



Color Management for Professional Work Flows & Black Printing CorelDRAW X5 SP3 & X6.1

David Milisock



Black Printing

Non-postscript Devices

The printing of (what is described as) the color black to non-postscript devices has been a hotly contested issue since the release of CorelDRAW X5. The reason for this is simple, the color management process in X5 positioned CorelDRAW to compete with all professional level graphic applications in the fields of ICC color managed postscript digital devices, as well as art quality archival printing and from non-postscript devices. However in doing so X5 had to be engineered to remove the non-ICC compliant processes that were supported in X4 and older versions of CorelDRAW.

The first thing to understand is that to conquer this issue we must all speak the same language and by that in this case I mean the term black. There is a color (NAMED) black for every color palette and color model in the world, they are all called black and THEY ARE NOT THE SAME BLACK! We must identify our color black by palette and color model when we speak and write! We must do this to avoid confusion because they will all not convert to the same color on the display nor in print.

The second thing to remember is that Non-postscript printing is a hybrid interface of the RGB world, all application color content during printing is converted in the process to sRGB then to some form of CMYK/ C, LC, M, LM, Y, K, LK, PK or other (up to 12 colors) version of CMYK. This forces the application through the GDI (graphic device interface) to convert ALL application color to sRGB, then to the media color profile for the device. X4 and older versions in all the default settings had a convoluted conversion process to CMYK then to the internal RGB which in some cases was a non-ICC compliant version of RGB.

The third thing to remember is that THERE NEVER HAS BEEN, AND NEVER WILL BE a true setting where color management is off. **The setting called color management off is simply a set of color management instructions governing how CorelDRAW converts color from one model or color space to another.**

The issues for users of previous versions of CorelDRAW are theses; first and foremost many of the color management procedures used by users were non-ICC compliant and therefore this fact will force the users of X5 and X6 to create color management settings in their current version to enable them to utilize legacy files without rebuilding the file and to make color management decisions about their file creation techniques going forward.

Second a few of these previously used color management procedures used erroneous exotic color management settings and due to some of the improper non-ICC compliant methods used in X4 and older versions there may be some settings that cannot be duplicated in X5 and X6. The Kodak color engine is no longer available as Kodak no longer distributes it, dual rendering intents, (saturation for vectors and perceptual for images) and most Non-ICC compliant work flows are no longer supported.

In the work flow section of this book black printing will be addressed in full detail so those who have a need to, can understand what they were doing in X4 and older versions and allow them to make the best decisions possible.

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Use

the files embedded profile to properly view and edit
the file in its color space
(no color change)

Convert

a file with an embedded profile into your documents
color space
(a proper color conversion)

Assign

a file with or without an embedded profile your
document color space
(a color shift may occur)

When properly configured the CorelDRAW X6 Color Management interface will ask or automate the process of answering these three questions. This publication will teach you how to understand and to properly answer those questions.

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Forward;

Regardless of your background with the CorelDRAW Graphics Suite you will find the information contained in this publication to be REQUIRED READING, contained herein is an over view of basic color management terms, all the information required to provide reliable and consistent color reproduction of your CorelDRAW X6 Graphics Suite file for the internet, office/presentation, traditional print and expanded gamut large and grand format output.

CorelDRAW X6 has been released with few but important changes in color management over X5 however users of X4 and older versions will find these changes add significant improvements for the CorelDRAW X4 and users of older versions. You'll see the main core technologies changes listed below, a detailed examination of the new color management dialogs and an easy to understand (How To Get My CorelX4 File To Match in X5 and X6) section that appears later in this publication.

1. Non-RGB objects and images can now be properly converted to the documents RGB color space as required, by the GDI (graphic device interface) in the print stream for non-postscript devices.
2. RGB vectors are now supported as native color in the EPS, PS and supported PDF export filters as well as postscript drivers and Distiller Published PDF.
3. Proper identification of all embedded ICC profiles is now possible upon opening, pasting or importing files.
4. Embedding of all ICC profiles is now possible in all CorelDRAW X6 and Corel Photo-PAINT X6 files specifically embedding CMYK and gray scale profiles, which before X5 was never possible.
5. The CorelDRAW Graphics Suite X5 and X6 now reads and utilizes the display ICC profile directly from the computers operating system.
6. CMYK color numbers are now allowed to change in the postscript print stream allowing for the use of ICC device media profiles for device simulation hard proofing.
7. The entire suit now utilizes document color management, meaning that the applications themselves can have default color management settings that may be different from the document. The applications are now capable of properly opening, displaying and printing multiple files simultaneously.
8. CorelDRAW X6 and Corel Photo-PAINT X6 are now capable of assigning or converting files to color spaces that are not the applications defaults.
9. The entire graphics suite allows simulated soft proofing and exportation for soft and hard proofing through the color proofing docker.
10. Each new document can be independently color managed and resolution adjusted at the startup with new document dialog, defaults or with settings custom designed by the user.
11. A professional level color management interface giving CorelDRAW X6 users the tools they need to compete at any level.
12. In X6 images can now be converted from their working space to the LAB color space and back to the document color space, in X5 once converted to LAB you could only convert to the application color space.
13. Improvements to the color display in the enhanced view mode have taken place in X6.

CorelDRAW X6 has provided you with a professional level color platform for your creations, the goal of the publication is to provide the user with enough information to make educated choices on how to configure those settings to allow you to recreate your color management settings from previous versions of CorelDRAW as closely as possible and to allow you to utilize the new enhanced features.

Color management between X5 and X6 is commercially compatible so absolute matches between the two applications is possible as well as with other professionally color managed applications.



About the Author

David Milisock has been professional in the graphics industry since 1975, supporting professional output from CorelDRAW since version 4 as Custom Printers. The support for CorelDRAW as well as other graphic applications started as output only but quickly evolved into support for postscript compliant file creation, at first only for established clients of Custom Printers. As word of mouth spread training services were offered to new customers and another company was formed, Custom Graphic Technologies Inc.. This company offered software support, this quickly evolved into the building of custom configured graphic workstations, and then into network support. As the companies evolution continued Custom Printers was absorbed into Custom Graphic Technologies Inc..

Today Custom Graphic Technologies Inc., while still offering training for graphic applications, workstation and network support, has evolved to offer state of the art Color Management Support, Technical Systems Development, Signage, Management Consultation and Print Production.

Our latest addition of a 34 foot ariel bucket truck aides in our installation of our many sign projects specifically our lighted sign cabinets, all created in CorelDRAW X6 of course. Not only is it diesel powered but it comes with it's own kitten.



David Milisock

Definitions and Overviews

You do not need to know how to color calibrate a multi-million dollar output system, however you do need to know a few basic terms and what they mean so that you can make an educated choice when the software requires you to select a setting. These are laymen definitions for the general user.

CMYK

Cyan, Magenta, Yellow and Black. The four base colors used in process printing. An absolute color space with a color limit of 100 for each color a total limit of 400 with identical meaning in all CMYK color spaces.

Color Calibration

In terms of the CorelDRAW Graphics Suite, it is using the features of the suite to print and or display specific target files in an un-color managed manner, reading the results with a spectrophotometer, creating device specific profiles, loading those profiles and maintaining a working environment that is conducive to utilizing the calibrated system.

Calibration for displaying Web, Presentation and Office work is

A white point of 6,500 Kelvin

Gamma of 2.2

RGB color space of sRGB (standard red, green and blue)

Calibrations for Printing Press work is

A white point of 5,000 kelvin

Gamma of 1.8 or 2.2

No standard RGB color space, consult your output provider

Calibration for expanded gamut ink jet reproduction has no standard at this time, consult your output provider

A Color Calibrated work environment requires attention to details, ambient lighting temperature, the decor of the environment, regular monitor calibrations. It also requires the user to adhere to some specific work habits, opening a file in its residing color space, proper conversion and file export methods.

Color calibration is like a mosaic, it is only complete when you have all the pieces in place!

Do not assume that your output provider will have their output calibrated.

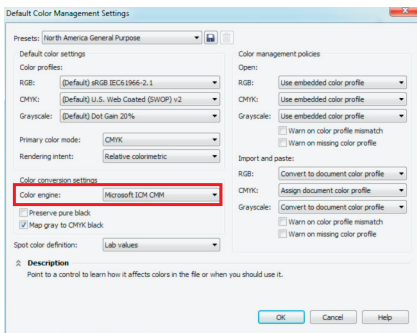
For printing press work postscript color managed process is still used, however many companies are now using ICC controlled processes . Which means TAGGED CMYK color profiles for exported files only!

All editing for RGB and CMYK requires that the objects or images color profile be used during the editing process.

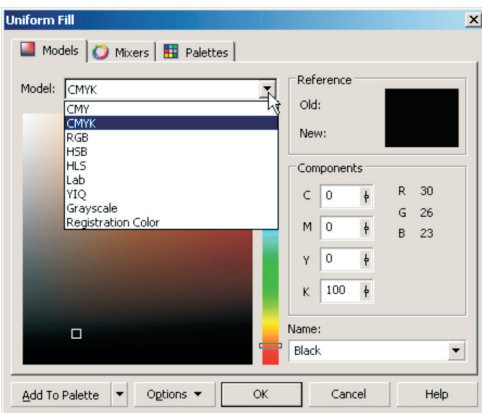
For all composite digital printer devices you will need to embed your RGB and or CMYK profiles.

Definitions and Overviews

Color Management Module



This is the software that allows the operating system, your graphics applications and your output devices to **communicate the color functions of your file to one another**. You will find this in CorelDRAW and Photo-PAINT under the tools menu/color management. Enclosed in the Red Rectangle, note that XP users will support MS ICM CMM 2 and Adobe Color Management Module (a third party engine that you must download and install). Vista and Windows 7 users will have the ability to use MS ICM CMM 3, WCS (Windows Color System), LCMS or download and install the Adobe CMM, (not available for 64 bit versions). **Look for a note concerning profiles and color engines in the profile section.**

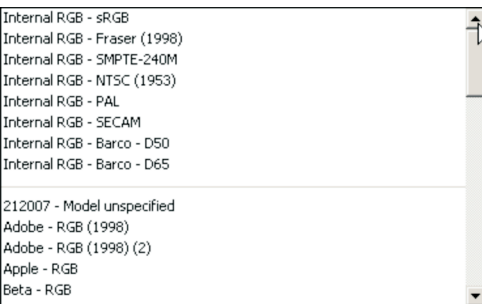


Color Model

This is a system so spaces and numbers can be assigned to the colors. Examples of color models are easily found in the **Uniform Fill Dialog** under the model tab in CorelDRAW as seen to the left. There are many times less correctly referred to as color spaces, in either case it is imperative that you control the color model and the color space of your images. **Remember color spaces exist inside color models.**

Color Space

A color space exists inside of a color model and is a **theoretical 3D representation of all the colors that can exist in a color space within a color model**. They have a profile file that is used to identify the color space inside an application so it can be used. However a color space is not always associated with a device. The **capture to the left** shows the drop down list from the internal RGB icon in the **Corel Color Management Dialog in X4**. These color spaces do not represent any specific device unless noted. An example of a device color space would be a **monitor profile this is a device specific profile** because it was created to correct errors in how this specific monitor displays color.



The confusion with the numbers used in RGB color spaces arises because different RGB color spaces have different sizes. However the distances between dark to light are always assigned a maximum of 256 shades. **What results is that the RGB numbers of one RGB color space do not always translate directly to another RGB color space. This is why it is imperative that you embed the profiles of your images. Grayscale and CMYK images have similar issues and require profile embedding also.**

Definitions and Overviews

Color Rendering Dictionary (CRD)

In Postscript Color Management the CRD is equal to the destination profile in ICC Profile color management and is a part of all postscript work flows. The CRD provides the destination color information for the final conversion from your file to the plate or film curve via the postscript interpreter. (This takes place automatically in the background and you will need to understand this term later in the book as we discuss CMYK press output and Postscript Color Management.)

Color Space Array (CSA)

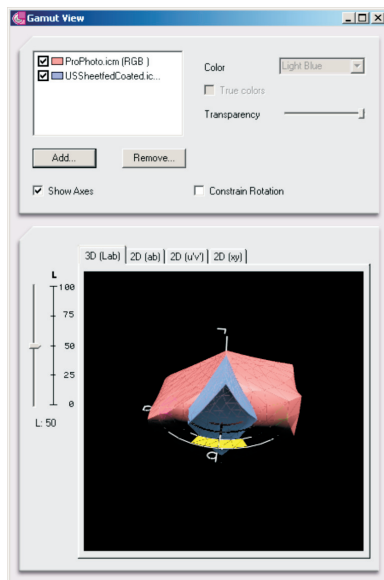
The CSA is incorrectly said to be equal to the source profile in ICC Profile color management, this is also part of all postscript work flows. The CSA is the apparatus that transfers the color numbers but not the color space from the objects or images in your file to the postscript interpreter which contains the CRD. (This takes place automatically in the background and you will need to understand this term later in the book as we discuss CMYK press output and Postscript Color Management.)

Gamma

The degree to which a color space is non-linear, this is chosen in the calibration software when one runs a calibration sequence. A gamma of 2.2 is now the standard. **Corel X5, X6 now allows you to choose your gray scale gamma**

Gamut

The range of colors of a color space. The range of colors and densities reproducible on an output device. **As shown in the screen capture from a profile editing application to the left.** The pink represents the range of colors reproducible in the Prophoto color space and the blue represents the range of colors reproducible in the U.S. Coated Sheet Fed CMYK profile.

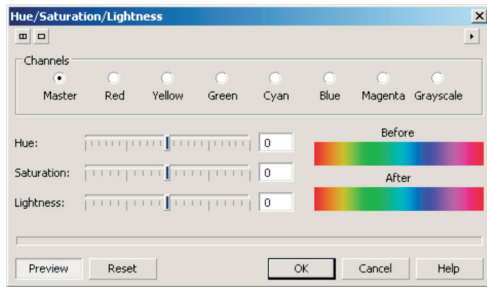


Gamut Mapping

The process of making the larger color space (in this case Prophoto) in pink in the capture to the left fit into the smaller U.S. Coated Sheet Fed CMYK color space in blue in the capture to the left.

Definitions and Overviews

Hue



The property of a light source from which we perceive its dominant wavelength.

Always used in conjunction with **Saturation** and **Lightness** so for purposes of ease we will discuss all three here. To the left you will see a capture of the Hue/Saturation/lightness dialog on Corel Photo-PAINT, it is found under the adjust menu in Photo-PAINT.

Saturation

The property of light from a light source from where we perceive the most pure, (single wavelength) light.

Lightness

The brightness of a light source when compared to a calibration standard

Kelvin

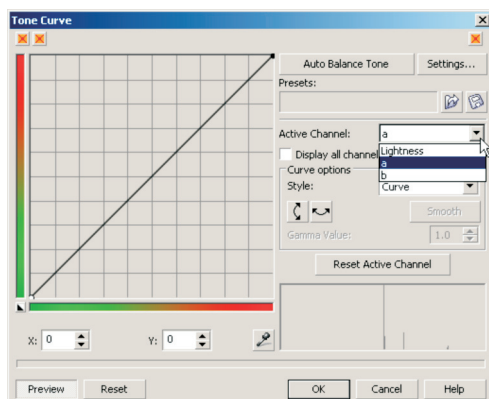
A scientific unit of measurement to describe temperature with the scale starting at absolute zero. Used as a measurement of the white point of a device profile as in a monitor calibration, 5,000 or 6,500 Kelvin.

Also known as CIE LAB it is a color space used as a profile connection space for conversions from one color space to another. It is also a device independent space used for color correction. The space is comprised of the L channel, A channel and the B channel. **L** refers to the lightness value, **A** refers to the red/green value and **B** refers to the blue/yellow value.

To the left you see the convert to menu that is accessed in Photo-PAINT under the image menu/convert to, note that we can convert to Duotone or other color spaces here.

It is important that you understand that LAB and another connection space XYZ are used anytime a color space conversion takes place. You will also read more about LAB when we discuss work flows which will include conversion methods to improve efficiency and quality.

LAB is the one color space we can convert our images to that will allow us to view them simultaneously and make critical color editing decisions before converting to a commercial color space.



Lightness

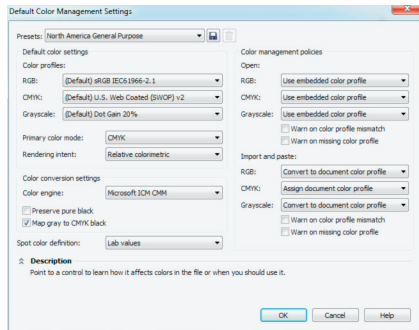
The degree to which a stimulus can be described as similar to or different from stimuli that are described as red, green, blue, and yellow.

Definitions and Overviews

Profile

A properly prepared profile is a file that contains all the required information to allow a Color Management Module to convert colors into or out of any color space.

A working understanding of profiles is so important to the CorelDRAW user that I will break with the alphabetized order of our definitions to provide an inclusive look at the profile information a user needs so you don't have to jump around the book. Including independent, device, source, destination, rendering intents, embedding and extracting of profiles.



The capture left is the main color management and profile control in CorelDRAW. It is accessed under the tools menu/color management/default. All the features of Corel color management revolve around understanding what the setting in the dialog and other CM dialogs do and what are the best choices for your needs. You load/unload or control the other functions of using profile through here. **Understanding profiles is the first step!**

Independent

An independent profile is most commonly referred to just as a color space, examples are Adobe RGB 1998, IEC sRGB, EIC RGB and CIE RGB, these color space have no affiliation with any device. These color spaces are most commonly used as the **Internal or working RGB for graphic applications.** The **Internal RGB in CorelDRAW is called the working RGB in Adobe.**

Device

As the name implies these types of profiles contain color control information specific for a device. They can be RGB or CMYK depending on the type of device the profile was created for.

Source

The source profile is the color space of any file that you would open in CorelDRAW or Photo-PAINT. It in most cases will be the color space of residence for the file. It is also the beginning profile of a color space in a conversion, for example, your Adobe RGB image is being converted to CMYK. **The source profile is Adobe RGB.**

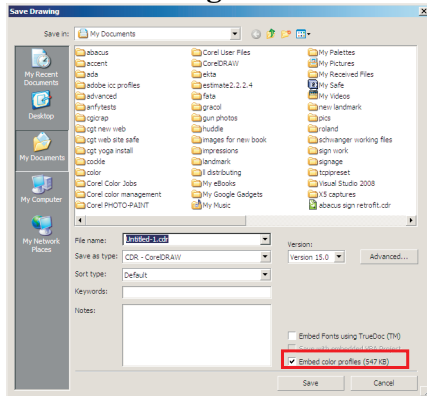
Destination

As the name implies it is the profile that controls the color space to which you are converting a file to. They can be RGB or CMYK depending on the type of device the profile was created for. For example, your Adobe RGB image is being converted to U.S. coated CMYK. Then U.S coated CMYK is the destination Color profile.

Definitions and Overviews

Profile Continued

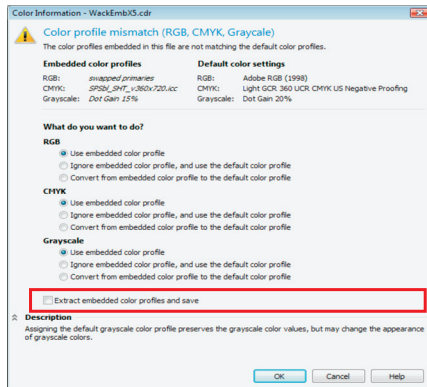
Embedding a Profile



The concept of attaching a profile to a file. Embedding a profile is done so the color profile travels with the file so color integrity can be maintained. Using the embedded profile for properly opening, editing or outputting a file is called **honoring the profile**. CorelDRAW X6 supports honoring an images embedded profiles, RGB, Grayscale and CMYK.

The capture to the left shows the check box in the save dialog that embeds the RGB, Gray scale and CMYK profiles for the document by default.

Extracting of a Profile



Extracting but not removing a profile from an image is done so it can be loaded on your system.

CorelDRAW is one of the few applications that supports profile extraction, you will need to do this for multiple reasons, the capture to left shows the checkbox in the open drawing dialog that allows this process. This dialog box will only appear if you attempt to open a file with an embedded profile which is not installed on you system. If you hover your mouse over this area it will tell you where it will save the profile, generally the Corel user file location usually the local drive c:\documents and settings (XP) user (Vista/Windows 7) username\application data\CorelDRAW Graphics Suite X6\user color.

If you're a Photoshop user you must have Photo-PAINT X6 so that you can extract a profile. If you open a file convert it to the LAB color model for editing you cannot then convert it back to the original color space in Photoshop, Corel Photo-PAINT X6 will allow this function but I recommend that any time this dialog appears you should extract the profile.

A Note About Color Profiles and Color Engines

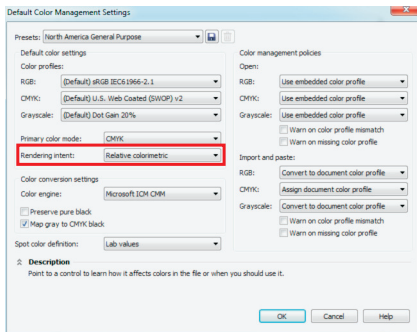
Type 4 ICC profiles are not supported by MS ICM CMM 2 in Windows XP, LCMS (Little Color management System), offers limited support for type 4 profiles, your must download the Adobe Color Management Module 1.1 if you need your new type 4 profiles supported however even then support is unstable and limited. This is required even if you have Adobe products such as the CS Suite installed even for the CS Suite to use these profiles properly.

In Windows Vista and Windows 7 you have a choice of MS ICM CMM 3, LCMS (Little Color management System) and WCS (Windows Color System) color engines. I personally recommend the WCS as it has performed extremely well for me, it has had rock solid performance with conversions very similar to the Kodak engine used in previous versions of CorelDRAW. Type 4 ICC profile support is provided in Windows Vista and Windows 7 via the MS ICM CMM 3 and WCS color engines.

Definitions and Overviews

Profile Continued

Profile Rendering Intents



Absolute Colorimetric

The conversion of color relative to (attempting to reproduce) the source colors white point with an exact match of the colors of the source that are within the destination profiles gamut. Colors from the source that are out of gamut for the destination are mapped to there nearest equivalent.

Many times used in proofing when trying to match the white point of a magazine or newsprint on a different proofing paper. This will produce a window pane effect on the proofing paper which is caused by the attempt to print what the intent sees as the white point of the original paper.

Relative Colorimetric

The conversion of color with a remapping of the source colors white point to the destinations white point, with an exact match of the colors of the source that are within the destination profiles gamut. Colors from the source that are out of gamut for the destination are mapped to there nearest equivalent.

Most often used in proofing general commercial work and in basic RIP or driver set up.

Perceptual

The conversion of color that tries to preserve the perceptual relationship of color. All colors in the source, both those that are in and out of gamut for the destination profile are manipulated to maintain the perceptual relationship, (the feel) of the colors from one space to another.

Most often used in images when converting RGB files that significantly out of the CMYK gamut. My choice for all around work.

Saturation

The conversion of color that tries to preserve the saturation properties (color depth) of color, even at the expense of hue accuracy.

Most often used in signs or the reproduction of maps, the least accurate of the rendering intents but with significant value in some processes.

Definitions and Overviews

Profile Continued

Profile Connection Space

When a color space is converted it is done via a connection space that connection space is a theoretical space and by design it is LAB or XYZ also known as CIE XYZ. What happens is that the source (original) color space is converted to the theoretical space and then that space is converted to the destination color space. This is done to facilitate the process as it is only required to compute the changes from the source or to the destination in one space LAB.

Color Space of Residence

The intended color space of creation of an image.

Example: If you create or capture an image in Adobe RGB whether or not you embed a profile the image is said to **reside in the Adobe RGB color space**. An image editor or output device that has its color controls for the source color space set to the images color space of residence will have the correct source information required to view, display or output this file correctly.

As this publication will deal with work flows it is important to understand this one important aspect of profiles.

False Profile

The process of assigning a profile to an image other than the profile that matches its color space of residence.

This is usually done to cause a color shift in the output, not recommended.

This Ends the sections on Profiles

RAW

Is a file format that is proprietary to the camera manufacturer. They are linear-gamma, grayscale images from digital color filter arrays. All these files require processing by a RAW converter to convert them to an RGB image. Corel Photo-PAINT X6 supports many RAW camera formats and converts your RAW file to the internal RGB color space.

RIP

Raster Image Processor, it is the software and or hardware device that will rasterize (converts to image) the interpreted postscript file.

Saturation

Saturation is the colorfulness of a color relative to its own brightness

Soft Proof

Editing a file in one color space but viewing it in another.

sRGB

Standard RGB color space designed for default use (assumed color space) of computer systems and the internet.

Tagging a Document

The act of embedding a profile with an image or document, an image with no embedded profile is called **untagged**

Total Ink Limit

Also known as total ink coverage. The total amount of all inks used at one time to reproduce (D_{MAX}) maximum density.

CMYK profiles can very efficiently be referred to by the total ink coverage. For example: a TIC 360 CMYK profile.

The Color Management Interface

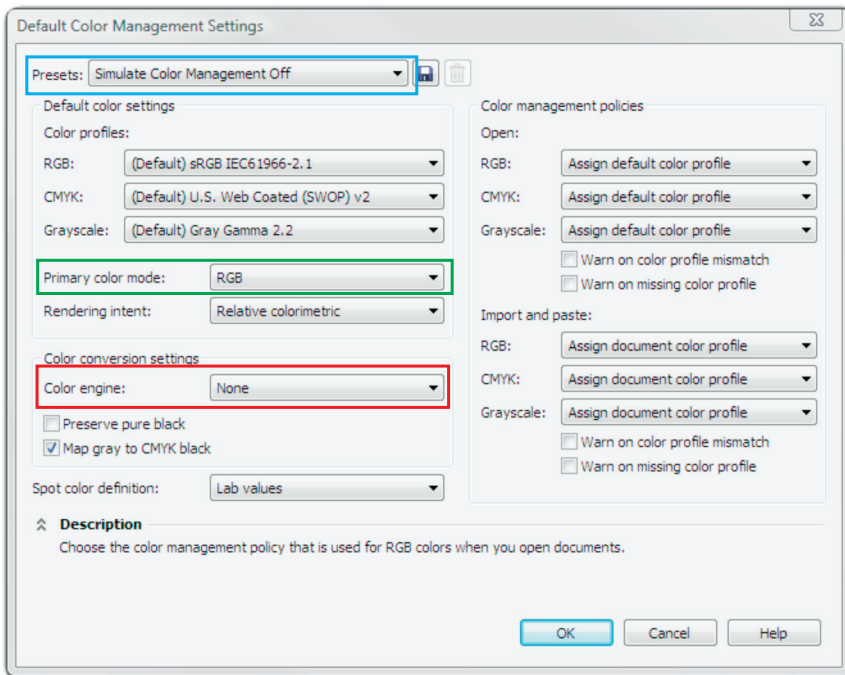
The color management interface of X6 is a serious departure from previous versions of CorelDRAW prior to X5, it has been configured to compete and operate with all ICC compliant applications. The application itself has basic default settings which are commercially compatible with all commercial graphic applications. The interface controls how the applications react to creating new documents, opening, importing and pasting files and file elements into current documents. With that said each and every document, including those which are open simultaneously can have their own color management settings while they can individually display and print accurately.

This may at first sound confusing however it is not, it is how professional level color managed applications must function. To help orient ourselves to this type of color management this section of this publication will show you the X6 color management dialogs, describe in detail what the settings in the dialogs are and what they do.

In this section of the book I will also suggest some settings for some specific types of work flows however very specific instructions for specific work flows especially matching color management settings from CorelDRAW X4 and older versions of CorelDRAW will follow in later sections of the book.

CorelDRAW Graphics Suite X6

The Concept of Color Management Off. (There is No Such Thing!)



Anyone who frequents the Corel public forums knows that this setting is something that needs to be addressed immediately, so I'm doing it on the first page of the color management interface section. Corel has to their credit in X5/X6 provided a solution for users who have developed work flows based on this false premise. Laser engravers use this feature extensively.

THERE IS NO SUCH THING AS COLOR MANAGEMENT OFF PERIOD!

Until I wrote my first book on color management for CorelDRAW there had never been any cognitive collection or any one single source of ICC compliant instruction sets for CorelDRAW color management. Unfortunately until the time

my book was released the level of understanding of how Corel handled color by the user base was shall we say, interesting. While CorelDRAW X4 and older versions of the application were capable of producing work in a postscript and ICC compliant manner the fact is that in most publically available writings on CorelDRAW color management the author either didn't understand how Corel applied the ICC rules or possibly didn't understand the ICC rules at all, this has lead to the development of non-ICC compliant work flow processes for many users in the laser engraving, dye sublimation, embroidery and the large and grand format ink jet businesses.

CorelDRAW X4 and older versions were applications that managed color through a process called application based color management without the ability to change the applications color setting on the fly. Other shortcomings in the color handling process, such as no support for RGB color model vectors in postscript and the inability to convert non-RGB file content to the internal RGB color space lead to a very complex instruction set for proper ICC compliant color management from CorelDRAW X4 and older versions. ICC compliant processes were always possible but the instruction sets were too difficult for many users. CorelDRAW X4 and older versions were best and most easily used in state of the art professional digital front end RIP driven systems which is where most of my experience comes from.

Accessed under the tools menu/color management/ default settings is the application default color management dialog shown in the capture above. The presets (outlined in cyan) have in their alphabetical listing a preset named simulate color management off. What happens is that (outlined in red) we can see the color engine is disengaged and (outlined in green) the primary color mode is set to RGB. **When working in this mode it is imperative for the best color integrity that you build your file with all RGB color model, objects and images.** All color conversions from one color space to another will be incorrect, PERIOD! You may have been using older versions of CorelDRAW with the color management off setting and have been happy with your conversions but they are incorrect non-ICC compliant conversions. As Corel has decided to continue to support this work flow conversions in this color mode will continue to be in X5/X6, non-ICC compliant.

The application will still embed the profiles you see listed but will not use them as the color engine is disengaged. The other features of the default color management dialog are also disengaged. This resolves any legacy file conflicts arising from the use of this color mode however I suggest that users may wish to develop new work flows designed around ICC compliant processes as this will make your Corel work commercially compatible.

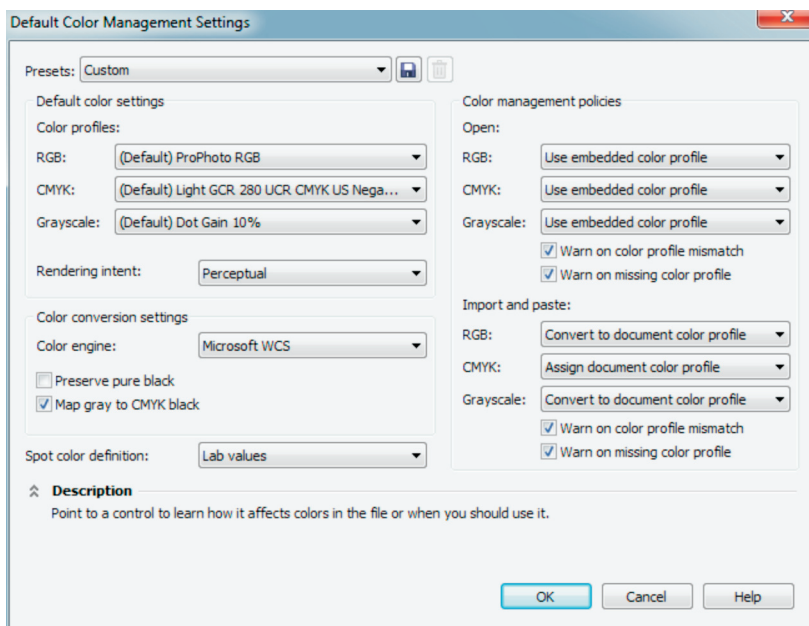
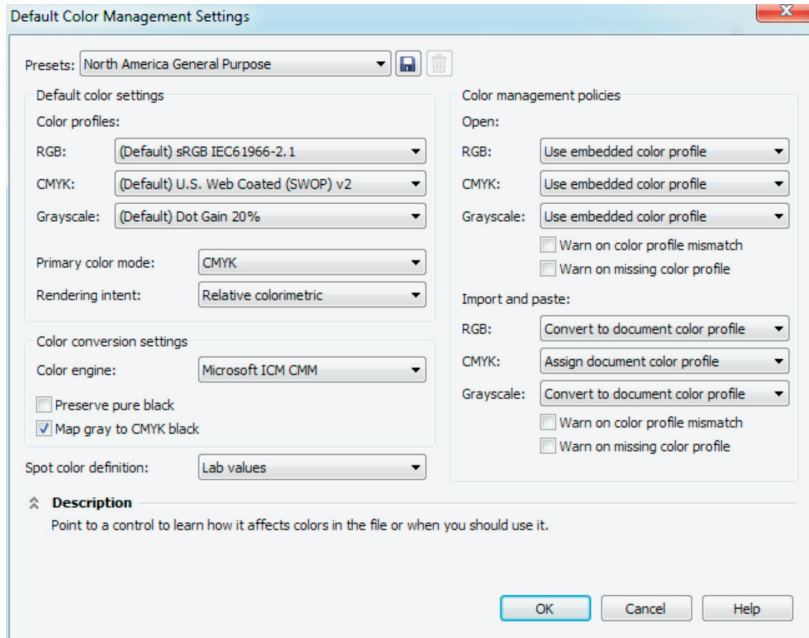
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Application Dialogs

To the left you see the application default color management dialogs, top is CorelDRAW and bottom is Corel Photo-PAINT. Accessed under the tools menu/color management/default settings. **Please do not take any of the settings shown in these dialogs as suggested color management settings.** The only real difference between the CorelDRAW and Corel Photo-PAINT dialog is the Primary color mode setting in the CorelDRAW dialog, this is because a CorelDRAW document can contain elements from multiple color models, (RGB, Gray Scale, CMYK and spot color) Photo-PAINT cannot and this setting is required to instruct CorelDRAW on how to handle special effects rendering, (transparency).

