

C9800

**OKI**  
PRINTING SOLUTIONS



## FIERY COLOUR REFERENCE GUIDE

C9800hdn/C9800hdtn/C9800 GA



**C9000**  
Series

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This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, and uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense.

#### **Industry Canada Class A Notice**

This Class A digital apparatus complies with Canadian ICES-003.

#### **Avis de Conformation Classe A de l'Industrie Canada**

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Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

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#### **Avis de Conformation Classe B de l'Industrie Canada**

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## Glossary

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## Introduction

This guide provides a reference for information about optimizing colour printing with the C9800 and improving colour quality and performance for all printer models. Specific features and options may vary, depending on the C9800 model at your site.

### About this guide

This guide provides an overview of general colour concepts, with a specific focus on colour management for print output. It describes multiple scenarios (called **workflows**) during which colour information can be specified, and makes recommendations about when to use each type of workflow. It also provides application notes that explain how to print to the Fiery from popular Microsoft Windows and Apple Mac OS applications.

The Glossary at the back of this guide defines terms and concepts—for example, **output profile**—that appear throughout this manual. Colour terms and concepts such as “RGB data,” “colour space,” “spot colour,” “gamut,” and “source profile” are used throughout this guide. If you are new to desktop colour, or if any terms are unfamiliar, consult the [Glossary](#) near the end of this guide.

### For additional information

This guide is one in a set of documentation that includes manuals for both users and system administrators. For a description of all the available documentation, see the [Quick Start Guide](#). All other manuals should be available at your site; refer to them for more information as directed in this guide.

For additional information about the topics discussed in this guide, see:

- [Colour Guide](#)—for detailed information about the colour printing options and settings available with your Fiery, as well as the ColorWise® colour management system built into your Fiery.
- [Printing Guide](#)—for information about how to set the ColorWise print options.
- [User Software Installation Guide](#)—for information about the software provided with your Fiery, including sample colour reference pages used to verify print results.

- *Job Management Guide*—for information about performing colour management tasks and using ColorWise Pro Tools™.

For general information about printing in colour, see [Appendix 8](#) and the sources in the [Bibliography](#).

# 1

## Chapter 1: Overview of Colour Management Concepts

To create successful colour documents and presentations, you can take advantage of the features of colour management software as they are implemented by the Fiery and on your desktop computer. This chapter is devoted to various elements of colour management that contribute to predictable colour results.

### Understanding colour management systems

A colour management system (CMS) is a “translator” between the colour space of the source device (for example, the monitor or a scanner) and the colour space of the destination device (for example, the printer). It compares the colour space in which the source image was created to the colour space in which the job will be output, and adjusts the colours in the document to maintain consistency across different devices. A CMS typically uses a device-independent colour space, such as CIELAB, as its intermediate colour space. To perform its translation, a CMS needs information about the colour space of the source image and the **gamut** of the printer. This information is provided through **profiles**, often created by the makers of the computer monitor or printer. The end product of a CMS conversion is a printed document or an image file in the gamut of a particular printer.

There has been progress toward standardization in the field of digital colour management systems. Both the Windows and Mac OS operating systems support an industry standard format developed by the International Colour Consortium (ICC). This ICC format is implemented on Windows computers as Image Colour Matching (ICM) and on Mac OS computers in ColorSync. More and more software developers are also incorporating colour management systems into high-end applications. The Fiery colour management system, **ColorWise**, supports this standard profile format.

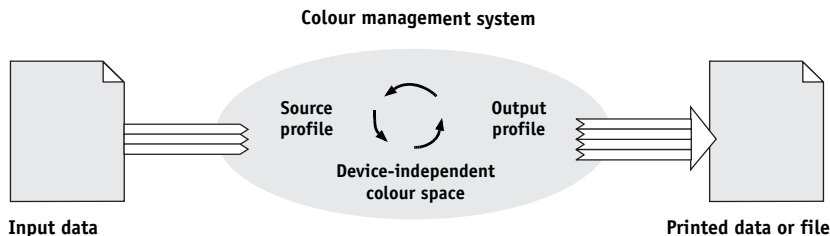
### How colour management works

Before you can print a colour document, the colour data in it must be converted to the gamut of the printer. Whether performed by the Fiery or a host-based **CMS**, the process of converting colour data for a printer is the same: the CMS interprets **RGB**

# 1

## 1-2 Overview of Colour Management Concepts

image data according to a specified **source profile** and adjusts both RGB and CMYK data according to a specified **output profile**, also called a destination profile by some colour management systems.



The source profile defines the RGB colour space of the image's source—characteristics such as the **white point**, **gamma**, and the type of **phosphors** used. The output profile defines the gamut of an output device, such as a printer. The Fiery (or the host-based CMS) uses a device-independent colour space to translate between the **source colour space** and the colour space of the output device.

The Fiery allows you to specify default and override settings for the source colour space information and the output profile information (see the *Colour Guide Chapter 1*). When you use these settings, you do not need to use the features of other colour management systems. Your Fiery software includes **ICC profiles** for use with other colour management systems, although conflicts may arise when the Fiery CMS is used in conjunction with a host CMS.

You can also use colour management systems to adjust colour data to the gamut of an output device other than the one to which you are printing. This process of simulating another output device is commonly used for proofing jobs that will be printed on an offset press. The Fiery simulation feature is described in detail in Chapter 1 of the *Colour Guide*.

The type of print job and the final output device—Fiery or offset press—determines the workflow that allows you to achieve the best results. For information about choosing workflows, see “Using Colour Management Workflows” on page 2-1.

## Using ColorWise and application colour management

The Fiery colour management system, **ColorWise** is designed to provide both casual and expert users the best colour output for a variety of purposes. Several applications also provide their own colour management system. This guide describes how to optimize print output using both ColorWise colour management and application colour management.

The Fiery can intelligently manage the printed appearance of **RGB**, **CMYK**, and **spot colours**. You can allow the Fiery to manage colour for most colour printing jobs without adjusting any settings.

A desktop (host-based) colour management system uses **ICC profiles** to convert colours from one device gamut to another (see **Appendix 8**). The colour data is converted when it passes from one application to another or when the job is sent to the printer; thus, the processing occurs on your computer, as opposed to the Fiery.

Conventional colour management systems typically address only colour conversions, and they occupy your computer processor. When you use ColorWise, jobs leave your computer faster, and are processed more quickly on the Fiery.

The advantages to ColorWise colour management versus desktop (application) colour management include:

- Relieving your computer from performing additional processing. Delaying colour conversions until the colour data reaches the Fiery frees your computer so that you can continue working, and colour conversions on the Fiery are, in most cases, much faster than similar conversions on a host computer.
- Eliminating the potential for undesirable colour management-related conflicts, such as iterative colour conversions and inconsistent colour. The Fiery applies global corrections to specific groups of RGB, CMYK, and spot colours to avoid such conflicts.
- Accepting RGB files in addition to larger CMYK files from applications, which minimizes network traffic and enables jobs to print faster.

ColorWise uses ICC profiles to convert colours to the device gamut or simulate other devices, such as an offset printing press. ColorWise manages colour conversions for all users printing to the Fiery from Windows and Mac OS computers. It allows users to follow a simple workflow with minimal intervention using robust default settings, while giving advanced users the control and precision they need.

## Using ColorWise colour management tools

Your Fiery user software includes several types of colour reference pages that allow you to see the range of colours that can be printed on your printer. For predictable colour, use the colour reference pages when defining the colour in your document.

The resources available are:

- RGB Colour Reference—a Microsoft Word file and a Microsoft PowerPoint file that allow you to view the colours available in the standard palettes of office applications and to see how those colours print on the Fiery (see [“Using colour matching tools with office applications”](#) on page 3-2).
- CMYK Colour Reference—an 11-page downloadable PostScript file of CMYK colour patches (see [“Using the CMYK Colour Reference”](#) on page 4-3).
- Process Simulation of PANTONE Solid Coated Colours—a 19-page downloadable PostScript file of colour patches showing CMYK equivalents of PANTONE Coated colours. This file prints differently depending on the setting of the Spot Colour Matching option (see [“Using the PANTONE reference”](#) on page 4-3).

In addition, you can print RGB, CMY, and PANTONE colour charts from the Fiery.

## Chapter 2: Using Colour Management Workflows

A workflow is the path a print job follows from creation to destination. In the workflow of any job, there are various points at which decisions are made about how to define, use, and translate colour. The choices made, and the point at which they are made, impact the colour output produced.

This chapter introduces issues with colour management in specific desktop applications and discusses the interaction between those applications and [ColorWise](#) colour management.

### Understanding workflows

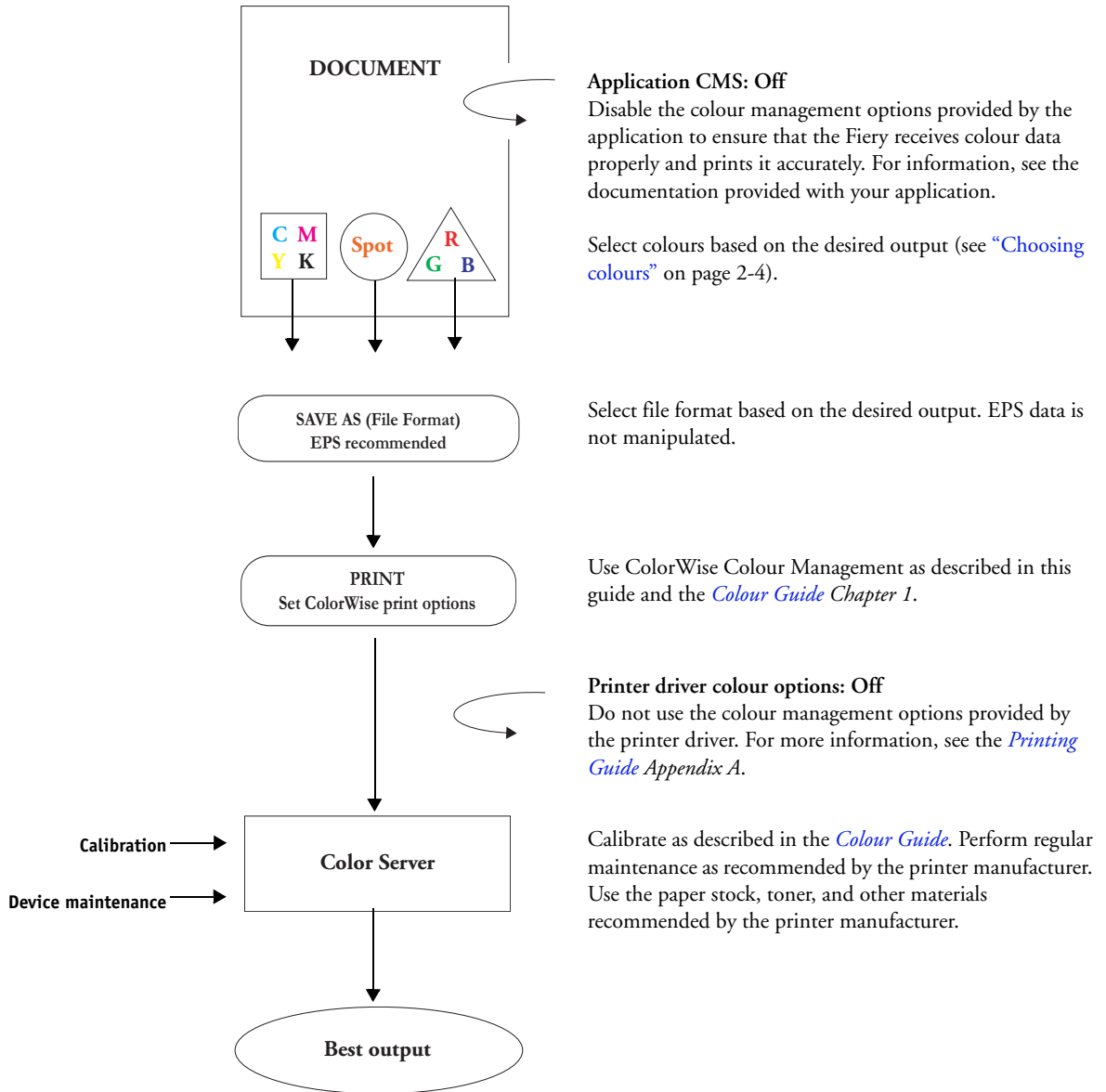
The term “workflow” is used to describe the path a job follows from its creation in a desktop application to final printed output. The Fiery supports a variety of workflows with different levels of complexity. There are several points at which colour management can be performed on a job (see the illustration on [page 2-2](#)). The information provided at each step (for example, the type of colour used) impacts the workflow of the job.

**NOTE:** Always consider the complexity of the workflow. Every time colours are converted, performance and colour accuracy are affected. A workflow with a minimum number of steps minimizes the risk of error.



# 2

## 2-2 Using Colour Management Workflows



## Standard recommended workflow

The Fiery controller is highly optimized for the C9800. ColorWise addresses issues unique to your printer, including screens, individual toner response, interactions among toners, natural smoothness of blends, and the capability to render spot and custom colours. The Fiery distinguishes text and graphics from image elements, so that black channel information is preserved while parameters used for CMYK **colour separations** are maintained.

The recommended standard colour workflow uses ColorWise calibration and colour management. The Fiery comes into play near the end of the colour workflow.

For this workflow:

- Bypass any colour management in the applications and printer drivers.

This ensures that the colours you selected reach the Fiery and ColorWise in a usable form. Keep in mind, however, that ColorWise fully supports colour management from applications and printer drivers (see “[Using ColorWise and application colour management](#)” on page 1-3).

- Set the CMYK Simulation Profile option in ColorWise to match the CMYK colour space used in the application to select the colours. Any CMYK Simulation setting (except Match Copy, if available) applies calibration, so the response of the printer will appear to be stable.

The recommended values for CMYK Simulation are **SWOP** in the U.S., **Euroscale** in Europe, and **DIC** in Japan—choices that reflect the colour standard for each region. If colours have been selected specifically for your calibrated Fiery, set CMYK Simulation to None.

- Set other ColorWise print options as appropriate. For a list and descriptions of ColorWise print options that affect CMYK, RGB, spot, and other colours, see the *Colour Guide Chapter 1*.

## Choosing colours

When working with colour materials, whether they are presentations, illustrations, or complicated page designs, you make aesthetic decisions about the colours you use. After you set a goal, you must make the best use of the capabilities of your Fiery to realize your design in print. Your colour printing system becomes an ally in this creative process to the extent that results are *predictable*:

- If you designed a poster to print on the Fiery, you want the printed colours to match the design specification.
- If you are printing presentations on the Fiery, you want to preserve the vivid colours you see on your monitor.
- If you are working with colour that is to be printed on an offset press, you want the C9800 output to match other **prepress proofs** or PANTONE colour swatch books.

The colours that you define when creating a file in an application, and the colour management tools within the application that you use, impact how the file is processed (workflow) and the final output you can expect.

Use colour management to control colour output by:

- Selecting a colour model—different types of applications use different colour models. The colour model you select, and whether or when data is converted from one colour model to another, influences the final colour output.
- Optimizing for output type—the type of final output influences your colour and application choices.
- Using colour matching tools—the Fiery provides several tools to preview colours available on a device and define them within an application.

## Understanding colour models

Colours can be defined in several different colour models, the most common being RGB, CMYK, and the spot colour matching system (such as PANTONE). Depending on the application you use, you may or may not have a choice of the colour model.

