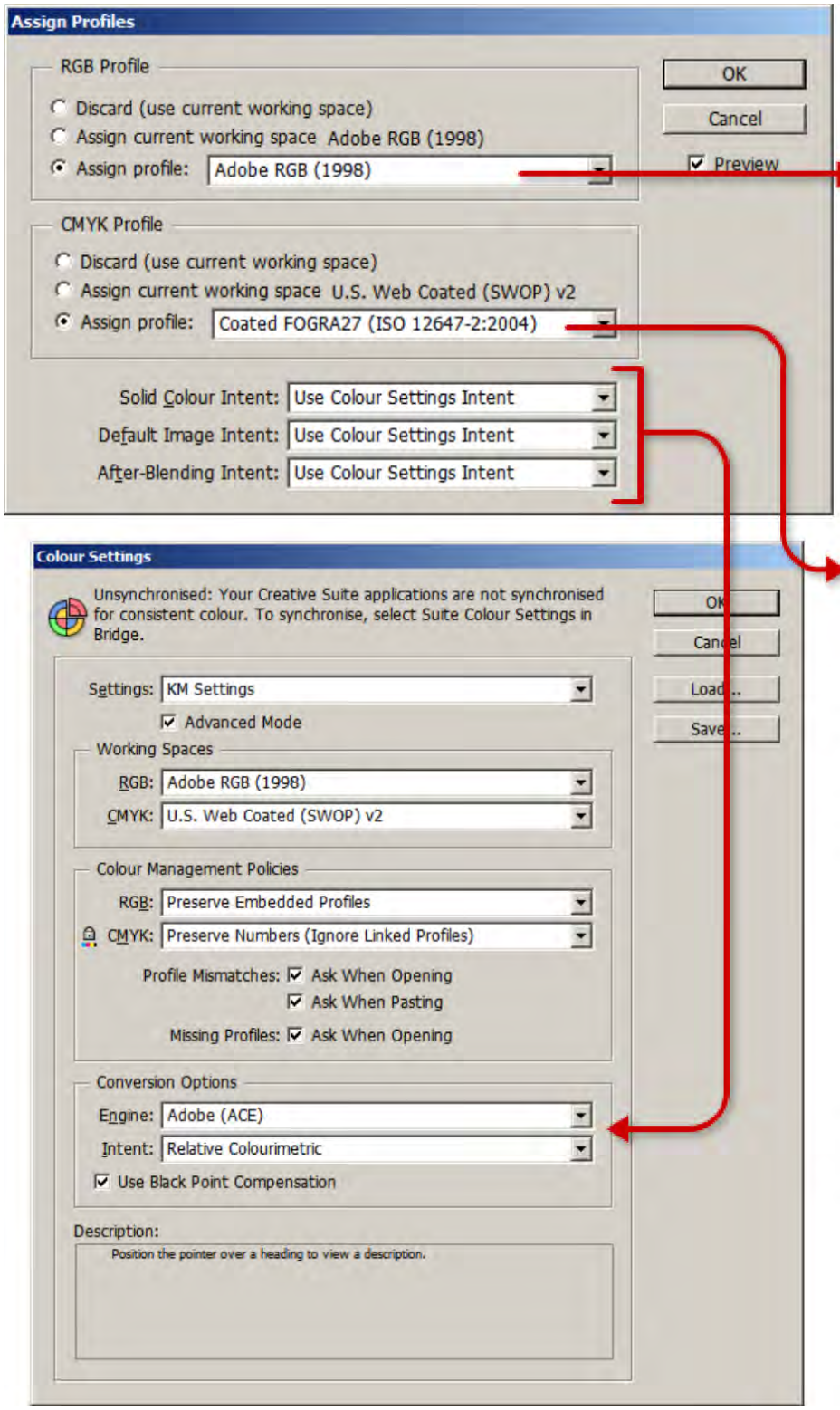
4.2 Opening a File

A profile mismatch on opening a file can occur if the Working Space differs from the document's profile.



Mismatch Profile on Open: when a document's profile differs from the Working Space profile a warning box appears when opening the file. To have the option of converting or not, tick the Ask When Opening box in Color Settings. This ensures you have control of color management options.

4.3 Color Profiles



RGB Profile: this is the working space for the application, it is best not to choose a profile based on a specific device as it may have a limited gamut. Popular choices are Adobe RGB (1998) and sRGB.
This profile is used as an assumption for all untagged RGB documents.