I feel these are critical settings to a smooth user experience, so let me start with the **check boxes labeled Warn on color profile mismatch and Warn on missing color profile**, under the Color Management Policies section of the dialog subsections Open, Import and paste. These check boxes do exactly as they are labeled, when they are checked they give you a warning that allows you to make a choice or when un-checked to rely on a preprogrammed set of instructions. The choice for these setting is up to you based on your work flow needs.

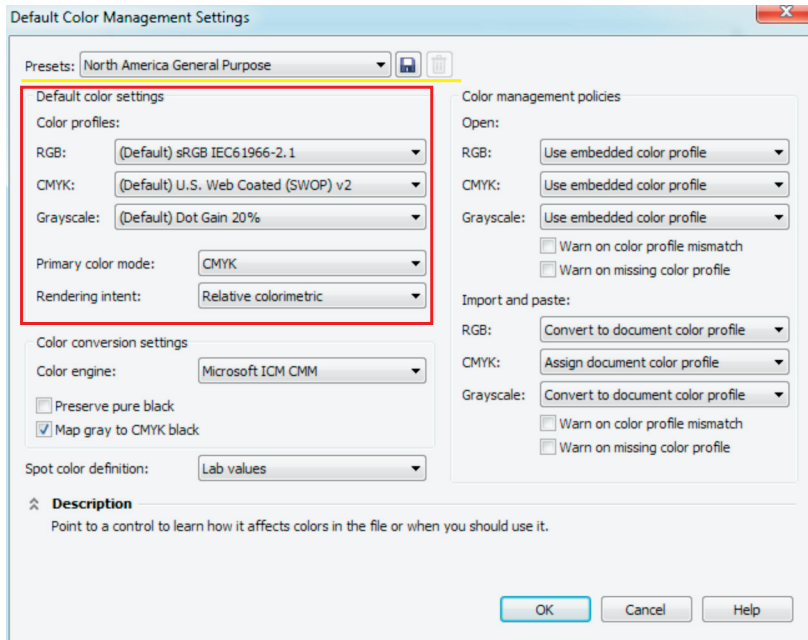
Un-checking these boxes is a reasonable choice for those who have a color work flow that does not vary. The application will automatically upon opening **use** the embedded profile. Upon importing or pasting it will **convert** to the document color space all RGB and Gray Scale spaces and then **assign** the document color space to the CMYK color. The problem with this type of work flow is that any image or file that does not have an embedded profile simply opens or imports into your



document and assumes the documents color space, right or wrong with no way of knowing. This is significant because most Corel users have many files without embedded profiles. There is a solution that is reasonable, look and take note of your color management setting used in your previous version of CorelDRAW and Corel Photo-PAINT, follow the instructions in this publication for duplicating those setting and simply open your file. This can be more complicated if you were using a customized color management setting in X4, due to the nature of how X4 and older versions of CorelDRAW handled color, please refer to my color management book for CorelDRAW X4 and older versions at www.graphicstechnology.com.

If your files come from many varied sources then it is imperative that you check these boxes. When this is done CorelDRAW and Corel Photo-PAINT X6 will ask you to make the decision when a mis-match or missing profile occurs. An example of this would be a Corel user who has the entire suite set up to work as sRGB. This user has a specific job that will not only post on the web but will also print expanded gamut to an inkjet printer. When an RGB image is opened in Corel Photo-PAINT X6 that is not sRGB with these boxes checked Corel will ask what to do. Your choices are to use the embedded profile, convert to the documents color profile or assign the documents profile. A missing profile will allow you to assign a profile and convert to the documents profile. All imported items should be converted to or assigned a documents color space proper for its color model.

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To continue with the default color management settings at left notice the presets underlined in yellow. These are default preset color management settings that are commercially compatible. They match those used by the competition. Use the drop down and page through them you may see regional settings that apply to your area.

The default color setting outlined in Red contain the color profile settings, primary color mode for CorelDRAW and rendering intent for the application. Let's look at these first for CorelDRAW, for internet, office or presentation display work. The RGB setting of sRGB 2.1, a CMYK profile that is commonly used in your region and a dot gain of 20% is common. These default setting in PhotoPAINT of sRGB, Adobe RGB 1998 and Prophoto RGB are supported in the RAW converter.

Print work would require an RGB setting that reflects the region in which you live, (I.E. Adobe RGB 1998 in the Western Hemisphere), as well as a regional CMYK color profile. Again the dot gain of the grayscale at 20% is a reasonable choice.

The primary color mode controls how Corel handles special effects and since the (soon to be discussed) document dialog picks up its settings from the application dialog it behooves you to set this to match your dominant work flow. Set for RGB if you work primarily for the web or presentations and CMYK if primarily for print. Those of you who will be working with expanded gamut ink jet output can experiment for yourself but my experience has been that CMYK mode has worked best for me in this workflow.

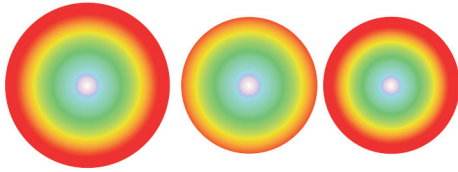
The rendering intent setting allows you to choose which rendering intent you want to use, earlier in this publication I gave you a laymen's definition of the four intents. Absolute Colorimetric and Saturation have specific uses and as such will not be discussed here. To make a reasoned decision at this stage of the game requires a bit more information, choosing a rendering intent depends on what color space your converting from (source) and what color space your converting to (destination).

CorelDRAW X6 has a proofing docker (which we will discuss later in detail) for your proofs that will allow a choice of a profile and a rendering intent, so choosing one intent one place and a different one in another place makes sense if you understand how the process works, with that said let's take a look.

First off we have to understand that while color has no actual physical size, the only way to theorize about it and to create applications to function with it, is to give color a property that can be measured. That property is a three dimensional color model and a gamut (a physical size) within that model and then an X, Y coordinates within that gamut to identify and measure that color. **WOW! WAY TOO HARD!**

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An Exercise



To our left we see three circles, the far left circle is physically larger than the other two, its physical size represents a large color space and the colors you see in that circle represent that color space's ability to display color. The two smaller circles represent a smaller color space in which we have to convert the larger circle's color space into. The difference in physical size and dispersion of the color between the two smaller circles represents what happens when we use different rendering intents to

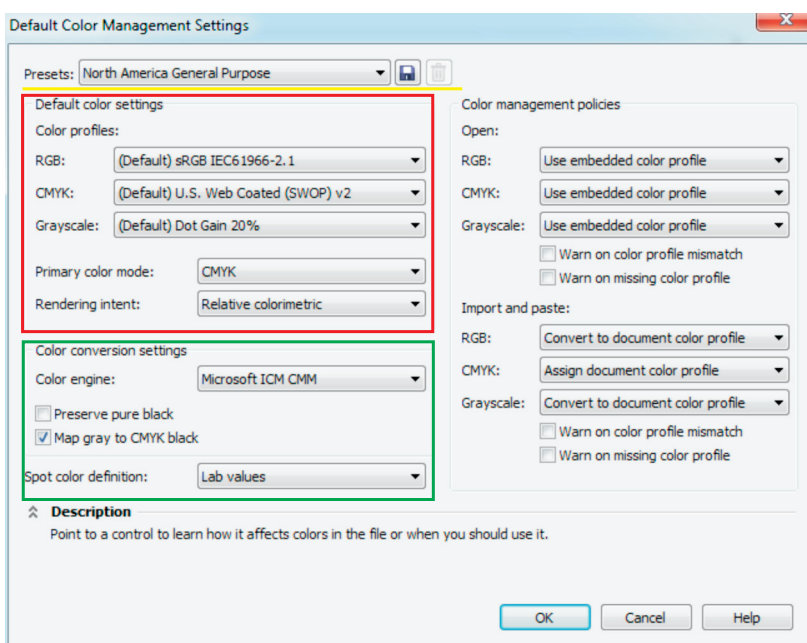
convert the larger space to a smaller color space.

THIS IS NOT SCIENTIFIC, it is an attempt to place a layman's understanding to a difficult concept. The circle in the middle represents what happens when we convert a larger color space into a smaller color space using relative colorimetric rendering. Note how the space is the same size of the circle on the far right but the many of the red colors that existed on the outside edge of the space are gone or altered. The white center is the same physical size as the larger circle to the left. This is what happens by definition; **“The conversion of color with a remapping of the source colors white point to the destination's white point, with an exact match of the colors of the source that are within the destination profile's gamut. Colors from the source that are out of gamut for the destination are mapped to their nearest equivalent.”**

The circle on the far right represents what happens when we use perceptual rendering to convert a larger color space into a smaller color space. Note how the perceived relationship of the colors is similar. NOT THE SAME, but similar enough that the perception of the two is very similar. We have the darkest red of the outer edge and the physical size of the white center is slightly smaller. By definition what takes place is; **“The conversion of color that tries to preserve the perceptual relationship of color. All colors in the source, both those that are in and out of gamut for the destination profile are manipulated to maintain the perceptual relationship, (the feel) of the colors from one space to another.”**

What this means is that there is no correct way to convert a large color space into a small color space, PERIOD! It's a judgement call, perceptual rendering keeps the overall feel (perception) of the colors so it is my choice for all conversions from a large gamut to a small gamut. Relative colorimetric simulates the white point and only changes the colors that are out of gamut for the destination color space, however all RGB color spaces are significantly larger than destination CMYK color spaces, making relative colorimetric a poor choice for RGB to CMYK conversions. With that said relative colorimetric is a great proofing rendering intent for **files that already reside in a small color space and are to be proofed in an equally sized or larger color space.** For

example a CorelDRAW file that is already converted to CMYK being proofed on an inkjet or match print device.

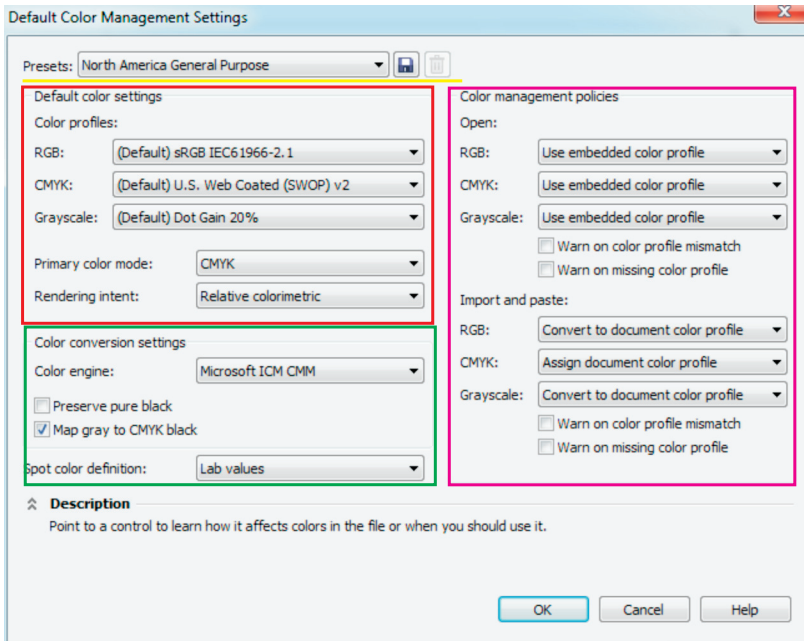


I hope I've given you enough information to make a choice between the two rendering intents. I've ignored Saturation and Absolute Colorimetric as I see them as very specific and those who want them have a definition to guide them and the ability to select these profiles. The default color management settings dialog allows you to make your choices and to save them so this is a once and done deal for a very large percentage of Corel users.

The color conversion settings outlined in green allow you to choose your color engine. Corel supports the Adobe Color Management Module if you have downloaded it and installed it on all supported operating systems. XP users can choose MS ICM CMM 2 and

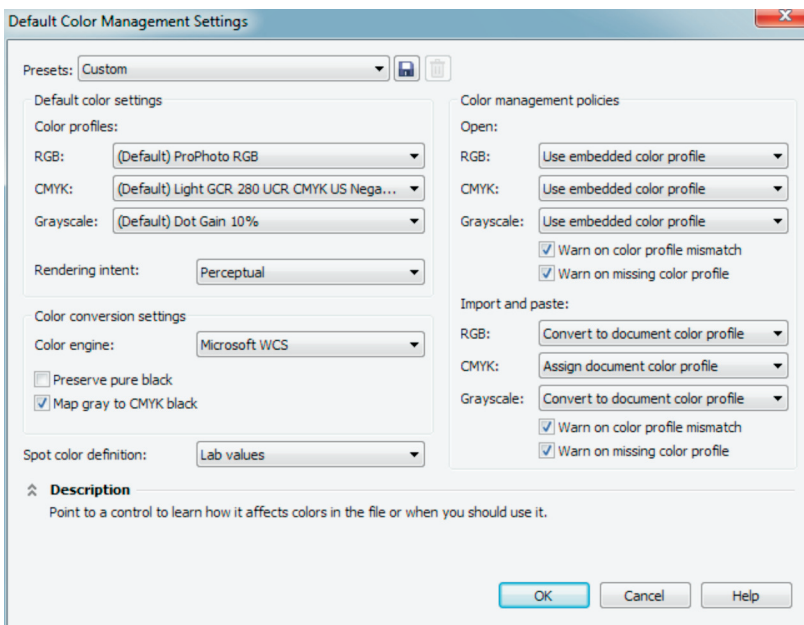
LCMS, Vista and Windows 7 users may use MS ICM CMM 3, LCMS and WCS (Windows Color System) Color Engines. Type 4 ICC profile support on Windows XP requires LCMS or the Adobe Color Management Module a utility that you must download from Adobe however type four support is limited.

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The color engine you choose is up to you I use Vista and Windows 7 now and have been using WCS (Windows Color System) for some time with rock solid results. For users that have migrated to Vista or Windows 7, WCS is a great choice as the results I get with my conversions very nearly duplicate the Kodak color engine used in previous versions of CorelDRAW X4v and older.

The settings to preserve pure black and map grey to CMYK black are your choice, users of previous versions will see less issues with the map gray to black settings. **Preserve pure black will give errors from some images and in my opinion should not be used as all vector conversion will be incorrect.** However this setting duplicated Adobe Illustrators rasterization conversion and can be useful when you need to convert complex vectors to grayscale raster images.



Spot color definition allows Corel to choose how to convert colors for display and conversion to other color spaces. The LAB choice is how Pantone is currently dictating that it be done, RGB is a choice that will duplicate CorelDRAW X4 or older versions.

Color management policies are outlined in magenta. The default settings for open as well as import and paste you see in this capture. You choices are use embedded profile, convert to document color profile or assign document profile. We'll assume that the warn check boxes are checked. This will be discussed in detail when we cover the mismatched and missing ICC profile dialog.

The default color work flow

(This discussion assumes the warning check boxes are unchecked)

Open file, if the file has an embedded profile the file opens properly. When the files color space does not match the application default, the application converts the document to the application color spaces. If the documents color profiles are missing the application assigns the documents color profile and a color shift may happen.

Importing or pasting files is just as simple except Corel looks at the document color management settings not the application default color management settings. If the files color profiles matches the open document the file imports properly. If the files profiles do not match the document the files color spaces are converted to the document. If the file is missing a profile the documents profile is assigned the document color spaces, a color shift may happen. CMYK files by default has the documents color space assigned meaning that the CMYK numbers remain, output to ICC controlled devices will shift but to Postscript color managed devices the output will remain the same as the source.

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Let's see the dialogs and then discuss them individually.

To the left the 4 captures outlined in red top to bottom we see the missing profile and profile mismatch dialogs from Corel Photo-PAINT and CorelDRAW, note that the profile mismatch dialogs from both applications are identical to each other. The missing profile dialogs from both applications are also identical to each other. I show them to you anyway so you're not concerned that we missed something.

To understand these dialogs one must first come to grips with the concept of document color management and how this is affected by interaction with the application default color management settings. Let's see the controls and then discuss them.

Applications color controls.

The default color management settings (shown previously) under the tools menu\color management\ default settings; control the ICC profiles that the applications sees when you select to create a new document. These are the applications defaults and are not dependent upon the document.

The Photo-PAINT default settings control the ICC profiles used for conversion of any RAW images that are opened in Photo-PAINT and any new images started in Corel Photo-PAINT X6. **(Note: NEW FOR X6 Corel now remembers the document color spaces for files converted from any color space to the LAB color space, when converting back will return to the documents color space and not the application default)** this function carries through for images in Draw that are edited in Corel Photo-PAINT 6.

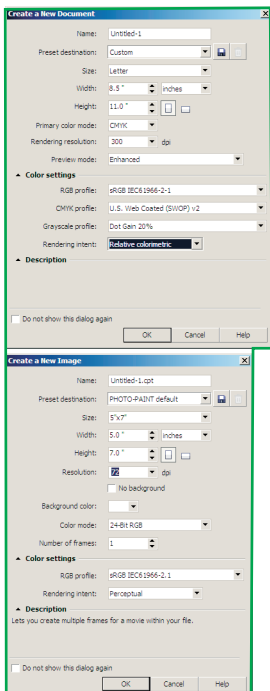
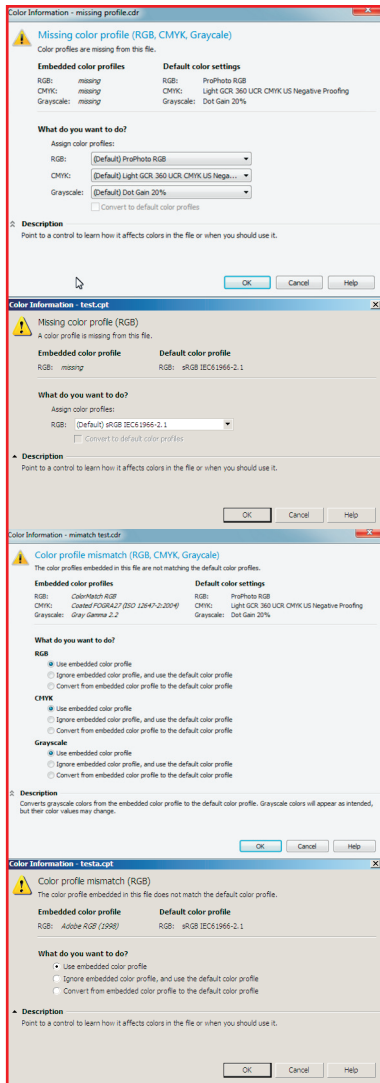
Document color controls.

The document color space is controlled by the create a new document dialog in CorelDRAW and create a new image dialog in Corel Photo-PAINT, shown respectively as the captures outlined in green to the left. You can always change a documents color spaces later, under the tools menu/color management/document settings.

The differences between the dialogs is that in CorelDRAW you choose 3 profiles, RGB, Gray Scale, CMYK because any CorelDRAW document can contain objects and images from multiple color space. A primary color mode to control effects rendering and the preview mode, simple wire frame, wire frame, draft, normal, enhanced and pixels.

In Corel Photo-PAINT you have controls for no background and for number of frames for animations.

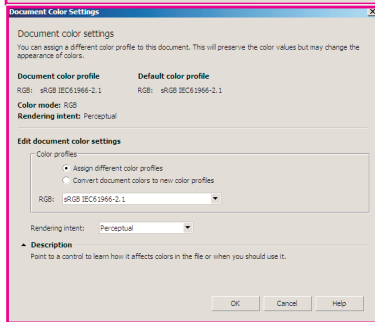
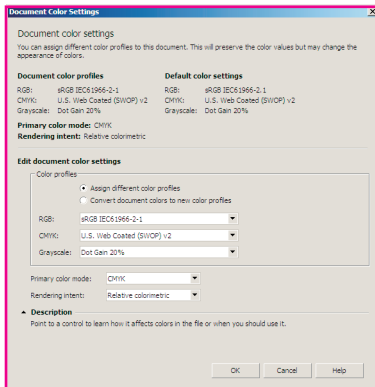
Both application dialogs have a check box so that you can start a document without showing the dialog. This is handy for those who regularly work with the same color space and document settings. There is an check box in DRAW and Photo-PAINT under the tools menu/options and then by selecting the general button to reactivate the dialogs when starting new documents or images.



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Document color controls.

The two captures to the left, outlined in magenta are the document color management dialogs found under the tools menu/color management/document settings. These allow changes to the color management of a document after it has already been created. We will address all these dialog immediately on the following pages.



Document Control Verses Application Control.

Application Color Management

In the CorelDRAW Graphics Suite X4 and older versions, color management was application based. What that meant was that for proper display and ICC controlled output, the ICC profiles of the application had to match any file that was opened in Draw or Photo-PAINT.

In X5/X6 the application color management settings control the default settings of the new document and new images dialog settings that will appear when you launch these dialogs.

The application ICC profiles are used as the destination color space for any CorelDRAW file opened as an image file in Corel Photo-PAINT. Photo-PAINT will see the Draw X6 document embedded source color space and allow proper conversion to any of the color spaces set as default in the application default color setting dialog of Photo-PAINT.

When set as default the application profiles sRGB, Adobe RGB 1998 and Prophoto RGB in Corel Photo-PAINT will be used as the destination color space for any RAW image converted using the RAW LAB. If the converted image is to be pasted into another Photo-PAINT or CorelDRAW document you must first set your application to give warnings of profile mismatches or set the application for automatic conversion to document color space to maintain color integrity in the case of Photo-PAINT having a default archival RGB.

This is the extent of the interaction of the application color setting dialog and the documents.

The relationship between the application color management settings and the document color management settings can be difficult to understand. In X5 and X6 a user can have multiple files from different color spaces open simultaneously, viewing and printing the properly, hence document color management. This is not possible in X4 and older versions.

The applications require some default color management setting to base the preset controls on, for example a user decides to open an RGB CorelDRAW file into Corel Photo-PAINT. Photo-PAINT will see the embedded RGB profile and therefor have the proper information for color conversion and rasterization of the file. However if the user wants to rasterize from the original RGB color space to CMYK, Photo-PAINT must rely on the applications default CMYK color profile for information on the destination color space. This is just one example but clearly define why there has to be application default profiles as well as document color profiles.

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Document Color Management.

Document color management except for the aforementioned interactions are exactly as stated. Each document can have it's own color spaces, simultaneously display and print properly.

If you start 5 new documents you'll get 5 new document dialogs (outlined in green) and each document can have different color management settings. If you have 5 open documents and under the tools menu select color management, document color you'll get a different document color dialog (outlined in red) for each document. These documents will not affect each other and they will display, soft proof and print properly.

Document color controls, control the profiles in which content imported and pasted into the document is converted to and the profiles used for the conversion menus of the applications. Example the destination CMYK of all Gray Scale and RGB content and visa versa.

We will now discuss these dialogs individually and how they interact with each other. Then we will look at these interactions, under several different scenarios hopefully this will provide guidance for your specific situation.

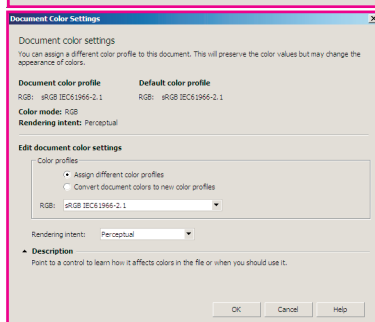
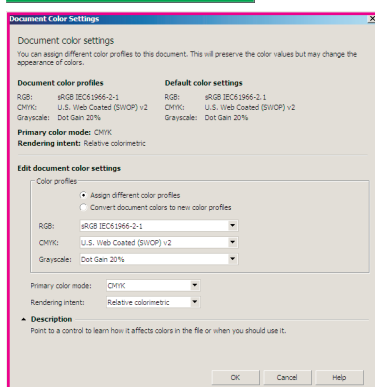
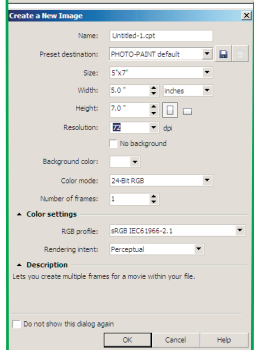
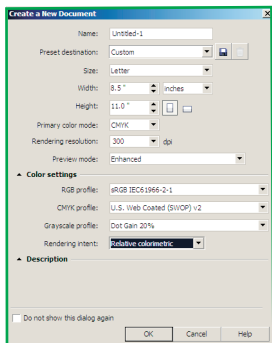
The New Document/New Image Color Management Dialogs

As mentioned earlier these dialogs start when you want to create a new document or a new image. You can name the document, you can create a preset color destination and save it for recall at a later time. This dialog will read the application dialog setting and open with those settings.

You select your page size, orientation and units of measurement. Most importantly you select you primary color mode, this tells CorelDRAW how to render transparent effects. Key to remember with this is that **with soft proofing turned off CorelDRAW will display RGB elements in the RGB color space of the document, Gray scale elements in the selected gray scale profile, CMYK elements in the select CMYK color space and spot colors using the Pantone as specified in the dialog, LAB/RGB or CMYK equivalents.** This is a significant point for the user who prints ink jets prints for wide or grand format and wants to use expanded gamut techniques. The CorelDRAW Graphics Suite X6 supports native color (files containing elements from RGB, Gray Scale and CMYK elements) in all postscript exportation and driver based postscript files as well as PDF.

With exact document level resolution controls via the rendering resolution setting CorelDRAW with soft proofing off is also the only application to have a real time resolution dependent expanded gamut display. This is serious technological advantage for CorelDRAW over Adobe and will help make the difference between great work or work that's just ok.

You may also select your view for the display, I always use the enhanced view, this is simply a personal choice and reflects on my perceived needs.



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The New Document/New Image Color Management Dialogs

The color profiles you select should reflect the needs of the destination and source of your file elements. As discussed earlier profiles are regional and therefore subject to change. Work for the internet is sRGB IEC 1966 2.1, RGB files for conversion to ink jet or press work will be regional, Euro for European Continent, Adobe RGB 1998 for the Western Hemisphere. Gray Scale has been widely accepted as dot gain of 20% as it seems to be used most widely.

The CMYK profile is a choice that unfortunately is very misunderstood especially by those in the print industry. **In general there are four basic types required, sheet fed coated and un-coated and web press coated and un-coated, for the types of glossy or non-glossy paper.** Embedding the CMYK as well as the Gray Scale and RGB profiles is critical for color integrity of all ICC controlled output, specifically driver based as well as RIP driven Ink Jets, Laser Printers or Digital Print Engines. Your choice of profile is best done on a regional basis check with the local service providers.

There has been a conversion in the print industry to ICC controlled RIPs for the creation of printing plates and specific ICC profiles as a standard. Embedding your color profiles in your files for exportation to press is imperative for those types of work flows.

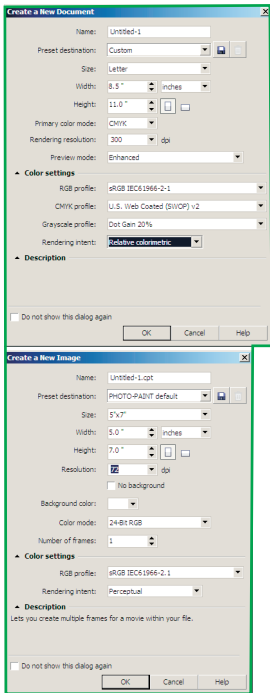
With all the above said for print press work by a user with confidence in their calibrated systems the reality can be something different. Many printing plates are made by a postscript color managed work flow and the only significant specification is the TIC (total ink coverage) of the press. I mention this because if you specifically like the color transformation of a specific CMYK profile go ahead and use it as long as it has a TIC that is equal to or lower than the press paper combination. Typically for high quality sheet fed work on heavy gloss text or cover paper a TIC of 360, commercial gloss a TIC of 320. High quality un-coated papers range for a TIC of 240 to a TIC of 280. Web coated press work ranges from the high end of a TIC 300 to a low of 240. Un-coated web press work ranges from the high end of TIC 240 to the low end of a TIC 200. To find out what TIC a profile has create a vector shape in CorelDRAW using a color of R0 G0 B0, convert it to RGB image and then to the CMYK profile of your choice, read the total ink coverage from Corel Photo-PAINTs info docker using the eyedropper tool.

The rendering intent choice selects how conversions are made, refer to the previous definitions. This controls the conversions made only in the menus in the application and do not affect the rendering choice made in the proof docker. I always use perceptual as it maintains the feel of the image and is almost identical to Adobe's default relative colorimetric with Black Point Compensation on.

You have an option to check the do not show dialog again check box, this will have your new document starting with the application defaults. To have CorelDRAW X6 show you the dialog again simply go to the tools menu/options under workspace general dialog you'll see a check box to show the new document dialog box. I always leave the dialog on as I never know where a file I'm starting will need to go so I can make the choice as needed.

The create a new image dialog for Corel Photo-PAINT X6 is very similar to the one in DRAW except that the choices you have are pertinent to an image. The dialog picks up the application default setting upon startup. Image size allows you to choose from some preset sizes, then there are height and width setting for custom sizes, resolution, you can choose your background, transparent or a specific color. Your color mode and the number of frames for animated images.

The color settings choice will be dependent upon the color mode you choose, again the previous warnings about regional choices apply. The rendering intent again is only for conversions in the import, open and conversions dialogs and other choices are again available in the proof color docker.



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The Document Color Settings Dialog (outlined in magenta)

This dialog is accessed under the tools menu/color management document color in CorelDRAW or Corel Photo-PAINT X6 respectively. The function of these dialogs is to assign or convert the document to different color profiles once the document has been already been created. **One note: in CorelDRAW to change the rendering resolution of a document once it has been started you'll need to access the layout menu/page setup/page size and adjust the new resolution there**, this is not available in the document color dialog even though it is in the new document dialog.

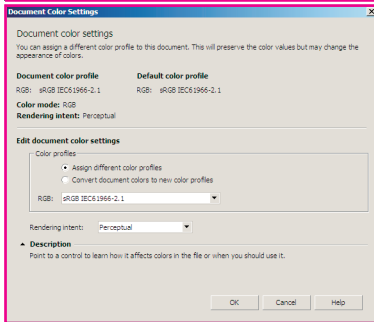
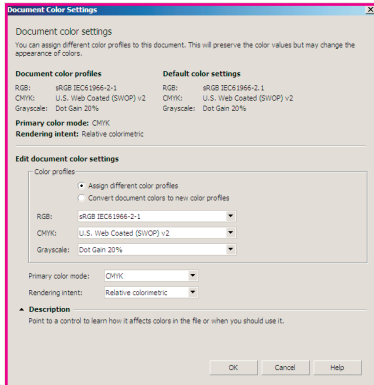
These dialogs show the documents color settings as well as the application default settings. The dialog for CorelDRAW will show the document rendering mode as all three profiles for the document. The dialog for Photo-PAINT does not show a rendering mode and has only one color profile as that is the nature of image editor documents.

The function of these dialogs will alter your documents so you may wish to rename and save the original file either before or after the action. How the commands affect the file are varied, your choices are assign a different color profile or convert document to new color profiles.

If you choose to assign different color profiles your document will exhibit a color shift in the display and print of any ICC controlled device. However the RGB, CMYK or grayscale numbers will be unchanged. When this procedure is done to a document of known color space this is referred to in many publications as assigning a false profile.

If your choice is to convert your document to different color spaces the numbers or the RGB, CMYK or grayscale color will change however the conversion is done so the display and print of your document is as close to the original as possible. In general when converting from a large to a small color space you exhibit a color shift, however when converting from a small to a large color space no color shift occurs.

When saving files CorelDRAW and Photo-PAINT embed the color profiles by default. If you wish to convert a file to different color space use these dialogs, save the file, the proper profiles will be embedded and you can send the file to another user color integrity will be maintained.