- **RGB** colours are used when you take output from an RGB device such as a digital camera or a scanner. Another use of the RGB colour model is for displaying colours on a monitor.
- **CMYK** colours are what most printers use.
- **Spot colours**, such as PANTONE, are special inks manufactured to run on an offset printing press. Spot colours can be simulated using CMYK toners (also known as **process colour** inks). With the Spot Colour Matching print option, you can determine how spot colours are printed at the Fiery:

**Spot Colour Matching On** uses colour tables built in the Fiery to simulate the spot colour with the closest equivalent available using the CMYK toners of the C9800.

**Spot Colour Matching Off** instructs the Fiery to simulate the spot colour using CMYK equivalents defined by the spot colour manufacturer. These are the same CMYK values used by applications that include spot colour libraries. This CMYK combination is then printed with the CMYK Simulation setting you choose, such as **SWOP** or **DIC**.

The colour model used by your application determines the methods available for choosing colours, as well as the way colour data is transmitted to the Fiery:

- **Office applications**, such as presentation software, spreadsheets, and word processing programs, use the RGB colour model. They typically transmit only RGB data to the Fiery.
- **Illustration applications** use both the RGB and CMYK colour models, but typically transmit only CMYK data to the Fiery.
- **Pixel-editing applications** use both the RGB and CMYK colour models. They can transmit either RGB or CMYK data to the Fiery.

## Optimizing for output type

The Fiery can be used for on-demand colour printing and for colour proofing. On-demand colour printing refers to those jobs for which the C9800 is the final print device. Printing jobs to the Fiery in preparation for printing on an offset press is referred to as colour proofing. Both types of Fiery print jobs can use RGB, CMYK, and spot colours.

Characteristics of on-demand jobs	Characteristics of offset proofs
Bright, saturated colours are often desirable.	Require the printed colours to match those from another set of CMYK printing conditions.
Colours are achieved using the full range of colours available, referred to as the full <b>gamut</b> of the printer or, more simply, device CMYK.	Colours that are specified for an offset press require <b>CMYK</b> simulation that is optimized for proofing on the printer.

**NOTE:** The term *on-demand* applies to producing printed output when it is needed. You may be familiar with the term *short-run*, which usually applies to the volume of a printing task. Although these terms do not mean exactly the same thing, the term *on-demand* in this manual applies also to short-run printing scenarios. Because you can print as many pages as you need and can reprint jobs quickly, the Fiery performs equally well in either environment.

The type of printing you plan for the document—on-demand colour printing on the C9800 versus colour proofing for eventual printing on an offset press—determines the way you define colours, as well as the print option settings you choose.

- For on-demand colour printing on the C9800, use any application and define colours in either RGB or CMYK. If your application supports it, you can also choose colours from the PANTONE colour library. Choose the appropriate settings for print options affecting colour output (for descriptions of the print options, see the *Colour Guide Chapter 1*).
- For colour proofing, use a PostScript-defined colour in CMYK or choose colours from colour libraries such as the PANTONE colour library. Placed images can also be defined in RGB or CMYK. Choose the appropriate settings for print options affecting colour output (see the *Colour Guide Chapter 1*).

**NOTE:** The Fiery allows you to use **RGB** or **CMYK** data when printing proofs for an offset press run. However, sending data to an **imagesetter** usually requires CMYK data.

## Maintaining colour accuracy

For the colours you see on your monitor to match those on your printed output, they must go through colour management, including precise **calibration** of your monitor and Fiery. If viewing colours on the monitor is critical, consider using a professional profiling software package and instrument, such as the EFI Colour Profiler, to create a monitor profile. A monitor profile enables application to compensate for the colour behavior of the monitor when displaying images. As a result, colours previewed on the monitor more closely match colours in your printed output.

If you are not equipped or inclined to maintain accurate monitor colour management, you can opt for an easier approach. Determine which is more important to you—printed colours or on-screen colours.

- If displayed colours are more important, trust your eyes and your monitor. Visually select colours on your monitor, but be aware that colours will be optimized only for your monitor. When the document is opened on other monitors, the colours may look different. And even though printed colours may not match those on your monitor, they will still print to the Fiery with good results.
- If printed colours are your priority, choose colours from printed samples. By using sample colours, you ensure your printed output remains consistent, regardless of how the colours appear on different monitors. Print the palette of available colours from business applications and select colours from the printed samples. Colour reference files are included on the User Software CD. (For more information, see “[Using colour matching tools with office applications](#)” on page 3-2 and “[Using colour matching tools with PostScript applications](#)” on page 4-2.) You can also print colour charts from the Fiery and select colours by name or number from the printed samples. Advanced applications allow you to define colours in the easier-to-control spot and CMYK colour spaces. For more advice on colour selection, see “[Choosing colours](#)” on page 2-4.



## Chapter 3: Managing Colour in Office Applications

The ColorWise colour management system provides complete colour management for jobs printed from office applications and other applications that do not generate PostScript. This chapter provides instructions for printing colour documents from **Graphics Device Interface (GDI)** and **QuickDraw** applications, such as presentation, spreadsheet, and word processing applications. Use these instructions with the Microsoft Office applications.

### Using office applications

The Fiery must receive PostScript instructions to print an image or a document. Many applications do not create these PostScript instructions, relying on the printer driver to create them. Included in this category are most word processing, spreadsheet, and **presentation graphics** applications. These applications use Windows **GDI** to display and print when running Windows, and Apple **QuickDraw** to display and print when running Mac OS. We refer to these GDI and QuickDraw applications as “**office applications**.”

All office applications handle colour similarly, using the same RGB colour model used for the colour monitor. Most office applications allow you to choose colours from a palette of preselected colours; some allow you to add new colours to the palette using a colour picker. Although some applications allow you to specify colour using the CMY, HSL, and HSV colour models, these applications always send RGB colour data to the Fiery.

(An exception to this is a CMYK EPS file placed in the document, which is sent as CMYK data.)

When working with colour in office applications, consider the following:

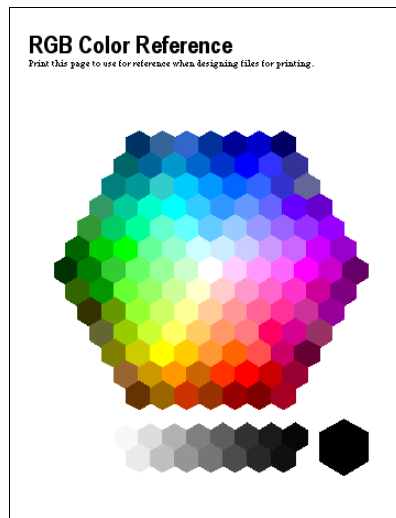
- The range of colours that can be displayed in RGB on your monitor is much larger than the range of colours that can be printed on your printer. When you print the document, out-of-gamut RGB colours are mapped to the colours your printer can produce.
- Office applications send only RGB data to the Fiery. You control the rendering style of the colour conversion with your selection of a **CRD**.



Each CRD uses a different colour rendering style and has a different way of mapping unprintable colours to the colour gamut of your printer. For more information on colour rendering styles, see the *Colour Guide Chapter 1*.

## Using colour matching tools with office applications

Your Fiery user software includes two RGB colour reference pages, a Microsoft Word file and a Microsoft PowerPoint file. You can print these files using different CRDs to see how the colours appear when printed to the Fiery. For best results, print the colour reference page using the same print options you plan to use for your final document. Select the colours you want to use from the printed version of the RGB colour reference page and use those colours in your document.



RGB Colour Reference (Microsoft PowerPoint)

## Working with office applications

Before printing from these applications, make sure the appropriate printer driver and the Fiery **PPD** are installed on your computer, as described in the *User Software Installation Guide*.

## Defining colour

Office applications use the RGB colour model. The only way to use CMYK or PANTONE colours is to define them in **EPS** format files with an illustration or page layout application, and then place these files in Microsoft Office documents. Colours in EPS files are preserved until they reach the Fiery (assuming no PostScript Colour Management information was included).

Office applications use low resolution to display EPS files, but the EPS images are printed at full resolution. In general, use EPS files only when RGB colours are impractical in your specific workflow. EPS files are useful when using large or complex images that must be printed at full **resolution** or exceed the memory allocation of some Microsoft Office applications.

## Working with imported files

Your application may allow you to import a variety of file formats. If you encounter printing problems when using other imported file formats such as TIFF and PICT, EPS files are recommended.

**NOTE:** If you are unable to import EPS elements, it may be necessary to perform a “custom install” of your Microsoft Office applications.

Even when there are no user-defined colour management options within office applications, colour conversions do occur when you import images or page elements that were not defined in RGB. To avoid such conversions with imported files, use the EPS file format for non-RGB artwork that is to be imported into office applications.

All RGB images placed in a document are affected by the settings you choose for the RGB Source and Rendering Style print options.

## Mixing imported image types (Advanced colour management)

If you place multiple RGB images—mixed non-photographic and photographic—into an office application file, a single **CRD** may not optimize output for all the images. In this case, you may want the photographic images to bypass the CRD altogether. To accomplish this, open the photographic image in **CMYK** mode with a pixel-editing application, such as Photoshop, and perform colour correction. Save the image as a Photoshop EPS and import it into the document.

## Selecting options when printing

There are few differences among office applications with regard to Fiery printing. To specify print options and colour management settings, follow the instructions in the *Colour Guide Chapter 1*. To specify these options, you must use a PostScript Level 2 (or later) printer driver, such as an Adobe PostScript Printer Driver.

Because office applications send RGB data to the Fiery, your choice of RGB Source and Rendering Style settings are important. Specify the appropriate CRD for the desired colour effect (see the *Colour Guide Chapter 1*).

## Output profiles

All colour data in the job is affected by the output profile on the Fiery. This profile may be the one designed for your device and shipped with the Fiery, or it may be a custom profile created at your site (see the *Colour Guide Chapter 1*). If necessary, print the Test Page to see which profile is the active default on the Fiery.

## Ensuring colour accuracy when you save a file

Take the following steps to ensure colour accuracy:

- When saving EPS files, do not include PostScript Colour Management information. This minimizes the risk of conflicting data and multiple colour conversions. PostScript Colour Management causes your CMYK and RGB colours to be interpreted by the Fiery as though they were supplied in the Lab colour space and, as a result, processed by CRDs, rather than your simulation settings.
- Include ICC colour information in files. ColorWise does not conflict with this information, and such data is useful for identifying the specific colour space used by your files.
- Do not include halftone and transfer functions.
- Turn off colour management in the printer driver.

On Windows computers, if the printer driver offers Image Colour Matching options, select Printer Image Colour Matching.

On Mac OS computers, set the printer driver to include *no* colour management commands at print time (see the *Colour Guide Chapter 1*).

## Chapter 4: Managing Colour in PostScript Applications

This chapter provides guidelines for using applications that have the ability to write their own **PostScript**, such as some page layout, illustration, and pixel-editing applications. For information about using specific applications, see “[Managing Colour in Adobe Photoshop](#)” on page 5-1, “[Managing Colour in Page Layout Applications](#)” on page 6-1, or “[Managing Colour in Illustration Applications](#)” on page 7-1.

### Working with PostScript applications

Most applications used for illustration, **pixel** editing, and page layout can create the PostScript information they send to a PostScript printer or save in PostScript files. Illustrator, Photoshop, PageMaker, QuarkXPress, and Macromedia FreeHand are all PostScript applications.

PostScript applications work with colour in many different ways. Most allow you to choose **process colours** (by entering percentages for cyan, magenta, yellow, and black), as well as **named colours** from a spot colour system, such as PANTONE. When you print composites, these applications send process-colour equivalents for named **spot colours** to the Fiery. In some applications, you can also choose colours using the **RGB**, **HSB**, **HSL**, or other colour models.

Generally, PostScript applications send colour information to the Fiery as CMYK data. An exception to this is an RGB image placed in a document, which is sent directly to the Fiery (unless you specify special colour management settings in the application). In addition, some PostScript applications that allow you to define colours in RGB or other colour models also send data to the Fiery in those colour spaces.

Colour controls in PostScript applications are typically designed for printing on an offset press, and some adjustments are required for printing to the Fiery. Displayed versions of colours you choose in these applications may not match C9800 output exactly, and named colours may not print accurately on the C9800, since these colours typically require custom inks.

## Using colour matching tools with PostScript applications

With PostScript applications, you can work with colours created with any of the colour models supported by the application. All PostScript applications support CMYK; some also support RGB and other colour models based on monitor display values. PostScript applications also allow you to choose named colours using one or more colour libraries, such as PANTONE (see [page 4-3](#)).

### Using swatch colour matching tools

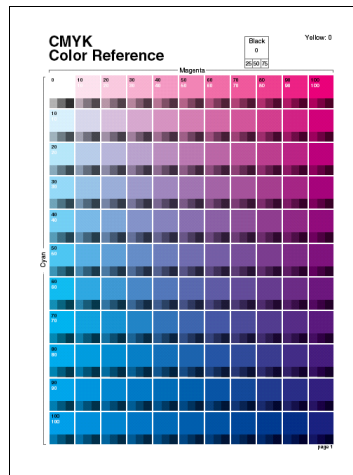
Your Fiery user software includes several colour reference pages (see [page 1-4](#)). By choosing colours from these reference pages, you ensure that you get the same colour from your C9800. For best results, calibrate the Fiery before printing the reference pages.

**NOTE:** We highly recommend that you use swatch colour matching to ensure predictable colour printing results with the C9800 or match your C9800 output to colours produced by other printers.

**NOTE:** Swatch colour matching does not match *monitor* colours to printed colours. For this, you must use a colour management system and calibrate your monitor.

## Using the CMYK Colour Reference

Use the CMYK Colour Reference included with your Fiery user software to see how various cyan, magenta, yellow, and black combinations look when printed on your C9800.



To print the CMYK Colour Reference, download the file to the Fiery. The printed pages display groups of colour patches in graduated combinations of yellow, magenta, and cyan, and smaller patches that include 25%, 50%, and 75% black. Refer to these pages to pick colours and specify process colour values in your application. For the location of the file on the User Software CD, see the [User Software Installation Guide](#).

## Using the PANTONE reference

Use this reference (Process Simulation of PANTONE Solid Coated Colours) included with your Fiery user software to help ensure predictable results with colours chosen from the PANTONE colour library.

The information printed by this reference depends on the Spot Colour Matching setting.

- **Spot Colour Matching On**—Prints swatches that simulate the spot colour with the closest equivalent available using the CMYK toners of the C9800. The equivalent PANTONE colour name/number is printed below each swatch.

# 4

## 4-4 Managing Colour in PostScript Applications

- **Spot Colour Matching Off**—Prints swatches of the CMYK equivalents of PANTONE colours as defined by PANTONE. (These are the same CMYK values defined in applications that include PANTONE libraries.) The CMYK values used to produce the colour, as well as the PANTONE colour name/number, are printed below each swatch.

To print the reference, download the file to the Fiery. For the location of the file on the User Software CD, see the *User Software Installation Guide*. If the default Spot Colour Matching setting on the Fiery is not the setting you want to use for printing the PANTONE colours, download the file to the Hold queue, and then override the Spot Colour Matching setting using a job management utility, such as Command WorkStation (see the *Job Management Guide*).

## Defining colours

The methods and options available for defining colours depend on the type of PostScript application that you are using.