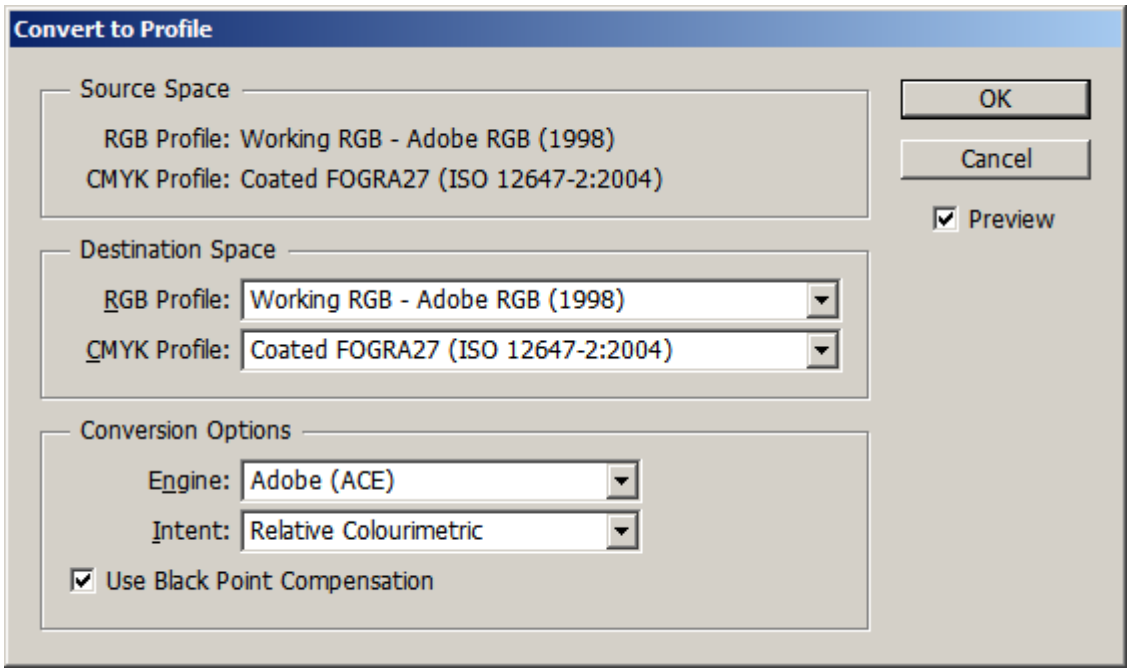
CMYK Profile: this profile should reflect the actual printer you intend to send your document to for output.
This profile is used as an assumption for all untagged CMYK documents.

Conversion Intent is taken from the Color Settings options

4.3.1 Converting Profiles

It is a simple matter to convert a profile. Sometimes there is a noticeable shift in the display colors as the new profile gives alternate information when describing the color numbers.

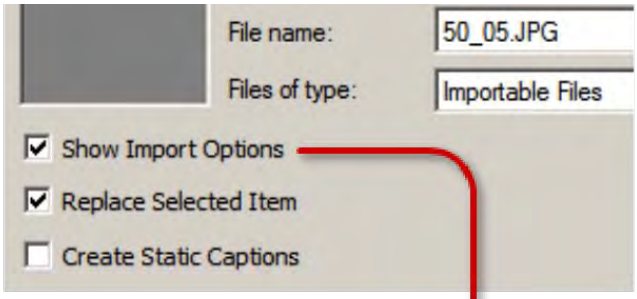
Choose the new profile from the Destination Space pop-up menu. The Conversion Options determine the Engine used and the rendering intent - Adobe (ACE) is recommended for the engine and Relative Colorimetric or Perceptual for the Intent.



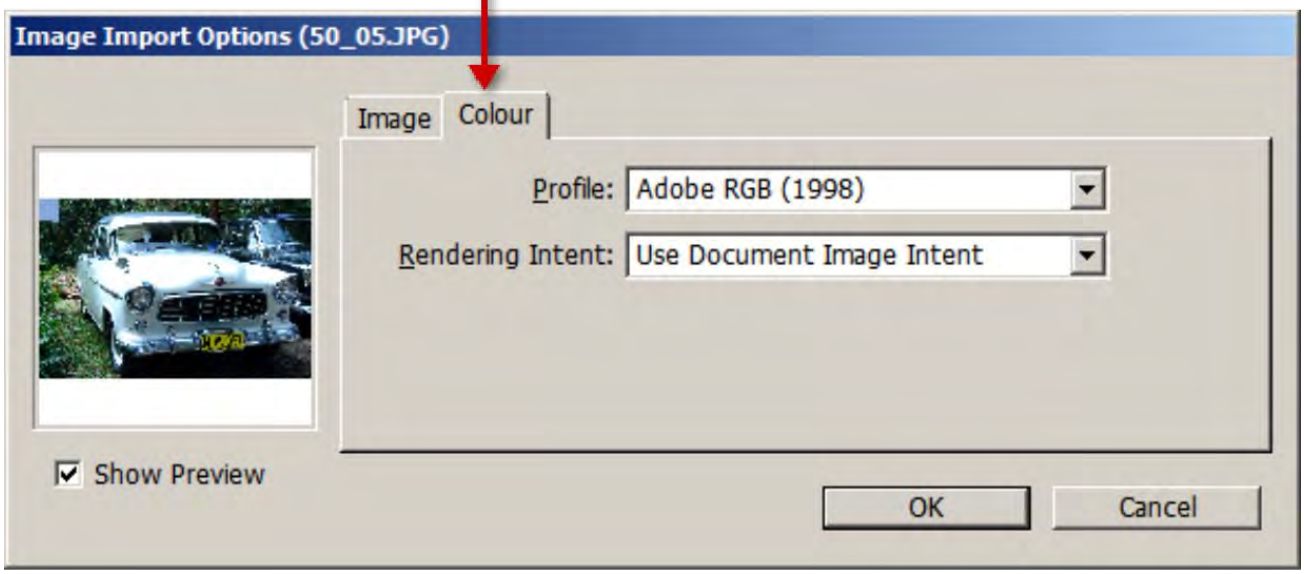
Convert to Profile is found in the Edit menu.

4.4 Image Allocation

When Placing an image into InDesign, use the Show Import Options in the Place dialog box. This will allow the option to allocate a profile or assign a different one to the image on import.