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The Mismatch, Missing Color Profiles Dialogs (outlined in red)

These dialogs requires some discussion, **first if you do not activate them in the application default color management settings dialogs you'll never see them.** Whether this is good or bad depends on your individually desired work flow, for me I always activate them so I can control everything, however for people who have a work flow where they have intimate knowledge of each and every file that comes their way and they know that they have a compatible process letting Corel make the decisions can be a wise and expeditious work flow.

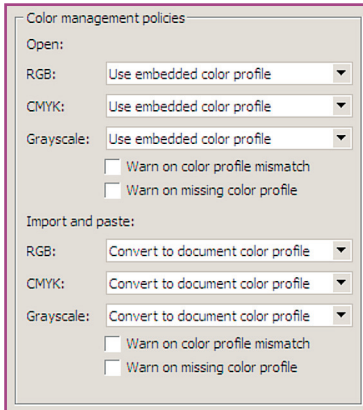
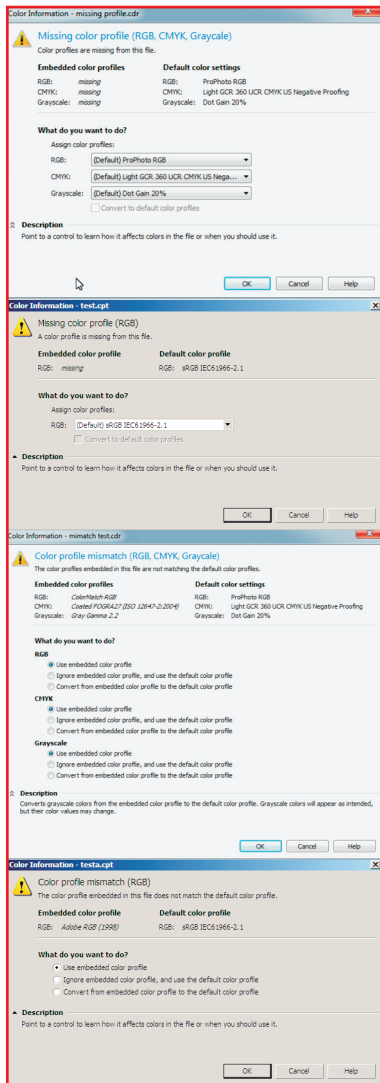
With these dialogs disabled Corel by default will use the embedded profile of any file opened so you can properly display and output the file. When imported or pasted Corel will convert the color of the file to the document color profile for RGB and Gray Scale color spaces and assign the document CMYK profile. This will maintain the CMYK numbers but may shift colors for ICC controlled devices. These are not bad defaults however like any automated process it removes control from the user. With mismatched profiles it's a good workflow because the application has the proper referenced source profiles to use and will make proper conversions.

However with missing profiles an automated process like the above can be a recipe for disaster, the application must have a proper source profile to use for the conversion or even to assign a color profile or serious color shifts can happen. This requires the intervention of a human and only by activating these dialogs can you even know that a problem exists.

Before we discuss the use of these dialogs there are a couple significant issues, no CorelDRAW files previous to X5 have any embedded profiles. First the X5/X6 user must take note of their usual CorelDRAWX4 color management settings and simulate them with X6, instructions follow later in this publication this does not necessarily mean the default setting simulate CorelDRAW Graphics Suite X4 setting). Another issue being that Corel X4 read the names of the profiles differently and incorrectly, X5/X6 reads the profile name correctly but the file name shown in Windows Explorer will not match the name of the profile. This will be covered completely in the section matching X4 and X5/X6 as closely as possible.

Outlined in purple is the color management policies part of the application default color management dialog, showing the warn on color profile mismatch and missing color profile check boxes for open, import and paste. What you also see is the default actions for when you leave the check boxes un-checked With my workflow I always have these boxes checked because I never have any idea where a file comes from and I certainly want to know what color space a file is in if it does not match

my document. I am a bit picky about color and because of that always archive my RAW conversions in an ultra wide RGB color space I use the Prophoto RGB color space, however converting Prophoto RGB directly to sRGB may not provide you with the best results so I many times use an intermediate space like Adobe RGB 1988 and then to sRGB for the web. This level of control requires that you understand the use of these dialogs.



CorelDRAW Graphics Suite X6

The Mismatch, Missing Color Profiles Dialogs (outlined in red)

Before CorelDRAW X5 there were no embedded ICC profiles in CorelDRAW files so if you activate the warning dialogs for a time as you transition from X4 or older to X6 this dialog, the missing color profile dialog will be the one that you will see the most and would not be my suggestion. Using this dialog properly requires that you understand your color management settings in X4 or older CorelDRAW files, refer to my CorelDRAW X4 color management book at www.graphicstechnology.com.

Note that when the missing color profile dialog appears for CorelDRAW you are ask to assign an RGB, a Gray Scale and a CMYK profile for the source space (only if the file content contains objects from all three color spaces) and then there is a check box to convert to the default color profiles. (SPECIAL NOTE:) ICC compliance requires that a source profile be assigned before you can properly convert to a destination profile.

What this means is that you have two choices. If you set your application default settings to match you older CorelDRAW setting you can leave the check boxes for the warnings unchecked and leave Corel to assign (note assign not convert) the default color settings and things will work smoothly.

If you decide to have these warning boxes checked you will have to make the decision on what source profile to use for making the conversion to the new document color settings. Example some X4 or older files created for presentation work only and others for press printing work, you can open these in X6 and individually convert them to the final destination color spaces on the fly because the new dialogs allow you to pick the multiple source color spaces for the conversions on the fly. There is no single correct set of setting of these dialogs that works for everyone. However a quick study of how you used X4 or older versions of CorelDRAW will allow you to maintain color integrity as you transition your file to

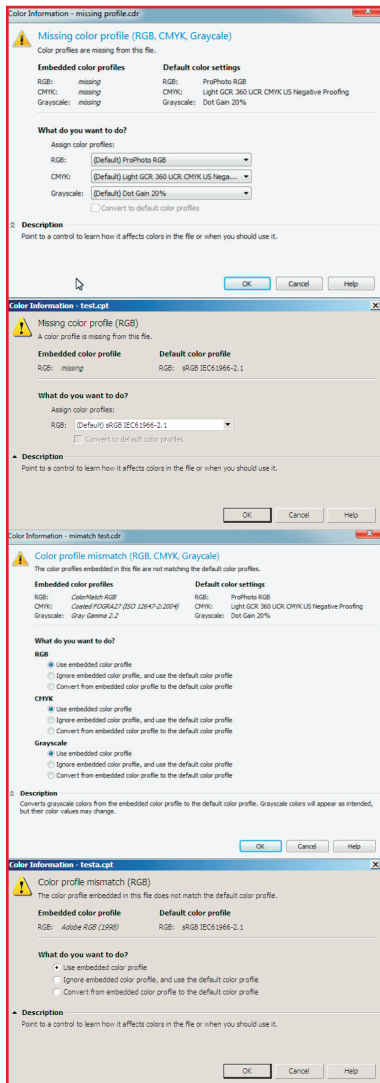
X6.

Note that the dialog boxes for CorelDRAW and Corel Photo-PAINT X6 differ in that the boxes for DRAW have three selections where Photo-PAINT has only one. Corel Photo-PAINT X4 and older did not embed ICC profiles for CMYK color spaces and therefore to make an intelligent choice you're required to examine your older Corel Photo-PAINT color management settings and see what you were using.

The mismatched color profiles dialog allows us the choice of use the embedded color profile, which has us using those profiles as the document profile. Ignore the embedded profile and use the default profile which has us assigning the default color profile which will give us a color shift. The third choice is to convert to the document color profile which will convert the document profile to the default color profile, if you're converting from a large color space to a small color space you may see a color shift. However this is proper and ICC compliant.

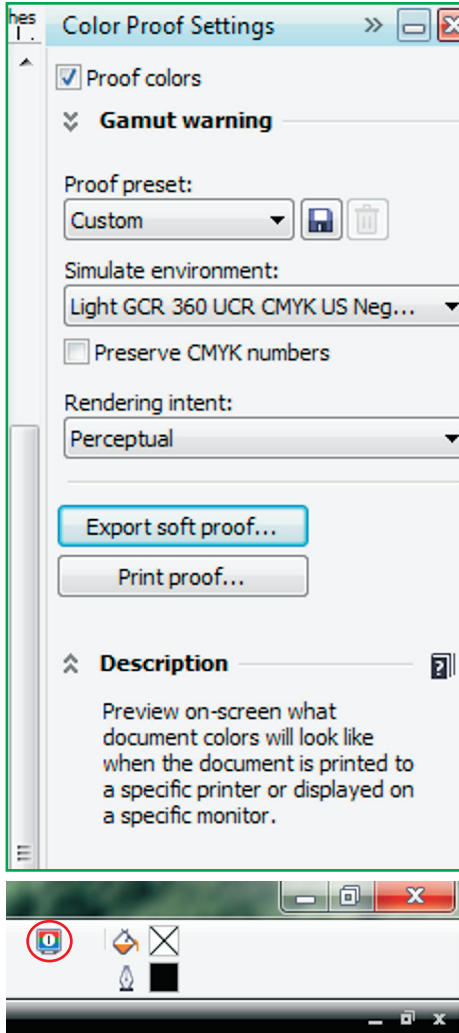
Remember this the missing color profile dialog requires that you know the color management settings of your previous CorelDRAW work flow, assign a source profile and then it allows you to convert to your document color profiles. This is the only correct ICC compliant method.

The mismatched color profile dialog reads the source profiles and allow you to properly use them, assign the document color space or to convert the file to the document color space. Using the embedded profile or converting to the document color profile are the only correct ICC compliant choices.



CorelDRAW Graphics Suite X6

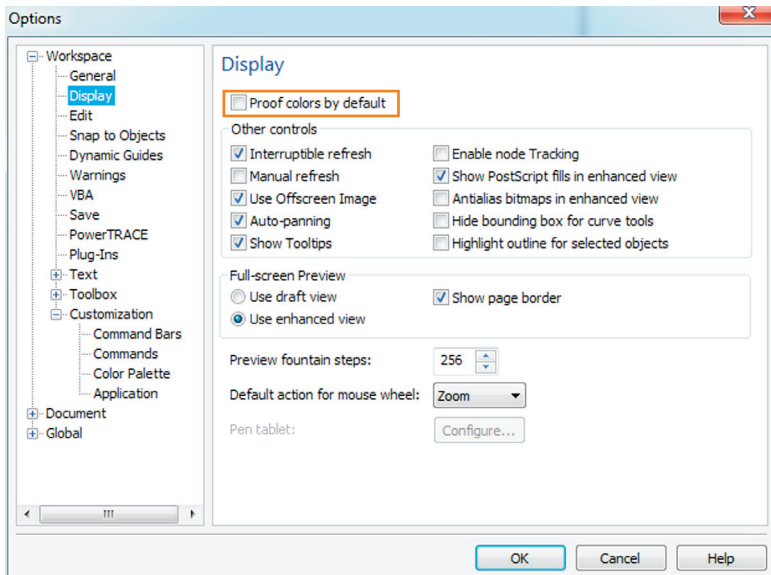
The Color Proof Docker



The color proof docker shown outlined in green is accessed via the windows menu, dockers, color proof settings. Directly below the capture of the docker you can see a capture of part of the status bar from X6 that I have circled in red, it is an icon to activate proofs color for the display. Also the bottom capture, accessed via the tools menu, options, display, outlined in orange is the check box to activate the proof colors by default. Checking this box will have the proof colors shown by default based on the settings used in the docker when you open CorelDRAW.

Soft proofing is a term that is used to describe the ability to simulate on your display how the file may look in print or on a different display. The docker allows soft proofing (export soft proof) and hard proofing (print proof), soft proofing is done via the CPT, TIF JPG and PDF file format. Files will be converted to the selected ICC profile and that ICC profile will be embedded in the proof file, PDF will allow spot colors to stay as spot colors and embed all profiles. Hard proofing converts the colors to the destination color space selected in the color proof setting dialog, hard proofing is done via the print dialog. The ability to check the box to maintain CMYK numbers will simulate older versions of CorelDRAW, if you check to maintain CMYK numbers CMYK passes through without any conversion of the files CMYK content. For example if your document CMYK profile is U.S. coated web and you wish to hard proof U.S. coated V2, when you check the maintain CMYK numbers there will be no conversion of the CMYK content. This is useful when proofing small CMYK color spaces on devices with larger CMYK gamuts.

An example of soft proof simulation of a multiple color model file would be for a user to be working in CMYK mode, with Euroscale CMYK selected as the CMYK color space, Adobe RGB as their RGB color space. Placing Adobe RGB and Euroscale CMYK elements in their file and using the color proof settings docker to view the elements as if they would print to a U.S. Coated V2 CMYK profile.



The CorelDRAW X6 display with soft proofing OFF will display properly imported and created RGB elements in the documents RGB color space, properly imported and created CMYK elements in the documents CMYK color profile and properly imported and created gray scale elements in the documents color space. Spot colors are displayed per the setting selected in the default application color management dialog, in either RGB, LAB or CMYK regardless of the soft proof setting.

The color proof setting docker due to its ease of use and function is a vast improvement over the proof setting in the competition. All the required controls are in one place and in a docker that is accessed with one click of the mouse.

CorelDRAW Graphics Suite X6

The Color Proof Docker

The color proof docker under the windows menu/docker shown outlined in green allows you to simulate for display a specific destination color space and rendering intent under the view menu. You can set a custom preset so you can recall specific environments to simulate.

At the very top of the color proof settings dialog is the Gamut warning, my views on gamut warning are such that I'm going to address this feature in detail on it's own page, suffice to say I don't use a Gamut warning and in the later discussion I will give you enough information for you to make you own decision.

The other settings in the color proof dialog are self evident, you choose the destination profile based on your (what else) destination. Which may be a different display system, standard press color space or an ink jet or digital printer profile.

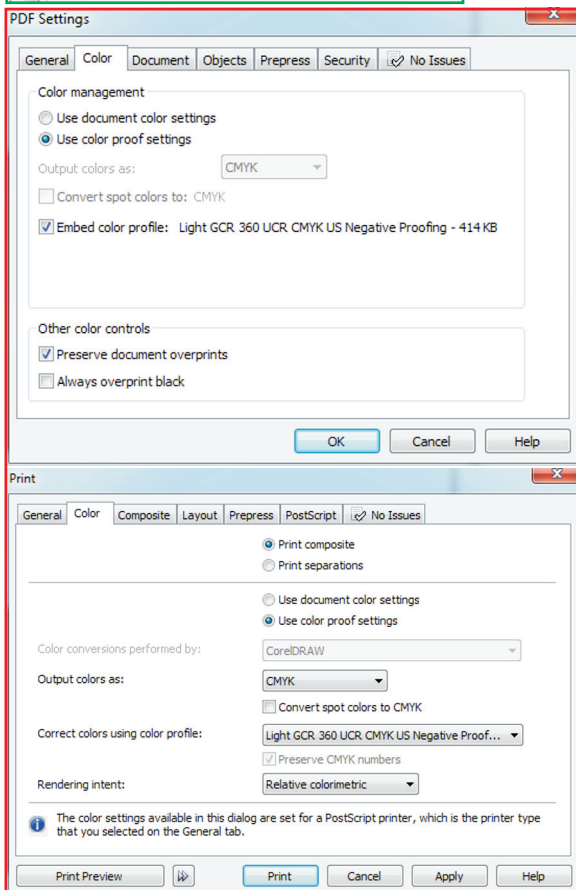
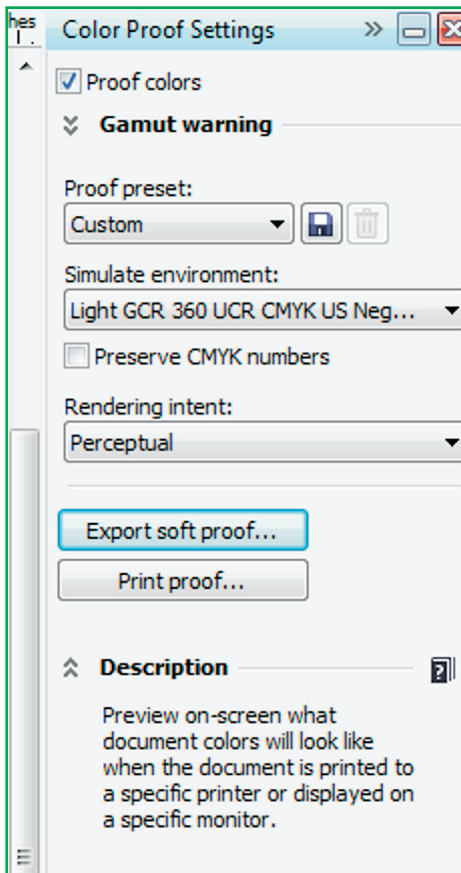
I show the PDF setting dialog to the left, there is a bit of redundancy with the export soft proof specifically when using a PDF soft proof as you use the same PDF dialog as the publish to PDF function. I say that because your soft proof can actually be used as an output file so you may wish to set the resolution in the object tab of the PDF dialog to a resolution too low for output. By checking the preserve CMYK numbers box on the color proof docker your CMYK content travels along the process with the CMYK color integrity intact for all postscript color managed devices (print press plate setters). Leaving this box unchecked is mandatory when sending a file to an ICC profile color managed digital device.

The rendering intent in the color proof settings docker is for the display and for the soft proof. The soft proof PDF dialog to the left does not show a rendering intent because the ICC profile is embedded and the rendering intent is set by the color proof setting docker. In the case of a soft proof colors are converted to the destination color space (except for spot colors unless you decide to check the convert spot colors box and allow the conversion) and the destination color profile is embedded in the file. In the case of soft proof, image file formats, JPG, TIF and CPT all file contents are converted to the destination color space set in the color proof setting docker and a profile is embedded.

The rendering intent selection is accessible in the print proof dialog at the bottom left of this page and is critical because an actual conversion to the proof color space takes place during the printing process. You need to match the rendering intent to your choice set in the color proof setting docker or the conversion will be different then your display. Note that preserve CMYK numbers is grayed out this is standard for all graphics applications.

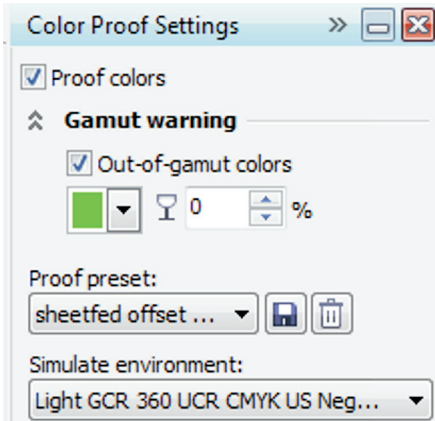
All of these proofing scenarios can be carried out via other methods, the publish to PDF, convert to bitmap features, however CorelDRAW X6 has placed a convenient process in the application

for your use via the color proof setting dialog.



CorelDRAW Graphics Suite X6

The Color Proof Docker (Out of Gamut Alarm)



The color proof docker out of gamut alarm shown activated to the left displays a color over top of an object, image or even a color fill dialog when you choose a color in a color model that's out of gamut for the destination color space set in the color proof docker. Let's examine the theory, the expected results and the real results.

Color to be properly represented in a computer model has to be assigned a theoretical three dimensional space, so every individual color has an X, Y and Z coordinate to represent its location in the color space model. When a larger color space is compared to a smaller color space any colors that cannot be exactly reproduced in the smaller space is said to be out of gamut. For an out of gamut alarm to be of any use the alarm must be keyed on a pattern based on a mathematical representation of the X, Y and Z coordinates of the compared color spaces. What that means in reality is that it does not matter what color we are examining the out of gamut alarm should only review its XYZ relationship of the source color space to the destination space and then send an alarm if needed, a light or dark color no matter out of gamut is out of gamut.

In preparation for my X5 book I had a few casual images taken of myself, my friend and business partner. I specified the clothing that she and I would wear so that the images could be used as examples in my color management writings. The captures to the left demonstrates the concept, on the right is a capture of the



original RGB image converted to CMYK, the left side is a capture of the RGB original with the out of gamut display activated over it. Notice how the green highlights (indicating out of gamut colors) are only placed over the plant in the background to the left in the image. This indicates according to the alarm that this is the only area of the image that is out of gamut for the destination CMYK color space.

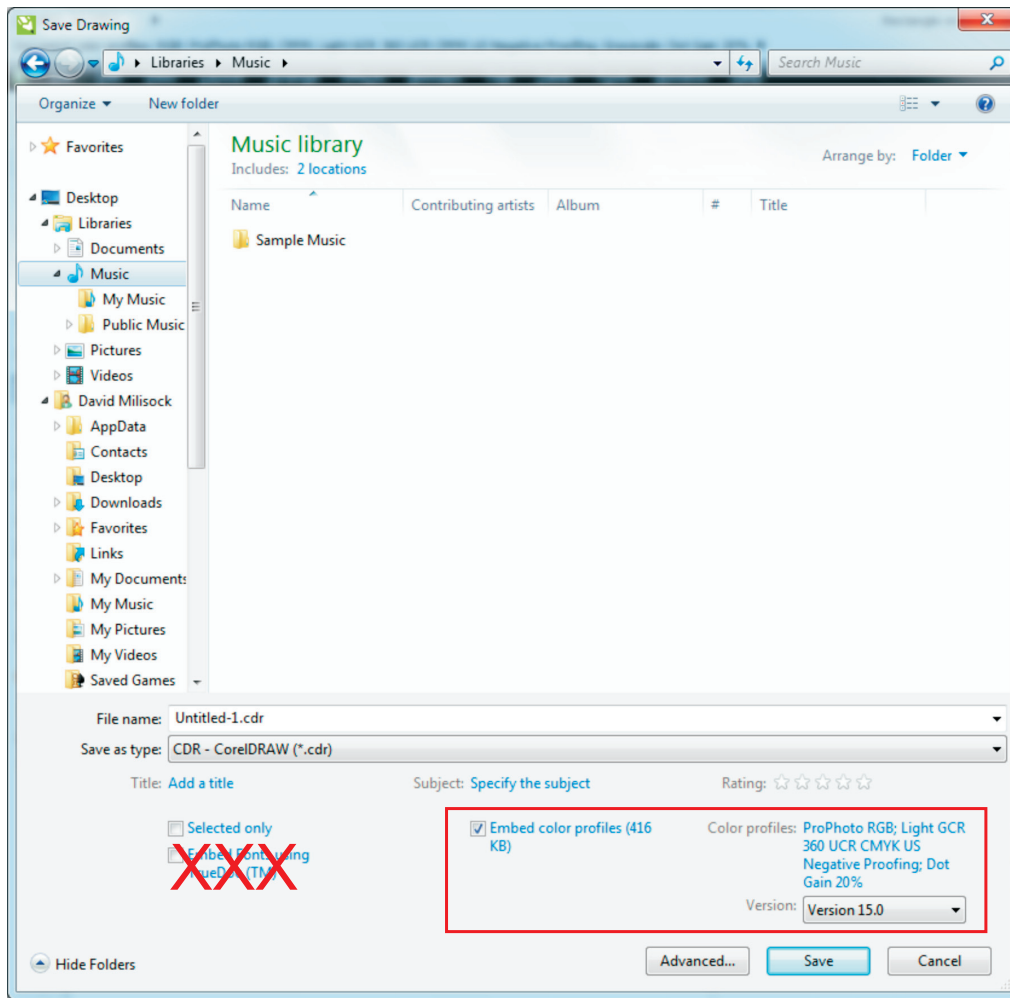


Herein lies the issue, depending on how good your display is you'll notice that in the CMYK version of the image my blue shirt has a color shift and so does Nancy's green jacket. This is by design, I specifically picked the clothing color to be out of gamut for CMYK. The enlarged capture to the left demonstrates this more clearly. The out of gamut alarm totally missed this color shift in my shirt, however there is no reason to despair. The soft proof setting in the color proof docker does properly show the out of gamut condition by displaying the color shift in the entire image.

I have examined the out of gamut alarms of every graphics application I have come in contact with and have had the same result. So my argument is this, I don't use the out of gamut alarm, I use the soft proof display instead. In my case if the color is super critical I use the display with the proper RGB and CMYK profiles used in the document for my destination and edit a duplicate of the original image instead.

The color of the soft proof in the color proof setting docker of CorelDRAW X5/X6 is the best in the graphics world, in my opinion the out of gamut alarm is of no value, you decide.

CorelDRAW Graphics Suite X6



The Save Dialog

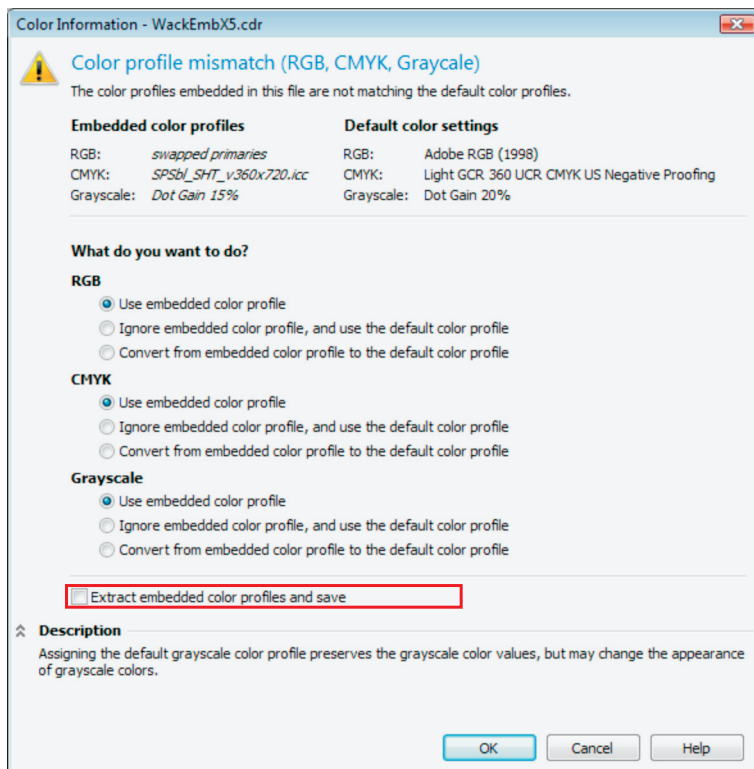
To the left is a capture of the save file dialog, note outlined in red the area of the dialog where by default it embeds the profiles if the file had an embedded profile unless you decide not to allow this to happen by un-checking the box. **Please note font embedding is no longer supported in X6.**

Extracting of a Profile

Extracting but not removing a profile from a file is done so the profile can be loaded on your system.

CorelDRAW is one of the few applications that supports profile extraction, you will need to do this for multiple reasons, the capture to lower left shows the checkbox in the open drawing dialog that allows this process. This dialog box will only appear if you attempt to open a file with

an embedded profile which is not installed on your system.



If you hover your mouse over this area it will tell you where it will save the profile, generally the Corel user file location usually the local drive c:\documents and settings (XP) user (Vista, Windows 7) username\application data\CorelDRAW Graphics Suite X6\user color. I suggest that you copy the profile to the c:\windows\system32\spool\drivers\color\ folder the Windows default, then all applications will see it.

If you're a Photoshop user you must have Photo-PAINT X6 so that you can extract a profile. If you open a file in Photoshop, convert it to the LAB color model for editing you cannot then convert it back to the original color space in Photoshop, Corel Photo-PAINT X6 will allow this but I recommend that any time this dialog appears you should extract and save the profile.

Printing

Postscript and Non-postscript

Exporting

EPS, PDF, AI, Web and CDR

Scanning

CorelDRAW Graphics Suite X6

Postscript Printing

In the graphic world few words have invoked more misunderstandings than the word print! In this section of the book we will concentrate only on postscript printing. Postscript printing is basically handled by two processes, driver based and digital front end systems. Just to make it interesting there are processes that utilize a proprietary driver to create a proprietary PS file for importation into the digital front end, I call these hybrid systems. All of these processes can be either ICC color managed or Postscript Color Managed some can be set to utilize both but never both at one time.

Driver based systems can be singled out by the fact that to use them you go to the file menu and select print, then you select the printer and the proper settings depending on your output requirements, the print dialog will have a postscript tab. The individual scenarios are too numerous to document in this publication. Even though Distiller published PDF can require that you print to a postscript driver to create a PDF it is not a proprietary driver and the resulting PDF is a defacto pre-press standard so I include Distiller published PDF in the digital front end work flows.

Digital front end systems utilize an exported PDF, TIF, EPS or some other file format to place into the digital control software (usually a RIP, raster image processor) for output. The process in general progresses like this, export file goes to a trapping utility, to an imposition utility and then to a RIP for proofing, plate setting or digital print.

The hybrid system unlike Adobe driver generated Distiller published PDF requires that you use a proprietary postscript driver supplied by the manufacturer of the specific digital front end. The resulting (PS) postscript file, not a PDF file is then imported into their device for pre-press processing, the digital front end will not accept other PS files. A recent development is that the proprietary PS driver produces a PS file that is then Distilled VIA the vendors specified PDF settings then sent to output. All three of these systems can be color managed via ICC profiles or Postscript Color Management, let's address those color management processes as applied to the print processes.

Postscript Color Management

Postscript Color Management is all that there was before there was an ICC (International Color Consortium) to set the rules for ICC Color Management. The book Real World Color Management by Bruce Fraser, Chris Murphy and Fred Bunting had within it a very small section stating that they didn't really understand Postscript Color Management and someone who did should write a book. The issue is that PS color management is so simple that it's only a few paragraphs, no book required.

Postscript Color Management is not that hard to understand, first it only works for output within the CMYK color space that is a CMYK color source to CMYK destination, for film/plate setters a total ink limit of 400. As stated in the definitions section of this book, the PS file contains color space arrays, these are the color numbers of the file content but not the labeling of the color space for postscript color management it is assumed to be CMYK. The PS interpreter contains color rendering dictionaries, these define the color space of the device based on a software interpretation of the ink limit linearization media dot gain curve always an ink limit less than 400, between 230 to 360. A critical error can be made if tested PS files don't contain color space arrays, such as it was with some previous tests, so some technicians could not understand how the process worked. What happened here was that they may have tested a Quark PS file and (I assume) those doing the testing didn't realize that at that time all RIP manufacturers supplied an export plugin for Quark because Quark at that time didn't produce an Adobe conforming postscript file, every RIP manufacturer knew it and provided a fix, Quark later remedied that situation.

Postscript Color Management works because the theoretical three dimensional representation of the CMYK color space for presses is always the same size, four channels with one hundred shades per channel. Since this is fact a LAB and or XYZ representation of these color spaces can be created allowing the connection between the color space arrays of the postscript file and the color rendering dictionaries of the device which are always less than the maximum CMYK space. Hence Postscript Color Management.

CorelDRAW Graphics Suite X6

Postscript Printing

The controlling factor of color management for print is the TIC (total ink coverage) of the output device. That figure is determined through a process of linearization of the film/plate media, I.E. a set of screens are printed onto the plate and the screens are read and adjustments made until all screen percentages reproduce on the plate accurately. These plates are run on the press on a specific paper to the ink manufacturers recommended ink density and the resulting printed screens are read for dot gain. A 50% screen may read 55% and then the resulting reading are used to compensate on the plate setter so the resulting print reflects proper screen percentages across the full range of shades for the particular paper and ink set. Most high quality plate setter press combinations can handle a range 2% dot and high quality papers can handle up to 90% solids per channel for a TIC of 360. This information, (the ink limit media linearization dot gain curve), becomes through software interpretation the color rendering dictionary information for the plate setter press combination, each combination has one of these TIC curves, specifically for multiple weight gloss, and multiple weights of uncoated paper for example TIC's of 260, 280, 318, 350.

These curves are NOT ICC PROFILES and as such cannot be used to convert non-CMYK color spaces to CMYK. For postscript color management to work in a modern world we use graphic applications that are ICC color managed, we convert all file content to CMYK using an ICC profile that has a TIC that is equal to or less than the TIC of the press paper combination. The CMYK color space arrays in the postscript file will be assigned LAB/XYZ coordinates that have equal values in the devices color rendering dictionaries and the color passes through to the press plates almost identical to the original CMYK document.

What this means is that as long as you convert your document content to a CMYK color space that has a TIC equal to or lower than the TIC of the device you may use any CMYK color space that you like. What it also means is that embedding an ICC profile has no value for Postscript Color Managed work flows. If your application uses a CMYK profile that has a TIC that is greater than the output device the colors that are out of gamut will be clipped.

To establish the TIC of a CMYK profile that is not labeled simply create an object that is in the Adobe RGB color space R0 G0 B0 and convert it to a CMYK image reading the total ink coverage with the image info docker in Corel Photo-PAINT X5.