Colour model	Application type	Colour definition notes
CMYK	Photoshop	In Photoshop you can choose colours with various colour models, including HSB, CIE Lab, RGB, and CMYK.
	Page layout application	<p>Page layout applications generally use the CMYK colour model. Some allow you to define colours with other colour models and may be able to send that data to the Fiery in those other colour models. Generally, however, CRDs (which affect only RGB data) do not affect colours defined in page layout applications.</p> <p>For predictable results with CMYK colours, use the CMYK Colour Reference when defining colours in page layout applications (see <a href="#">“Using colour matching tools with PostScript applications”</a> on page 4-2).</p>
	Illustration application	<p>All illustration applications use the CMYK colour model. Although you may be allowed to define colours using other colour models, these applications generally send only CMYK data to the Fiery.</p> <p>For predictable results with CMYK colours, use the CMYK Colour Reference pages when defining colours (see <a href="#">“Using colour matching tools with PostScript applications”</a> on page 4-2).</p> <p>Different versions of Illustrator support colour models slightly differently (see <a href="#">“Note about colour models in Adobe Illustrator”</a> on page 7-1).</p>



Colour model	Application type	Colour definition notes
RGB	Photoshop	Choose colours in Photoshop with various colour models, including HSB, CIE Lab, RGB, and CMYK.
	Page layout application	<p>If the application allows you to define colours in RGB, determine whether it converts the RGB data to CMYK before sending it to the Fiery. If it does, this will determine which ColorWise print options affect your job.</p> <p>For example, if the application converts RGB black (defined in the document as R0%, G0%, B0%) to four-colour CMYK black when it sends the job to the Fiery, the option you select for the Pure Black Text/Graphics print option has no effect when you print the job.</p>
	Illustration application	<p>If you define colours in RGB and print directly from the application, the application converts the RGB data to CMYK before sending it to the Fiery. This conversion by the application determines which ColorWise print options affect your job.</p> <p>For example, if the application converts RGB black (defined in the document as R0%, G0%, B0%) to four-colour CMYK black when it sends the job to the Fiery, the option you select for the Pure Black Text/Graphics print option has no effect when you print the job.</p>
Spot Colours	Photoshop	Choose <b>named colours</b> from the PANTONE colour library (see “Using the PANTONE reference” on page 4-3). For best results, use the colour definition methods described in “Using swatch colour matching tools” on page 4-2.
	Page layout application	
	Illustration application	

## Working with imported images

You can import images into documents created in illustration applications (such as Illustrator) and page layout applications (such as QuarkXPress). The recommended formats for images imported into page layout documents are **EPS** (or EPSF) and **TIFF**. If you encounter a problem using a TIFF format image, use the EPS file format. Support for importing other file formats may be provided by individual applications.

All RGB images placed in a document are affected by the RGB Source and Rendering Style settings. The ColorWise colour management system applies the specified RGB Source setting to all RGB data and then uses the specified Rendering Style (**CRD**) to perform a colour conversion. An exception to this occurs if you assign **ICC profiles** to RGB images using the application's colour management tools (see the following section). In this case, the application performs the colour conversion of the image and sends CMYK data to the Fiery.

**NOTE:** To take advantage of RGB Source and Rendering Style settings for images imported into QuarkXPress, save images in the EPS format or use the Quark PrintRGB XTension, which outputs RGB TIFF image files without converting them to CMYK.

### Mixing image types (Advanced colour management)

If you place multiple RGB images—mixed non-photographic and photographic—into a file, a single CRD may not optimize output for all the images. In this case, you may want the photographic images to bypass the CRD altogether. To accomplish this, separate the image to CMYK data with a pixel-editing application, such as Photoshop, and perform colour correction. Save the file as EPS or TIFF format and import it into the document.

If your application supports this feature, you can save the RGB image in TIFF format and assign it an **ICC profile** and **rendering intent** when you import it into the document.

## Using CMYK simulations

You can specify a CMYK Simulation profile and a CMYK simulation method for a job using the CMYK Simulation Profile and CMYK Simulation Method print options (see the *Colour Guide Chapter 1*). The CMYK Simulation setting affects all CMYK colour data sent by the page layout or illustration application. It can also affect RGB data sent to a page layout application if RGB Separation is set to Simulation.

- If the document contains CMYK graphics that were separated for an offset press standard, apply the corresponding CMYK Simulation setting. For example, for graphics separated for **SWOP**, choose SWOP as the CMYK Simulation setting.  
If you print separations to the Fiery and choose to use the Combine Separations feature in conjunction with Full Simulation, the result may not match that of the same page printed as composite.
- If the document contains CMYK graphics that were separated according to the colour characteristics of a custom **ICC profile** (not a press standard profile), specify the corresponding profile as the CMYK Simulation Profile setting on the Fiery.

For more information on downloading CMYK Simulation profiles to the Fiery with ColorWise Pro Tools, see the *Colour Guide Chapter 3*.

## Using application-defined halftone screens

If your site has installed the Fiery Graphic Arts Package (not available for all Fiery models), you can define halftone screens from several PostScript applications and use them when printing. The results vary depending on the application.

To define a halftone screen, use the application to adjust the Frequency and Angle values of the halftone screen. For applications that use the Fiery default (InDesign, FreeHand, QuarkXPress, and Illustrator 10), the ink dots are round; for applications that define their own shape and do not use the Fiery default (PageMaker, Photoshop, and Illustrator 9), the halftone dots may be a different shape. When you print the job, choose Application Defined for the Halftone Screen print option.

The Frequency and Angle settings in the Application Defined halftone screen are used regardless of whether the setting for Combine Separations is set to On or Off. For special instructions for printing separations with Photoshop, see “[Selecting options when printing](#)” on page 5-8,

**NOTE:** In general, using halftone screens is not recommended because the print output will have visible dots of toner rather than smooth blends. Use halftone screens only when necessary to achieve a specific style of print output.

## Ensuring colour accuracy when you save a file

You can take the following steps to ensure colour accuracy:

- When saving EPS files, do not include PostScript Colour Management information. This minimizes the risk of conflicting data and multiple colour conversions. PostScript Colour Management causes your CMYK and RGB colours to be interpreted by the Fiery as though they were supplied in the Lab colour space and, as a result, processed by CRDs, rather than your simulation settings.
- Include ICC colour information in files. ColorWise does not conflict with this information, and such data is useful for identifying the specific colour space used by your files.
- Do not include halftone and transfer functions.
- Turn off colour management in the printer driver.

On Windows computers, if the printer driver offers Image Colour Matching options, select Printer Image Colour Matching.

On Mac OS computers, set the printer driver to include *no* colour management commands at print time (see the [Colour Guide Chapter 1](#)).



## Chapter 5: Managing Colour in Adobe Photoshop

This chapter covers features of Adobe Photoshop versions 7.x and 6.x for Windows and Mac OS. The illustrations show Mac OS dialog boxes, but the information and instructions apply equally to the Windows version of Photoshop.

Because Photoshop uses a sophisticated colour management system, you should perform some colour management tasks before you use Photoshop.

### Specifying colour settings

The following sections outline the recommended colour settings for Photoshop in a Fiery workflow. These colour settings include:

**Working Spaces**—Default colour spaces to use when working with **RGB** and **CMYK** documents. **ICC colour profiles** describe the gamut and colour characteristics of these working spaces.

**Colour Management Policies**—Instructions that tell Photoshop what to do when it encounters colour data from a colour space other than the specified working space.

### Configuring Photoshop colour settings

Photoshop uses a sophisticated colour management system that handles document colours for a variety of colour-managed workflows. By customizing colour settings, you specify the amount of colour management you want to use while working in Photoshop.

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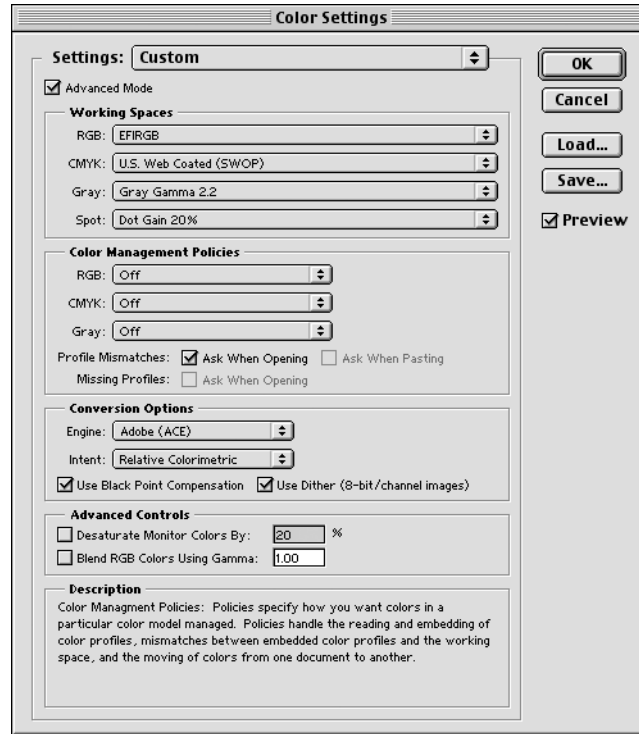
#### TO SPECIFY COLOUR SETTINGS FOR PHOTOSHOP

1. **Choose Colour Settings from the Edit menu.**

The Colour Settings dialog box appears.

2. **Select Advanced Mode.**

In Advanced Mode, a more extensive list of options is displayed.



### 3. Choose the desired working space profile for each colour mode in the Working Spaces area.

A working space specifies the colour profile for documents that have no colour profile associations or for documents that are newly created. It also defines colour space of a document converted to RGB, CMYK, or Grayscale colour modes, and for spot colours in a document.

Choose an appropriate **ICC profile** to embed when saving a file for each colour space. Use the following guidelines for specifying working spaces:

- For RGB, choose the profile for the default RGB colour space used by the Fiery. In most cases, this is EFIRGB. (For information about installing the EFIRGB profile, see the *User Software Installation Guide*.) Consider sRGB if you usually view images on a generic PC monitor or rely on a Windows operating system to manage colour on your monitor. If you choose sRGB as a working space, you must print with the ColorWise RGB Source option set to sRGB. New RGB documents you create in Photoshop will use this working space.

**NOTE:** EFIRGB is set as the default RGB **source colour space** on the Fiery. No matter what RGB space you select, make sure it is available on the Fiery. For more information on downloading RGB **source profiles** to the Fiery, see the *Colour Guide Chapter 3*.

- For CMYK, choose a profile that describes your target press (such as **SWOP**) if you are a prepress user. If you are an office user printing final output, choose an output profile that describes the C9800. To use a device-specific output profile, you must first upload the profile from the Fiery to your computer (see the *Colour Guide Chapter 3*). New CMYK documents you create in Photoshop will use the specified working space.
  - For guidelines on specifying Gray and Spot working spaces, see your Photoshop documentation.
- 4. In the Colour Management Policies area, choose policies for handling documents without embedded profiles or with embedded profiles that differ from the working space.**

Unless you are an advanced colour user, choose Off from the RGB, CMYK, and Gray menus. If you specify a colour management policy and open a document in an environment with a different working space than the one in which it was created, you may encounter problems. The profile embedded in a document may be overwritten if it differs from the specified working space (although the numeric colour values in the document are preserved).



- 5. If you do not choose Off for the Colour Management Policies, select Profile Mismatches: Ask When Opening, Ask When Pasting, and Missing Profiles: Ask When Opening.**

This option displays an alert message that allows you to override the specified policy behavior (Off) when opening documents or importing colour data.

This is recommended so that you will be notified before any application colour management is applied.

- 6. In the Conversion Options area, specify settings for converting between colour spaces.**

Choose Adobe (ACE) from the Engine menu to use the built-in colour management engine for Photoshop.

Choose a **rendering intent** from the Intent menu that will optimize the colour quality of the conversion. For guidelines on choosing the rendering intent, see your Photoshop documentation.

Select Use Black Point Compensation and Use Dither (8-bit/channel images) to optimize the quality of colour conversions.

- 7. Clear the Desaturate Monitor Colours By and Blend RGB Colours Using Gamma options in the Advanced Controls area.**

Clearing these options helps ensure a match between your monitor display and the printed output.

- 8. Click Save to save the current group of colour settings.**

The Save dialog box appears.

- 9. Name the settings file, accept the default saved location, and click Save.**

You can switch to your saved settings at any time by choosing the group name from the Settings menu at the top of the Colour Settings dialog box.

## Saving files from Photoshop

Before saving a file from Photoshop, perform any necessary rotating, cropping, and resizing. This speeds processing when printing from the application in which the image is placed.

When saving a document from Photoshop 6.x, you have the option to embed a colour profile in the document. We recommend that you disable this option if you are sending the document to the Fiery.

### Choosing a file format

We recommend that you use **EPS** or **TIFF** file formats to save **RGB** images that will be imported into other documents and printed to the Fiery. You can import EPS and TIFF files into virtually all page layout applications.

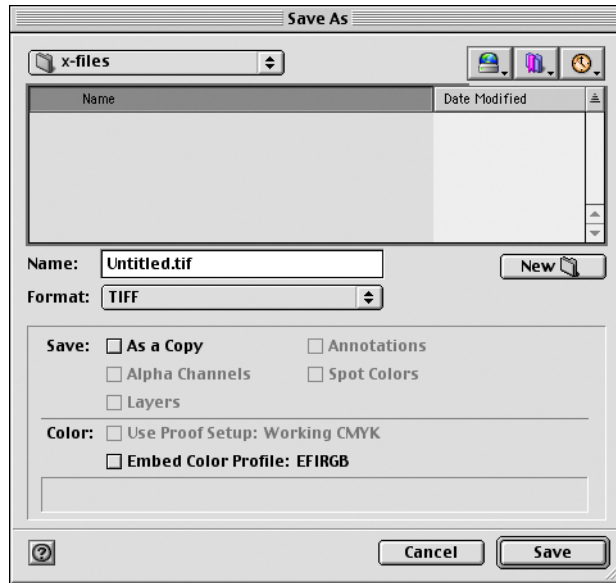
**NOTE:** Although TIFF files generally display better when imported into other applications, their colour and resolution characteristics may be altered by the application into which they are imported. EPS files are not modified by the application into which they are imported.

**NOTE:** In the following procedures, only Photoshop 7.x (Mac OS version) dialog boxes are shown. When applicable, differences between versions 7.x and 6.x, and the Windows and Mac OS versions of Photoshop are noted.

---

**TO SAVE A DOCUMENT FROM PHOTOSHOP****1. Choose Save As from the File menu.**

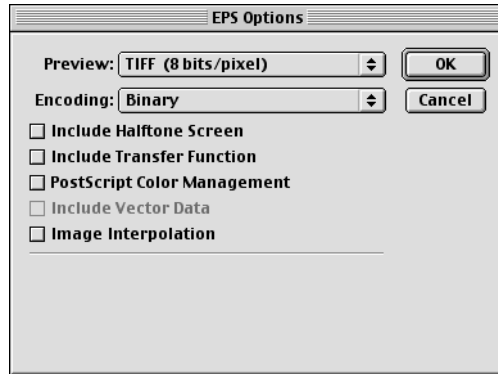
The Save As dialog box appears.

**2. Specify settings in the Save As dialog box.**

- Specify a name, file format, and location for the document.
- Clear the Embed Colour Profile option (Mac OS) or ICC Profile option (Windows).

### 3. Click Save.

If you chose Photoshop EPS as the format, the EPS Options dialog box appears.