When Placing an image, select the Show Import Options. This will present you with options for assigning image profiles



If the image is RGB, only RGB profiles will show in the Profile pop-up menu. Likewise for CMYK images.

4.4.1 To change a Profile in an Image

To modify an image within an InDesign document, use Image Color Settings (Object menu). This brings up the option to convert the profile and rendering intent.

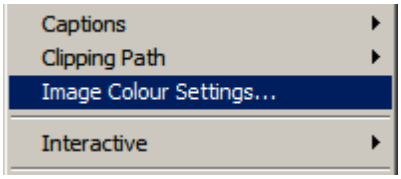
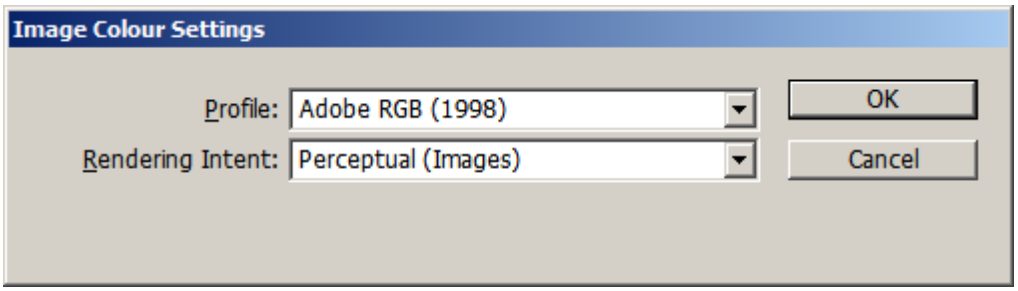


Image Color Settings, (Object menu).

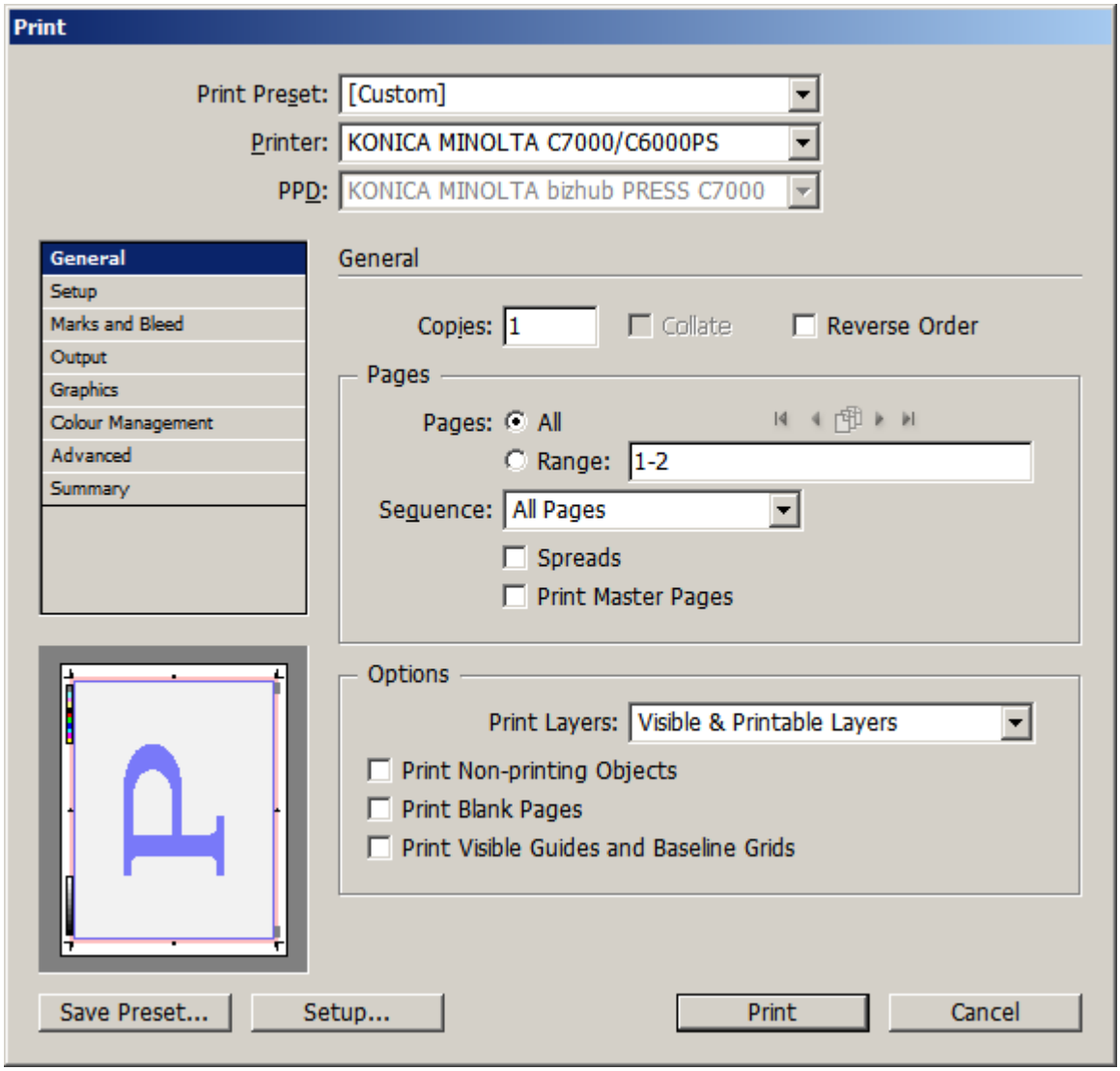


4.5 Print Settings

The entire Adobe Creative Suite contains synchronized color management capabilities. InDesign uses the same Color Setting preferences as Photoshop and Illustrator and handles profiles in the same manner.