ICC Color Managed Work Flows

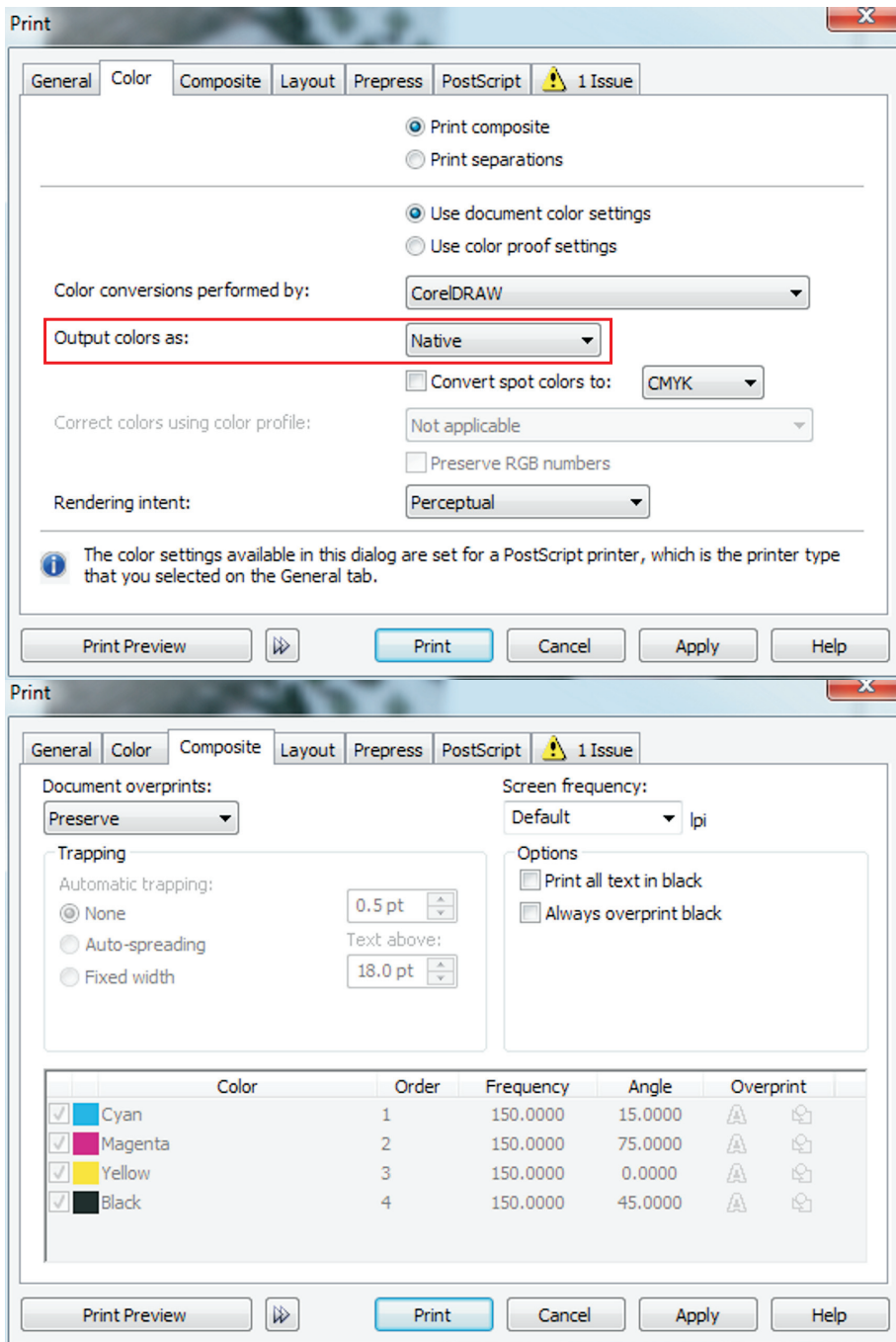
ICC color managed devices also all have a media linearization curve it is the very last color conversion that takes during printing, generally the curve is an ICC profile and is generally named for a paper or other media. The difference being that these devices can convert non-CMYK file content to CMYK. All ICC color managed work flows require that you embed an ICC profile with your file or use an assumed color space work flow. The CorelDRAW X6 graphics suite fully supports embedding all ICC profiles for an ICC color managed workflow so the assumed color space work flow we used in X4 or older versions of CorelDRAW is no longer required.

CorelDRAW X6 has the ability to support native color in the postscript stream for vectors as well as images. This is a significant improvement for those who wish to utilize the media profile for the final conversion. This allows RGB, Spot Colors and CMYK elements to exist in one document and to print with the widest gamut possible on digital devices. This is extremely useful for any digital printing especially for the large and grand format print business. Prior to X5, CorelDRAW only supported native color output in Corel published PDF files. This feature is still supported in Corel published PDF as well as Distiller published PDF files. With the release of CorelDRAW X5 support for ICC color managed print work flows is now completely commercially compatible and ICC complaint, this continues with the release of CorelDRAW X6 with a few improvements.

There is a work flow called late binding that has been taught as the end all in color management. It is a process where you work in CorelDRAW entirely in the RGB color model allowing the final conversions to take place during exportation or during print. This work flow is fully supported in all versions of CorelDRAW but only fully supported in X5 and X6 due to the complexity of CorelDRAW X4 and older accessing the application RGB color space. I do not recommend this as the conversions take place in many case not only in a blind fashion to the user but in a manner sometimes not fully displayed in soft proofing. This works ok as long as you use sRGB and USWEB COATEDCMYK profiles but for real quality work forget it.

CorelDRAW Graphics Suite X6

Postscript Printing the dialogs



The main print dialog for CorelDRAW X6 shown to the left has two tabs that are significant for our discussion on color. The color tab and the composite tab. The composite tab switches to the separations tab when we choose the print separations radio button under the color tab. Let's discuss composite printing first.

Composite printing under X5 & X6 takes on a whole new dimension. X4 and previous versions composite postscript printing only worked easily for files that contained entirely only CMYK or entirely raster (image) RGB content, no mixed content. In X5/X6 there is an entirely new dimension that needs to be discussed.

I cannot stress how important it is for print press work that you work in the primary color mode of CMYK and that all your file content be in the CMYK color model for CMYK work (except for spot colors). Composite printing can then be used to create Distiller published PDF files for digital front end work flows. Composite printing allows for spot colors to be printed as spot colors when we choose output colors as native. The selection is shown to the left outlined in Red. I mention this setting first because in my opinion this is an extremely simple method of color managing your work flow. You control your color by selecting the proper color mode during the file creation and choose native color for your composite output of your composite work flows. Then by following some simple rules you control color by building your file correctly. The rules are simple, native color output setting and CorelDRAW

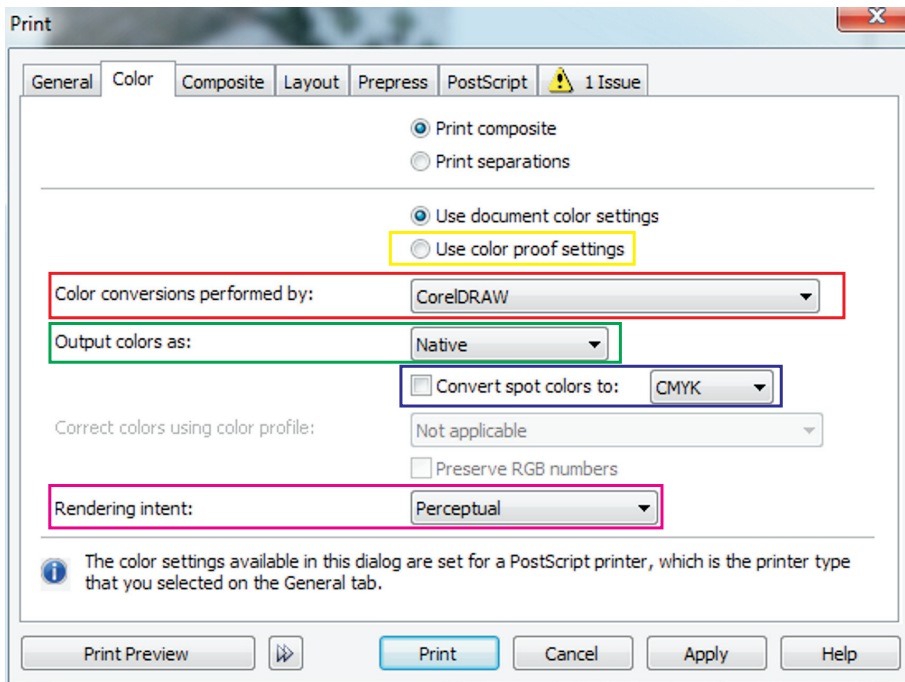
handles color conversions in the print dialog and Distiller published PDF:

1. CMYK output uses only CMYK file content.
2. 4 process colors and multiple spot colors can be Distilled as native color and will produce proper color separations so the file content can be mixed Spot color and CMYK.
3. Expanded gamut printing (mixed color model file content, RGB, Spot Color and CMYK) printed as composite with the destination device handling the color conversions is for digital print ONLY. Driver based processes do not embed profiles so a digital device requires an assume color space process.

I know this sounds simple but for composite printing this really is all you need to know, you can skip the rest. We'll cover native color Corel published PDF in another section.

CorelDRAW Graphics Suite X6

Postscript Printing the dialogs



Looking at the color printing tab, left. Selecting use document colors will allow you to choose to let CorelDRAW or the output device handle color conversions in the color conversions performed by drop down outlined in red. When you choose to let the output device handle color, the output colors as drop down (outlined in green) becomes grayed out.

If you choose to let CorelDRAW handle color, you can select output colors as native. When you choose RGB, Gray Scale or CMYK the print dialog defaults to the document profiles and converts the files contents to your selection.

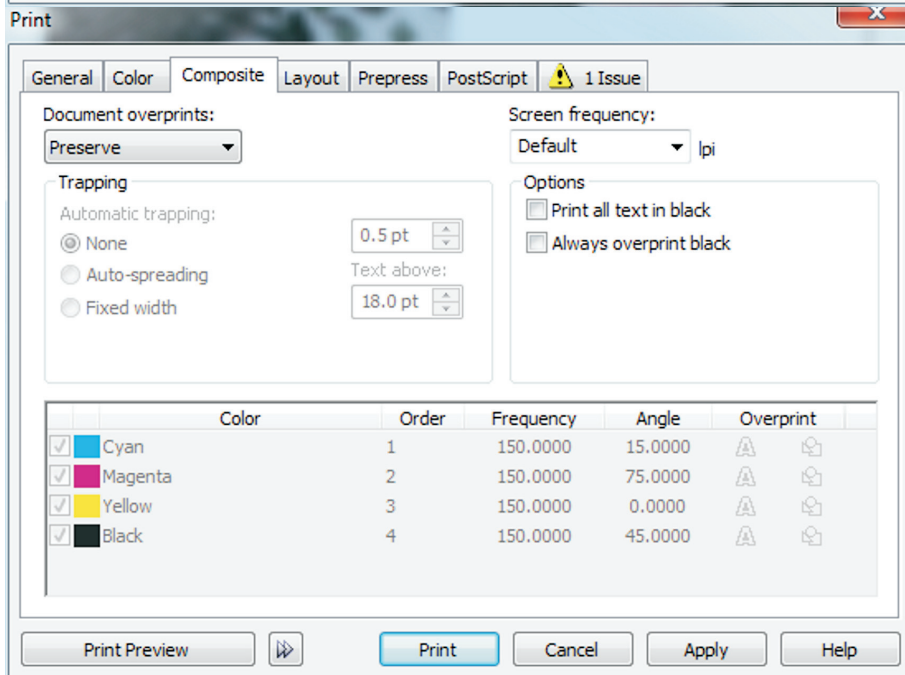
You can select to convert spot colors as CMYK (outlined in blue). You can also select the rendering intent for any conversions that you decide to take place (outlined in magenta).

The user can select the radio button so that the settings in the proof color can handle the color conversions (outlined in yellow). If you choose to do this the profile selected in the color proof docker will handle all color conversions. However the rendering intent in the print dialog will over ride the rendering intent in the color proof setting docker.

The bottom capture at left shows the composite tab of the print dialog. The drop down for the document over prints has a default setting of preserve which in my opinion is a great choice. You also get the option to ignore and simulate. Ignore is fairly self explanatory but simulate is

for the print preview feature. In my opinion if you're using composite print to generate a PS file to distill into a PDF for digital front end work flows your best choice is to leave the preserve over prints on but to design your document without over prints. Automated trapping and imposition programs are infinitely more sophisticated in terms of their specialized capabilities, you would be best served by letting them handle these tasks.

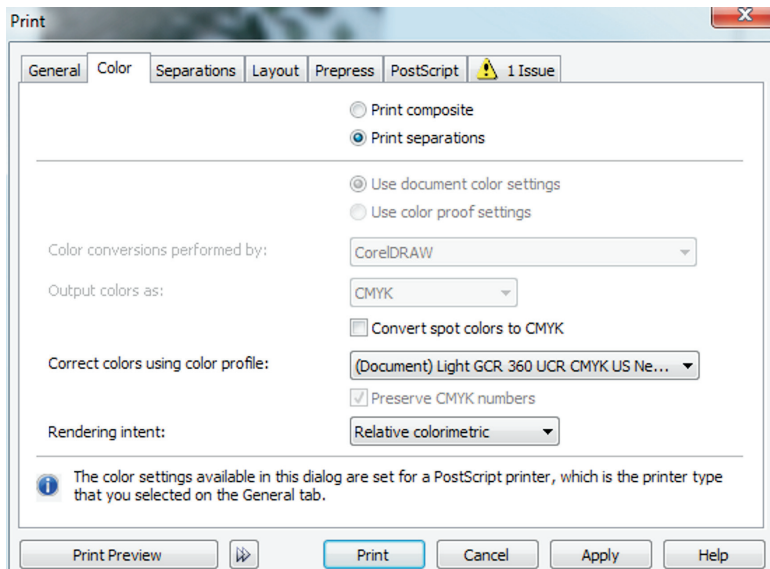
The screen frequency drop down is set to default for the driver, for composite I suggest letting this alone the output device will handle this.



	Color	Order	Frequency	Angle	Overprint
<input checked="" type="checkbox"/>	Cyan	1	150.0000	15.0000	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Magenta	2	150.0000	75.0000	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Yellow	3	150.0000	0.0000	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	Black	4	150.0000	45.0000	<input checked="" type="checkbox"/>

CorelDRAW Graphics Suite X6

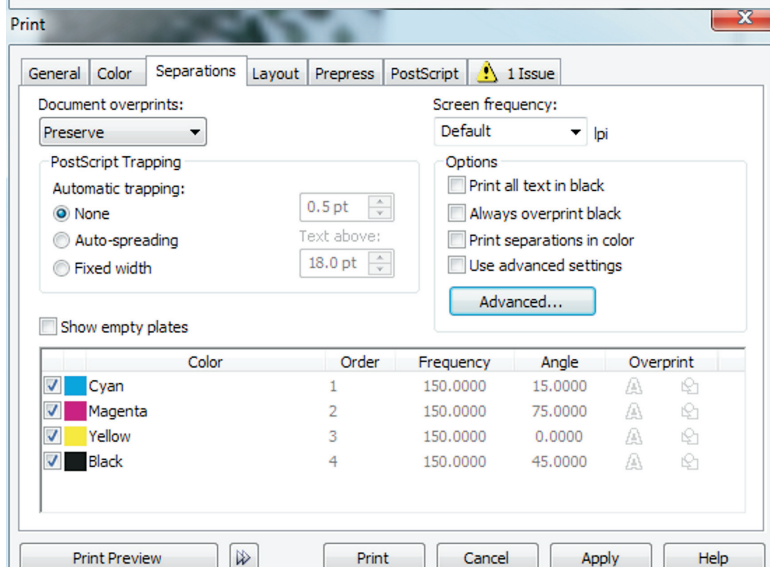
Postscript Printing the dialogs



The print dialog changes when you select the print separations radio button. The composite tab changes to the separations tab and in the separations tab you get an advanced button for advanced separations features.

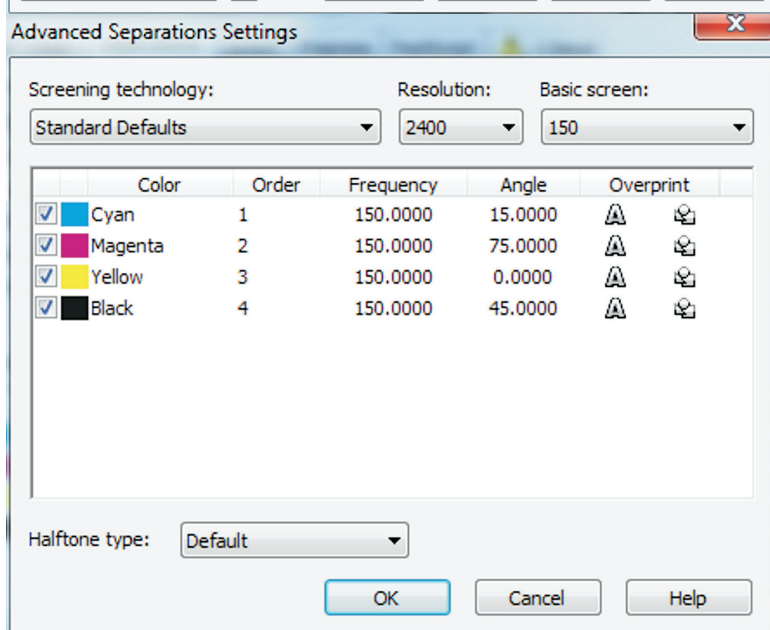
The changes of note are that the use document colors, use proof color settings, the color conversions performed by and output colors as selections are inactive. The document CMYK color profile is set in the correct colors using color profile drop down, this can be changed to another profile is desired.

The preserve CMYK numbers is grayed out and you can select your rendering intent. Remember this will over ride the rendering intent selected in the color proof setting docker.



Only the options on this color tab will affect color of color separated work flows. Changing the profile in the correct colors using color profile drop down to a profile different then the document default will affect a change in the color. Also selecting to convert spot colors to CMYK will most likely affect the color of those objects.

The reality of color is that while I show you the other print tab dialogs the only thing that they can do to affect the color is the over prints. Overprinting will result in a shift in color of the top color because of the under color being overprinted.



Printing separations in color will print the separations as their base color CMYK, spot colors will be simulated on digital proofing. Spot colors separate on film and plates as individual colors.

None of the settings for screen technology, screen angle, screen resolution or screen frequency will have any affect on color. The unfortunate aspect of the internet is that you may find posting to the contrary however they are totally untrue. These setting may affect the clarity of the reproduction but have no affect on color.

CorelDRAW Graphics Suite X6

Non-Postscript Printing

For users of X5/X6 I have devised a G (grayscale) color palette available on my web site www.graphicstechnology.com to use for black text and vectors in non-postscript work flows, **this resolves the issue of 100% black (of the CMYK colorspace) printing as a gray tint in non-postscript devices.**

Please refer to the new work flow section of this publication.

ICC color managed non-postscript printers DO NOT convert K100 of the CMYK color model to a solid black print on paper or transparencies I have a solution for this in the new work flow section of this publication.

Non-postscript printing from CorelDRAW X5/X6 has been greatly improved from X4 and previous versions and for those of you who prefer to use non-postscript devices you will see a vast improvement with cross application compatibility. If you work in office environments simply use RGB mode and RGB as your RGB color space and you will see a vast improvement with color consistency with your office applications.

The printing process for non-postscript devices is one of the fastest growing areas of graphics today due to the proliferation of low cost ink jet devices and of course the old try and true office devices. There is only one piece of advice that I can give a user about these types of devices and that is if you're really serious about professional level color don't buy one. You simply cannot reproduce corporate color and high end sophisticated wide gamut printing with a non-postscript device without spending more time and money than you would have if you had originally purchased a postscript option. I know all the arguments that will arise by making such a statement but they are all hogwash. I do a good deal of consulting and every time I've had to resolve color issues with non-postscript devices when I get to the manufacturer's highest level technicians they tell me that my clients need to purchase their postscript option. Certainly their salesperson didn't tell my client that at the time when they could have bought the postscript option as an \$600 add on to their new purchase, they hear it when they have to buy the same feature a year later as a \$1,900 accessory.

The process for non-postscript requires that the application internally through the GDI (graphic device interface) rasterize and convert all color in the document to the RGB color space, X5/X6 has the ability to convert all non-RGB file content to the document RGB color space, this is cross application compatible. The print device then converts the RGB print stream data to the media profile which will be some form of CMYK. CorelDRAW X4 and older versions could not convert the non-RGB color model file content to the document RGB in the print stream resulting in a work flow for the user that required that they manually convert all file content to RGB in the application before print if you wanted an ICC compliant color conversion. What ended up usually was some convoluted CMYK to RGB to CMYK conversion.

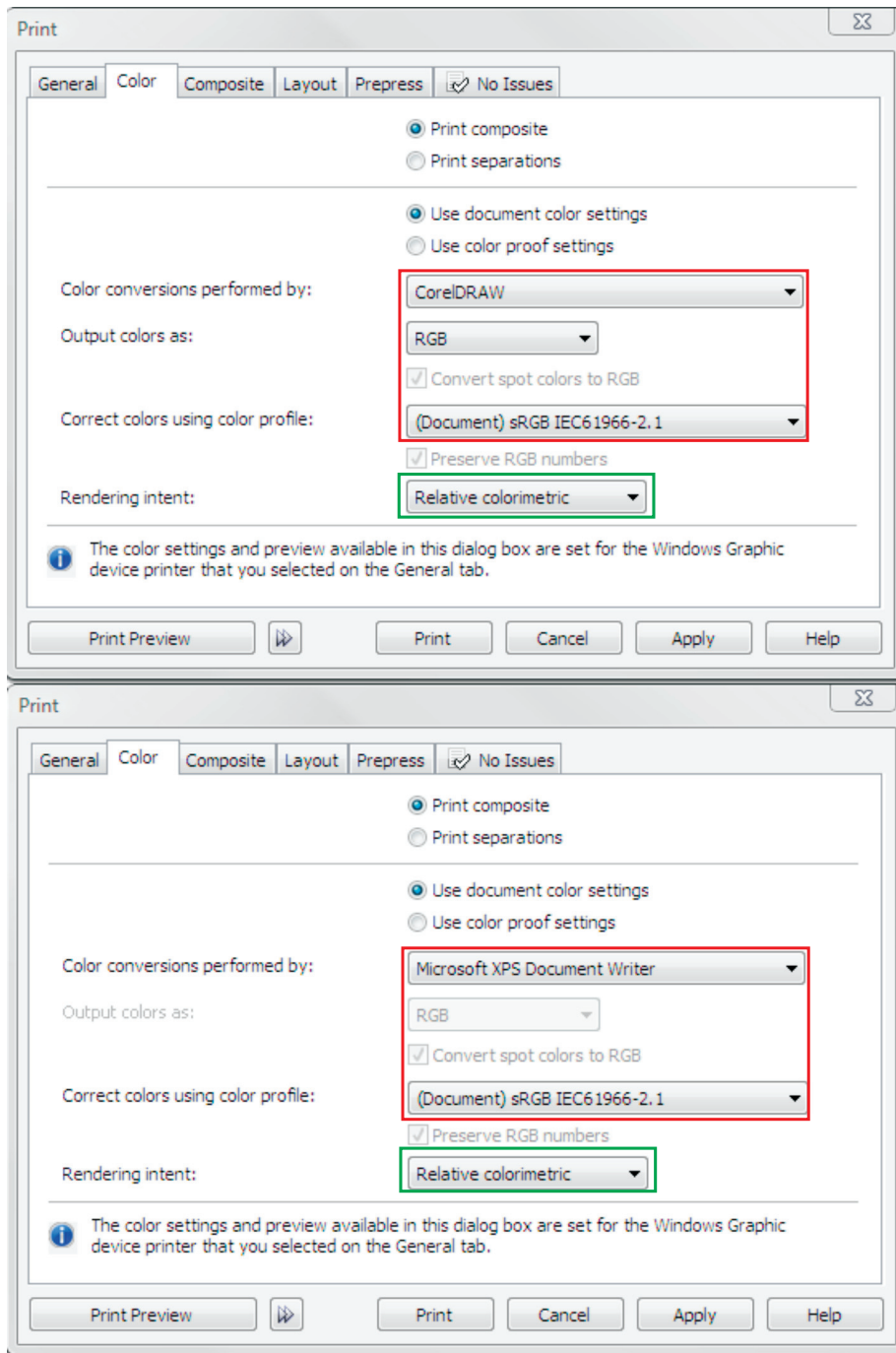
This process has been the most contentious aspect of color management for CorelDRAW X5 and X6 because so many users developed a process that while incorrect they thought it was correct and it seemed to work for them, now in a proper color managed work flow this sometimes cannot be duplicated. This GDI (graphic device interface) required RGB color space in the print stream has many people confused and they refer to this as RGB printing, or RGB printers, there is no RGB printing, merely a convoluted process for converting file content to the required color space of the GDI (graphic device interface) of Windows.

The reality of digital printing postscript or non-postscript is that for accurate (within bounds of the mechanical and software technology) color, a media profile is required for each and every paper or substrate and it must be the last conversion in the progressive line of color conversions. EXAMPLE: file content is from mixed color models printing to non-postscript, file color to RGB, to a device simulation profile to the media profile. Or straight from the application color models to RGB to the media profile. This is why postscript is superior, the native colors can go directly to the media profile with no intermediate conversions.

The very best control you can have with non-postscript devices is for you to work in RGB mode with your file content that is only in the document RGB color space and to print directly to the media profile for your device. CorelDRAW X5/X6 allows you to utilize the media profiles from any device that uses ICC media profiles but has no features that allow you to create them.

CorelDRAW Graphics Suite X6

Non-Postscript Printing the dialogs



Non-postscript printing from CorelDRAW X6 allows as shown by the two captures to the left (outlined in red) the user to have CorelDRAW or the driver to handle color conversions. **Please remember this no matter what the very first conversion will be to the document RGB.** This is a function of the operating system and there is nothing that can be done about it. The rendering intent outlined in green will in most cases produce a better conversion **WHEN CHANGED TO PERCEPTUAL.**

If you choose as shown in the lower capture to have the device to handle color conversions a different RGB color space may show in the correct colors using profile drop down, since sRGB is the standard for most non-postscript devices you most likely will see sRGB. In some cases you'll see the document RGB if it's not sRGB. When you choose to use color proof settings the document's RGB color space will appear in the correct colors using profile drop down. You may choose another profile to handle color corrections. In either case Corel or the device handling color conversions the rendering intent in the driver dialog will override any other settings particularly the one chosen in the color proof settings docker.

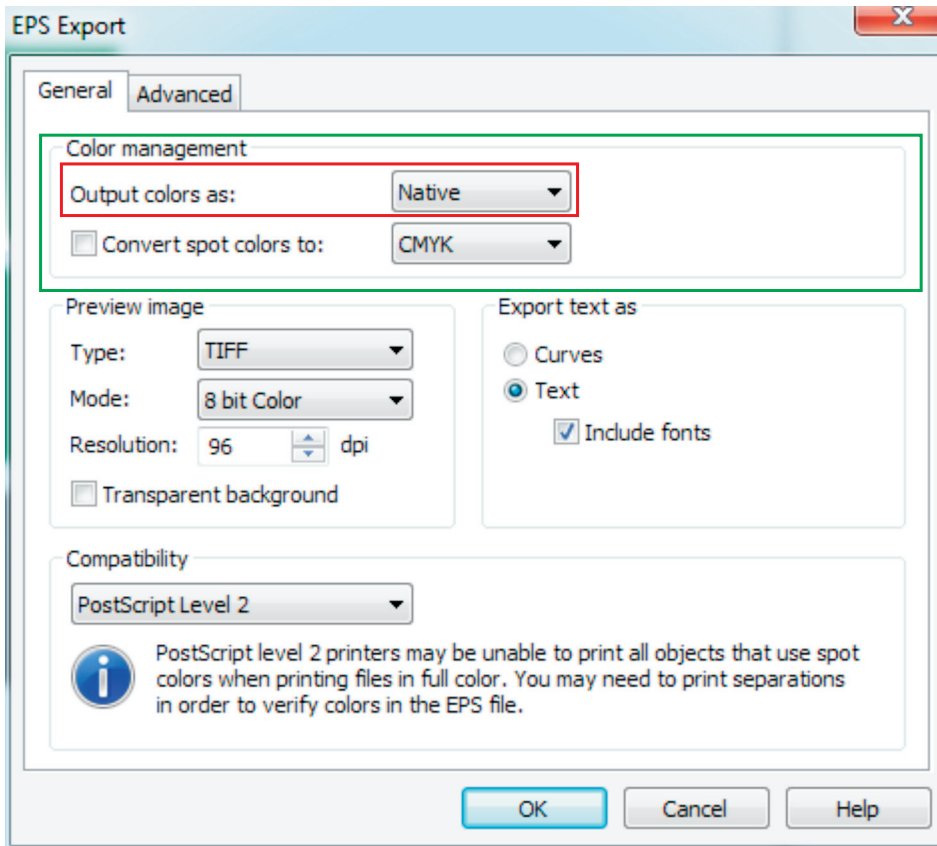
It is imperative that you remember that if you choose to work with non-postscript devices USE RGB COLOR and that a default document color mode of RGB will simplify your color control as it eliminates one color conversion in the process of printing.

The composite or the separations tabs (if you choose to select print separations) have no bearing on any color from the device.

Describing color printing for non-postscript devices is complicated by the sheer number of different devices and different interfaces available. Some do not allow you to circumvent the media profile and as such they always have the final conversion. Other devices do allow you to completely turn off the device's color control and still again others allow a composite process of control, some to the application some to the device. It is suffice to say that in CorelDRAW X6 you have a state of the art conversion to the document's RGB and the ability to place other profiles in place as your device allows.

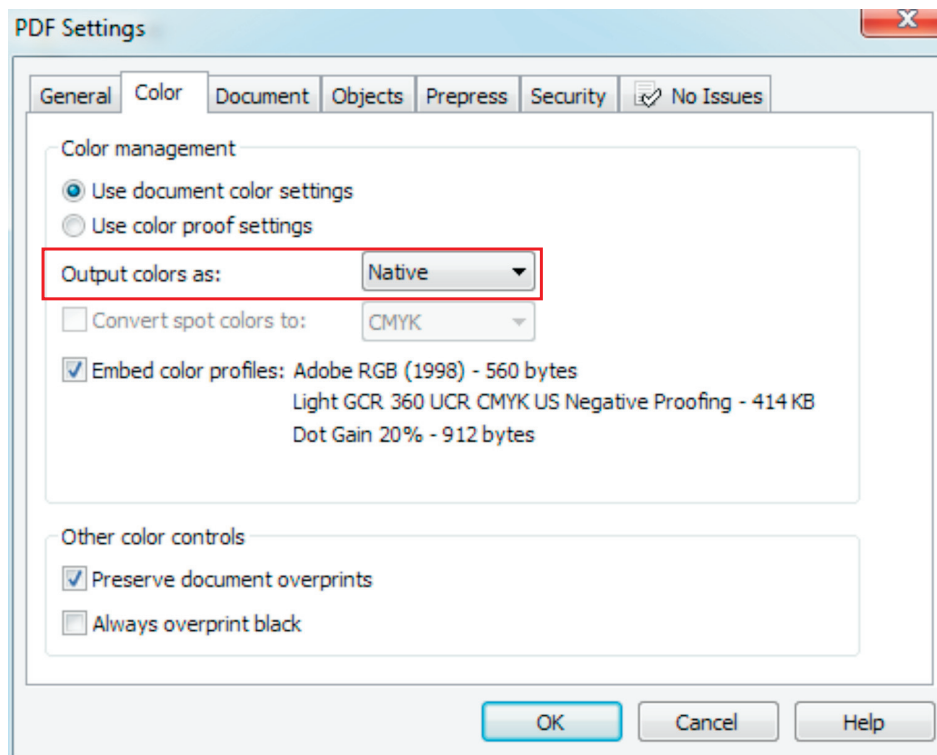
CorelDRAW Graphics Suite X6

Exporting a File EPS and PDF Supporting Wide Gamut Printing



Exporting a file from CorelDRAW X6 (for output) while maintaining the color integrity of the files content is a simple matter. The process is basically set up your document color management, create your content for the proper destination and use native color. You also can allow conversions to take place during exportation, for example files that were originally created for press that need to be displayed on the internet. In this case you would select the dialog to output colors as RGB outlined in red. Your choices are RGB, Grayscale, Native and CMYK. **Native color supports wide gamut printing.**

To the left you see the EPS export dialog, the setting shown are native color settings and are an excellent choice allowing the destination device to handle conversions or CutContour, when the EPS is used as an output file format. (Remember Adobe Illustrator cannot utilize more than one color model at a time) so all EPS files for placement in Illustrator have to be RGB or CMYK. Only those settings inside the color management area of the EPS dialog (outlined in green) affect color. **Note the PS level 2 warning, I suggest that postscript level 3 be used.**



Publishing to PDF is also best done as native color, in which case all required color profiles are embedded. I say this because then there are only four relevant PDF presets, **bleed and no bleed, high and low resolution** and you control color management by creating the file properly using the correct color content. You can choose to output colors as RGB, Gray Scale or CMYK converted by the documents color profiles outlined in red.