### 4. Specify EPS options and click OK.

- Choose a **TIFF** preview option. A TIFF preview is compatible with both Windows and Mac OS computers.
- Do *not* select the PostScript Colour Management option. For more information about PostScript Colour Management, see the following section.
- Do *not* select Include Transfer Function or Include Halftone Screen.

**NOTE:** If you choose **JPEG** encoding, save a backup of the original image saved with binary encoding until you see the printed results of the JPEG file. Occasionally, the compression used for JPEG encoding produces unwanted **artifacts**. If you see unexpected results in the printed output of a JPEG file, revert to a binary version.

If you experience problems printing the document in which you placed the image, substitute an ASCII version of the same image and reprint the document. Binary encoding is much more compact than ASCII encoding, but occasionally causes printing problems with some system configurations.

## Selecting options when printing

You can print **RGB** or **CMYK** images from Photoshop.

- When you print an RGB image, you choose whether the conversion to CMYK is performed by the Fiery (using a CRD), PostScript (using PostScript Colour Management), or Photoshop built-in colour management.
- When you print a CMYK graphic, you can print composites or **colour separations**.

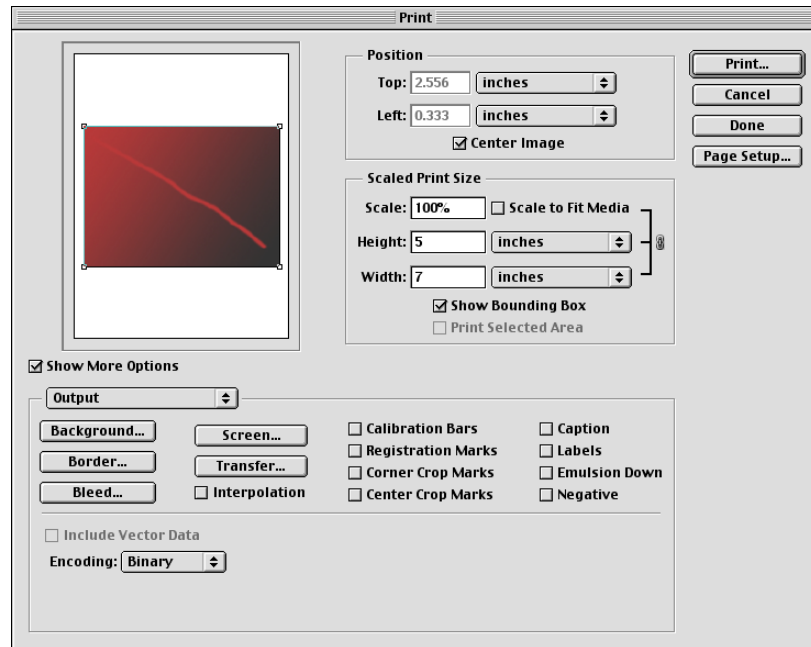
**NOTE:** Make sure that the Fiery Combine Separations print option is set to Off. To print separations, use the Separation option in the Adobe Photoshop pane of the print dialog box. For instructions, see your Photoshop documentation.

---

### TO PRINT IMAGES FROM PHOTOSHOP 7.X

#### 1. Choose Print with Preview from the File menu.

The Print dialog box appears.



Photoshop 7.x

#### 2. Select Show More Options.

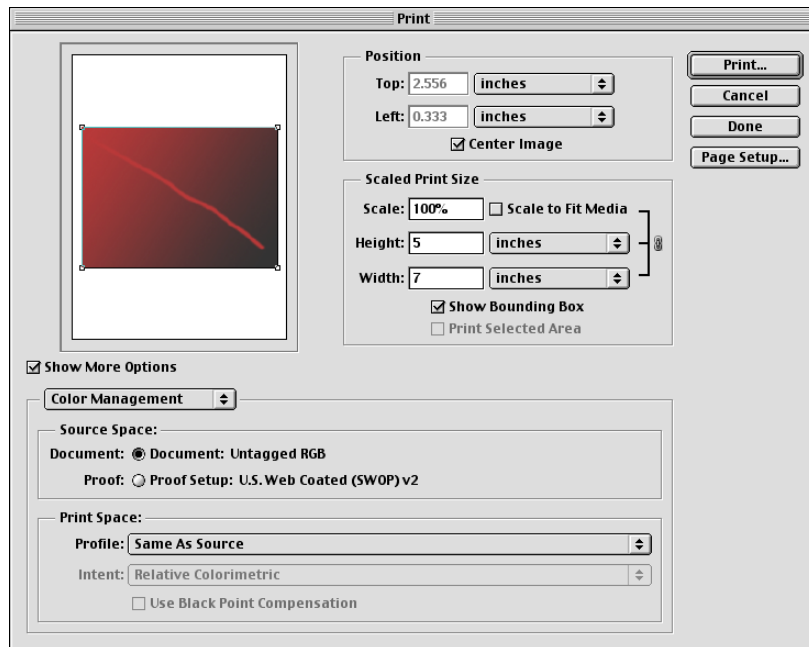
# 5

## 5-9 Selecting options when printing

3. Select Output.
4. Choose an Encoding method.

**NOTE:** If you choose **JPEG** encoding, save a backup of the original image with binary encoding until you see the printed results of the JPEG file. Occasionally, the compression used for JPEG encoding produces unwanted **artifacts**. If you see unexpected results in the printed output of a JPEG file, revert to the binary version.

5. Select Colour Management.



Photoshop 7.x

6. Choose Same as Source from the Profile menu to specify the colour space for printing the image.

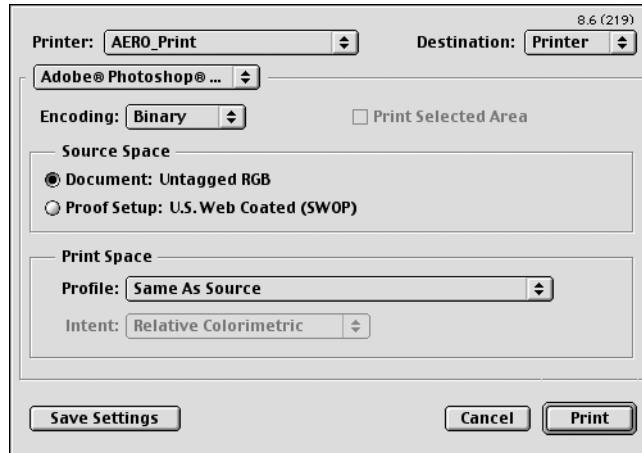
Any other setting causes Photoshop to convert image data to that colour space before sending it to the Fiery.

7. Click Print.

---

**TO PRINT IMAGES FROM PHOTOSHOP 6.X****1. Choose Print from the File menu.**

The Print dialog box appears.



Photoshop 6.x

**2. Choose the Fiery from the Printer menu, and then choose Adobe Photoshop from the pop-up menu.****3. Choose an Encoding method.**

**NOTE:** If you choose **JPEG** encoding, save a backup of the original image with binary encoding until you see the printed results of the JPEG file. Occasionally, the compression used for JPEG encoding produces unwanted **artifacts**. If you see unexpected results in the printed output of a JPEG file, revert to the binary version.

**4. Choose Same as Source from the Profile menu to specify the colour space for printing the image.**

Any other setting causes Photoshop to convert image data to that colour space before sending it to the Fiery.

**5. Click Print.**

## Advanced tips for using PostScript colour management

Use the following information to implement alternative, more complex, colour workflows with Photoshop.

**NOTE:** To use PostScript colour management with Photoshop 6.x, choose PostScript Colour Management from the Profile menu in the Photoshop pane of the printer driver.

### Saving EPS documents with PostScript Colour Management

Selecting the PostScript Colour Management option when saving either a CMYK or RGB EPS file prompts Photoshop to embed PostScript colour information—which is independent of [ICC profiles](#)—in the resulting document. This information is intended for PostScript devices like the Fiery.

### Printing RGB EPS files saved with PostScript Colour Management

When you print an RGB EPS file that contains an embedded profile to the Fiery, you can use the working space information from the embedded RGB profile as an RGB source definition for Fiery [CRDs](#). To use this source colour space information from the embedded profile with Fiery CRDs, choose None as the ColorWise RGB Source when you print. This applies when you print directly from Photoshop, or when the same RGB EPS file is output from another application.

To *override* the embedded profile in an EPS file using an RGB Source definition made available by the Fiery, choose anything except None as the Fiery RGB Source Profile.

### Printing RGB images with Photoshop PostScript Colour Management

If you select an RGB [colour space](#) and decide to use PostScript Colour Management, Photoshop sends RGB data to the Fiery along with PostScript colour information defining this RGB colour space. When you select PostScript Colour Management, a CRD is used to perform colour conversions to CMYK.

**NOTE:** The included RGB source colour space information is overridden by the ColorWise RGB Source option unless it is set to None. The ColorWise Rendering Style option specified will take effect if the ColorWise RGB Source Profile option is set to None.



For fastest print times, choose JPEG encoding, but inspect printed output carefully for unwanted artifacts that may appear as a result of JPEG compression. If you see unexpected results in the printed output, reprint the job using Binary or ASCII encoding.

### **Printing CMYK EPS files saved with PostScript Colour Management**

If you select the Photoshop PostScript Colour Management option when you save a CMYK EPS image, Photoshop embeds PostScript colour information that defines the CMYK source colour space of the image. When you print a CMYK EPS file that contains PostScript colour information to the Fiery, CRDs are used instead of ColorWise CMYK Simulation and Simulation Method settings. Choose the appropriate setting for the Rendering Style option.

### **Printing CMYK graphics with Photoshop PostScript Colour Management**

If you select a CMYK colour space and decide to use PostScript Colour Management, Photoshop sends CMYK data to the Fiery along with PostScript colour information defining this CMYK colour space. When you select PostScript Colour Management, a CRD is used to perform colour conversions to the CMYK colour space of the Fiery.

The destination colour space for the CRDs is determined by the RGB Separation print option. If RGB Separation is set to Simulation, the CMYK graphic is printed according to all specified CMYK Simulation Profile and CMYK Simulation Method settings. If RGB Separation is set to Output, the CMYK graphic is converted to the CMYK colour space of the selected output profile.

Setting the Fiery print option Spot Colour Matching to On has an effect only if you use the Photoshop Multi-Channel feature to define spot channels and then save the image in EPS format and open it in another application. For information see your Photoshop documentation.

Photoshop converts **spot colours** to CMYK values when you work in CMYK mode.

- If the graphic was separated for an offset press standard, apply the corresponding CMYK Simulation setting. For example, if the graphic is separated for SWOP, choose SWOP as the CMYK Simulation setting.
- If Photoshop is configured for a custom separation using a **ICC profile**, choose the corresponding profile for the ColorWise CMYK Simulation option.

The previous custom simulation setting requires that the same profile used for separation in Photoshop also resides on the Fiery. For more information about downloading CMYK Simulation profiles to the Fiery with ColorWise Pro Tools, see the *Colour Guide Chapter 3*.



# 6

## **Chapter 6: Managing Colour in Page Layout Applications**

This chapter provides instructions for printing colour documents from Adobe InDesign, Adobe PageMaker, and QuarkXPress.

Before printing from these applications, make sure the appropriate printer driver and the Fiery PostScript printer description file (**PPD**) are installed on your computer, as described in the *User Software Installation Guide*.

### **Adobe InDesign 2.0.1 and 1.5.2**

The following sections outline the recommended settings for using Adobe InDesign with a Fiery.

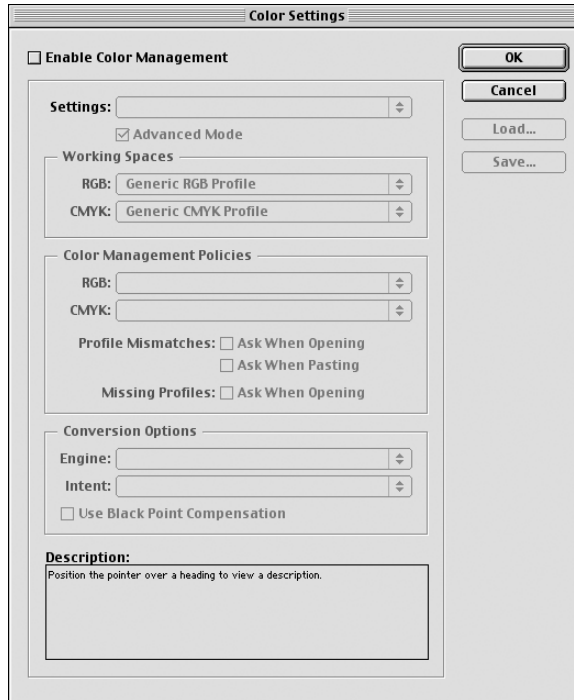
#### **InDesign colour settings**

When using ColorWise colour management, turn off the InDesign colour management features.

# 6

### To DISABLE INDESIGN 2.0.1 COLOUR MANAGEMENT

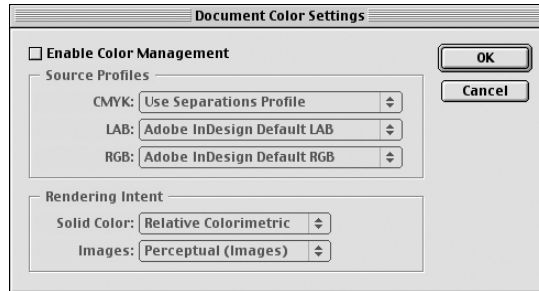
1. Choose Colour Settings > Document Colour Settings from the Edit menu.
2. Clear the Enable Colour Management option and click OK.



---

**TO DISABLE INDESIGN 1.52 COLOUR MANAGEMENT**

1. Choose **Colour Settings > Document Colour Settings** from the **Edit** menu.
2. Clear the **Enable Colour Management** option and click **OK**.



## Importing images

All RGB images placed in a document, except for RGB TIFF images, are affected by your RGB Source and Rendering Style settings. For best results with placed images, use the instructions in [“Working with imported images”](#) on page 4-7.

**NOTE:** InDesign converts placed RGB TIFF images to CMYK.

Disable InDesign colour management when placing images in a document.

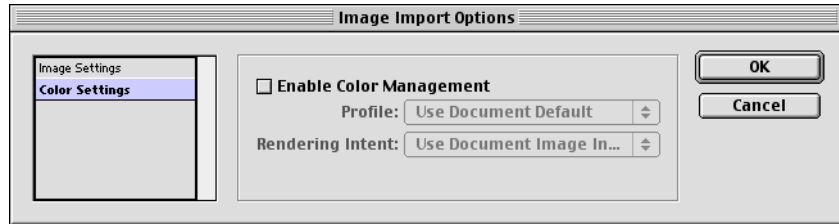
---

**TO DISABLE INDESIGN 2.0.1 COLOUR MANAGEMENT WHEN IMPORTING IMAGES**

1. Choose **Place** from the **File** menu.  
The Place dialog box appears.
2. Select the **Show Import Options** option.
3. Select the file you want to import and click **Open**.

# 6

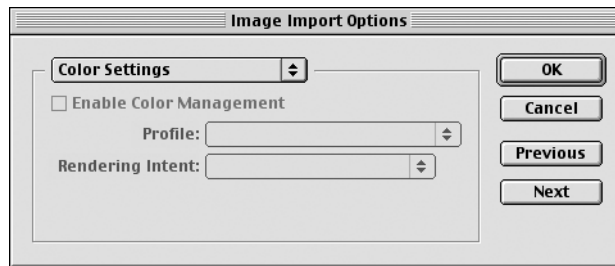
4. Choose Colour Settings from the option menu. Make sure the Enable Colour Management option is cleared, and click OK.