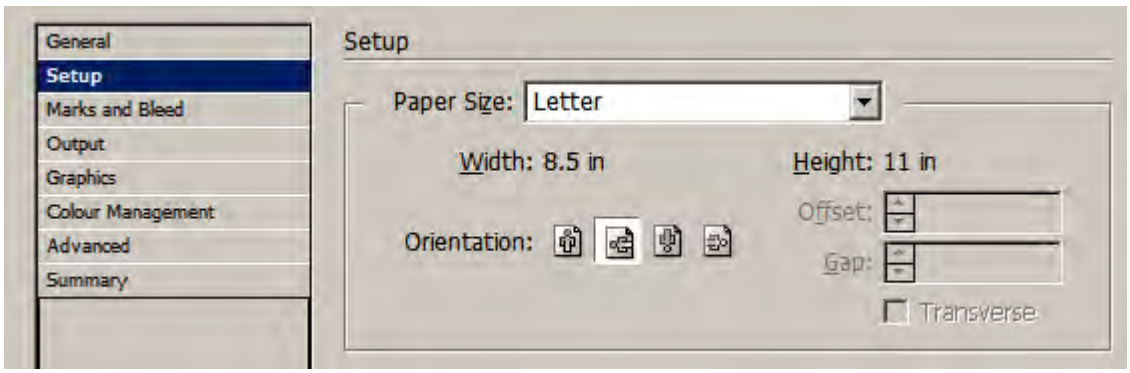
Since InDesign documents can contain both CMYK and RGB content, there are more options in the Output settings in the Print dialog box, which are lacking in the other CS applications. However, the Color Management panel is very similar and does interact with the Color Management settings to provide options the other applications lack.

On the surface it appears that InDesign's print dialog box is much like most applications, however there is a wealth of options available once we start to explore the menus on the left (see next page).



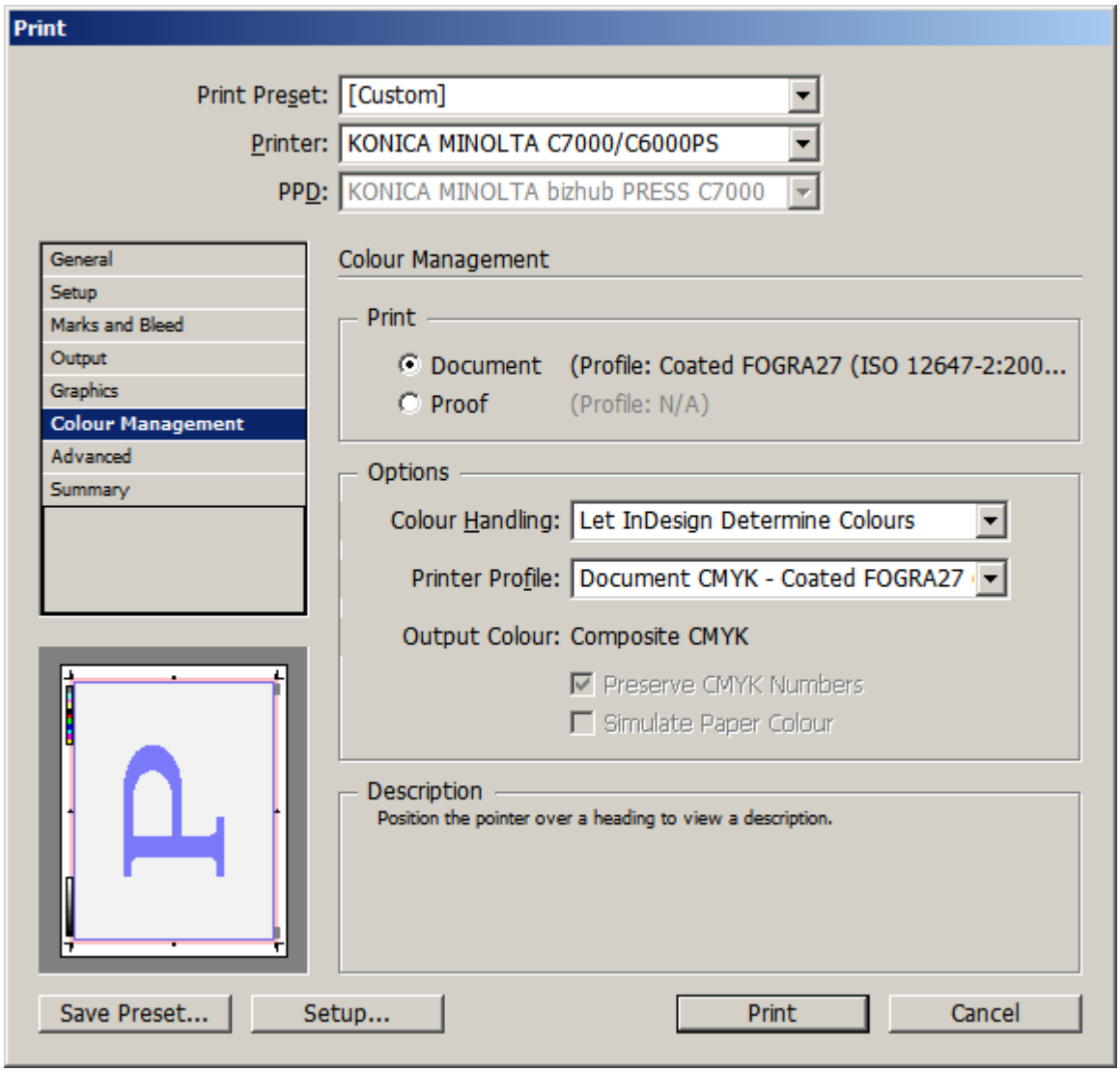
The Print dialog box, (File menu).