You can also use the color proof settings, output colors as becomes inactive, color conversions will take place to the proof settings profile and the proof settings ICC profile will be embedded in the PDF.

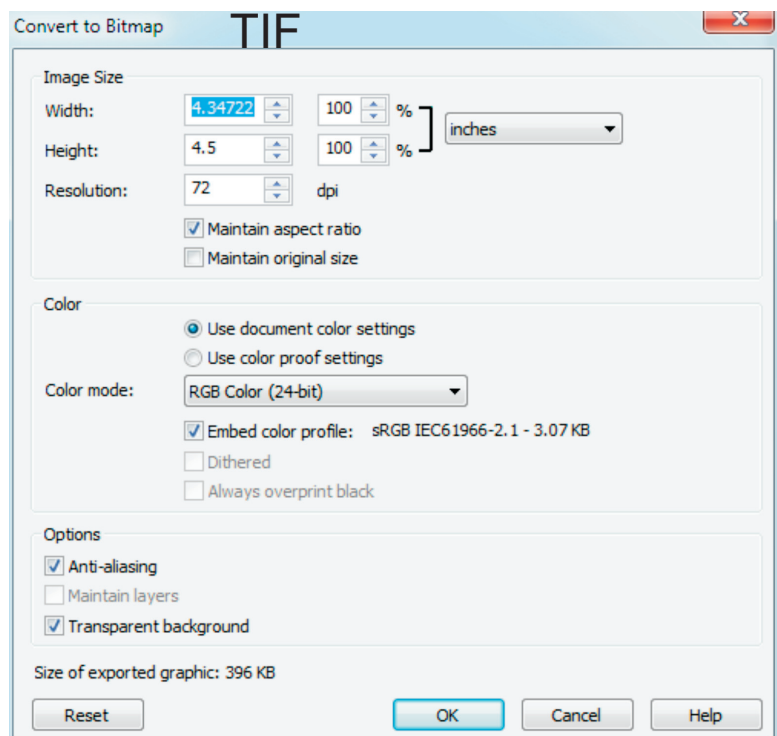
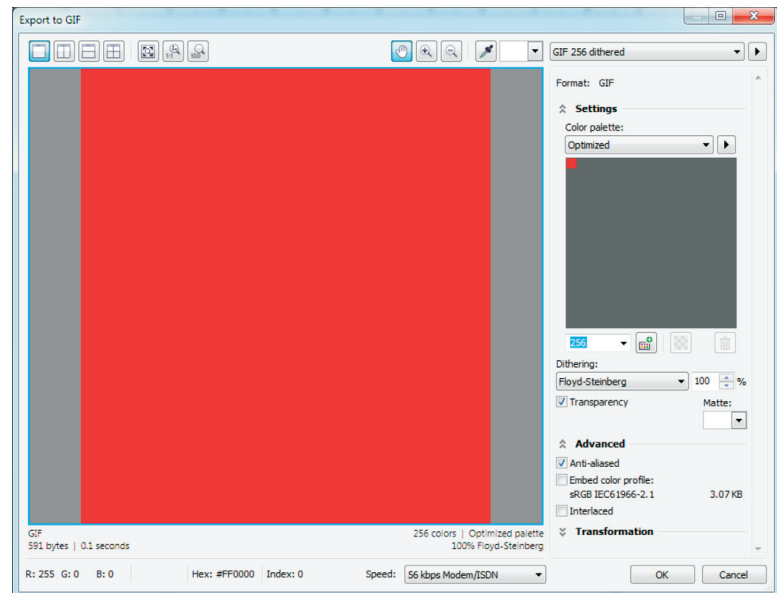
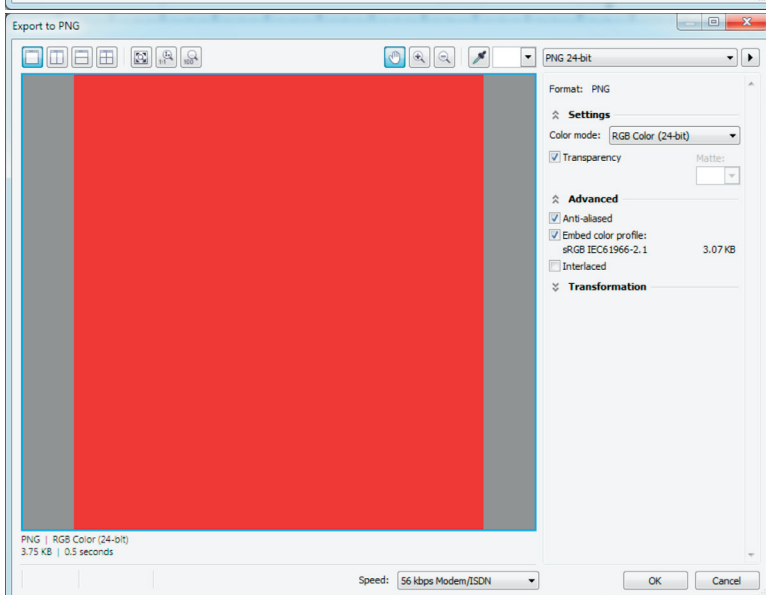
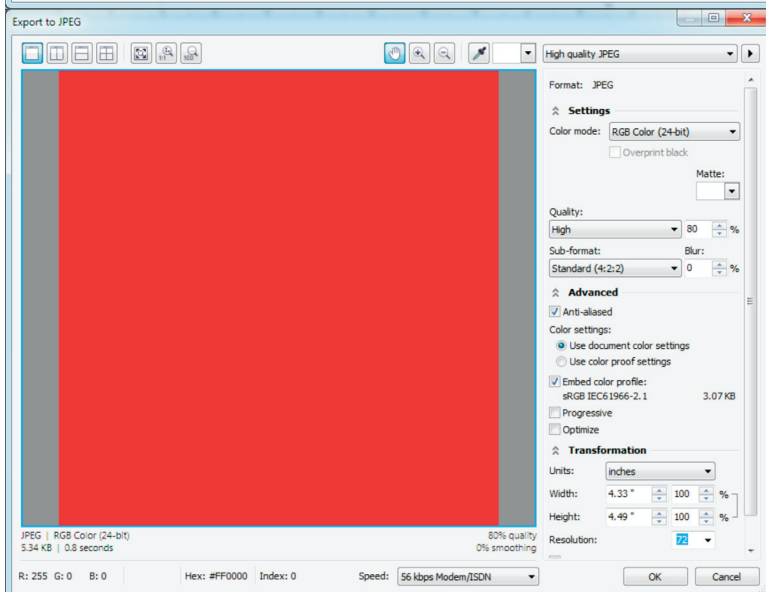
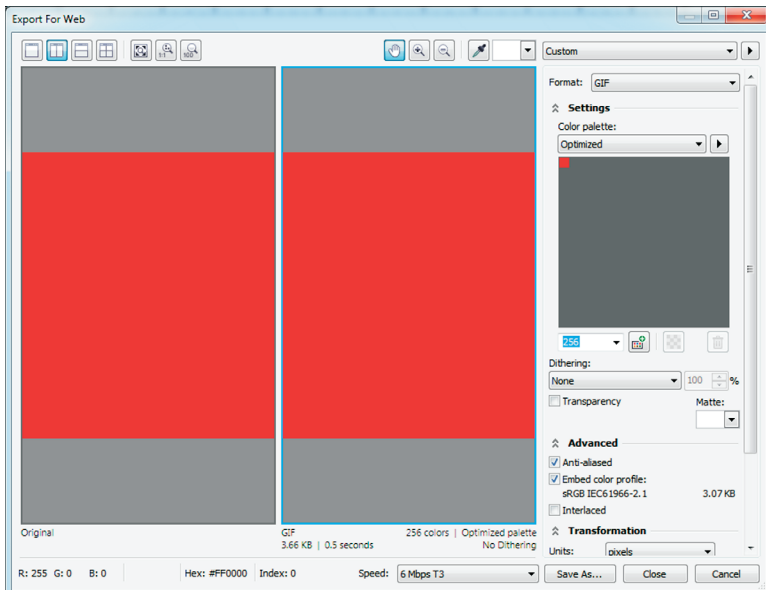
All PDF X formats are CMYK output only!

CorelDRAW Graphics Suite X6

Exporting a File

WEB

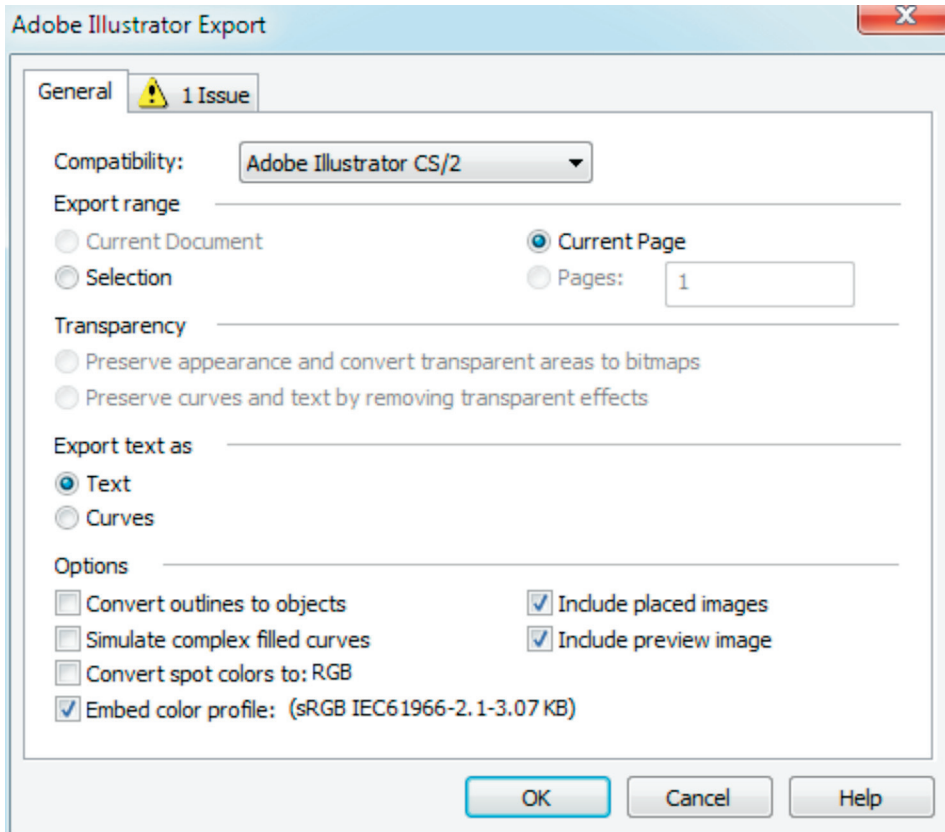
Exporting a file for web is simple in terms of color management. The new dialogs allow you to embed an ICC profile, that's it. You can choose to embed a profile or not that discussion took place in the work flow section of this publication and in general embedding for the web is not recommended because only the latest web browsers support color management and the added size of profiles slow the web site considerably. **The RGB profile is 3.07KB and is added to each image.**



CorelDRAW Graphics Suite X6

Exporting a File Adobe Illustrator

Exporting a file for Adobe Illustrator is simple in terms of color management. The new Adobe Illustrator Export dialog top left, allows you to embed an ICC profile for CS2 and newer Illustrator formats including CS5. **Remember this in terms of color capabilities Adobe Illustrator is not a very sophisticated program, it works in RGB or CMYK not both, it also by default converts black incorrectly.** If you export for versions of Illustrator older than CS and color is important then you have no choice but to tell the person receiving your files what color management settings you used. Do not expect that any Adobe user will understand this, set your color management to North American Press and relax. All adobe products use Black Point Compensation on and relative colorimetric rendering as default. This is NON-ICC conforming. This is most cases (99.5%) results in conversions very similar to perceptual rendering, Corel wisely does not non-ICC conforming work flows so to match Adobe conversion as close as possible use perceptual rendering in CorelDRAW..



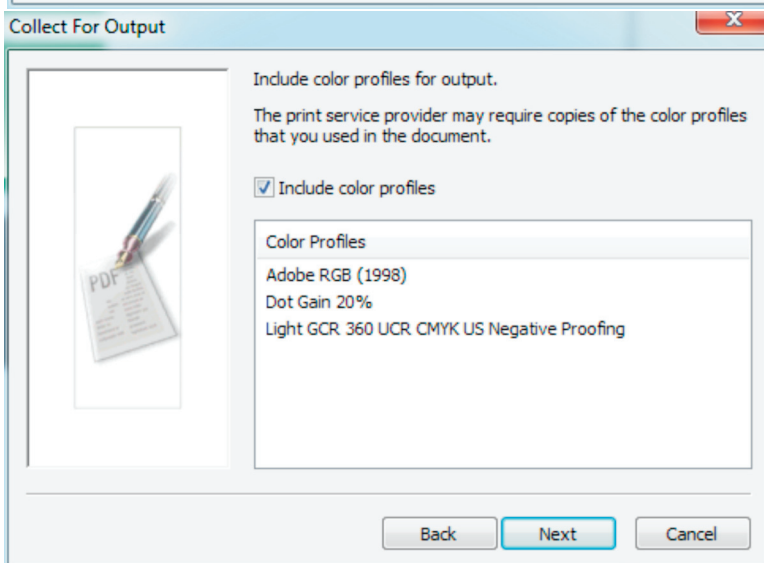
Collect for Output

Collect for Output

CorelDRAW X5 has changed the prepare for service bureau commands under the file menu to collect for output, these have continued for X6. The capture bottom left displays the commands.

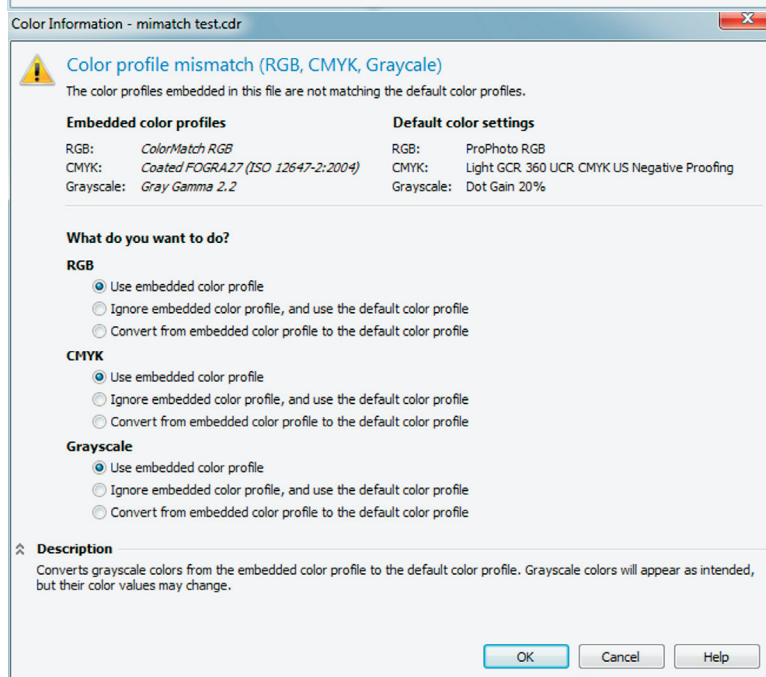
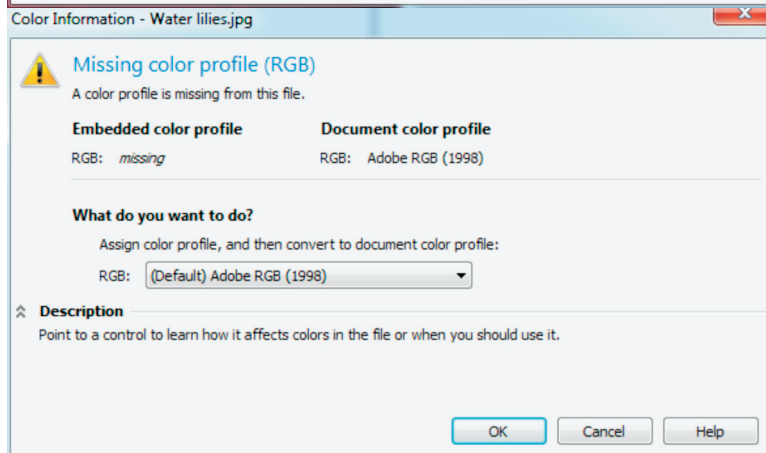
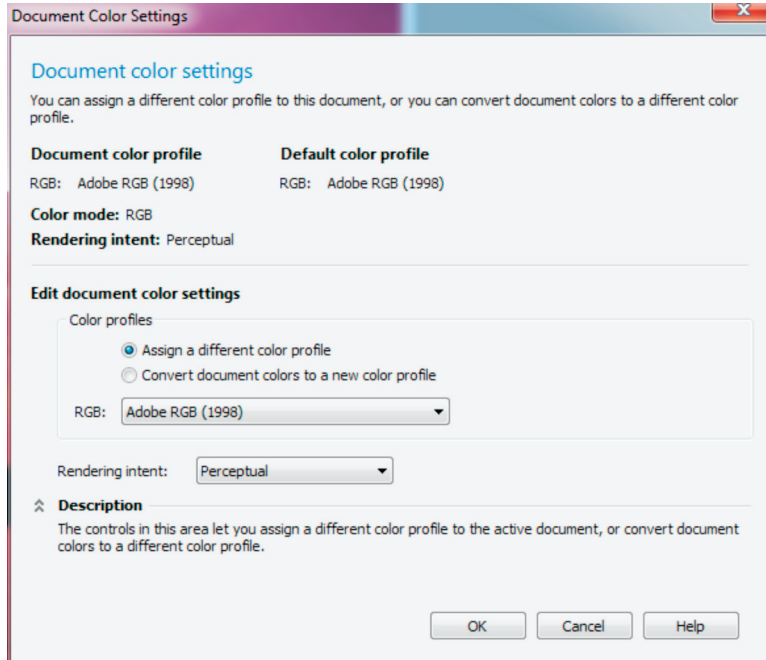
Please understand that color management is about organization, what that means is embedding profiles so the end user has all the information they require to properly process the color of your file regardless of the destination.

That is why you see me recommending native color for export filters that support the feature. This color process allows the user to transmit the full spectrum of color models and the ICC profiles that are required. The collect for output has a dialog that allows you to include the document ICC profiles.



CorelDRAW Graphics Suite X6

Acquiring an Image via a Scanner 64 bit CorelDRAW requires Service Release 1 to support scanning



When you scan an image into Corel Photo-PAINT X5/X6 to create a new document, if the scanner does not embed a profile the new document automatically assumes the default application color setting. To view the scan in the scanners color space you have to select document color under the tools menu/color management/document settings. In this dialog you have a choice to assign the scanner color profile and then convert to the document color. This must be done for each scan, for the color to be displayed correctly.

Scanning an image into CorelDRAW X5/X6 is another matter. In CorelDRAW to acquire an image you must have a document open, so when you scan an image and place it in CorelDRAW the application will see either a missing profile or a mismatched profile. In the case of a missing profile, which will be the case for most low cost scanners you will need to assign the scanner color space and then convert to the documents color space. That is unless the scanners color space matches the documents color space. This will be the case if you work in sRGB and by default the scanner will be use the sRGB color space if you use lower cost scanners.

In the case where the scanner embeds a profile you may get the mismatched color profile dialog and your selection will be to convert the scanned the image to the documents color space. The CorelDRAW color profile mis match dialog shown left (of course only the RGB section would display).

Color Management Settings and Advanced Work Flows

CorelDRAW Graphics Suite X6

The importance of the export and print dialogs

The previous chapter has displayed the export and print dialogs for the user and to say the very least they are very significant! The following pages will expand on the application and document color management settings but ALL and I mean ALL of these settings work in coordination with the color setting in the previously shown export dialogs.

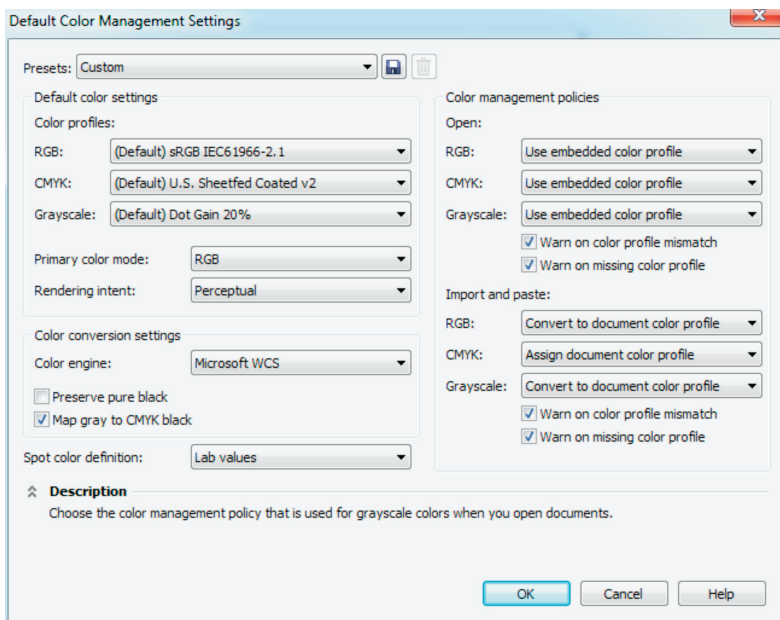
Color management is in many cases just that simple, you set your applications color settings, the document color setting and export and or print with proper color settings.

The concept of using perceptual rendering in CorelDRAW to bridge the gap between the CorelDRAW ICC compliant work flow to the Adobe non-compliant work flow needs to be a serious consideration.

CorelDRAW Graphics Suite X6

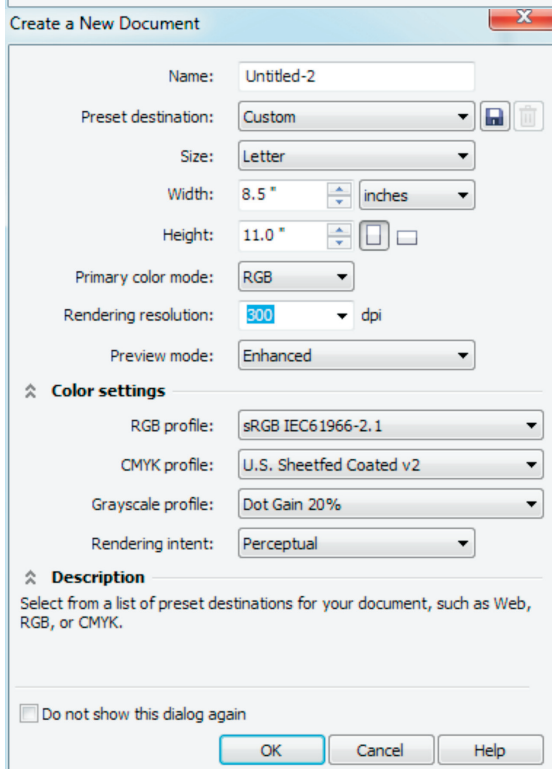
Web, Office and Presentation Work

The environment for color in web, office and presentation work is not changing at any rapid pace. Yes you're seeing some web browsers support embedded profiles, you're also seeing projectors utilizing ICC color management but as of yet I have not seen any office applications other than presentation applications adapt ICC controlled color management and even then only as a profile for the projector or monitor, the process assumes sRGB. What this means is that there is a solution for everyone, that solution is the standard assumed sRGB color space. I know that people will offer many opinions on this but the fact that the dominant method works, and uses no embedded color profiles renders all those arguments moot. In fact the argument that embedding color profiles for the web requires too much of an increase in file size has in my opinion won the argument. So let's stick with what we know, first an assumed sRGB is still universally compatible and when this changes CorelDRAW X6 allows for the embedding of profiles. The only choice you have to make is to allow the profile to be embedded or to not allow the profile to be embedded in your file, CorelDRAW allows for such a choice in the export and save dialogs, the choice is yours.



To the left you see the default color management dialog and below it the document color management dialog. The settings you see here are proper for a Western Hemisphere web work flow. The sRGB color space is universally used around the globe, the CMYK is a regional choice, set your to CMYK profile to match your area. Grayscale of 20% is the Corel default if you wish to match the older default set for gray gamma 1.8, 2.2 is considered the web standard. Using the check boxes for the warnings for mismatched or missing color profiles is simply my choice and is not required. Corel can automate these choices for you as discussed earlier in this publication. The highlighted resolution setting is your choice in general 72 or 96 DPI is proper for web and presentation, 300 is for press work. Working for this environment is really simple, notice that the

primary color mode is set to RGB, this is a fundamental requirement as no web or office application uses any other color model. Create your web/presentation work in the sRGB color space with the RGB color mode at web resolutions and all will be well.



The color management setting seen here with the CMYK setting set to your regional needs allows for you to convert files that were originally created in CMYK mode and press color models for print to the sRGB color space for web and presentation work. Perceptual rendering is used due to the compression of out of sRGB gamut aspects of the spot color and CMYK color models. These color conversions will be ICC compliant and will be repeatable and consistent for all web supported file formats. Remember that the sRGB color space is not wide enough to encompass all the CMYK or spot colors so there will be some color shift in shadows colors, dark greens and blues. However the conversions are as good as possible until the entire process supports either a wider gamut RGB or embedded profiles.

CorelDRAW Graphics Suite X6

Printing Press Work

A file properly prepared for press can contain elements from the two color models, CMYK and Grayscale and one spot color palette. If your work is only spot color use one spot color palette, if your work is black and white use K of the CMYK model for vectors and type and grayscale images, if your work is only CMYK only use the CMYK color model, PERIOD! The document must use CMYK color mode, other controlling factors are screen rulings of the plates, which governs the resolution of images within your document. The general rule is image resolution needs to be twice the plate line screen; example 150 line plates need 300 PPI or DPI images at output size.

The controlling factor for CMYK color is the TIC (total ink coverage) of the press paper combination. This is a technical fact however finding a customer service representative for a printing company that knows this or even knows what a CMYK profile is may be an impossibility. So you're stuck with using regional commercially acceptable CMYK profiles, for example U.S. WEB coated V2 or WEB uncoated for Western Hemisphere. European Fogra coated and uncoated, in Europe, there are just too many to list so consult your regional service provider.

Facts that you can count on, press work is for the very large part handled by a plate maker or pre-press technician that has no idea of the technical parameters that govern their work. At countless numbers of shops that I've been in over the last three years time and time again I've ask and the technician tells me that they just do what their told and use the setting that they're told to use. They have no idea what or why.

Spot color is controlled by using the proper palette, stay within the palette that was used from the beginning when you started to create your file. Understand this coated, un-coated, C, U and CVC are designations only and used for the computers simulated display on the screen only, the pressman uses the same ink regardless of what you choose. The display and conversion of spot color by using LAB is the new Pantone specification I suggest we use it, if you must match older versions of CorelDRAW then you can use RGB or CMYK for the spot color conversions. You can use K of the CMYK model for black text as well as for vectors and as the black color duotones in Corel Photo-PAINT.

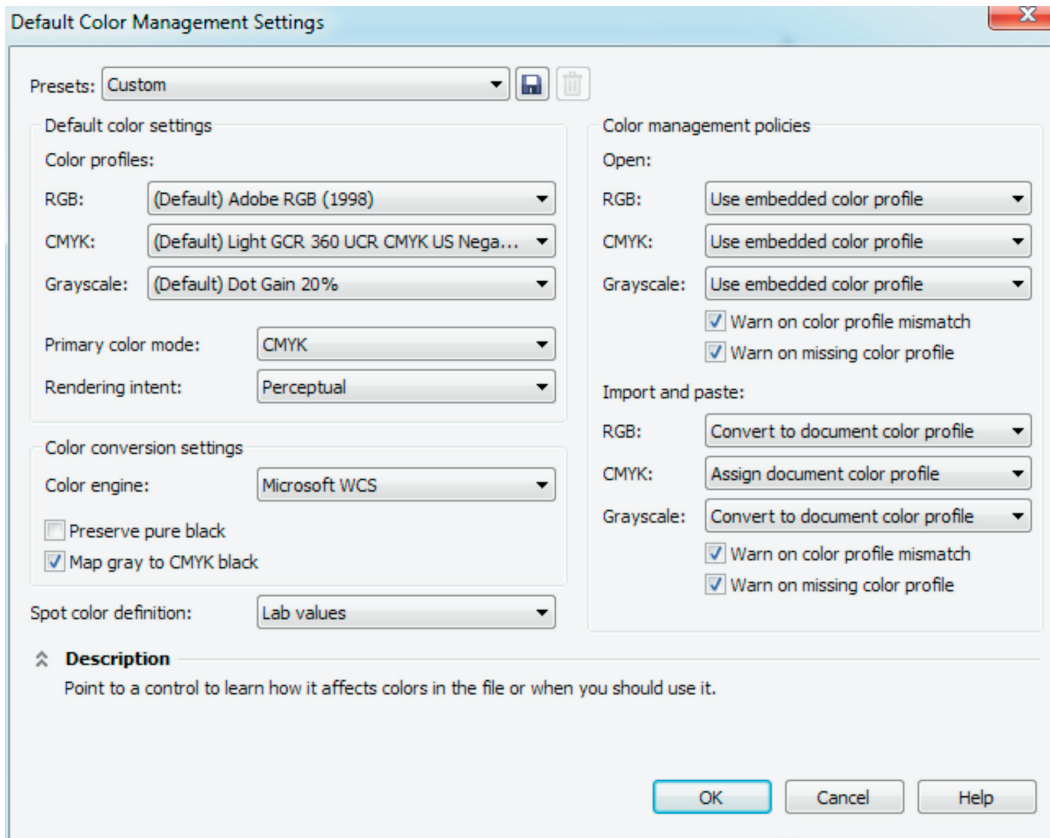
Grayscale profiles are used to control the transition from L MIN (lightness minimum) to D MAX (maximum density) and the naming of them is dubious at best for example a 20% dot gain. Just how exactly is that defined? I can never find an answer that makes sense, so try those available to you and see what you like I stick with the default of 20%. The one aspect of press work for grayscale is this the profiles do not affect L MIN or D MAX and if you export a grayscale file such as an ad for printing at a newspaper they will specify a D MAX and an L MIN, usually this will be 3% L MIN to 85% D MAX. To achieve this simply convert your image to grayscale and edit the image in Corel Photo-PAINT using the tone curve under the adjust menu, read the L MIN and D MAX in the image info docker and adjust the two ends of the tone curve to match the requirements.

On the next page you'll see the default color management dialog and the document color management dialog. The settings therein are what I use for my day to day use, perceptual rendering is my choice because I am converting wide gamut (RGB) color spaces to small gamut (CMYK) color spaces and I want to maintain the perception of the color transition of the images. The warning check boxes are again my choice and you can properly choose not to use them and let Corel make automatic choices for you. The profiles used and the document resolution seen again are what's required for my personal coated paper sheet fed work flow, please remember to use an RGB color space wide enough to utilize all the CMYK gamut of the profile you choose (Adobe RGB 1998) seems to work fine. Consult your local print provider and set your dialogs accordingly.

Set your dialogs and control your color management via proper file creation, it really is just that simple. never place a spot color in your file from more than one palette, use only grayscale and CMYK objects or images in your press file and your color management is correct. This assumes of course that you have some control over the display and creation process, I recommend using Pantone Spot color and Process Color Guides.

CorelDRAW Graphics Suite X6

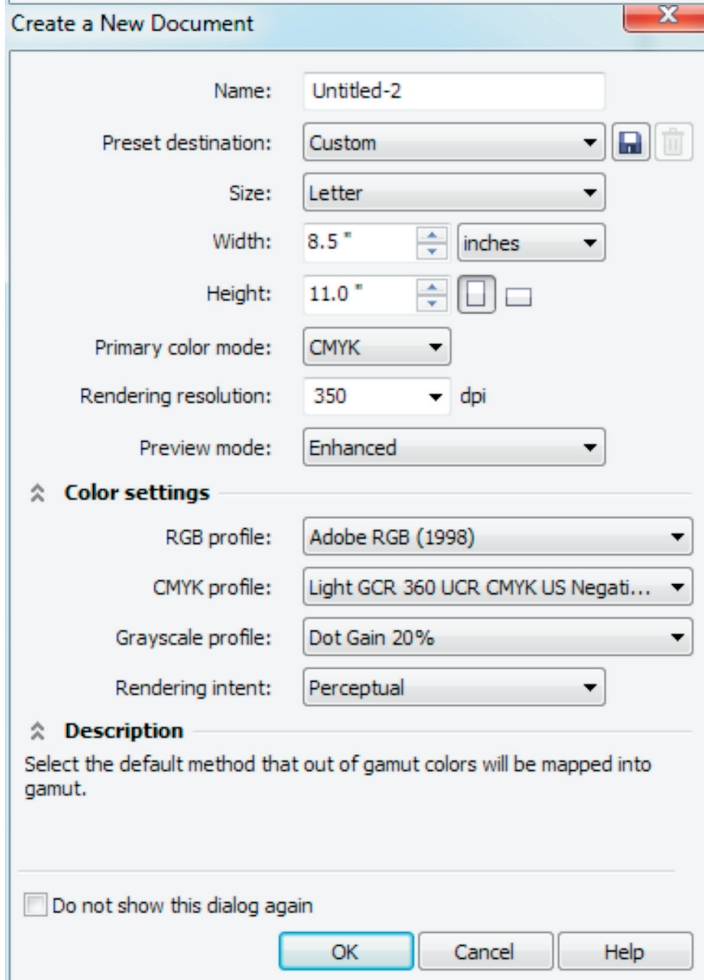
Printing Press Work



To the left you'll see the default color management dialog and the document color management dialog.