---

## TO DISABLE INDESIGN 1.5.2 COLOUR MANAGEMENT WHEN IMPORTING IMAGES

1. Choose Place from the File menu.  
The Place dialog box appears.
2. Select the Show Import Options option.
3. Select the file you want to import and click Place.
4. Choose Colour Settings from the option menu. Make sure the Enable Colour Management option is cleared, and click OK.

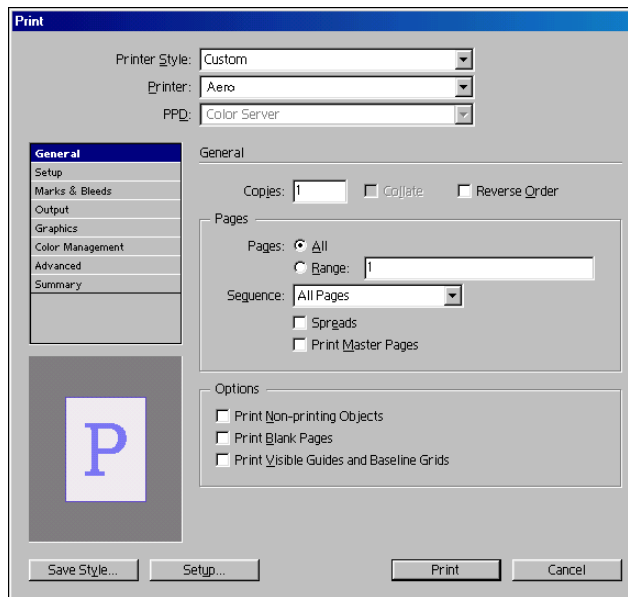


## Selecting options when printing

You can use the standard Fiery printer driver interface to select print options from InDesign.

### TO SET PRINT OPTIONS FROM THE WINDOWS VERSION OF INDESIGN 2.0.1

1. Choose Print from the File menu.
2. Choose the Fiery from the Printer menu.



3. Click Setup.  
The Windows Print dialog box appears.
4. Click Properties.



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## 6-6 Managing Colour in Page Layout Applications

5. Click the **Fiery Printing** tab in the dialog box that appears.

The standard printer driver interface for the Fiery appears.

6. Choose the desired print options.

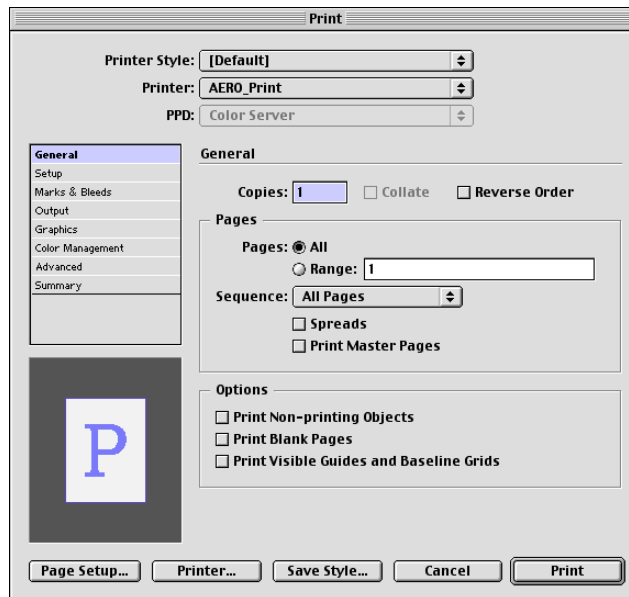
For information on setting ColorWise print options, see the *Colour Guide Chapter 1*.

7. Click **Print**.

---

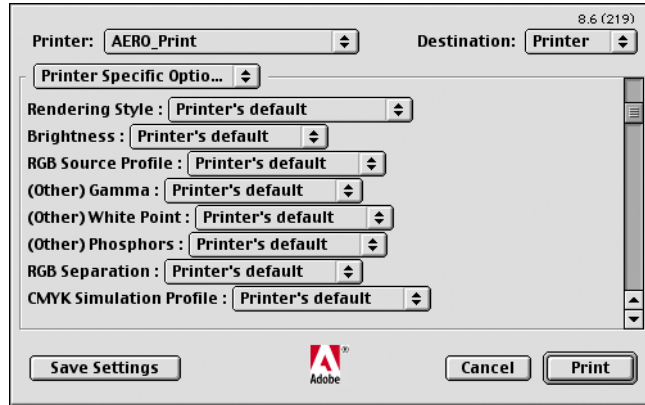
### TO SET PRINT OPTIONS FROM THE MAC OS VERSION OF INDESIGN 2.0.1

1. Choose **Print** from the **File** menu.
2. Choose the **Fiery** from the **Printer** menu.



**3. Click Printer.**

The AdobePS Print dialog box appears.

**4. Choose Printer Specific Options.**

The Fiery print options appear.

**5. Select the desired options.**

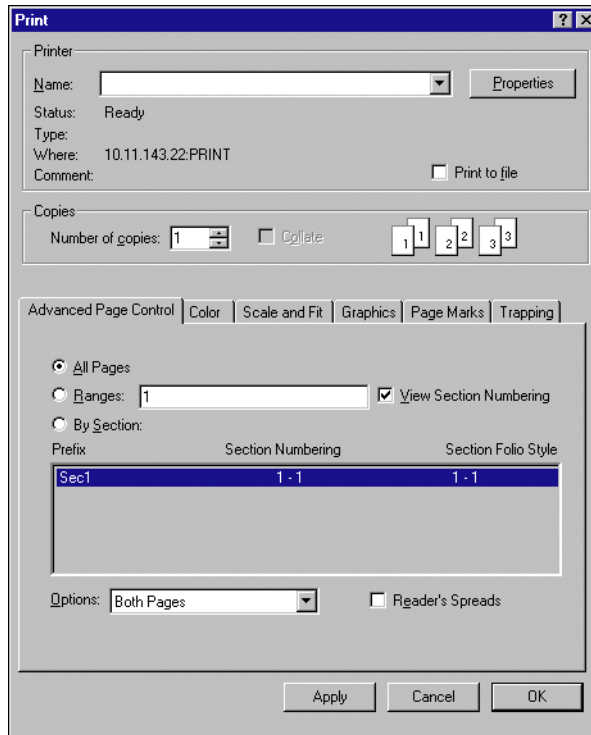
For information on setting ColorWise print options, see the *Colour Guide Chapter 1*.

**6. Click Print.**

---

**TO SET PRINT OPTIONS FROM THE WINDOWS VERSION OF INDESIGN 1.5.2****1. Choose Print from the File menu.**

The Print dialog box appears.

**2. Choose the Fiery from the Name menu.****3. Click Properties.****4. Click the Fiery Printing tab in the dialog box that appears.**

The standard printer driver interface for the Fiery appears.

**5. Choose the desired print options.**

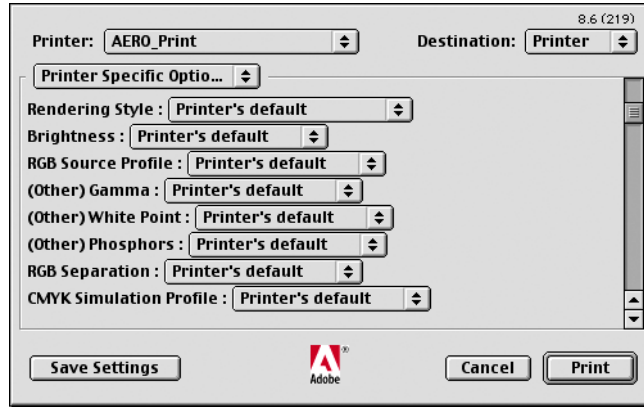
For information on setting ColorWise print options, see the *Colour Guide Chapter 1*.

---

**TO SET PRINT OPTIONS FROM THE MAC OS VERSION OF INDESIGN 1.5.2**

1. **Choose Print from the File menu.**

The Print dialog box appears.



2. **Choose the Fieri from the Printer menu.**
3. **Choose Printer Specific Options.**

The Fieri print options appear.

4. **Select the desired options.**

For information on setting ColorWise print options, see the *Colour Guide Chapter 1*.

## Adobe PageMaker 7.x and 6.5 for Mac OS and Windows

The Mac OS and Windows versions of PageMaker 7.x and 6.5 are essentially the same. The illustrations in this section show only the Windows version, except where differences exist between the two versions.

### Windows version requirement

To use the Windows version of PageMaker 6.5, make sure a copy of the Fiery PPD file is in the following folders:

- PM65\RSRC\USEENGLISH\PPD4
- Windows\System

For information about installing this file, see your PageMaker documentation.

### PageMaker colour settings

We recommend that you use [ColorWise](#) colour management rather than the [CMS](#) options built into Adobe PageMaker.

**NOTE:** Do not use both systems for the same print job.

---

#### TO DISABLE PAGEMAKER COLOUR MANAGEMENT

1. Choose **Preferences > General** from the **File** menu.
2. Click **CMS Setup**.
3. Choose **Off** from the **Colour Management** menu.
4. Click **OK**, and then click **OK** again to close the dialog boxes.

---

#### TO DISABLE COLOUR MANAGEMENT FOR A BITMAPMED IMAGE

1. Select the bitmapped image in the document.
2. Choose **Image > CMS Source** from the **Element** menu.
3. Choose **None** from the **This Item Uses** menu and click **OK**.

## Importing images

All RGB images placed in a document are affected by your RGB Source and Rendering Style settings. For best results with placed images, use the instructions in “[Working with imported images](#)” on page 4-7.

## Selecting options when printing

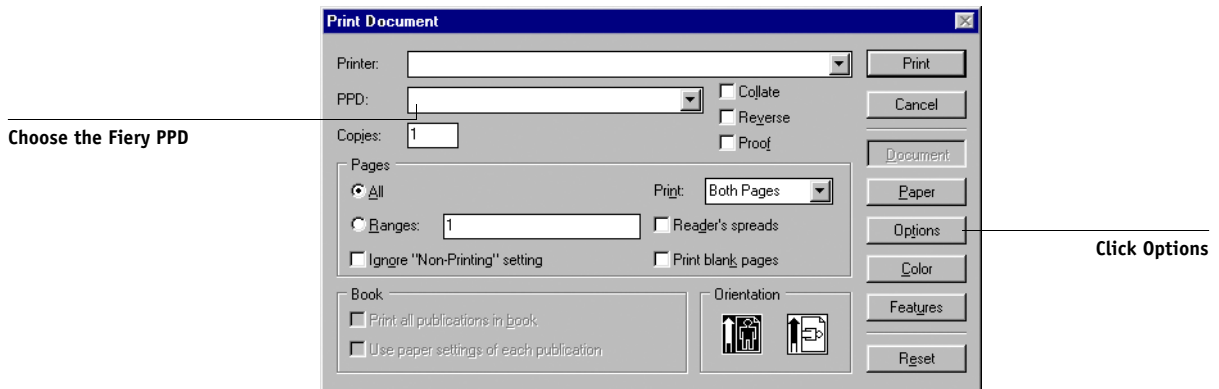
All print settings are specified from the various Print dialog boxes in PageMaker 7.x or 6.5.

**NOTE:** The Print dialog box for PageMaker is different than the Print dialog box for other applications that print to the Fiery. Follow the instructions in this section rather than the print instructions in the *Colour Guide*.

---

### TO SET PRINT OPTIONS WHEN PRINTING FROM PAGEMAKER

1. Choose the Fiery printer description from the PPD menu in the Print Document dialog box.

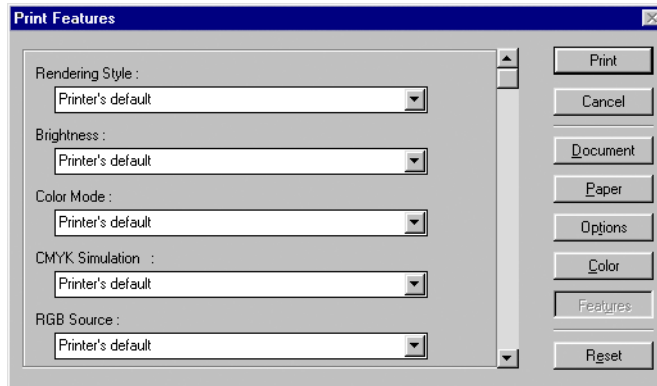


2. Click Options.
3. Choose Normal from the “Send image data” menu in the Print Options dialog box and click Features.

To ensure that TIFF images print at their full resolution, do *not* choose the Optimized Subsampling default from the “Send image data” menu.

4. If a document contains RGB placed images or colours defined in RGB that will not be separated to process colours, choose RGB Source and Rendering Style settings in the Print Features dialog box.

If the document contains PANTONE colours, choose the appropriate Spot Colour Matching setting.



5. Click Print from any of the PageMaker dialog boxes to send the job to the Fiery.

## Using optional Colour Management from PageMaker

If you have additional colour management requirements not offered by ColorWise, such as managing colour on devices not controlled by the Fiery, consider using the PageMaker colour management features. For more information, see your PageMaker documentation.

## QuarkXPress 5.x and 4.x for Mac OS

### Importing images

With the exception of RGB images that are saved in EPS format or use Quark PrintRGB XTension, QuarkXPress converts all RGB data into CMYK, even when Quark CMS XTension is disabled.

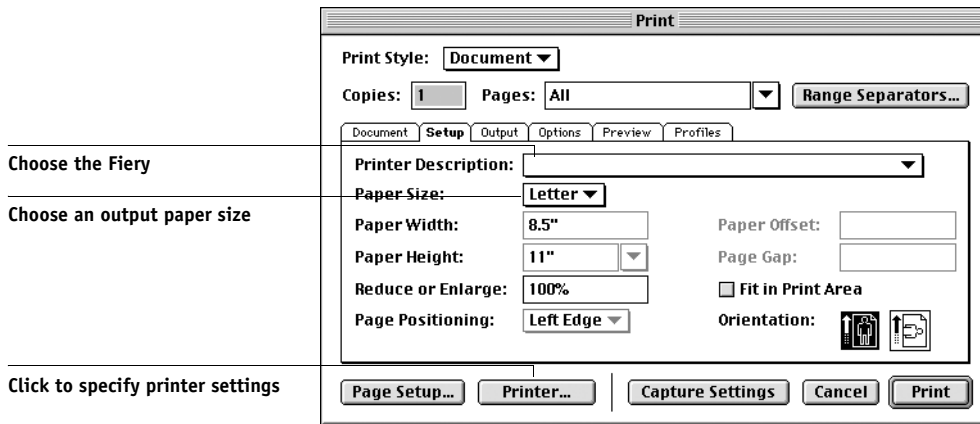
Only RGB images saved in EPS format are affected by RGB Source and Rendering Style settings. For best results with placed images, follow the instructions in [“Working with imported images”](#) on page 4-7.

## Selecting options when printing

The following procedure provides instructions on printing files to the Fiery.

### TO SET PRINT OPTIONS IN QUARKXPRESS 5.X OR 4.X

1. Choose the Fiery printer description name from the Printer Description menu in the Print dialog box.



Mac OS

2. If the document contains PANTONE colours, choose the appropriate Spot Colour Matching setting.

For instructions on specifying print options, see the *Colour Guide Chapter 1*.