To choose a paper setting use Setup, this also allows you to orient the page sideways.



Print dialog box showing paper handling and orientation.

If you have a custom color profile for a specific printer, ink, and paper combination, letting InDesign manage colors may produce better results than letting the printer manage colors.



InDesign Print dialog box showing Color Management options.

4.5.1 Printing with Color Management

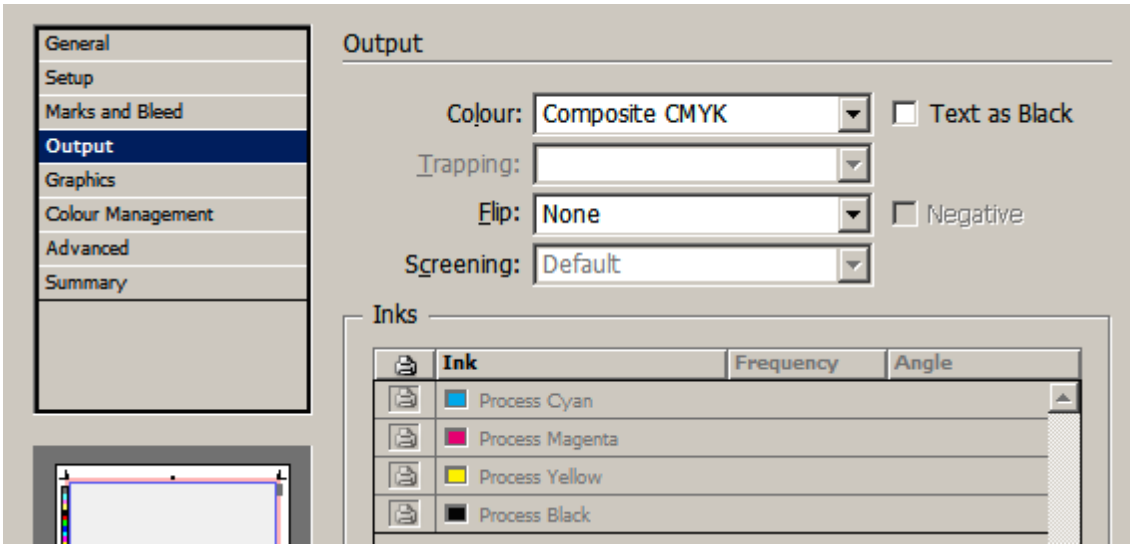
Color management options let you specify how Adobe applications will handle your files for printing colors consistent with what you see on your monitor. Your options for printing color-managed documents depend on the Adobe application used, as well as the output device selected. You have the following choices for handling colors during printing:

Let the printer determine colors.

Let the application determine colors.

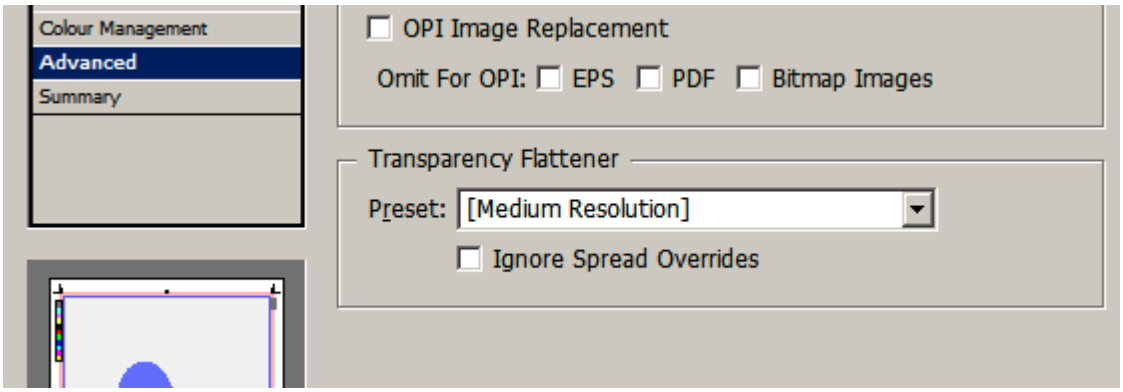
Do not use color management. In this workflow, no color conversion occurs.

Printing separations is usually reserved for pre-press specialists, however most printing jobs tend to be Composite Gray or CMYK for laser printers or Composite RGB for inkjet printers. The printer's documentation can accurately advise on its preferences in detail.



Output options for Composite CMYK. Plates and screen frequency settings are active when Separations is chosen.