Again consult your local provider as to the regional profiles. Change these profile setting so suit your regional needs.

As demonstrated by the recent discussions on the Corel public forum be prepared to get the wrong answer from the print shop. One user was told they the print shop used Euroscale color profiles but found that when he selected the US Web Coated his display was very close to the printed product. Knowing what I know I'd say the print shop does not use Euroscale



profiles.

The warning boxes being checked, the rendering intent, the color engine and the LAB display of spot color are my personal preferences.

Primary color mode of CMYK is an absolute must! As is using one spot color palette, grayscale and CMYK files contents only!

CorelDRAW Graphics Suite X6

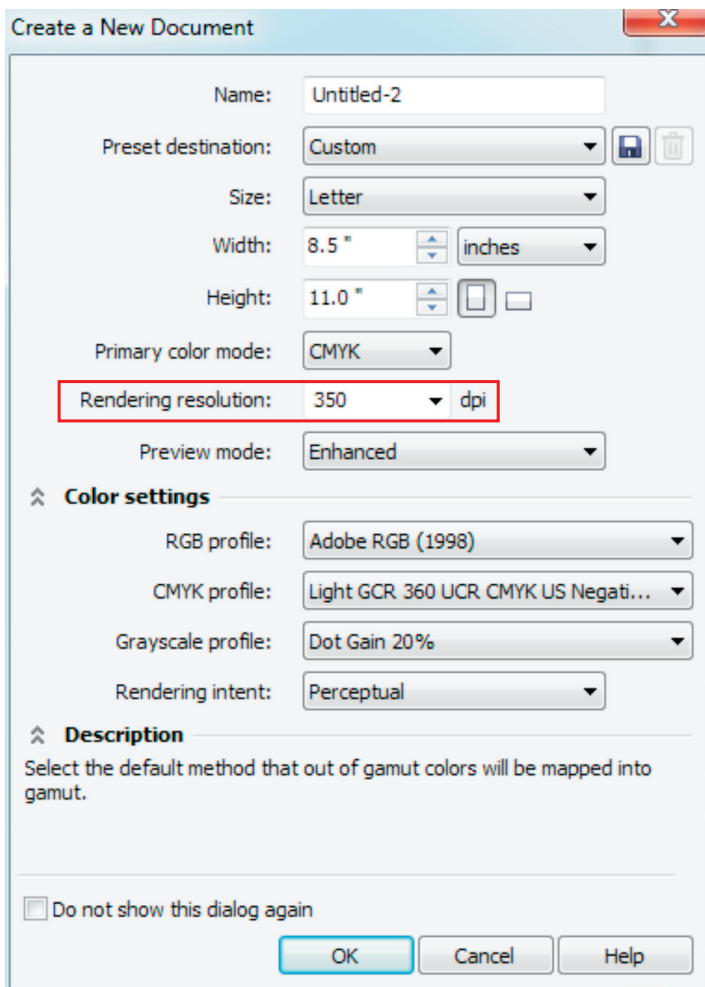
Expanded Gamut Printing Work (Read Printing Press Work on the previous two pages)

What is expanded gamut printing? It's a term that I use to describe printing a file whose color content is from one RGB, one grayscale, one CMYK color models and one spot color palette, allowing the final color conversions to be handled by the output device using the media profile. Many times through a native color PDF or postscript driver based or digital front end process. A native color PS or EPS file is one that contains elements from multiple color models and or a spot color palette. This process is best used with digital printing units. How the process works is fairly simple, one can use a Corel published or Distiller published PDF and embed the documents color profiles. The RIP will read the PDF utilizing the embedded profiles for the color conversions. Distiller published PDF also works the same way.

X6 has the ability to support RGB vectors in postscript so we can export a native color EPS file or print a composite PS file. CorelDRAW will transmit the color space arrays through the postscript files, the RIP simply has to be set to assume the color spaces used in the CorelDRAW file supplying the proper profile identification for the conversion to the media profile. This is an assumed color space work flow.

Another method of expanded gamut printing would be to rasterize the entire file contents to the documents RGB color space and saving the file in an image format supported by the RIP with the RGB profile embedded. This works as long as you use an RGB color space wide enough to completely encompass the CMYK color space and the spot color palette of the file contents, Adobe RGB 1998 seems to work well for this.

Everything about expanded gamut is identical to printing press work except for the following. You may utilize one RGB color space along with your other color elements. The resolution set in the new document color management dialog is crucial.



Test your output device set the media and quality settings to various setting and send various resolution images to the device. Look at the test output and establish the required minimum resolution of files sent to the unit for the best quality at the various quality settings. Now when you start a new document for output on this device you can set the document resolution to the minimum required, allowing you to print the largest size file possible with the highest quality.

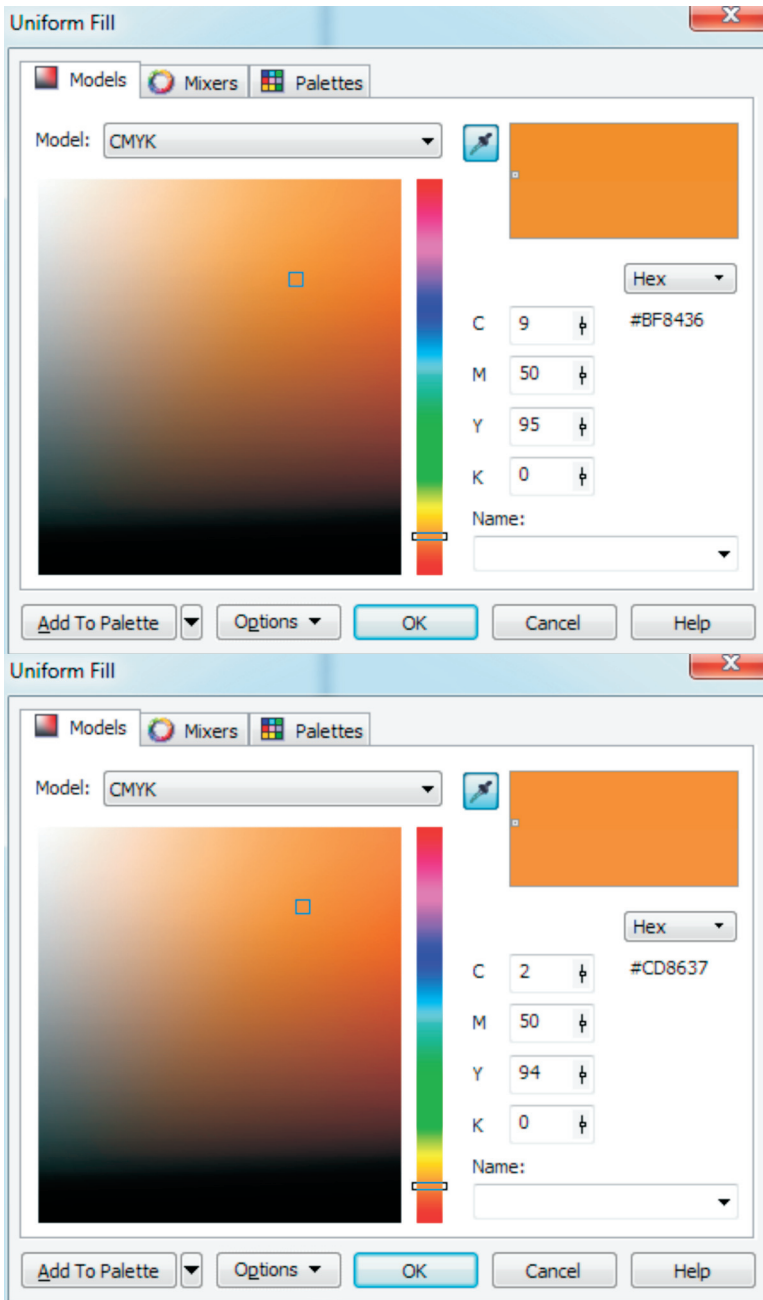
The rendering resolution outlined in red in the capture to the left is critical for managing system resources in large and grand format printing. It also can be critical for proper color managed output on some RIPS. I utilize perceptual rendering because again I am converting wide gamut color spaces to smaller color spaces.

CorelDRAW X6 Graphics Suite is to my knowledge the only application to offer expanded gamut output and display with a live high resolution effects preview.

Expanded gamut printing as I call it works very well for al digitally reproduced graphics.

CorelDRAW Graphics Suite X6

Spot Color



The new spot color management policy governed by Pantone is for graphics applications to use LAB color space values for display and conversion of spot colors. What this means for Corel users is that the default spot color display for X6 is better and different than X4. To match the X4 automated spot color to CMYK conversions in X6 you will need to load the same ICC profiles as X4 and set the default color management dialog under the tools menu/color management to use RGB for spot color. If you displayed your spot colors as CMYK you need to access the default color management dialog and select spot colors as CMYK.

To the left you see two screen captures of the uniform fill dialog from CorelDRAW X6 using Pantone 138C and converting to CMYK. The top one is the default of LAB display and the bottom one is X6 set to the old X4 default of RGB. Notice how the top display of the old and new colors are much closer to the spot color than in the bottom capture using the X4 defaults. Also notice the difference in the resulting spot color builds, C9 and C2, Y95 and Y94 specifically. The 7 point change in the X6 LAB default is significant and results in a much closer conversion to CMYK from this specific Pantone color.

What's of even more interest is how the display of the original PMS 138C using the LAB default is significantly closer to the Pantone Spot Color Guide itself. The RGB display used in X4 is not even close and the LAB display of X6 is now the Pantone specified method so beware of this.

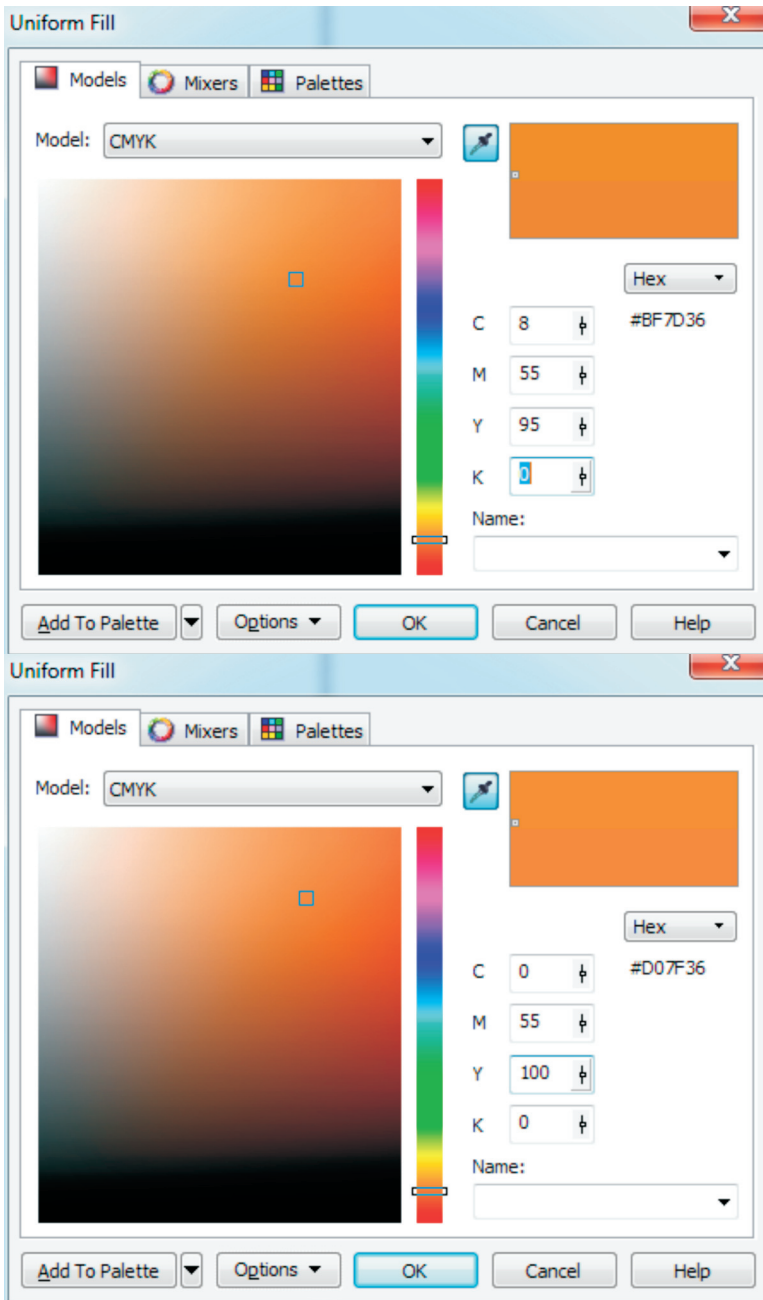
One key issue for spot colors is that even when using LAB for converting spot color to RGB for web use, sRGB will clip some spot colors as the

gamut of sRGB is too small to display all the spot color palette. If you convert spot color to RGB to output for digital printing such as on an ink jet you'll be best served using Adobe RGB 1998 or a regionally supported RGB color space which is at least as wide as Adobe RGB. Since Pantone colors are specific mixes there will be no change in how the color prints only in how it display and how it converts to other color models.

The one true strength of CorelDRAW was always the uniform fill color dialog. It allows the user to see a better quality display of the spot color so that the user when manually converting to CMYK in some cases a much better conversion of CMYK is possible when you use normal view. This gives the Corel user an edge in terms of quality that can't be achieved using Adobe products. When X6 using LAB conversions this edge over the competition is even greater.

CorelDRAW Graphics Suite X6

Spot Color



The new spot color capabilities are demonstrated on this page with manual conversions. The fact is this if you want accurate spot colors print in spot colors. If you want the most accurate automated and manual conversion of spot color to RGB or CMYK use CorelDRAW X6.

The dialogs here show the possibilities of manual conversion and the prints seem to bear them out. Especially the conversion using LAB, the middle capture using RGB conversions just cannot hold a candle to those using LAB.

Looking at the bottom capture you see that it is a composite of two sets of captures each made up of three swatches. Each set is composed of a spot color swatch on the left, a automated conversion to CMYK top right and then across the entire bottom a manual conversion to CMYK. The top set of three swatches displays the LAB conversions. The bottom set of three swatches is displaying the RGB spot color conversions.

NOTE PMS: 138 is slightly out of the CMYK gamut but regardless of which process you use LAB or RGB conversions you can get a better conversion in this instance with a manual conversion. Albeit the LAB conversion is much closer to a spot color.

CorelDRAW X6 gives you an enhanced tool for spot color work and I suggest that you make use of it.

Please note the resulting CMYK color build will be dependant upon the CMYK ICC profile selected for your document.

**Color Management
Laser Engraving
Dye Sublimation
Conversions
Color management
Off**

CorelDRAW Graphics Suite X6

Non-Postscript Devices

Laser Engraving, Dye Sublimation

Color Management Off **Please Read the Black Printing Section that Follows**



C100 M100



R0 G0 B255



M100 Y100



R255 G0 B0



C100 Y100



R0 G255 B0

Below are conversions from specific CMYK colors that take place with the Color management Off Setting. This duplicates the X4 and older settings allowing X5 and X6 to be used for laser engraving and some dye sublimation processes.

The details of the three black colors that will convert to R0 G0 B0 are too detailed to add to this section of the book so I preceded the black print section with this one on color management off and the resulting conversions as used for laser engravers and tied it into the black print section.

Laser engraving requires very specific conversions as seen by the capture to the left. These are non-ICC compliant conversions and the displays are completely incorrect however they are specific to the requirements of many laser engraving devices so Corel has continued to support this work flow. While the colors may not be pertinent to every ones work flows the type of conversion process is. Red gives a pure Red, Green a pure Green, Blue gives a pure Blue.

Black with this color management setting can obtain a pure R0 G0 B0 with K 100, Pantone Process Black 100% and G0 of the Grayscale color model.

Some newer devices may be able to utilize proper color management setting and utilize the Grayscale G0 black as well as the other shades available from my G palette available at www.graphicstechnology.com.

Color Management

Black Printing

Non-Postscript

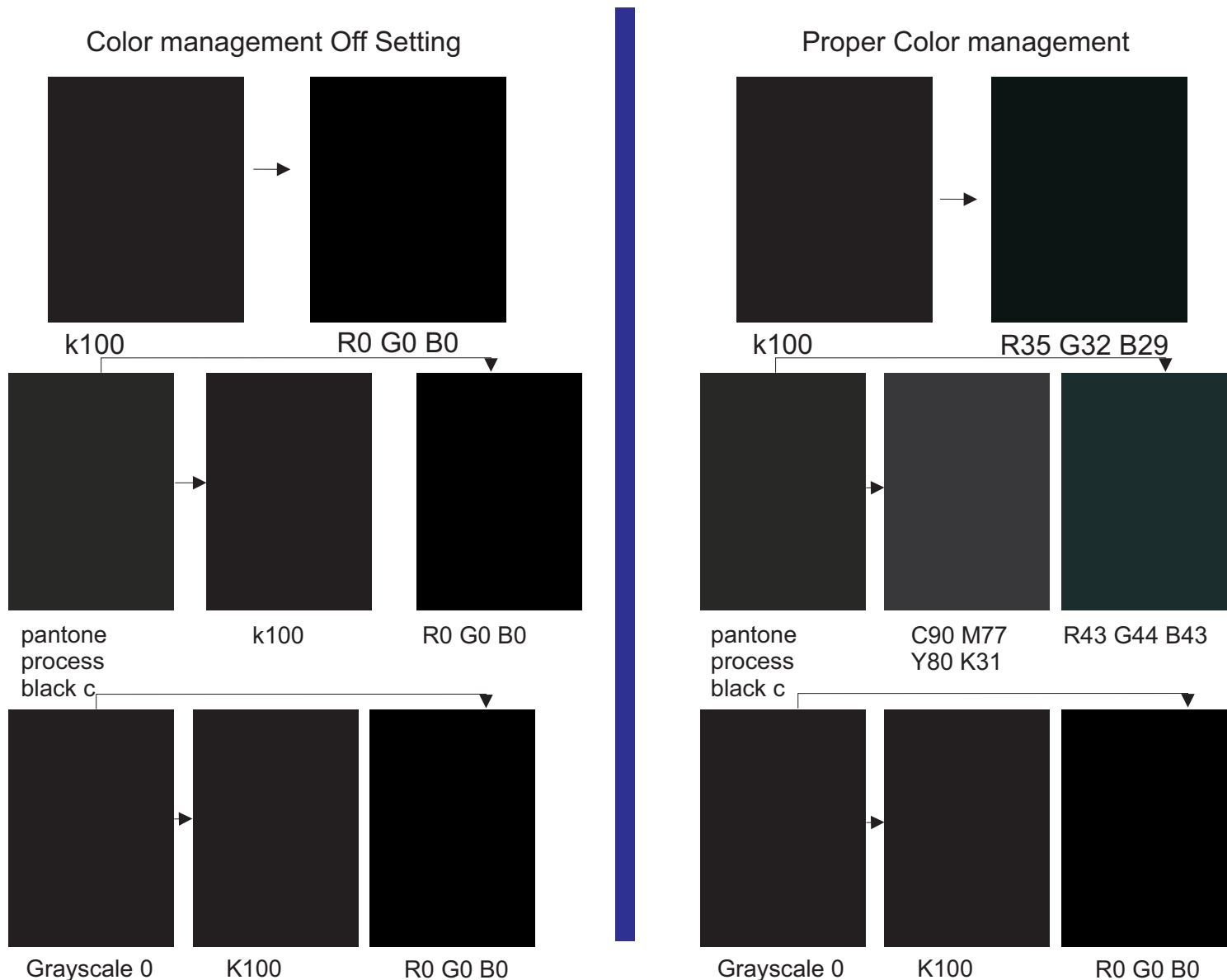
Devices

CorelDRAW Graphics Suite X6

Non-Postscript Devices

LET'S TALK BLACK PRINT

Below are conversions from specific black colors that take place with the Color management Off Setting directly beside the same black colors converted properly with color management on, (note: resulting conversions with color management on are based on my currently selected profiles)



To print a solid black text or vector shape with non-postscript devices regardless if we use color management of or proper color management it is required that we select a black color that will convert properly, then our application black color will convert to R0 G0 B0 in the print stream via the GDI (graphic device interface). On the left of this page we see simulated the color management off setting and three different source black colors on the left of each row, the next color to the right is the CMYK conversion of the original and to the far right of each row the RGB conversion from the original black color, note that they are all pure blacks. The only blacks I know that work with the color management off setting is K100, R0 G0 B0, Pantone process Black and Grayscale G0. The bottom row on each side of the page demonstrates that it is possible to achieve this pure black goal with both settings, color management off and a proper color management setting. **You can only do this with a proper ICC compliant color management setting by utilizing Grayscale G0 for solid black.** This is an ICC compliant solution for printing pure black text and vector objects going forward for all X5 and X6 work flows, non-postscript and postscript. **I have created a grayscale palette named, black for mixed RGB work flows that you can download at www.graphictechnology.com.**

CorelDRAW Graphics Suite X6

Non-Postscript Devices

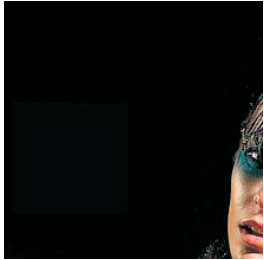
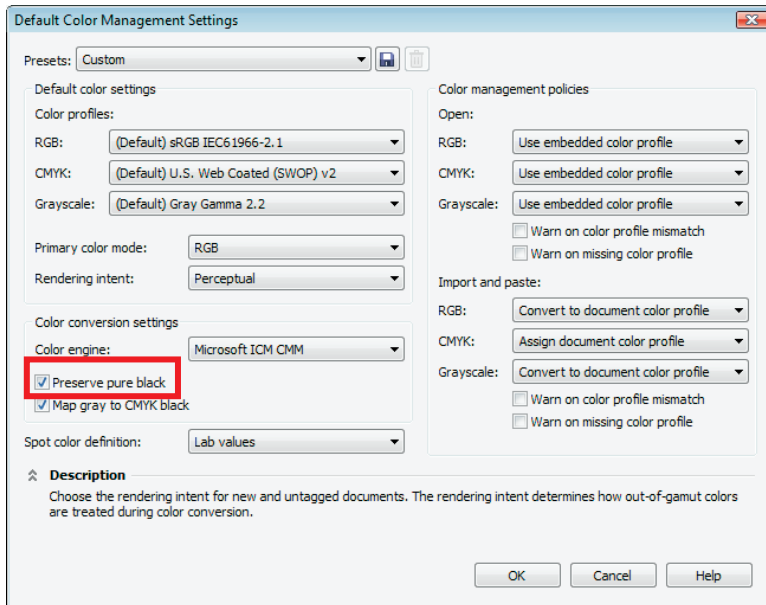
LET'S TALK BLACK PRINT

DANGER INCORRECT COLOR CONVERSIONS AHEAD

There is another NON-ICC compliant work flow for printing text and vectors in pure black with non-

postscript devices, as shown to the left CorelDRAW allows you to select preserve pure black outlined in red. This will allow C0 M0 Y K100 of the CMYK model to convert to R0 G0 B0 and R0 G0 B0 to convert to C0 M0 Y0 K100, this is incorrect for ICC compliant work flows but required for the ease of users with the non-postscript print devices. As shown in the color management dialog checking this setting is the only required change to the default color management settings for this to work.

Herein lies the problem, as demonstrated by the light black square in the small capture below the color management dialog, all your black colors darker than k100 convert incorrectly. Zoom in please. With this setting all the dark black in this image would convert to the same color black as this small square completely changing the relationship of the colors of this file, it also removes all shadow detail in the black.



What happens is that in the RGB color model there can be no darker black color than R0 G0 B0. However the darkest color in CMYK is C100 M100 Y100 K100, however we have told our application to improperly convert all the darkest RGB black to the lighter CMYK black of C0 M0 Y0 K100 and of course the opposite is also true, the lighter C0 M0 Y0 K100 and all darker elements K100 + CMY elements will convert to R0 G0 B0 only. Removing all black shadow detail.

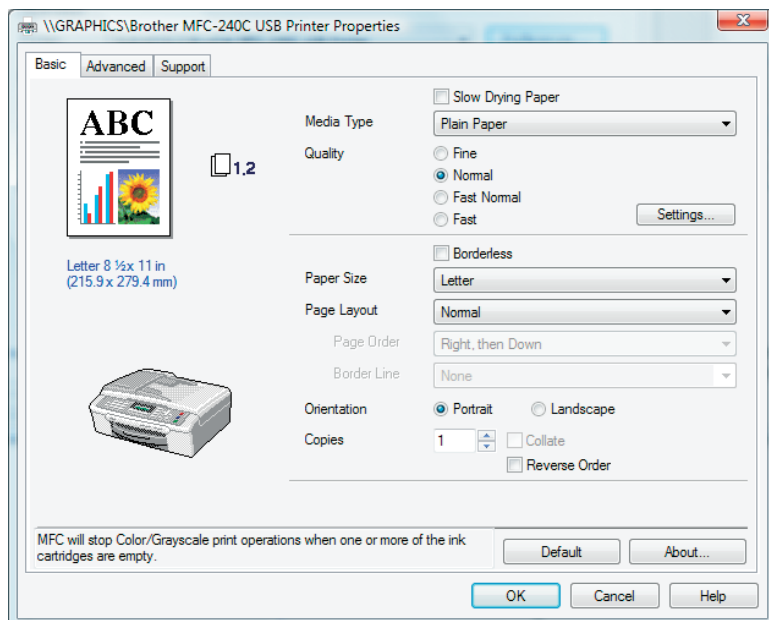
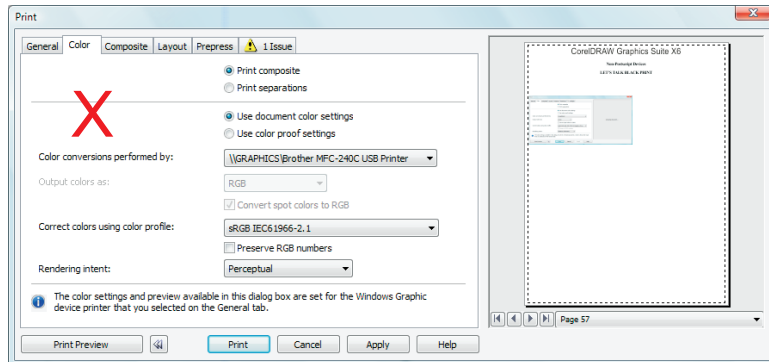
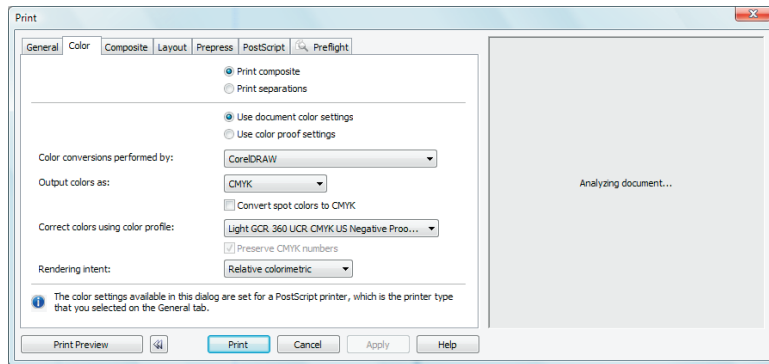
The not so dark K100 now converts to R0 G0 B0 the darkest RGB black so while text and vectors print a solid black in non-postscript devices black color for all of our images are posterized. The extent of this posterization will depend on the amount of content in the image that would have properly converted to K100 + CMY elements and the RGB equivalents. The elements that should convert to K100 will be fine but all elements that should be a darker black will lose all their detail.

CorelDRAW Graphics Suite X6

Non-Postscript Devices

LET'S TALK BLACK PRINT

I'll repeat this section in the non-postscript work flow section of the book for those who like to skip around when they read. Below the top capture shows the default settings for the CorelDRAW print dialog color tab for my non-postscript device. **The selections use document color settings, color conversions performed by, correct colors using color profile and rendering intent are important.**



The rendering intent in my opinion is also critical, when one reads the definitions of the rendering intents, logically, since the source in the file is a wider gamut RGB being sent to a narrow gamut printer CMYK. (Even though the non-postscript print stream contains RGB data, the printer itself will convert to CMYK for the ink print heads). Only perceptual rendering makes sense as relative colorimetric rendering will clip such a large portion of the color because it is so far out of the CMYK gamut. Perceptual rendering will maintain the feel (perception) of the file. **Also making the black print solid**

To the left the second capture marked with a red X shows changes I needed, you'll need to substitute your printer name and profile. You also may find that your device, especially those that are more expensive allow you to use other profiles for specific media. I have shown the device print dialog for my device, yours will be different and for more complex devices I suggest that you develop a color management process that works for your device.

Some units will accept a change from CorelDRAW where you select the media profile in the convert colors using color profile drop down. Others simply want sRGB selected in the CorelDRAW dialog and in the device print dialog allows the user to select a media color profile that customizes the printer to the paper selected. .

Expectations!

Let's talk realistic expectations, I don't care if you spend \$10,000 on a non-postscript printer it's still a non-postscript printer and limited to the parameters of the process in which it was designed. Matching corporate colors (spot color support not at all) many

times won't happen, expanding beyond the sRGB color space is dubious. Support for transparency and complex objects is limited as is calibration capabilities. Repeatability within the operating parameters is very good.

Color Management Non-Postscript Devices

CorelDRAW Graphics Suite X6

Non-Postscript Devices

We start this discussion by recapping the black print and color management off setting for those who skipped the special black printing section. There are several issues with non-postscript printing, the first issue is legacy CorelDRAW X4 and older files and I'll start with them first. Legacy files are difficult for several reasons the most significant is that many users over the years received the wrong information about color management and were told to use the color management off setting, you'll see this many times in dye sublimation work.

The real issue is that there always was an ICC compliant solution and these legacy files did not need to be created in a manner that would leave them as an issue going forward. The reason that this was incorrect can be difficult to understand because of the name of the setting, color management off, THERE IS NO COLOR MANAGEMENT OFF. No graphic application can function without color management PERIOD.

What that means is that the color management off setting is a series of color management settings that set color operational parameters in a specific way. The unfortunate aspect of this is that the way it works is NON-

ICC compliant and utilizes an RGB color space that does not exist anywhere except in these older versions of CorelDRAW. As shown below Corel has decided to continue this type of setting, (it is not identical but very close) so these legacy work flows can be supported. The only other setting one might set is the preserve pure black setting.