## Optional Colour Management from QuarkXPress

If you have additional colour management requirements not offered by ColorWise, such as managing colour on devices not controlled by the Fiery, you may want to consider using the QuarkXPress colour management features. For more information, see your QuarkXPress documentation.

For QuarkXPress 4.02, consider using Quark CMS XTension. These features allow advanced users to control RGB to CMYK colour conversions. If you plan to use these features, make sure that Quark CMS XTension is installed before starting QuarkXPress. If it is not installed, use the Quark XTensions Manager to install it. For instructions, see your QuarkXPress documentation.



**NOTE:** Quark CMS converts RGB TIFF, JPEG, and PICT images to CMYK before sending colour data to the Fiery. RGB Source and Rendering Style settings have no effect on this data unless you use Quark PrintRGB XTension, which outputs RGB TIFF image files without converting them to CMYK.

## QuarkXPress 3.32 for Mac OS and Windows

Before starting QuarkXPress 3.32, make sure the EfiColor XTension is *not* loaded in the XTensions folder. EFICOLOR profiles are not currently provided with Fiery products. Without the correct EFICOLOR profile, the EfiColor XTension cannot perform colour conversions on placed images.

### Windows version requirement

For the Windows version of QuarkXPress, make sure a copy of the Fiery PPD file is in the \XPRESS\PDF folder.

### Importing images

All RGB images placed in a document are affected by your RGB Source and Rendering Style settings. For best results with placed images, follow the instructions in [“Working with imported images”](#) on page 4-7.

### Selecting options when printing

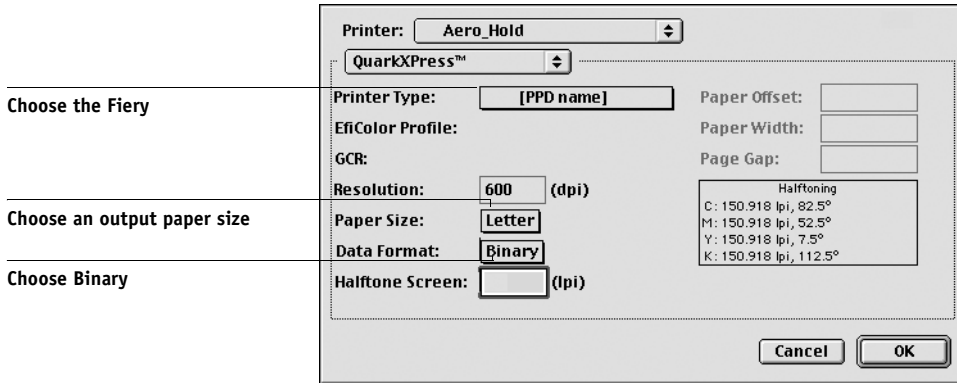
The following procedure provides instructions on printing files to the Fiery.

---

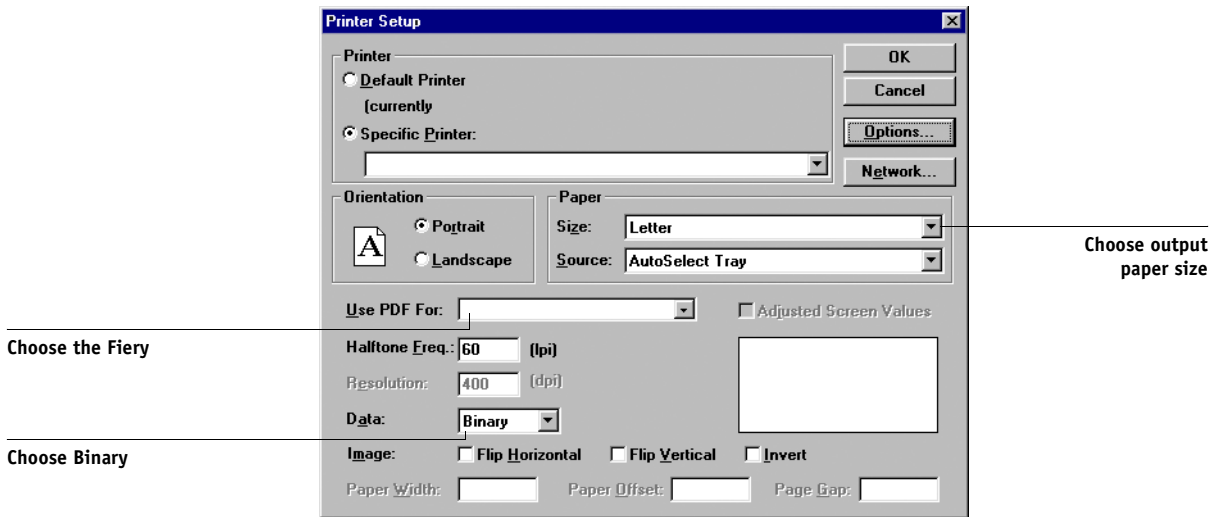
#### TO SELECT PRINT OPTIONS IN QUARKXPRESS 3.3

1. Choose the Fiery printer description from the Printer Type menu in the Page Setup (Mac OS) or Printer Setup (Windows) dialog box.

# 6



Mac OS



Windows

2. If a document contains RGB-placed images or RGB colours that QuarkXPress will print without converting to CMYK, choose RGB Source and Rendering Style settings.

If the document contains PANTONE colours, choose the appropriate Spot Colour Matching setting.

For instructions on specifying print options, see the *Colour Guide Chapter 1*.

# 6

## 6-16 Managing Colour in Page Layout Applications

## Chapter 7: Managing Colour in Illustration Applications

You can print directly from an illustration application or use it to create and save files that will be imported into a page layout document. To print from an illustration application, use the printer driver and print settings recommended in the *Colour Guide Chapter 1*. As a general rule, use the **EPS** file format when saving files with an illustration application. When an EPS file is imported into another application, the colour information in the imported image will not be changed by the application into which it is imported.

Before printing from illustration applications, make sure the appropriate PostScript printer driver and the Fiery **PPD** are installed on your computer, as described in the *User Software Installation Guide*. This chapter provides instructions for using Adobe Illustrator, Macromedia FreeHand, and CorelDRAW for Windows and Mac OS.

**NOTE:** This manual provides instructions for printing composites only. For instructions on printing **colour separations**, see the documentation for your application.

### Adobe Illustrator for Windows and Mac OS

The following sections provide guidelines for working with Adobe Illustrator versions 10.x and 9.x.

#### Note about colour models in Adobe Illustrator

In Illustrator, you can set the Document Colour Mode to either RGB Colour or CMYK colour. All elements in that file are created in that colour model. When you print the file, the data is sent to the Fiery in the colour model that you specified.

#### Illustrator colour settings

Illustrator uses a sophisticated colour management system that can handle both RGB and CMYK colours for a variety of colour-managed workflows. By customizing colour settings, you specify the amount of colour management you want to use while working in Illustrator. These colour settings include:

**Working spaces**—Default [colour spaces](#) to use when working with RGB and CMYK documents. [ICC colour profiles](#) describe the gamut and colour characteristics of these working spaces.

**Colour management policies**—Instructions that tell Illustrator what to do when it encounters colour data from a colour space other than the specified working space.

## Specifying print options

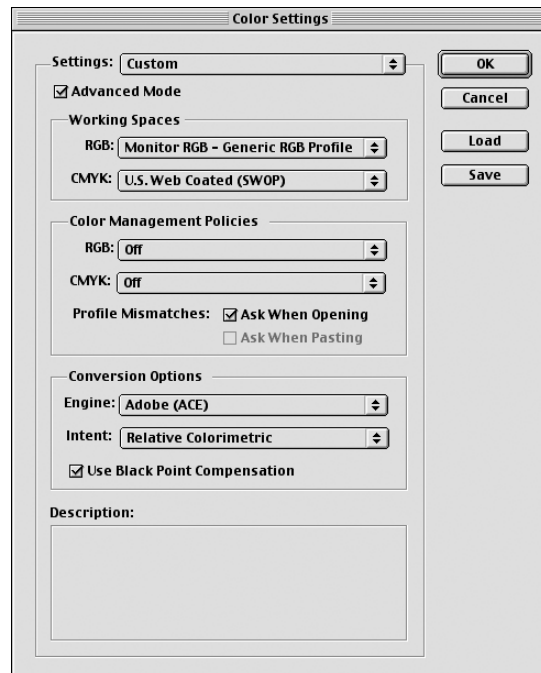
The following procedure outlines the recommended colour settings for Illustrator in a Fiery [workflow](#).

---

### To SPECIFY COLOUR SETTINGS

1. **Choose Colour Settings from the Edit menu.**

The Colour Settings dialog box appears.



2. **Select Advanced Mode.**

In Advanced Mode, a more extensive list of options is displayed.

**3. Choose the desired working space profile for each mode in the Working Spaces area.**

Use the following guidelines for specifying working spaces:

- For RGB, choose EFIRGB. This profile represents the default RGB colour space used by the Fiery. New RGB documents you create in Illustrator will use this working space.
- For CMYK, choose a profile that describes your target press (such as SWOP) if you are a prepress user. If you are an office user printing final output, choose an output profile that describes the C9800. To use a device-specific output profile, upload the profile from the Fiery to your computer (see the *Colour Guide Chapter 3*). New CMYK documents you create in Illustrator will use the specified working space.

**4. Choose policies for handling documents without embedded profiles or with embedded profiles that differ from the working space in the Colour Management Policies area.**

Choose Off from the RGB and CMYK menus. This option discards the original profile embedded in a document if it differs from the specified working space.

In the Profile Mismatches area, select the Ask When Opening option. This option displays an alert message that allows you to override the specified policy behavior (Off) when opening documents or importing colour data.

**5. Choose settings for converting between colour spaces in the Conversion Options area.**

Choose Adobe (ACE) from the Engine menu to use the built-in colour management engine for Illustrator.

Choose a rendering intent from the Intent menu that will optimize the colour quality of the conversion. For guidelines on choosing the rendering intent, see your Illustrator documentation.

Select the Use Black Point Compensation option to optimize the quality of colour conversions.

**6. Click Save to save the current group of colour settings.**

The Save dialog box appears.

**7. Name the settings file, accept the default saved location, and click Save.**

You can switch to your saved settings at any time by choosing the group name from the Settings menu at the top of the Colour Settings dialog box.

## Saving files for importing into other documents

When saving files in Illustrator for importing into other types of documents, use the EPS file format. Illustrator can save colour information in both RGB and CMYK. The ColorWise RGB Source and Rendering Style settings affect colour output of RGB artwork saved in Illustrator EPS and imported into other kinds of documents (even when both RGB and CMYK artwork exists in the same file). In the case of Illustrator files imported into Photoshop, however, vector data from the Illustrator file is rasterized into **bitmaps** in Photoshop, and the final colour space of the bitmap data is determined by the colour mode you set in Photoshop.

## Specifying print options

The following procedure explains how to set print options when printing a document from Illustrator to the Fiery.

---

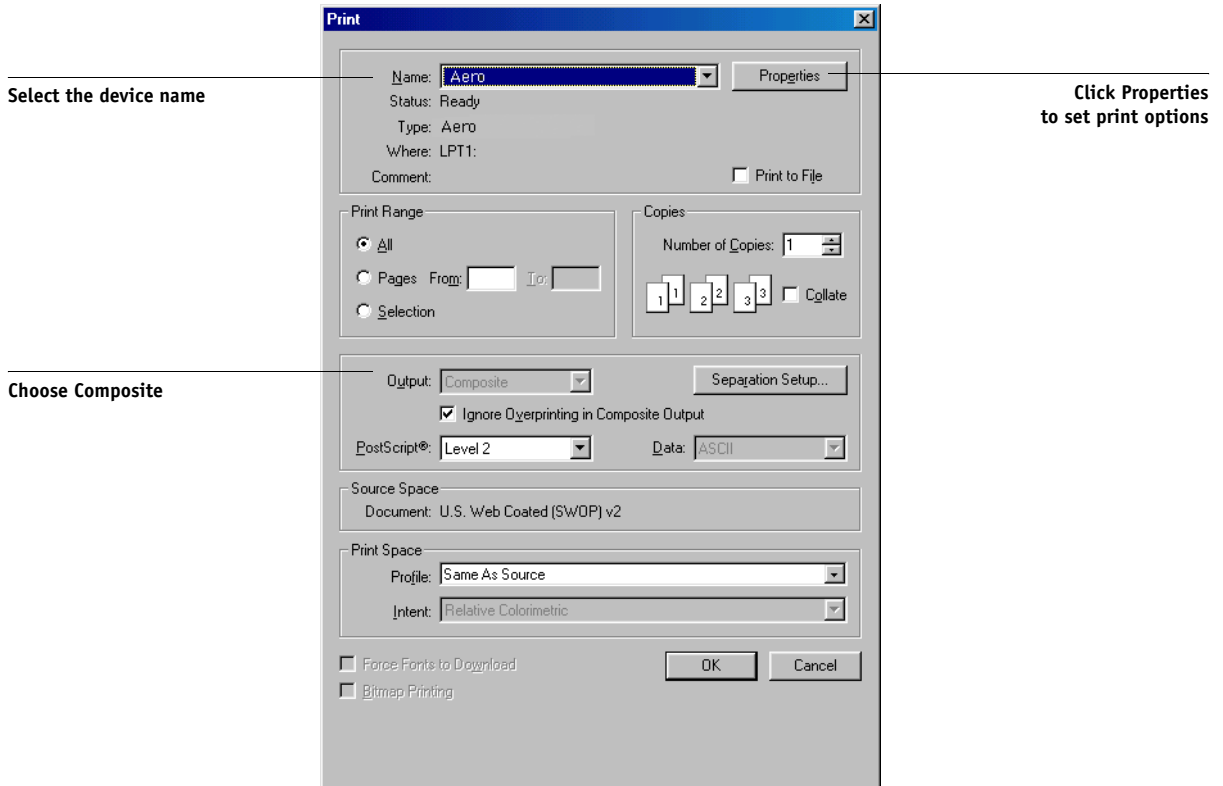
### TO SET PRINT OPTIONS IN ILLUSTRATOR

- 1. Choose Print from the File menu in Illustrator.**

The Print dialog box appears.

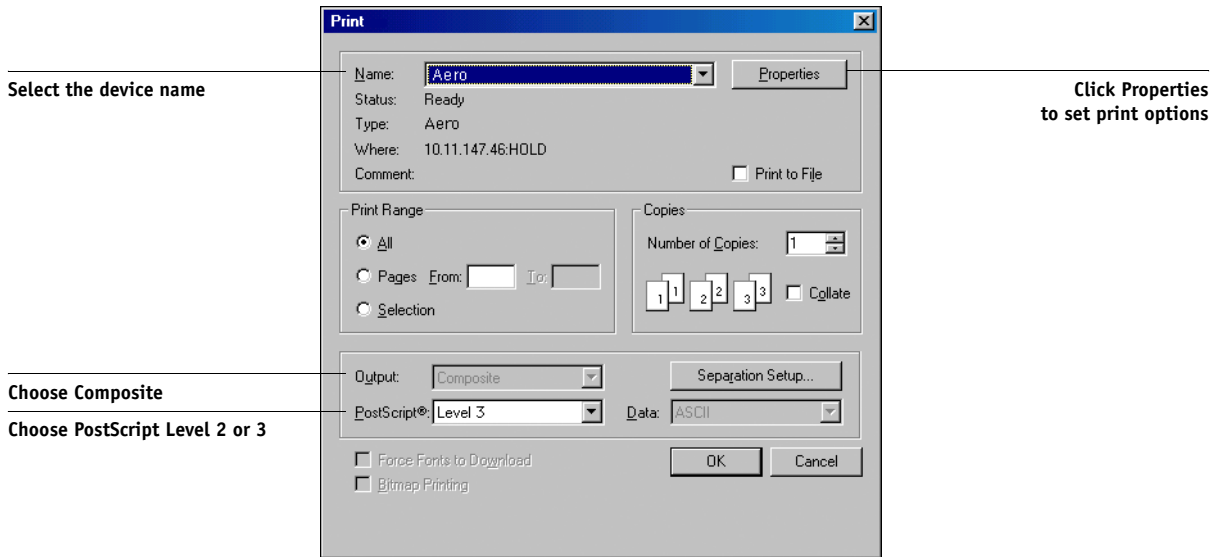
- 2. For the Windows version of Illustrator, specify appropriate print options.**

- Choose the Fiery device from the Name menu.
- Choose Composite from the Output menu.
- Choose Level 3 from the PostScript menu. If you encounter problems, you can also use Level 2.