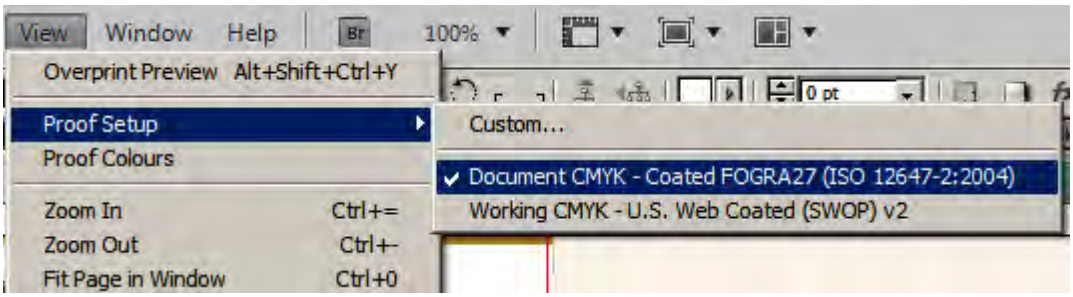
If there are complex transparency elements placed within the InDesign document, use the Transparency Flattener to improve print performance.



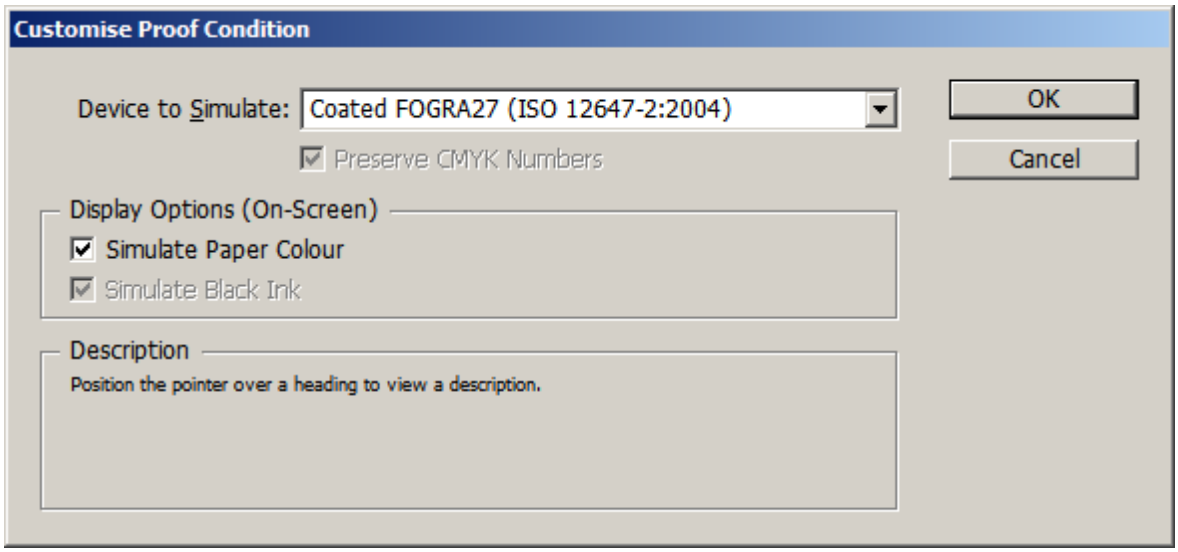
Transparency Flattener is found in the Advanced menu on left.

4.6 Monitor Proof

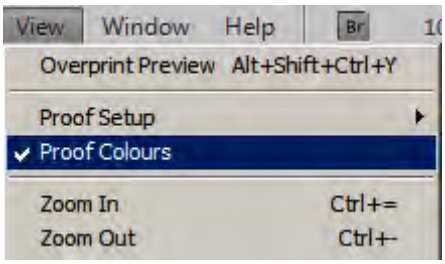
Also referred to as "Soft Proofing", this is the method to simulate the eventual output of your document on the computer screen. The real power of the soft proof is when using the Custom submenu found in Proof Setup. Here you can pick any ICC output profile that resides on your computer and save these settings to quickly produce a soft proof.



To customize the Proof Setup for your own output device use Custom. The saved settings will then be available as a menu option.



Choose the Device to Simulate in Pop-up menu.



Use Proof Colors (View menu) to turn on soft proofing.

Color-managing spot colors provides a close approximation of a spot color on your proofing device and monitor. However, it is difficult to exactly reproduce a spot color on a monitor or proofing device because many spot color inks exist outside the gamuts of printing devices. Some examples are metallic, gold, silver and fluorescent colors.