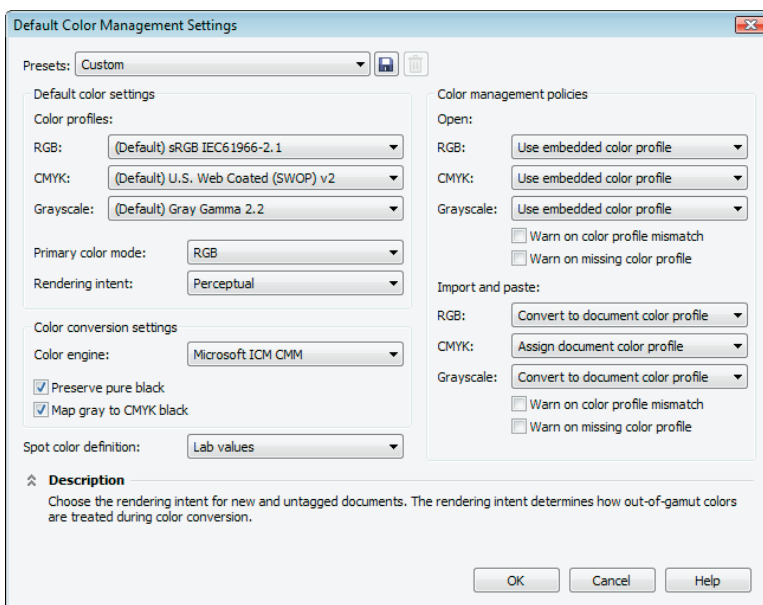
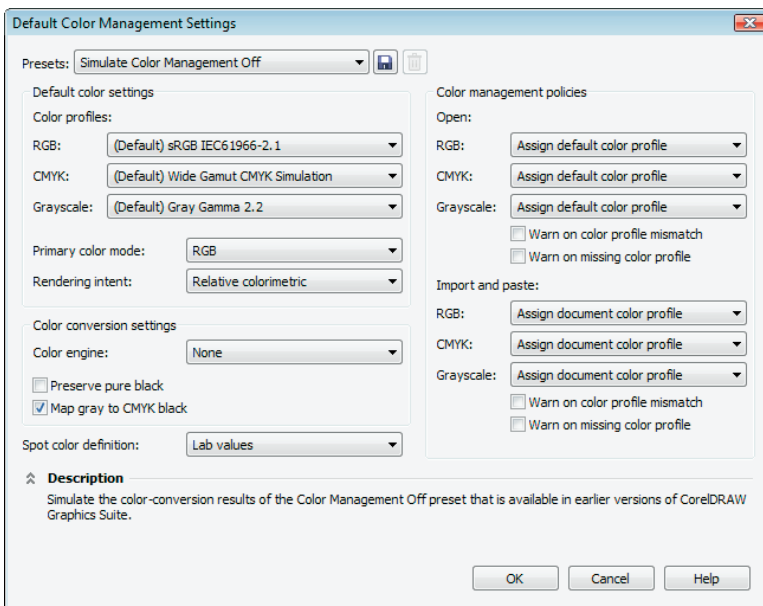
The unfortunate aspect of this is that the work WILL NOT be ICC compliant and WILL NOT be able to be replicated at other output providers with any color consistency. Worse off this improper work flow continues and all future work is compromised.

The captured dialog lower left shows one method of dealing with the issue of K100 not printing solid black in non-postscript devices. Note the preserve pure black is checked, the mode is RGB and perceptual rendering is selected. The spot color definition may need to be changed to RGB or CMYK.

While this resolves this issue for text and vectors it causes another issue and that is the conversion of bitmaps because it removes the ability of the color engine to discern the difference between K100 and a dense black (any CMYK build that utilized K100 and any other added component of CMY such as C20 M0 Y0 K100). All blacks with K100 and more dense blacks convert to the same color black. This is incorrect!

A combination of these two methods should allow you to resolve non-postscript printing issues for legacy X4 and older files.

There are solutions that are ICC compliant and will be discussed in the following pages.

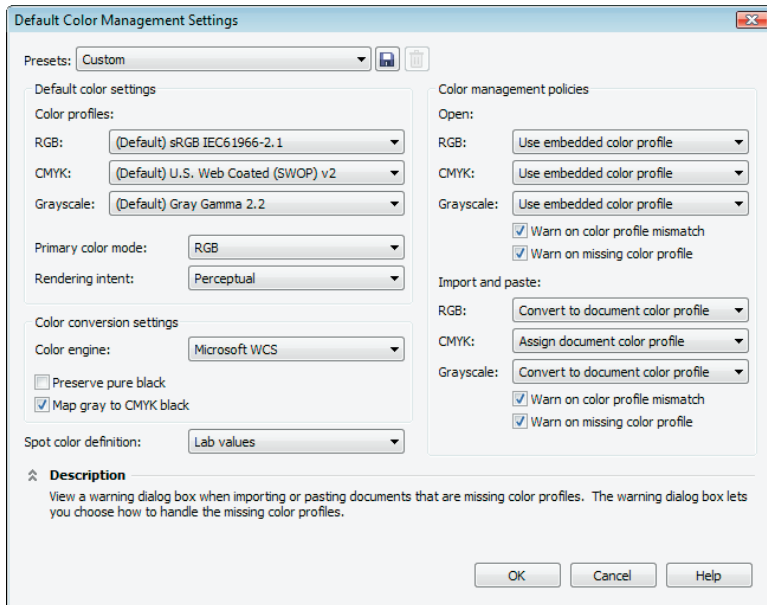


CorelDRAW Graphics Suite X6

Non-Postscript Devices

There are ICC compliant solutions and the first step is to understand the limitations of the ICC specifications. These specifications DO NOT ALLOW for the direct conversion of black (K100), (R0 G0 B0), grayscale 0 or any spot color black to the same solid black. Every conversion will be to some gray and rarely a solid black.

What this means is that a user must understand how they will utilize their file and create it accordingly, utilizing the ICC specifications to their advantage, I will provide some guidance in the captures below.



The capture to the left are my suggested color management settings for non-postscript devices if **ALL YOUR WORK GOES TO NON-POSTSCRIPT DEVICES**, or if you send work to postscript devices and wish to employ the technique of late binding. (Late binding is where you create your work in one color model and allow the final color conversion to take place during output)

Note that the primary color mode is RGB, map gray to CMYK black is on by default, I prefer the WCS color engine in Vista and Windows 7. Perceptual rendering only makes sense due to the wide gamut going to print in a narrow gamut, I also like to get every warning so I check the warning boxes, these boxes are only my preferences and do not affect output.

The key to this work flow is that **EVERYTHING** you create or place into your file is sRGB to match the color management setting and the default for non-postscript print streams. That is all color palettes, all images and all effects are RGB!!!.

Now let's discuss late binding! The Pros are that it's easy and in digital work flows (ink jet, laser or other digital print engine work) produces few issues. This is a set once and forget about it work flow and for table top ink jets and laser printer as well and large and grand format devices will suit many users.

The Cons are that the issues can be, well an issue! Your text and solid black vectors will be printed dense black containing elements of CMY as well as K so small text in most cases will be out of register even on digital devices and especially on printing presses. The dense black may offset (be too heavy to dry properly and leave an imprint on the back of the page) on press. This issue many times is countered by the ICC profile for the plate setter. The other issue is that the color conversions take place unseen by you and may end up to be not to your liking, too late to not have to pay for it.

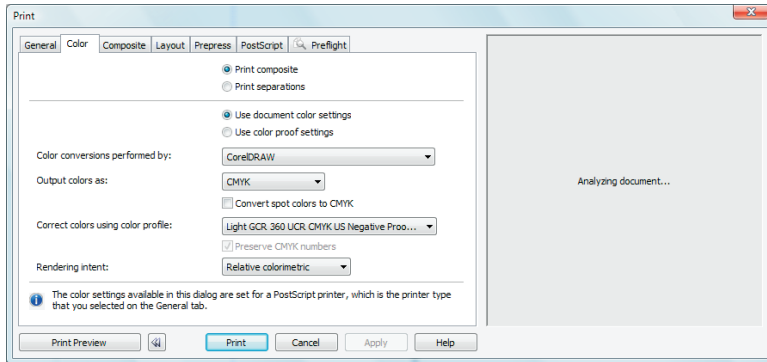
The late binding techniques works with ICC color management maintaining color integrity using EPS and well as PDF work flows.

CorelDRAW Graphics Suite X6

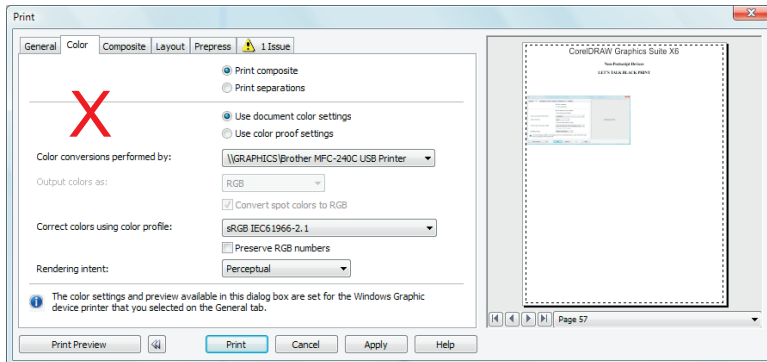
Non-Postscript Devices

REPEATED FROM THE LET'S TALK BLACK PRINT SECTION

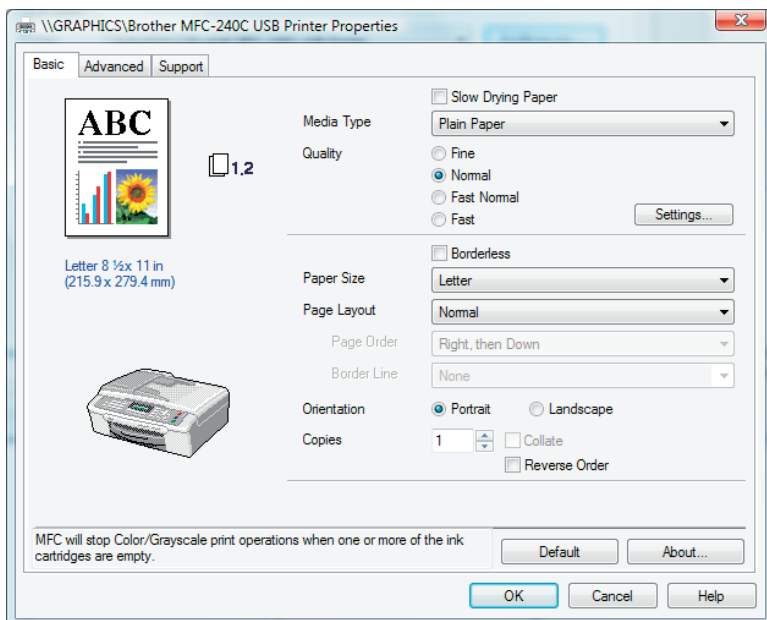
This page has been repeated from the black print section of the book for those who like to skip around when they read. Below the top capture shows the default settings for the CorelDRAW print dialog color tab for my non-postscript device. **The selections use document color settings, color conversions performed by, correct colors using color profile and rendering intent are important.**



The rendering intent in my opinion is also critical, when one reads the definitions of the rendering intents, logically, since the source in the file is a wider gamut RGB being sent to a narrow gamut printer CMYK. (Even though the non-postscript print stream contains RGB data, the printer itself will convert to CMYK for the ink print heads). Only perceptual rendering makes sense as relative colorimetric rendering will clip such a large portion of the color because it is so far out of the CMYK gamut. Perceptual rendering will maintain the feel (perception) of the file. **Also making the black print solid**



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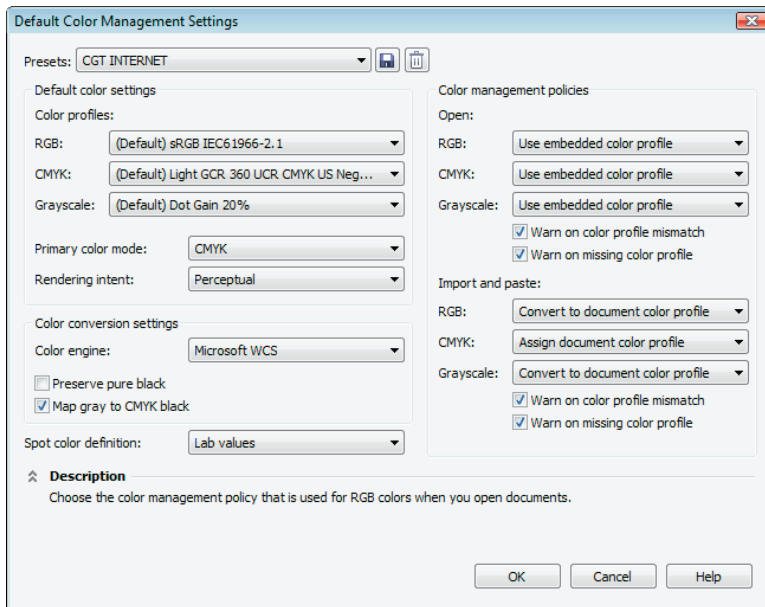
Expectations!

Let's talk realistic expectations, I don't care if you spend \$10,000 on a non-postscript printer it's still a non-postscript printer and limited to the parameters of the process in which it was designed. Matching corporate colors (spot color support not at all) many

times won't happen, expanding beyond the sRGB color space is dubious. Support for transparency and complex objects is limited as is calibration capabilities. Repeatability within the operating parameters is very good.

CorelDRAW Graphics Suite X6

Mixed Postscript and Non-Postscript Devices



The capture to the left are my suggested color management settings for non-postscript devices if regularly YOUR WORK GOES TO NON-POSTSCRIPT DEVICES, DRIVER BASED AND DIGITAL FRONT END POSTSCRIPT DEVICES.

The selection of sRGB suits the non-postscript world as well as other application defaults, the choice of grayscale and CMYK profiles should be done on a regional basis.

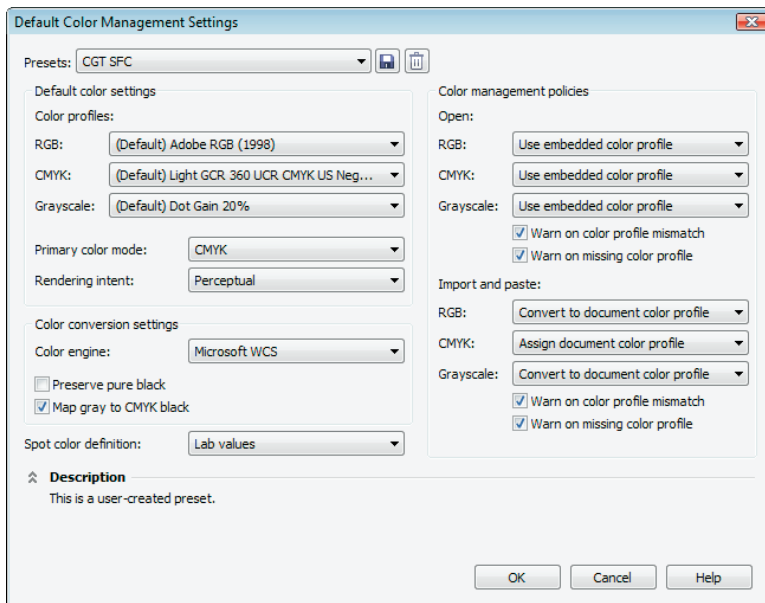
Note that the primary color mode is CMYK, map gray to CMYK black is on by default, I prefer the WCS color engine in Vista and Windows 7. Perceptual rendering only makes sense due to the wide gamut going to print, I also like to get every warning so I check the warning boxes these boxes are only my preferences and do not affect output.

The key to this work flow is that CorelDRAW maps grayscale blacks to K of the CMYK color model, so **ALL TEXT AND VECTORS THAT ARE TO BE PRINTED BLACK must utilize a grayscale pallet when the file is being created!** I have such a grayscale pallet posted on my web site at www.graphicstechnology.com that replicates percentages of black from 5% to 100% in 5% increments.

The other key to this workflow is that all other conversions will take place in an ICC compliant manner, meaning that the RGB, CMYK, grayscale and spot color elements will be cross application compatible.

There are cons to this, non-postscript digital devices will print the blacks as dense black utilizing elements of CMY as well as K. Some RIPS for ink jets may also do the same thing however no plate setters I know of have done so.

Postscript Devices only



Digital devices can utilize the wide gamut suggestions previously mentioned in this publication as well and the suggestions for press work. The settings here are my choice of profiles **for my region** and most often used press. Digital devices can utilize RGB, grayscale or CMYK blacks, producing the full range of dense black.

For the printing press all the blacks utilize the standard CMYK pallet, producing the full range of dense black.

CorelDRAW Graphics Suite X6

Photography

RAW Files

The RAW file format is different for each camera manufacturer and as such it is not an archival file format. All RAW files in my opinion should be converted to a wide gamut 48 bit RGB or 48 bit LAB color space for archiving. The reason for this is that a RAW file you captured in 2000 may be by 2020 a discontinued RAW format and the software you have to open the file may not run on the current operating systems. A converted RAW file can be save in CPT, JPG or TIF file format and opened later as these formats are application formats sure to be supported going forward, however to my knowledge only the corel CPT file format is a true 16 bit file format.

The RAW capture works like this, the capture device has a Bayer Capture Pattern that consists of Red only, Green only and Blue only sensors, with twice as many Green sensors as Red or Blue and an assigned bit depth some new state of the art high cost capture patterns are 16 bit patterns. These sets of sensors produce a Grayscale image for each sensor bank color, that's three individual Red, Green and Blue grayscale images. All digital cameras work this way, only some allow you to intercept the RAW data before the camera itself converts these three grayscale images into what we see as color.

A RAW converter reads the manufacturers file format and then handles the rendering of the data into color itself. RAW files cannot have a color space nor an ICC profile until

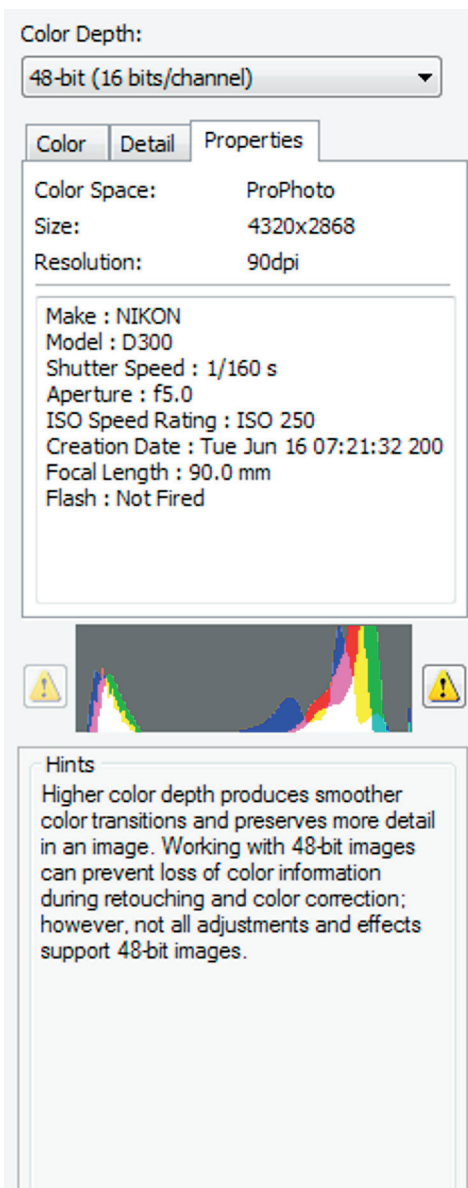
after they are converted to RGB however the RAW converter must have a destination RGB color space in which to create the rendering into. I convert all my RAW files into 16 bit Prophoto RGB files as this is an ultrawide gamut RGB color space that has the potential for some longevity.

As you can see by the capture to the left the RAW converter in Corel Photo-PAINT displays in the properties tab that I used a 48 bit conversion to the Prophoto color space.

One can argue RAW conversions all day but the facts are what they are, when you get a RAW file you have no visual electronic reference of what that original was supposed to look like. If your discussion is about professional photographic captures you will have a tough time using a laptop computer. A calibrated display, with a controlled ambient lighting conditions is an ABSOLUTE MUST! Unless what you're doing is sRGB web and presentation work I'm talking about using an EYE One Pro spectrophotometer as a minimum with display and print device color calibration for professional level photographic work.

Is Corel Photo-PAINT capable of such work? Yes! Corel Photo-PAINT X5 and X6 are the only image editing applications that can archive true 48 bit RGB images.

Corel AfterShot Pro RAW conversion software is an excellent addition to the CorelDRAW Graphics Suite family.

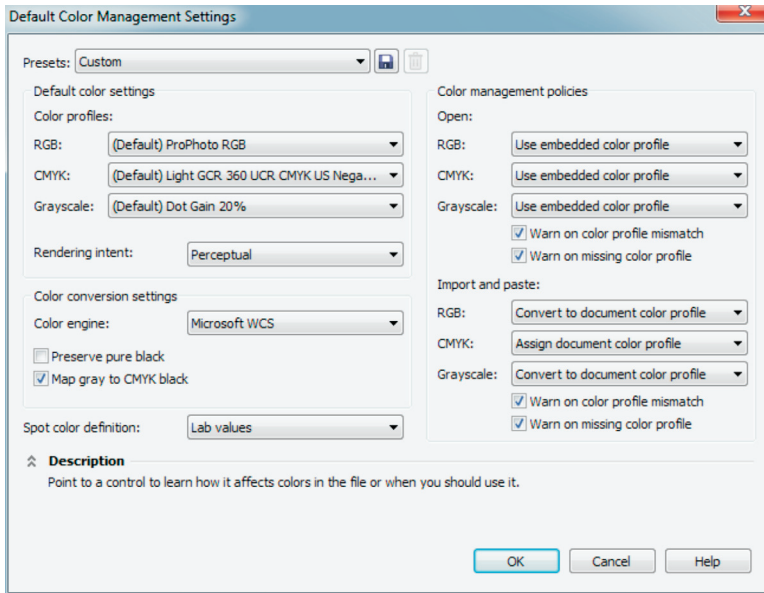


CorelDRAW Graphics Suite X6

Photography

Using the CorelDRAW Graphics Suite X6 for photography is a very easy process, using Corel Photo-PAINT X6 there are only four color management possibilities, opening a file and converting to the default color space, opening a file in it's color space, opening a file and assigning the default color space and opening a RAW file (for RAW file formats only).

The afore mentioned color management choices are made by me because as shown in the capture to the left I have selected for Photo-PAINT to ask me when any instance occurs except when the images color space matches my default setting. If you uncheck the warning commands the application will automatically do one of three things, it will use the embedded profile, assign the document the default profile or it will convert the image to the default profile. With the warning boxes checked you're ask to make the decisions but you will have all three choices to choose from instead of one automated choice.



By selecting Prophoto RGB as my default RGB color space I have told the Corel Photo-PAINT X6 RAW converter to use that color space when it opens and converts a RAW Image. The RAW converter supports Prophoto, sRGB, and Adobe RGB 1998. I use Prophoto 48 bit because it is an ultra wide RGB gamut for archiving my images in CPT format. Corel now offers another professional level photography product for RAW files to

compliment the CorelDRAW Graphics Suite, Corel AfterShot Pro.

Digital cameras in general depending on the price range will produce a file that may not have an embedded profile, use a proprietary profile, use one of several pre-set profiles or allow a RAW capture. The low cost devices that do not embed a profile are most likely using sRGB as their color space. To use these files set your default RGB to sRGB and assign the default color space. For cameras that embed a profile you can make your own choice of what to do from the afore mentioned choices. I always open an image in its color space before doing anything to it. Corel Photo-PAINT by default embeds a color profile for all saved files. After color correction or editing is done when you place your image into a CorelDRAW document, CorelDRAW will automatically make color management choices for you or ask for instructions from you based on your default settings.

The rules to follow are set your defaults to match your output intent, import images into CorelDRAW that match the documents color management setting. Do this by either having images converted to the documents color space before hand, or convert the image to the documents color space upon importation. You can only assign the document color space to images that are already in the documents color space or a color shift will occur.

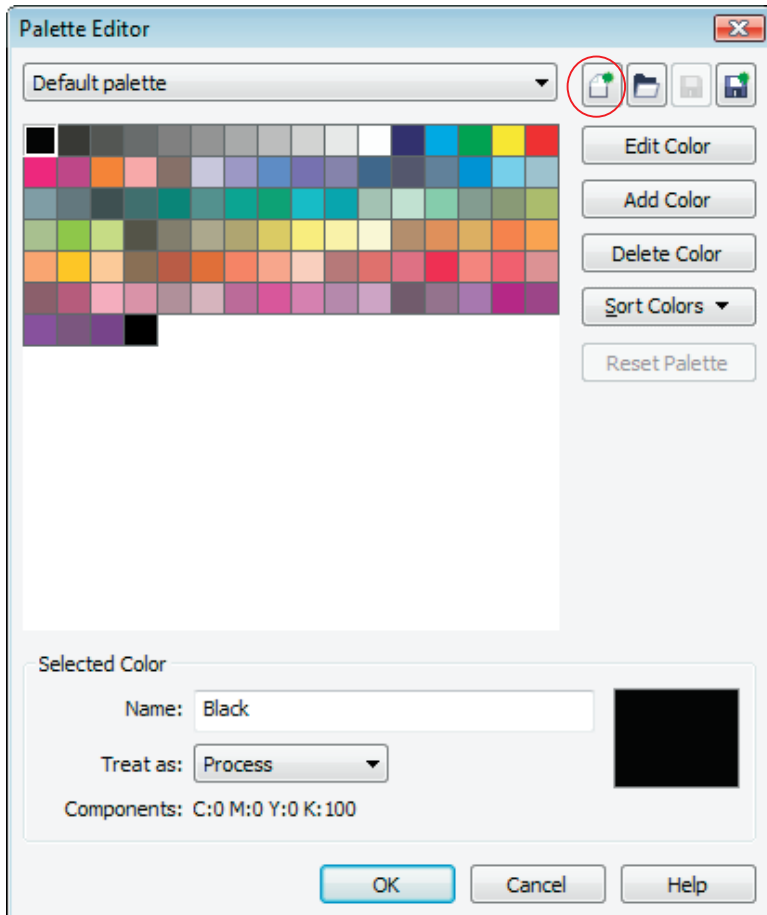
Corel Photo-PAINT as an image editor is second to none in its ability to display and color correct images, when combined with the advanced non-destructive RAW editing capabilities of Corel AfterShot Pro the Corel user has a state of the art photographic editing tool set.

CorelDRAW Graphics Suite X6

CutContour

To utilize CorelDRAW to cut vinyl with Roland cutters and some other devices it is required to create a custom spot color palette and name that color CutContour. Please note the spelling with the two capital C's.

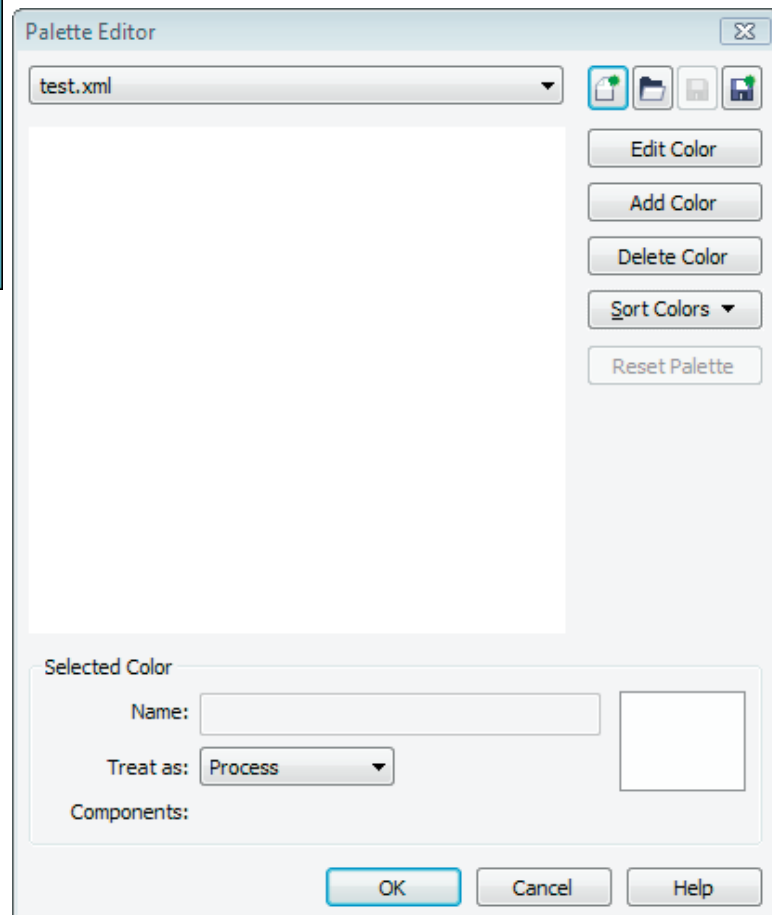
Under the window menu/color pallets/pallet editor you'll find the pallet editor allowing you to create the palette you need. You can also go to my web site www.graphicstechnology.com and download the palette you need. The dialog below is the pallet editor and circled in Red is the new pallet button which launches the New pallet dialog which goes on your computer to documents/my pallets. Select a name for your pallet and select save.



This will return you to the pallet editor shown directly below. The next steps need to be executed in the exact order or the colors component name will not transfer properly and may give you issues in other applications or in RIP devices.

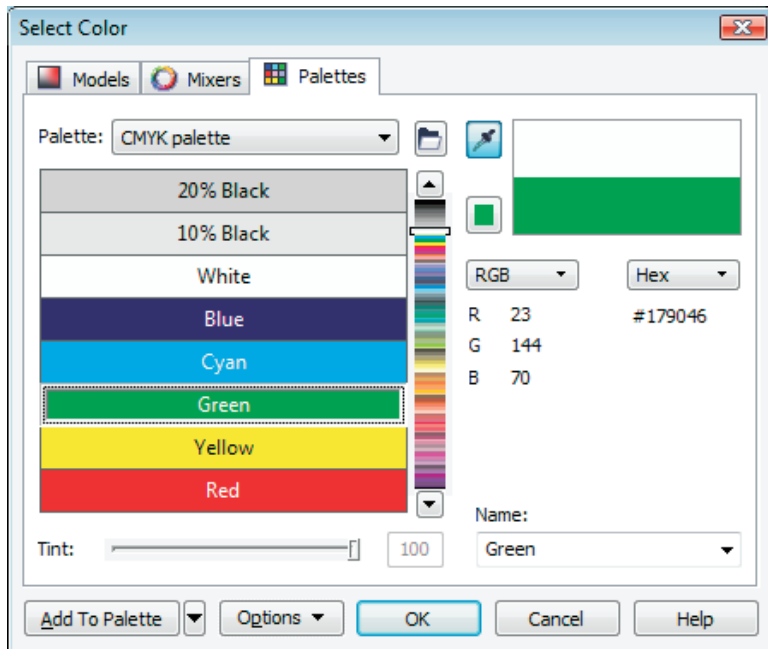
Select the add color button which will launch the select color dialog.

CONTINUED ON NEXT PAGE



CorelDRAW Graphics Suite X6

CutContour



Select any color you choose, I've selected green from the CMYK pallet and selected ok. This returns you to the Pallet Editor and your color choice shows up, the next steps must be done exactly is the sequence detailed.

1. in the box outlined in RED you must type the name CutContour (spelled as shown).

2. in the box outlined in Blue (Treat As), select spot

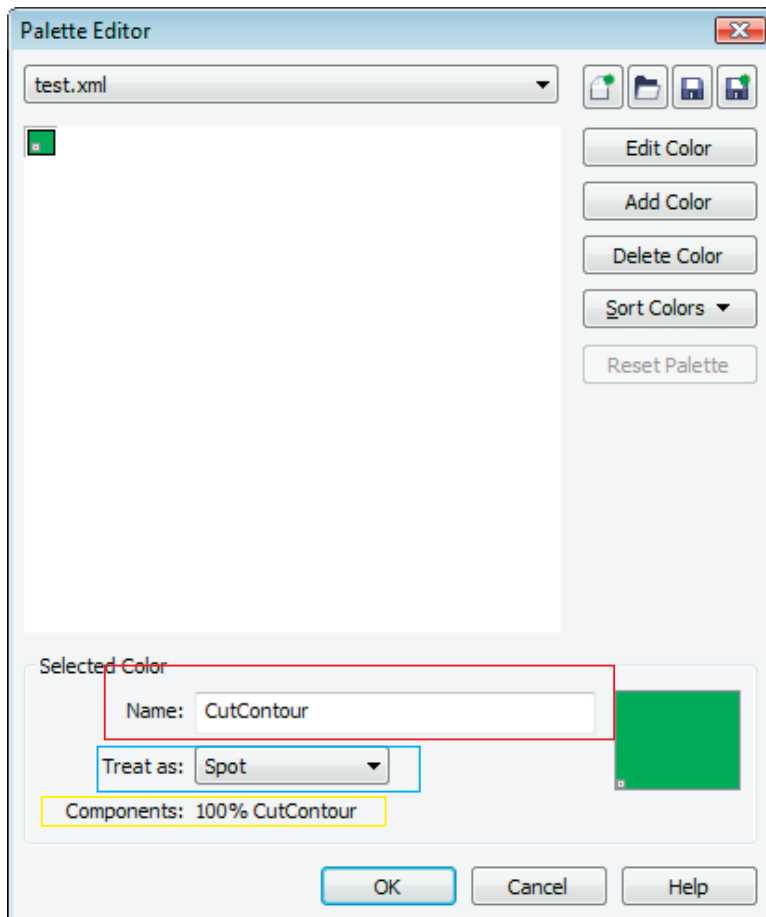
You will then see in the area components: 100% CutContour displayed.

ONLY then will this be correct.

3. select ok

This will place your new pallet in the user/documents/my pallets folder and will be available to you under the window menu/color pallets/(your pallet name)

Set this as an outline stroke color on items you wish to cut and export as a native color EPS (do not convert spot color to CMY or RGB). Some RIPS allow a native color PDF to be exported from CorelDRAW and imported into the RIP.