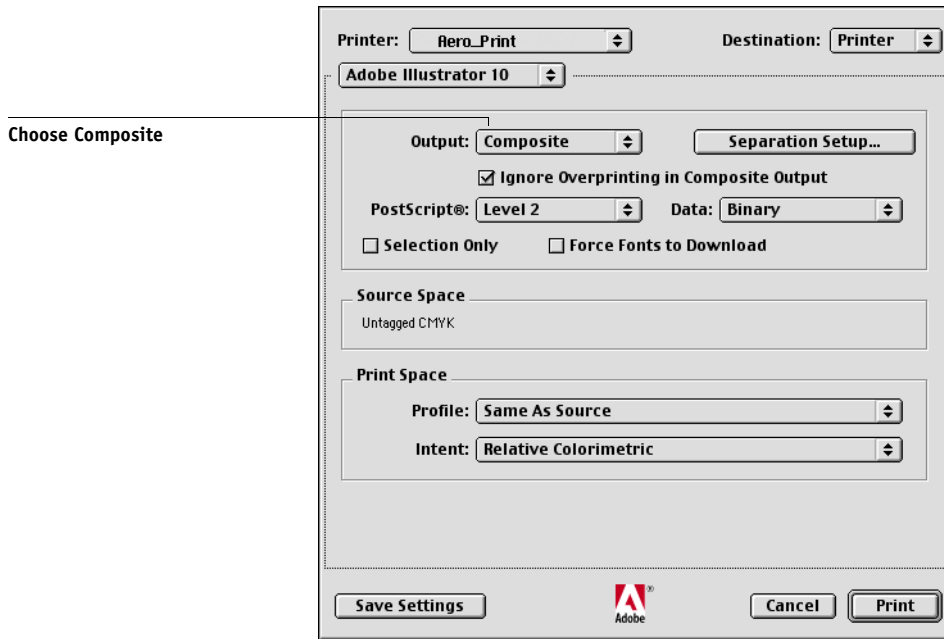
Illustrator 10.x for Windows



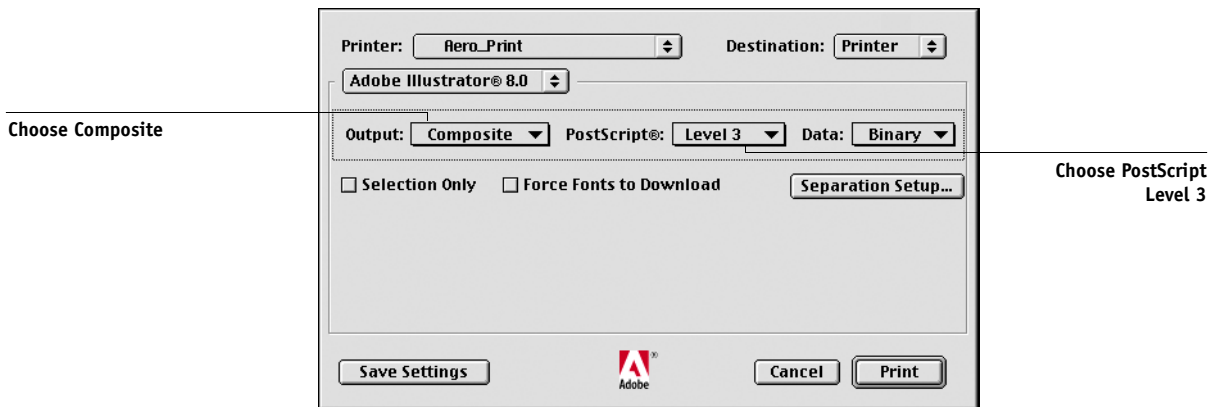


Illustrator 8.x and 9.x for Windows

3. For the Mac OS version of Illustrator, specify appropriate print options.
  - Choose the Fiere device from the Printer menu.
  - Choose Adobe Illustrator from the option menu below the Printer menu.
  - Choose Composite from the Output menu.
  - Choose Level 3 from the PostScript menu. If you encounter problems, you can also use Level 2.



Illustrator 10.x for Mac OS



Illustrator 8.x and 9.x for Mac OS

4. **If necessary, click Properties (Windows) or choose Printer Specific Options from the option menu (Mac OS) and choose RGB Source and Rendering Style settings for the Fiery.**

You only need to specify these settings if you have a CMYK document containing placed RGB images, or an RGB document in Illustrator 9.x. In all other cases, colours remain unaffected by the settings.

5. **If the document contains PANTONE-named colours, choose the appropriate Spot Colour Matching setting.**

For instructions on setting additional ColorWise print options, see the *Colour Guide Chapter 1*.

## Using Illustrator colour management

If you have additional colour management requirements not offered by ColorWise, such as managing colour on devices not controlled by the Fiery, you may want to consider using the Illustrator colour management features. For more information, see your Illustrator documentation.

## FreeHand 10.x, 9.x, and 8.x for Windows and Mac OS

The information in this section applies to both the Windows and Mac OS versions of FreeHand. Only Mac OS dialog boxes are shown, but the information and instructions are identical for the Windows version.

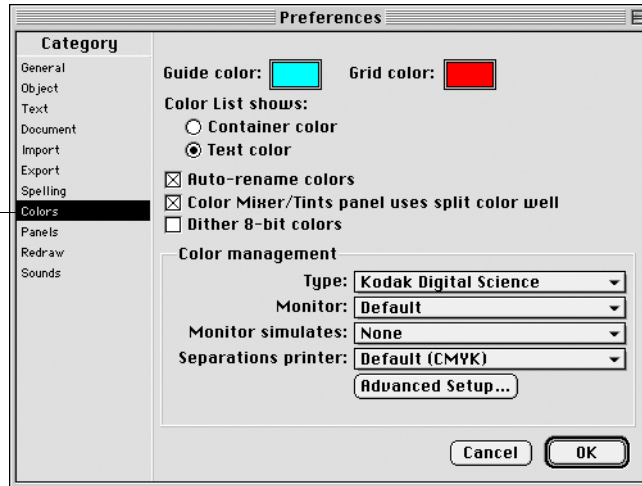
### Setting FreeHand colour settings

When using ColorWise colour management, turn off the FreeHand colour management features.

## TO DISABLE COLOUR MANAGEMENT IN FREEHAND

1. Choose Preferences from the File menu.
2. Click the Colours category in the Preferences dialog box.

Click Colors to access the color management settings



3. Choose None for the type of colour management.

## Defining colours

Any colours defined in FreeHand are sent to the device in CMYK—even those defined using other colour models. For best results, use the colour definition methods described on [page 4-2](#).

You can control the conversion of RGB colours defined in FreeHand by specifying settings in the Preferences dialog box under the Colours category, or choosing Colour Management from the FreeHand menu on the Print dialog box.

## Importing images

A number of file types can be imported into FreeHand, but once imported, all are treated as EPS images, TIFF images, or editable paths. For details, see your FreeHand documentation.

When you import an EPS image into a document, FreeHand inserts a link to the image rather than embedding the original file, resulting in a smaller file size. If the image is a CMYK EPS file, the colours print just as they would from the originating application.

**NOTE:** Before placing a CMYK EPS file, be sure the file was saved with Desktop Colour Separation (**DCS**) set to Off. If the file was saved with DCS activated, FreeHand prints composites of the image at the low resolution used for screen viewing.

All RGB images placed in a document are affected by your RGB Source and Rendering Style settings in the PPD. For best results with placed images, follow the instructions in [“Working with imported images”](#) on page 4-7.

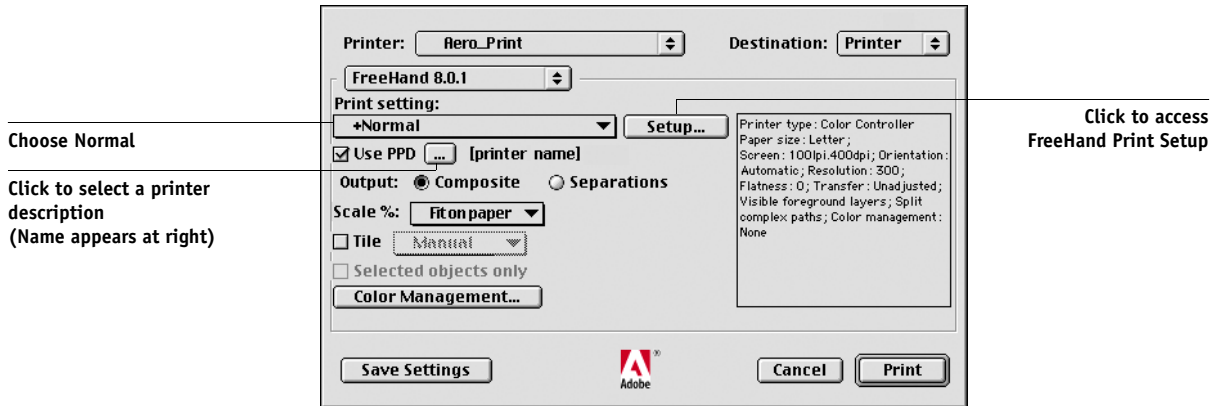
## Saving files for importing into other documents

When saving files in FreeHand for importing into other types of documents, use the EPS file format. FreeHand saves all colour information in CMYK. The RGB Source and Rendering Style print options have no effect on the colour output of RGB artwork saved in FreeHand and imported into other types of documents. In the case of FreeHand files imported into Photoshop, however, vector data from the FreeHand file is rasterized into bitmaps in Photoshop, and the final colour space of the bitmap data is determined by the colour mode you set in Photoshop.

## Selecting options when printing

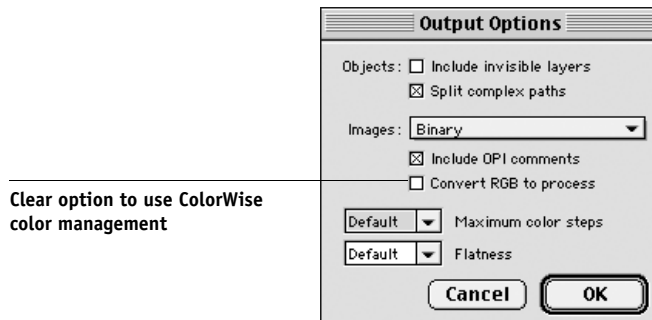
### TO SET OPTIONS WHEN PRINTING FROM FREEHAND

1. Select the Use PPD option in the Print dialog box.



2. Choose Normal from the Print setting menu.
  - If the Use PPD option is selected, a plus sign (+) appears in front of the word “Normal.”
  - If the model name for your Fiery is not displayed, click the button labeled “...” and choose the appropriate Fiery model from the menu that appears.
3. To use ColorWise colour management features, choose Output Options from the File menu.

The Output Options dialog box appears.



**4. Make sure the “Convert RGB to process” option is cleared.**

If this option is selected, FreeHand colour management settings are used to convert RGB colours and RGB TIFF, PICT, and JPEG images to CMYK.

**5. If a document contains placed RGB images, choose RGB Source and Rendering Style settings.**

With the exception of placed RGB images, these settings have no effect on colours printed with FreeHand. If the document contains PANTONE-named colours, choose the appropriate Spot Colour Matching setting when you print the document.

For information about other FreeHand print options, see your FreeHand documentation.

### **Optional colour management in FreeHand**

If you have additional colour management requirements not offered by ColorWise, such as managing colour on devices not controlled by the Fiery, you may want to consider using the FreeHand colour management features. For more information, see your FreeHand documentation.

## CorelDRAW for Windows and Mac OS

The following sections describe the recommended colour settings for CorelDRAW 9.x and 8.x.

### Defining colours

Any colours defined in CorelDRAW 9.x for Windows or CorelDRAW 8.x for Mac OS are sent to the device in CMYK—even those defined using other colour models. For best results, use the colour definition methods described in [“Using colour matching tools with PostScript applications”](#) on page 4-2.

You can control the conversion of RGB colours defined in CorelDRAW by specifying settings in the Colour Management dialog boxes. On Windows computers, the Colour Management dialog boxes are located in Tools > Colour Management. On Mac OS computers, the Colour Management functions are located in Edit:Preferences:Global.

**NOTE:** If you do not want to use colour management in CorelDRAW, choose None from the [composite printer](#) menu under Colour Management/Profiles. Do not select options under Colour Management and Colour Management General.

### Importing images

All RGB images placed in a document are affected by the RGB Source and Rendering Style settings. For best results with placed images, follow the instructions in [“Working with imported images”](#) on page 4-7.

### Saving files for importing into other documents

When saving files in CorelDRAW for importing into other types of documents, use the EPS file format. CorelDRAW saves all colour information in CMYK, so RGB Source and Rendering Style print options have no effect on colour output of artwork saved with CorelDRAW and imported into other kinds of documents. In the case of CorelDRAW files imported into Photoshop, however, vector data from the CorelDRAW file is rasterized into bitmaps in Photoshop, and the final colour space of the bitmap data is determined by the colour mode you set in Photoshop.

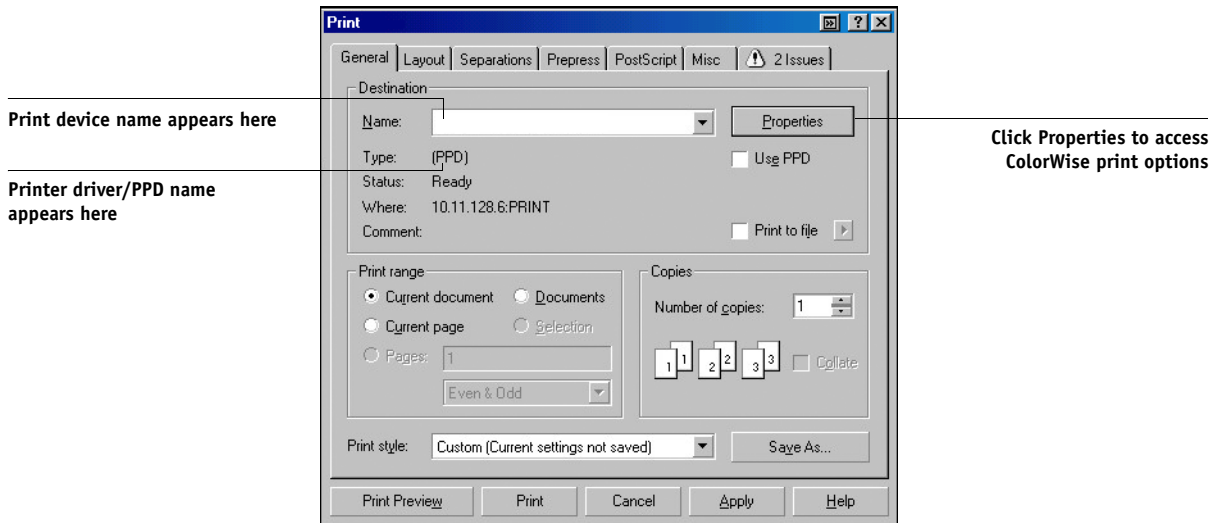


## Specifying print options

The following procedure outlines how to set print options when printing from CorelDRAW to the Fiery.