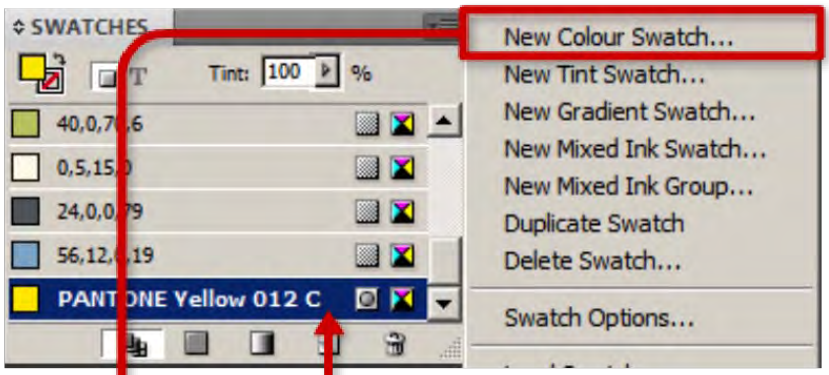
4.7 Spot Color

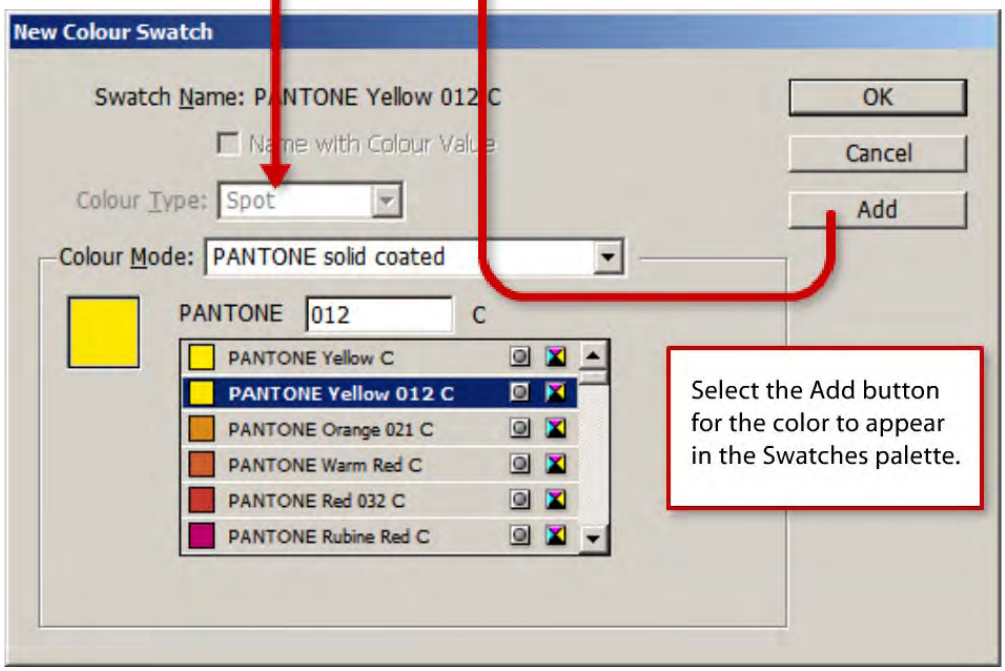
Spot colors are special pre-mixed inks used instead of, or in addition to, the process color (CMYK) inks. Each spot color requires its own plate on the press.

4.7.1 To choose a new spot color

Use the pop-out menu to select New Color Swatch.

From Color Type, select Spot. In Color Mode select your preferred spot color system and choose the colors which appear below.





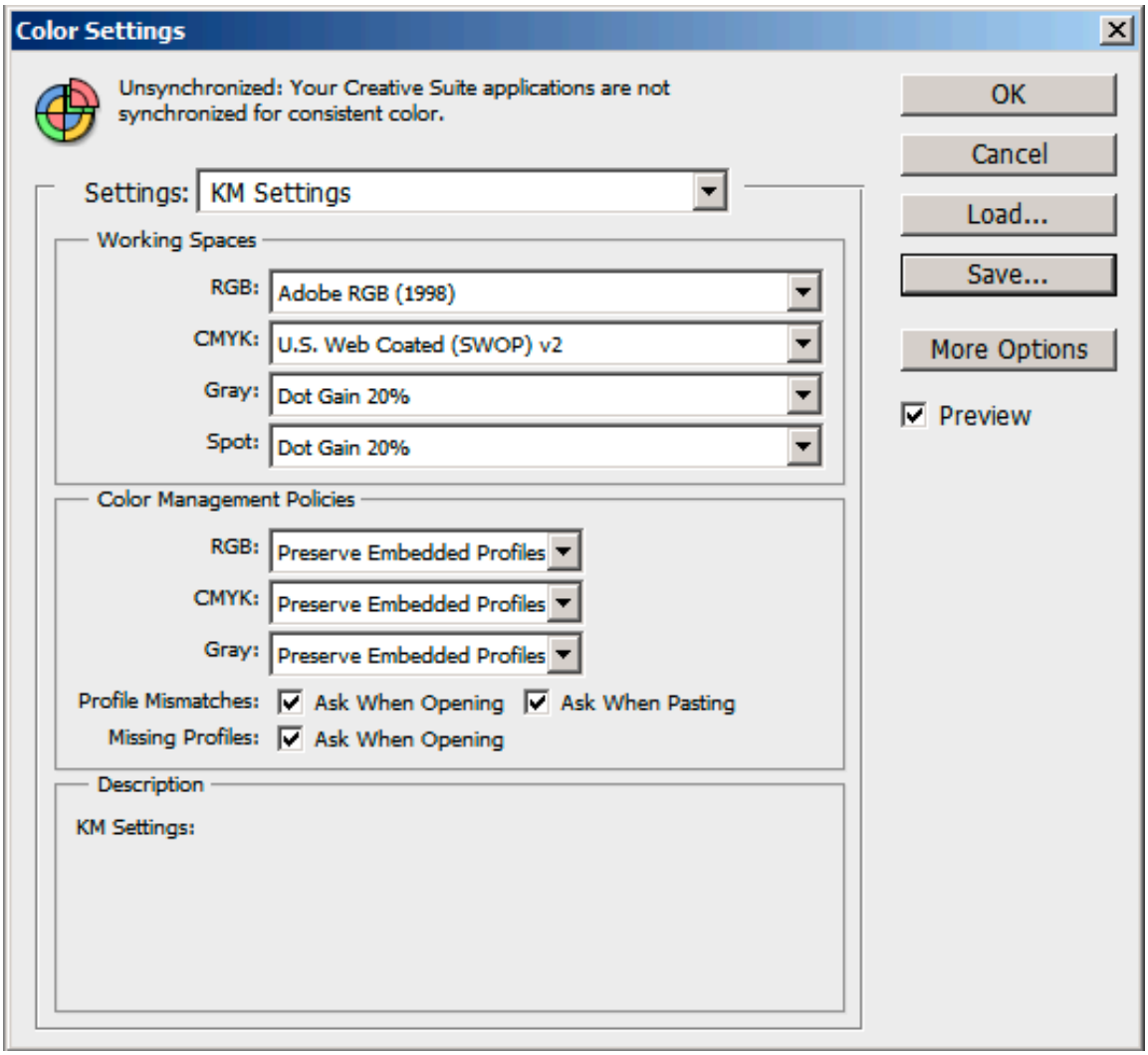
Some predefined spot colors, such as colors from the TOYO, PANTONE, DIC, and HKS libraries, are defined using Lab values. For backward compatibility with previous versions of InDesign, colors from these libraries also include CMYK definitions.