Matching X5/X6 to X4 Preset Color Management Settings

Color coordination between X4 and older to X5/X6 has a few interesting aspects, namely the fact that the Corel generic profiles that shipped with X4 are no longer shipping in X5/X6, if you are an owner of X3 or X4 they are available on your system. At www.graphicstechnology.com I have renamed the profile file names so Windows explorer sees them as the same name that X5/X6 will see them in the color management dialogs. These profiles displayed under different names in X4 but I have separated them on my web site to make it easy. Also the Kodak Color Engine that has shipped with Corel for many releases is not present in X5/X6.

CorelDRAW X4 and older versions also had some interesting peculiarities, some were simply nomenclature in nature and others were non-ICC compliant in nature these were mistakes that have not been repeated in CX5 and X6.

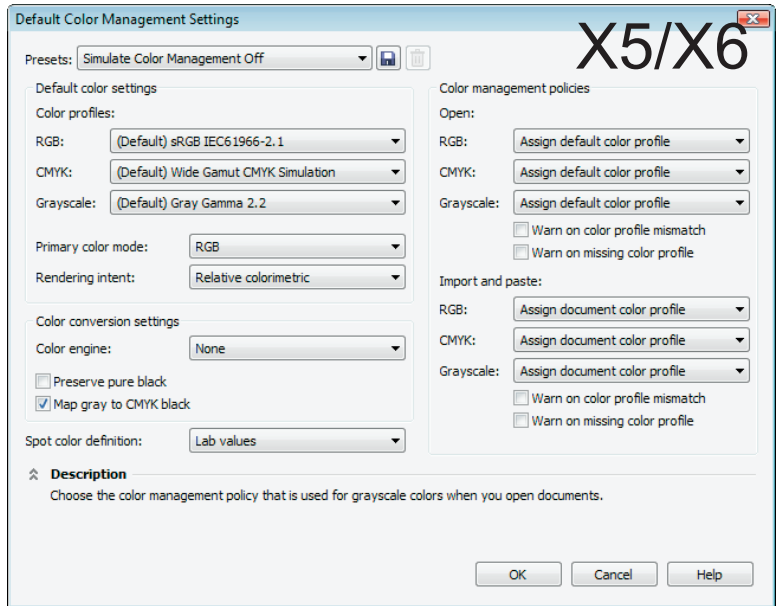
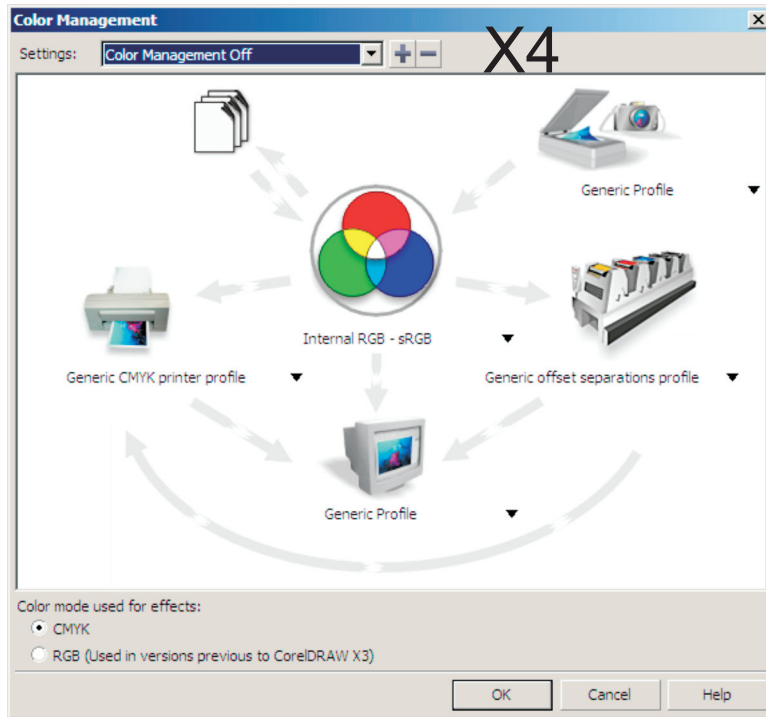
Lastly CorelDRAW X4 and older versions used by default automatic rendering which was saturation for vectors and perceptual for images, an error that CorelDRAW X5/X6 does not duplicate.

These pages display captures of the main color management dialog from X4 accessed under the tools menu/color management. The X4 captures depict the five preset color management settings that shipped with X4, the corresponding X5 color management settings appear on the same page.

The captures from X5/X6 are of the default color management dialog accessed under the tools menu/color management/default settings, the new document color dialog assessed under the file menu/new document and the options, display dialog accessed under the tools menu/options/display.

Some color management practices from X4 and older versions that were non-ICC compliant that are no longer supported in X5 and X6 may cause some challenges for the user of X5/x6.

Color Management Off

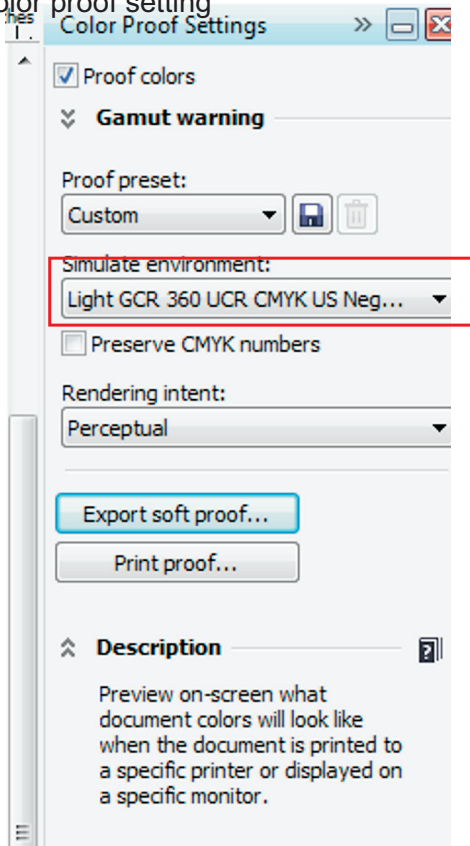


Soft proofing off

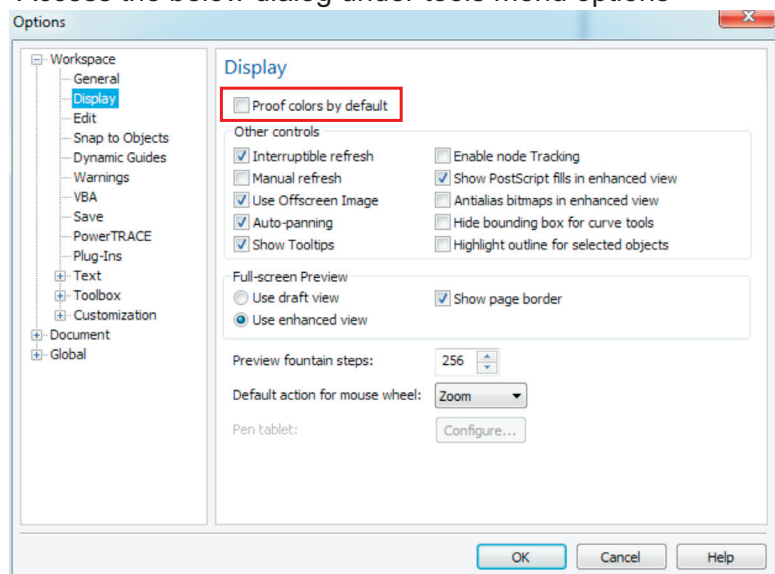
To match the default, optimize for professional output and optimize for desktop printing color management settings of X4 in X5/X6 requires that **soft proofing be turned on in X5/X6**. The simulate environment profile selected in the color proof settings docker must match the generic CMYK profile used in X4. In X5/X6 the generic CMYK profile used in X4 displays as Kodak swop proofer cmyk coated stock.ICC the proof color settings and display options dialogs are shown below.

The X4 generic internal sRGB displays in X5/x6 as internal RGB kodak sRGB.ICC this profile must be used in X5/X6 as the RGB color profile if you want to match X4's RGB display, X4 required that the display profile be loaded in the color management dialog, X5/X6 picks up the display profile from the operating system.

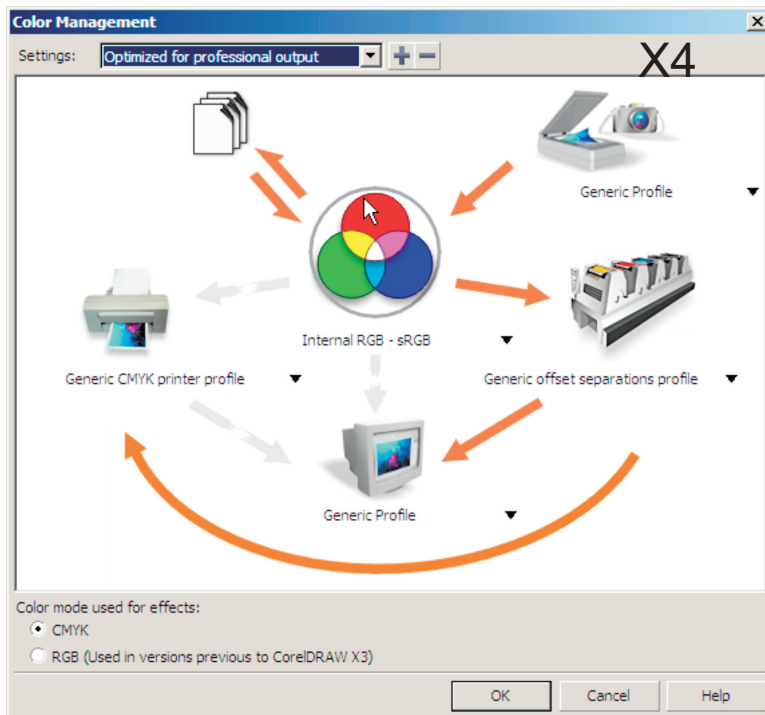
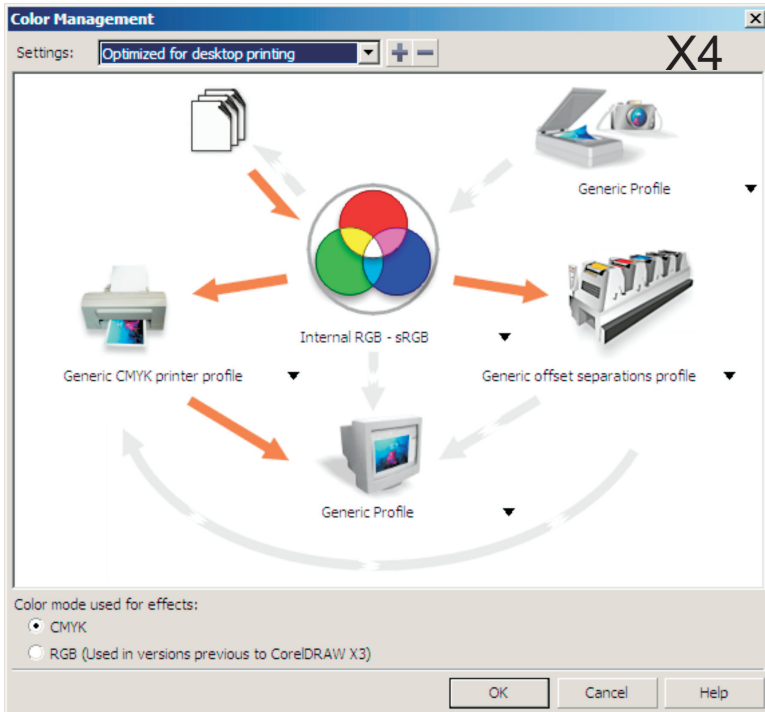
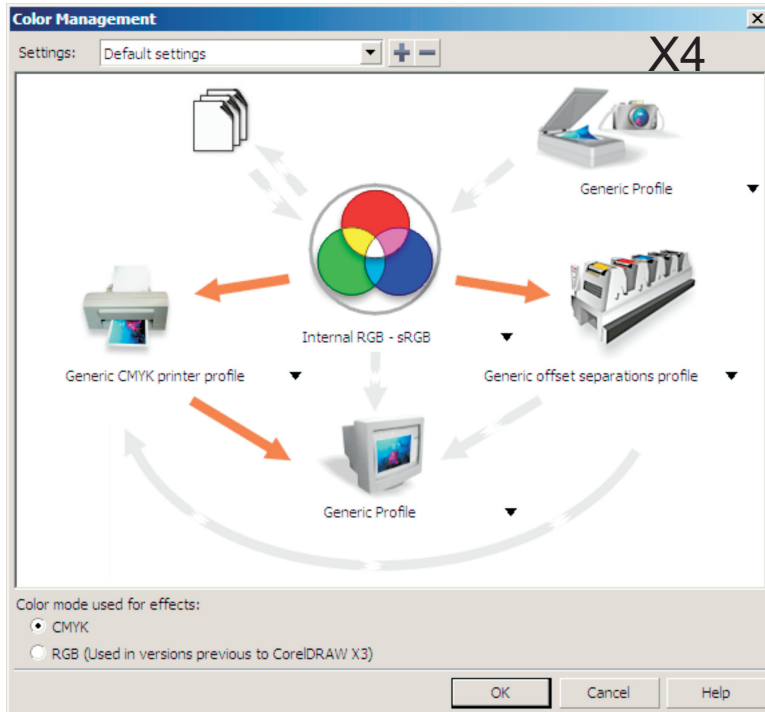
Access the below docker via window menu
docker/color proof setting



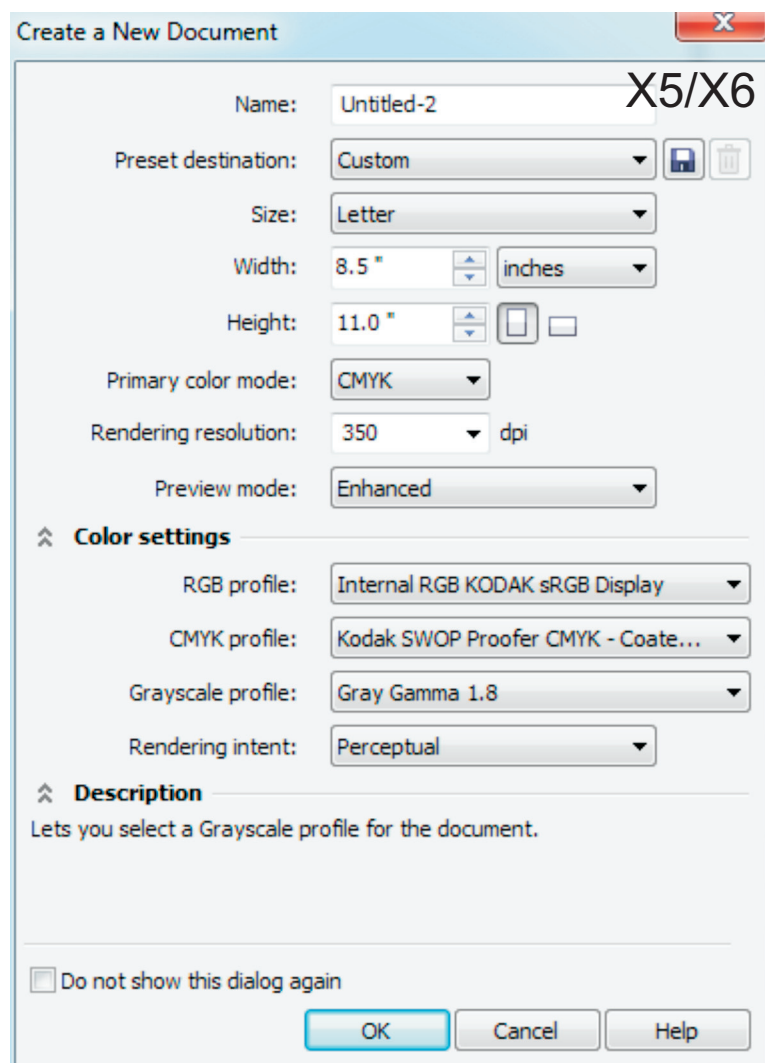
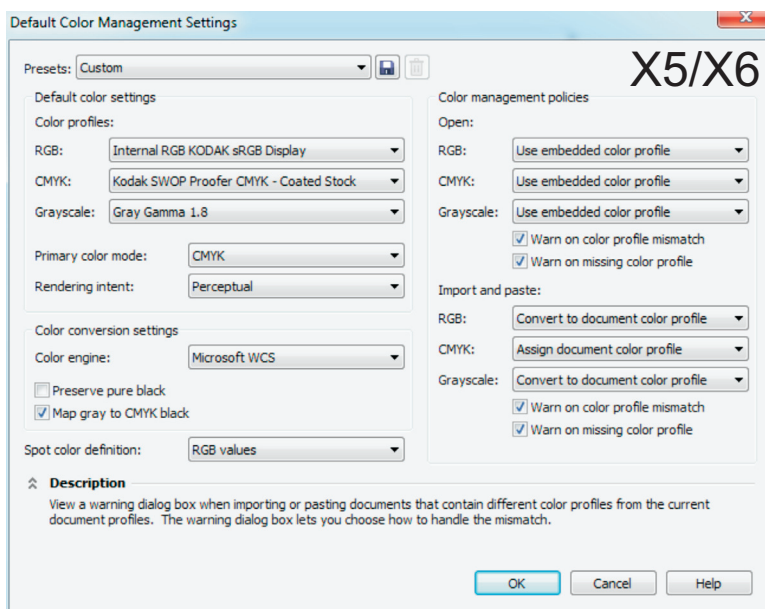
Access the below dialog under tools menu options



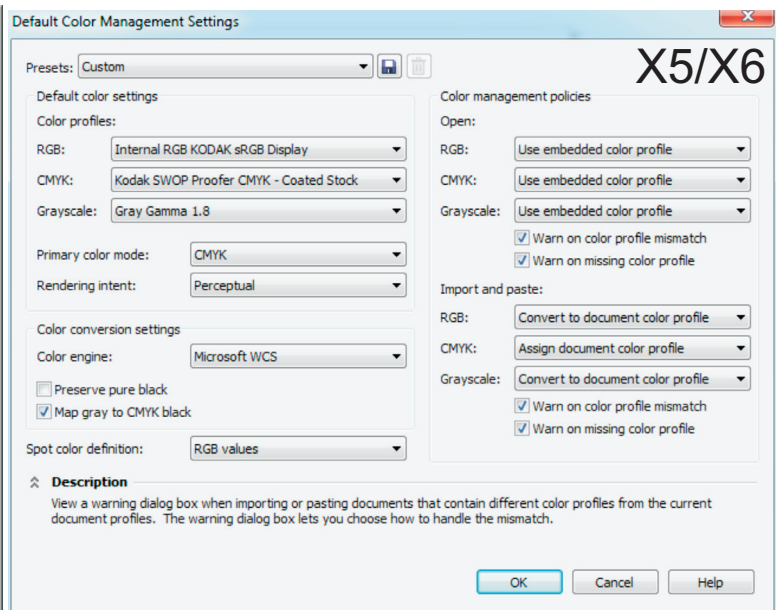
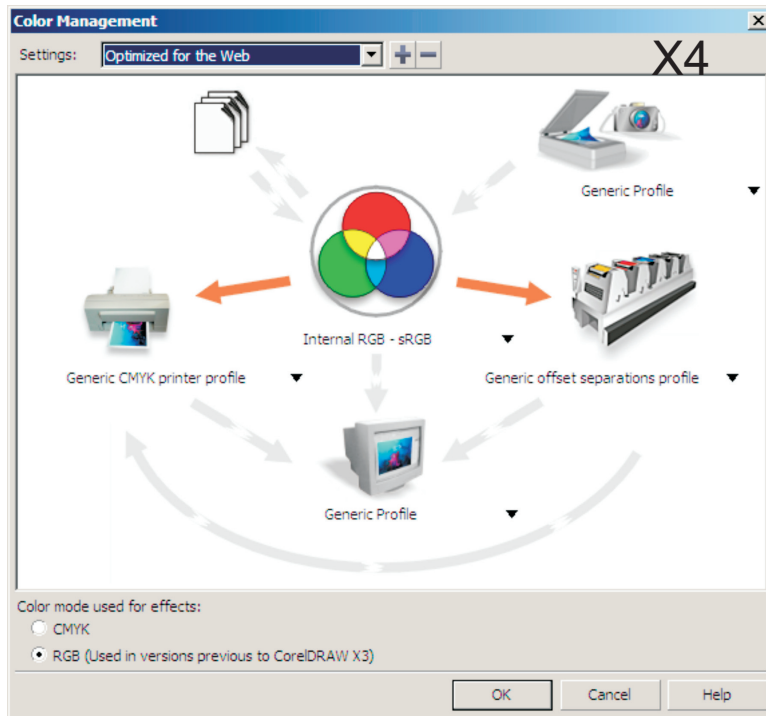
Soft proofing on in X5/X6
for all press desktop printing
and default X4 color
management settings



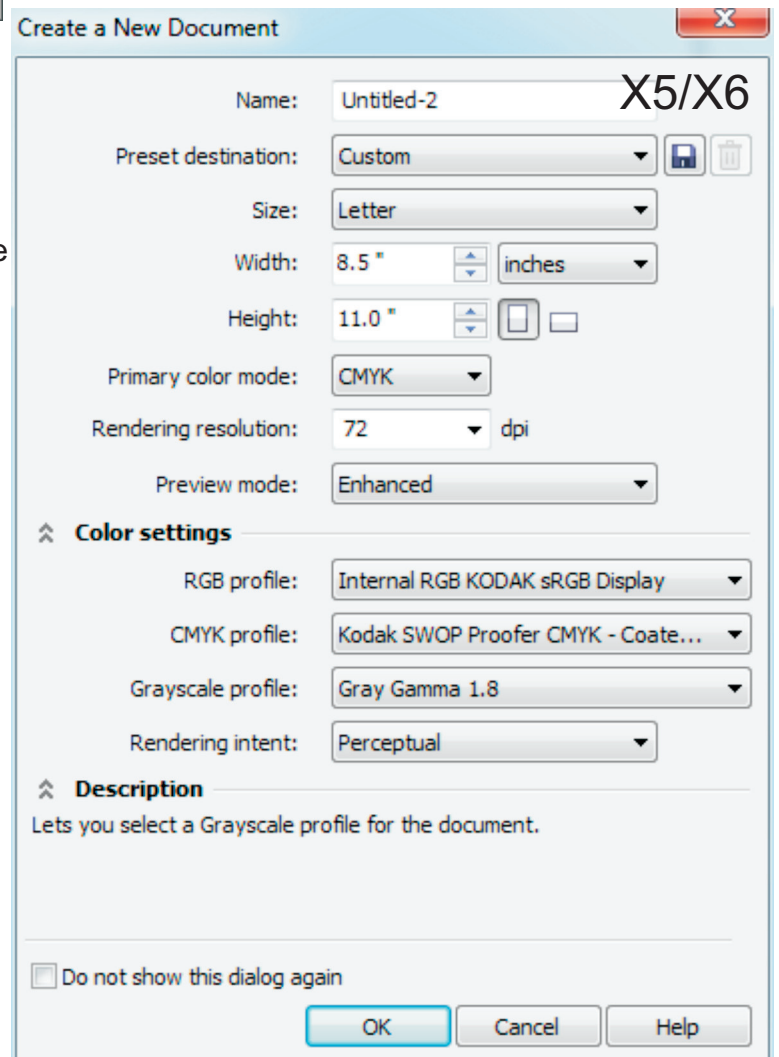
Soft proofing on for all press desktop printing and default X4 color management settings. Match the settings shown in X5/X6 captures below, except the color engine in XP, if you're using Windows XP then your only option is to download and use Adobe CMM.



Web



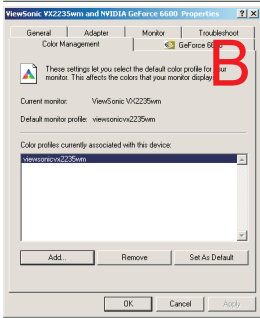
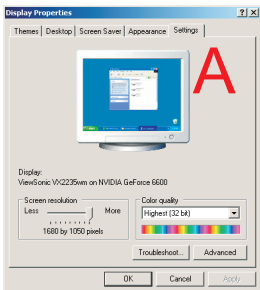
Soft proofing off in X5/X6! Match the settings in these X5/x6 dialogs, except the color engine in XP if you're using Windows XP then your only option is to download and use Adobe CMM.



**CorelDRAW
Color Management
Windows
XP, Vista and 7**

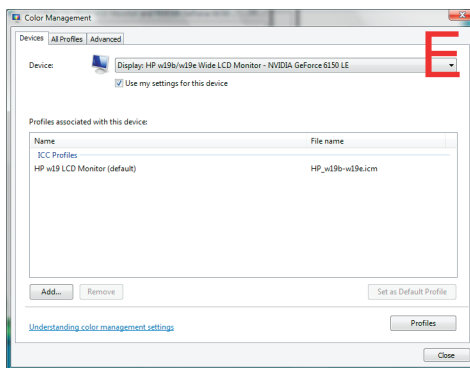
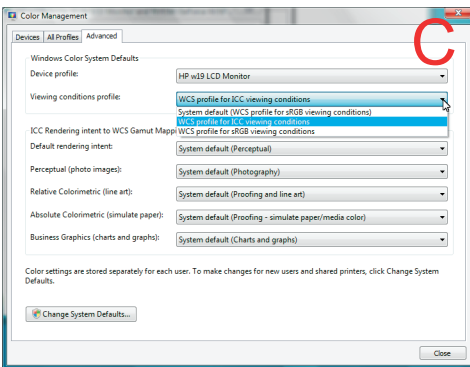
Windows XP, Vista/Windows 7

To setup color management of the display of Windows XP for color managed work flows right click on the desktop and **capture A** the display properties dialog appears. As you can see here I use an LCD flat screen so the resolution is the native resolution of the display. That is the only resolution in which an LCD display will function at the highest quality. Color quality is set at the highest possible for this system, 32 bit. By selecting the advanced **button capture B** the properties of the combined monitor, video card and Windows become available. Under the color management tab is where you can load the monitor profile created for your system. Every monitor calibration application I have ever used has copied the monitor profile to the Windows color folder and ask if you wanted to make the profile the default system profile during the calibration process. This is the color space in which all others are simulated.



You need to know that because using a custom monitor profile will totally negate the eyedropper readings you get from an application like Color Cop or Color Mania. They will be reading the changes made to the RGB curve by the monitor profile. Only the eyedropper readings of Corel Photo-PAINT or CorelDRAW will be accurate.

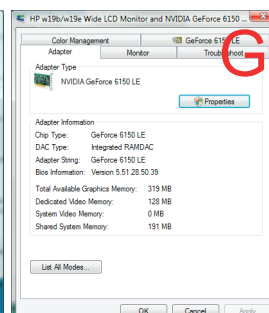
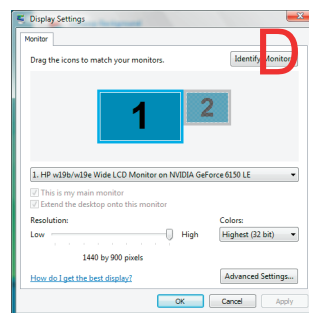
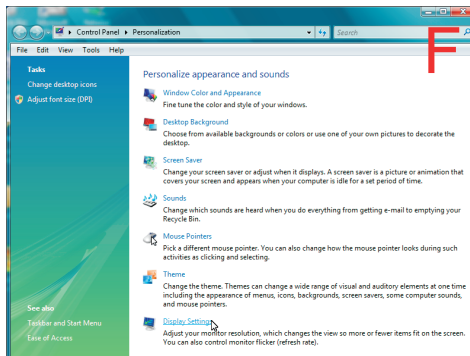
Whether you use Windows XP or Vista your color profiles and Windows color folder reside at c:\windows\system32\spool\drivers\color . I highly suggest that for the Corel Graphics Suits X5/X6 all ICC profiles used on your system should be placed in the Windows color folder.



Use only the highest quality color settings as default for your video card before and after calibrating your monitor do not change those settings. After calibrating your monitor DO NOT use any of the adjustments in your monitor menu.

Windows 7 and Vista share identical color management controls, except for a monitor calibration wizard that you should ignore, this will be discussed in more detail later. Unlike Windows XP after creating and installing your monitor profile you need to set Vista and Windows 7 so that it will use the monitor profile for the proper viewing conditions, otherwise your display in the graphics suite will be incorrect. You see this in **capture C** the advanced tab of the Vista Color Management dialog. In the viewing conditions profile area the default setting is WCS profile for sRGB viewing conditions. **You must select the choice highlighted in blue, WCS profile for ICC viewing conditions.** Make sure your calibration application did load the custom monitor profile if not select it in the advanced tab as the device profile.

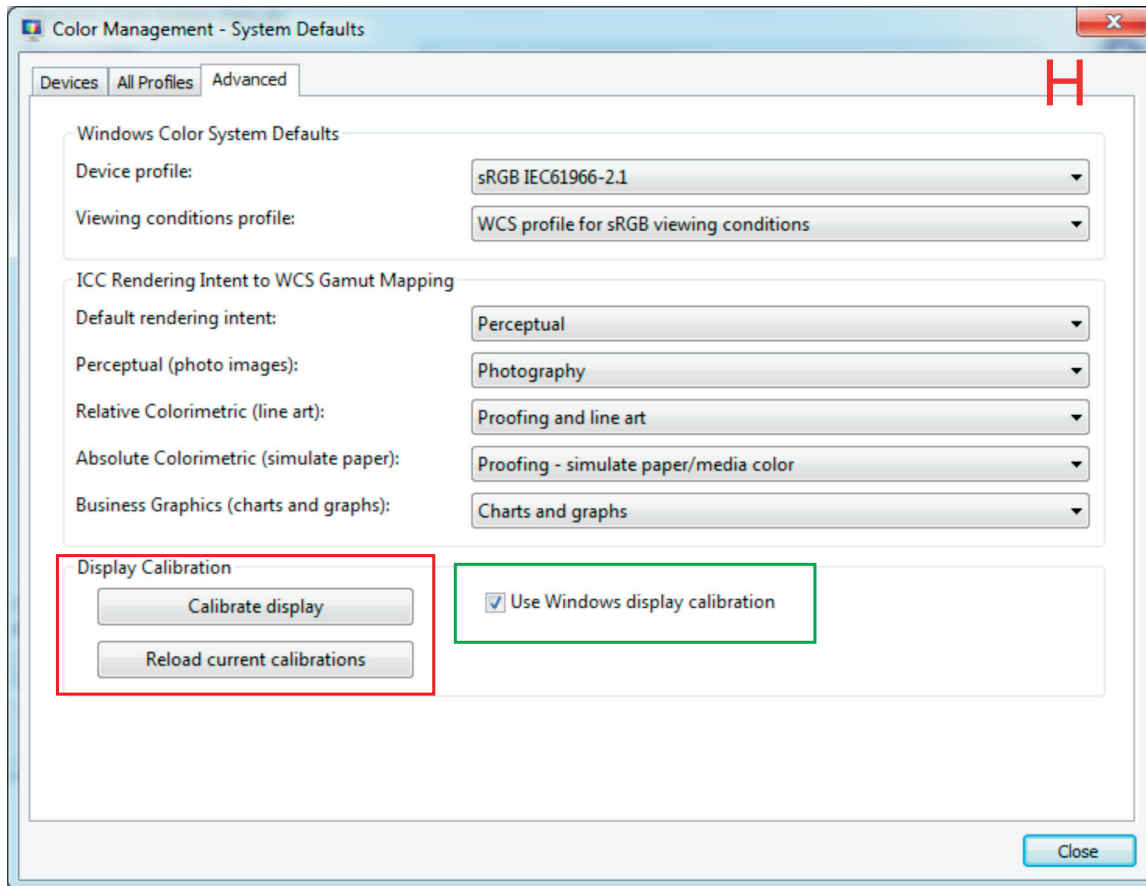
The device tab of the Vista color management dialog is shown in **capture E**, which is activated by choosing the display setting in **capture F** the control panel personalization dialog. You activate this by right clicking on the desktop and selecting properties. In Windows 7 right click the desktop select resolution/advanced settings will bring up **capture G**.



You can also access the display setting directly through the control panel which will bring up **capture D** and the advanced setting button brings up **capture G** where the color management tab will bring up **capture C & E**. Windows 7 select the control panel under Appearance and Personalization/adjust screen resolution/advanced settings.

Vista and Windows 7 have many modes of configuration however the commands as shown in **capture C & E** are what you require.

Windows 7



Windows 7 has a calibrate display wizard that the user can utilize to help with display issues, outlined in red. DO NOT take this as color calibration, it is a tool for manual eye ball configuration, I find it to be ok for instances where you have nothing else. Activate this by checking the check box outlined in green.

This is the only difference between Vista and Windows 7 color management. All other professional calibration procedures are identical.

For professional calibration make sure that the use Windows display

calibration check box outlined in green is unchecked before running your calibration otherwise you preliminary calibration will be incorrect.