InDesign can also generate multiple spot color variations with its New Mixed Ink Group function. This function eases the mixing of two spot colors into a varying combination of percentages.

5 Adobe Bridge

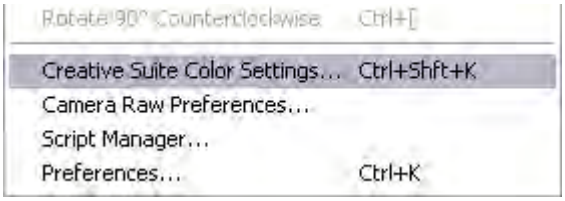
5.1 Color Synchronizing Adobe CS5 Suite

New to Adobe CS5 is an application called Bridge. Its function is to be a navigational link between the separate CS5 programs. Bridge has powerful cataloging and automation functions and well as synchronizing color settings. You begin by selecting the options you want to use in the Color Management Settings panel in one of the Adobe applications such as Photoshop.

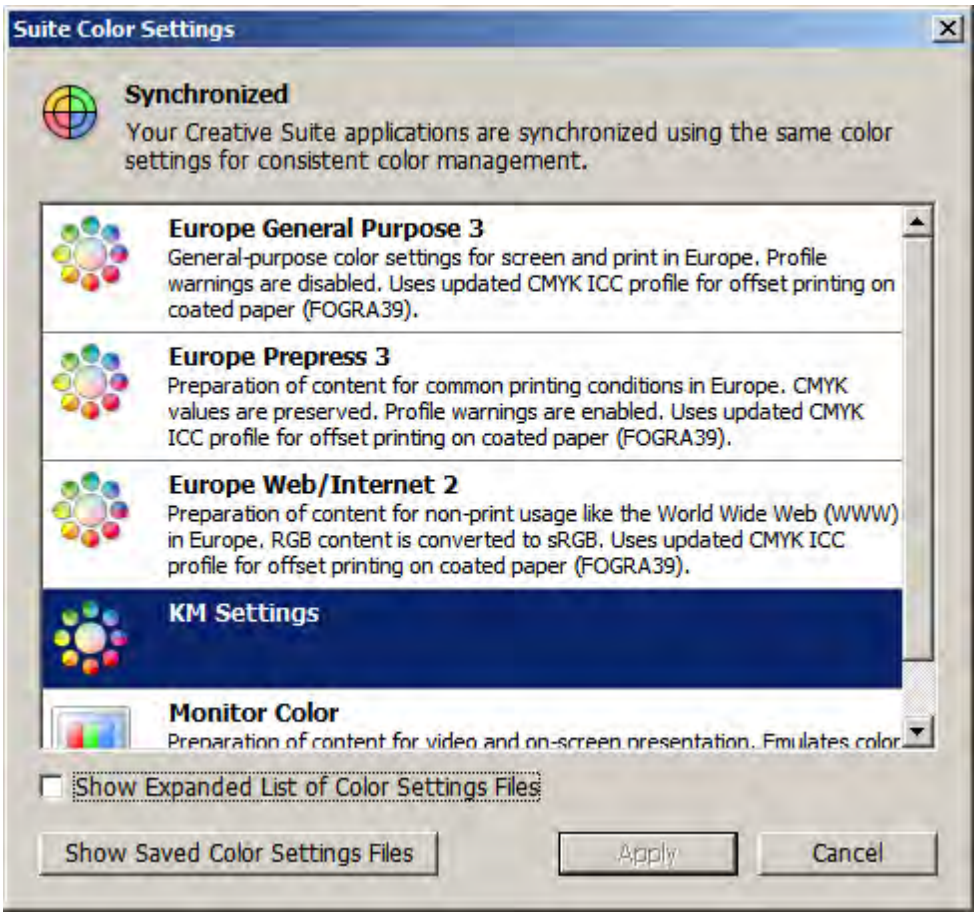


Color Settings in Photoshop (Edit menu).

Save these settings with the name of your choice, launch Bridge and select the CS Color Settings



Color Settings in Adobe Bridge (Edit menu). Note this is referred to as “Creative Suite Color Settings”.



Creative Suite Color Settings in Adobe Bridge (Edit menu) with default and custom settings.

Choose the setting, which you saved earlier in Photoshop (or other CS5 application). Your color settings will be synchronized when you select Apply. Selecting a default or pre-built setting will apply that setting across all Adobe CS5 applications as well.