### TO SET PRINT OPTIONS IN CORELDRAW

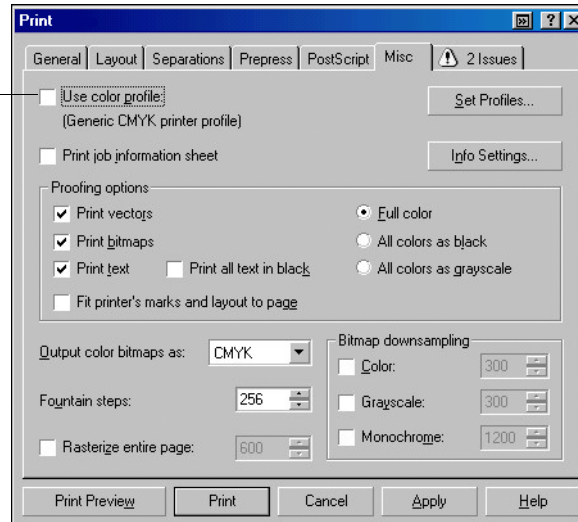
1. On Windows computers, click the General tab, and then click Print.
2. Make sure you have selected the correct device and printer description, and select the Use PPD option.
3. Click Properties to specify ColorWise print options.



4. On Mac OS computers, click Printer in the General Print dialog box to select the device and print options.

To use ColorWise colour management, make sure the “Use colour profile” option on the Misc tab of the Print dialog box is cleared. If this option is selected, CorelDRAW colour management settings are used to convert RGB colours and images to CMYK.

Clear this option to use  
ColorWise Color Management



5. **If a document contains placed RGB images, choose RGB Source and Rendering Style settings for your device.**

With the exception of placed RGB images, these settings have no effect on colours printed with CorelDRAW.

6. **If the document contains PANTONE-named colours, choose the appropriate Spot Colour Matching setting.**

## Optional colour management in CorelDRAW

If you have additional colour management requirements not offered by ColorWise, such as managing colour on devices not controlled by the Fiery, consider using the CorelDRAW colour management features. For more information, see your CorelDRAW documentation.



## Appendix 8: Desktop Colour Primer

This appendix covers concepts that are basic to printing in colour, including:

- Properties of colour
- Printing techniques
- Effective use of colour
- Raster images and vector graphics
- File optimization for processing and printing

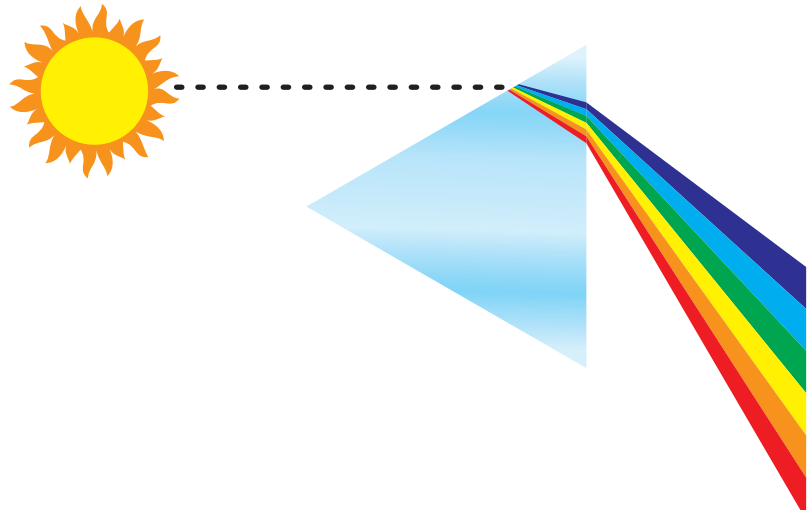
If you are already familiar with colour theory and digital colour printing, you can skip to the last section (“[Optimizing files for processing and printing](#)” on page 8-15) for tips on optimizing files for printing.

### The properties of colour

This section introduces concepts that are basic to colour theory. You will encounter some of these concepts (such as hue, saturation, and brightness) when you work with colour in applications; others provide useful background information. *Colour is a complex topic, so consider this a starting point for experimentation and further research.*

### The physics of colour

The human eye can see electromagnetic radiation at wavelengths between 400 nanometers (purplish blue) and 700 nanometers (red). This range is called the visible spectrum of light. We see pure [spectral light](#) as intensely saturated or pure colours. Sunlight at midday, which we perceive as white or neutral light, is composed of light from across the visible spectrum in more or less equal proportions. Shining sunlight through a prism separates it into its spectral components, resulting in the familiar rainbow of colours shown in the following figure.

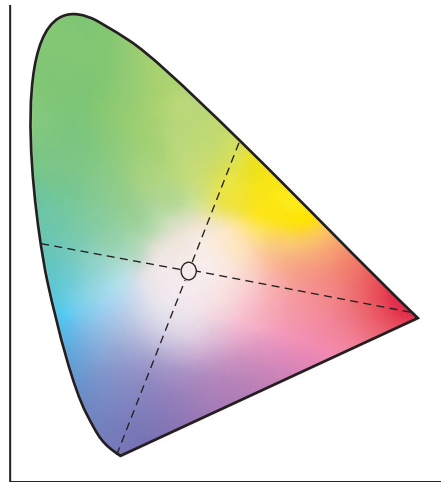


Like the sun, most light sources we encounter in our daily environment emit a mixture of light wavelengths, although the particular distribution of wavelengths can vary considerably. Light from a tungsten light bulb, for example, contains much less blue light than sunlight. Tungsten light appears white to the human eye, which, up to a point, can adjust to the different light sources. However, colour objects appear different under tungsten light than they do in sunlight because of the different spectral makeup of the two light sources.

The mixture of light wavelengths emitted by a light source is reflected selectively by different objects. Different mixtures of reflected light appear as different colours. Some of these mixtures appear as relatively saturated colours, but most appear as grays or impure hues of a colour.

## CIE colour model

In the 1930s, the Commission Internationale de l'Éclairage (CIE) defined a standard **colour space**, a way of defining colours in mathematical terms, to help in the communication of colour information. This colour space is based on research on the nature of colour perception. The following CIE chromaticity diagram is a two-dimensional model of colour vision. The arc around the top of the horseshoe encompasses the pure, or spectral, colours from blue-violet to red. Although the CIE chromaticity diagram is not perceptually uniform—some areas of the diagram seem to compress colour differences relative to others—it is a good tool for illustrating some interesting aspects of colour vision.



By mixing any two spectral colours in different proportions, we can create all the colours found on the straight line drawn between them in the diagram. It is possible to create the same gray by mixing blue-green and red light or by mixing yellow-green and blue-violet light. This is possible because of a phenomenon peculiar to colour vision called **metamerism**. The eye does not distinguish individual wavelengths of light. Therefore, different combinations of spectral light can produce the same perceived colour.

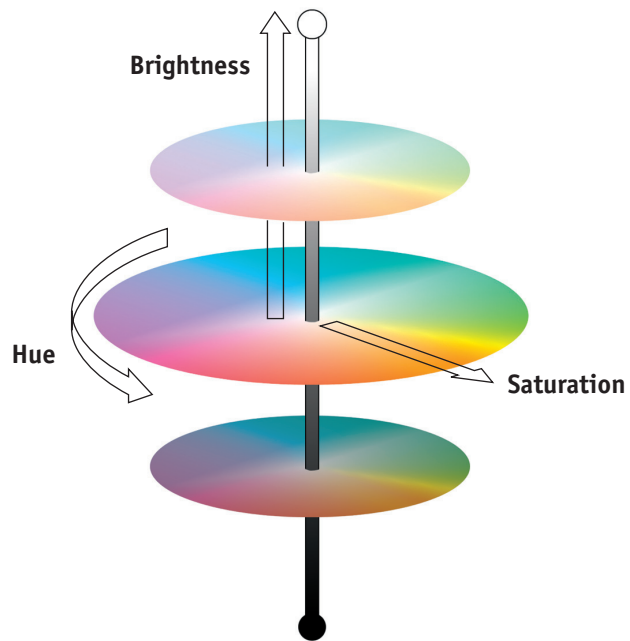
Purple colours, which do not exist in the spectrum of pure light, are found at the bottom of the diagram. Purples are mixtures of red and blue light—the opposite ends of the spectrum.

## Hue, saturation, and brightness

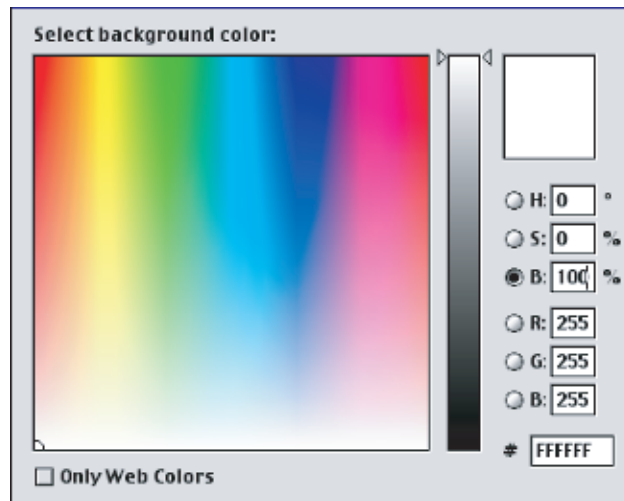
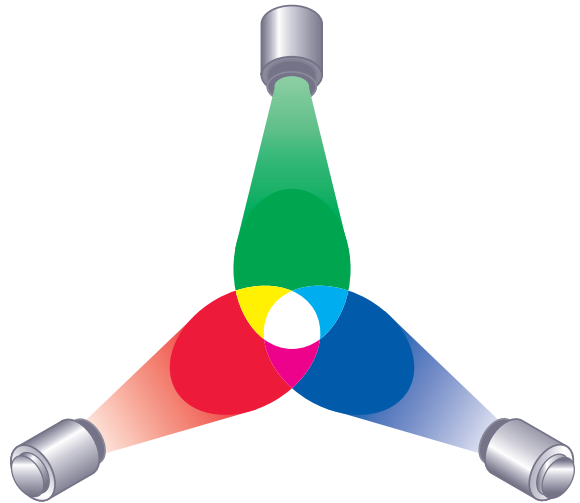
A colour can be described in terms of three varying characteristics, called the **HSB** colour model:

- Hue—tint (the qualitative aspect of a colour—red, green, or orange)
- Saturation—the purity of the colour
- Brightness—relative position between white and black

While the CIE chromaticity diagram shown earlier conveys hue and saturation, a three-dimensional colour model is required to add the brightness component, as shown in the following figure.



Many computer applications include dialog boxes in which you choose colours by manipulating hue, saturation, and brightness. For example, some applications use a colour picker that can be reconfigured according to your preference (as shown below).



## Additive and subtractive colour systems

Colour devices used in desktop publishing and printing *simulate* the range of visible colours using a set of primary colours that are combined to create other colours. There are two methods for creating a range of colours from a set of primary colours.

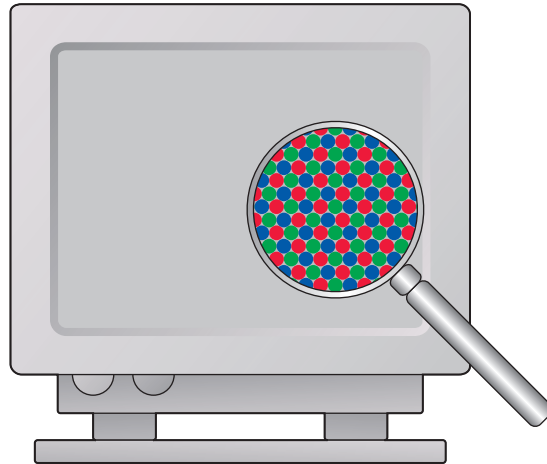
Computer monitors and scanners are based on the **additive colour model**. Printing technologies, including the Fiery and offset presses, are based on the **subtractive colour model**.



### Additive (RGB) colour

Colour devices that use the additive colour model create a range of colours by combining varying amounts of red, green, and blue light. These colours are called the **additive primaries** (shown in the following figure). White is created by adding the maximum amount of red, green, and blue light available. Black occurs wherever all three colours are absent. Grays are created by adding equal amounts of all three colour together. Combining varying amounts of any two of the additive primaries creates a third, saturated hue.

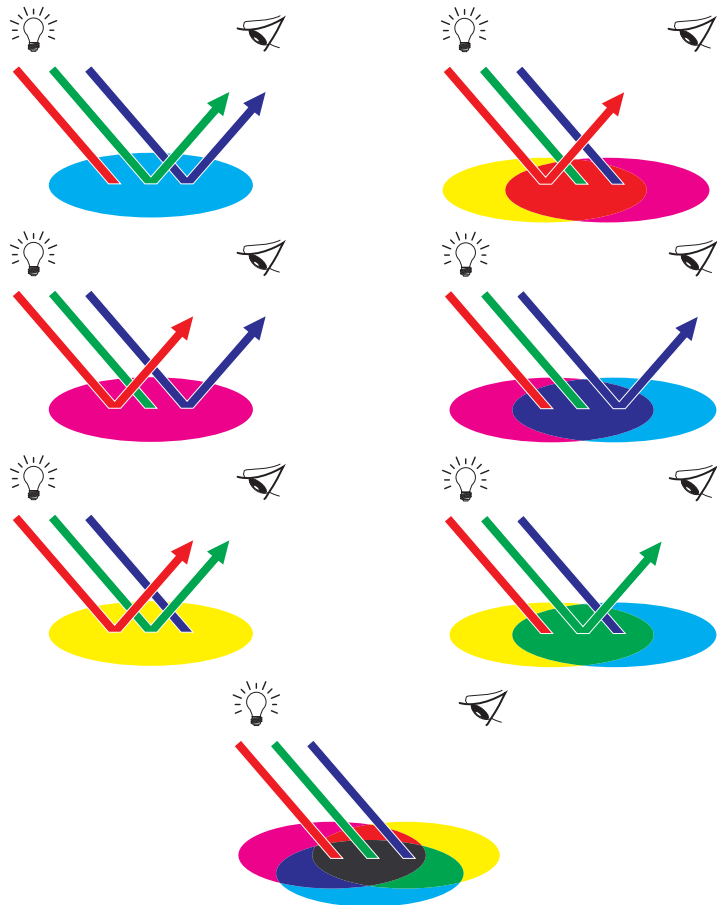
A familiar device that is based on this colour model is the computer monitor, shown in the following figure. Monitors have red, green, and blue **phosphors** that emit varying amounts of light to display a given colour. Scanners create digital representations of colours by measuring their red, green, and blue components through coloured filters.



### Subtractive (CMY and CMYK) colour

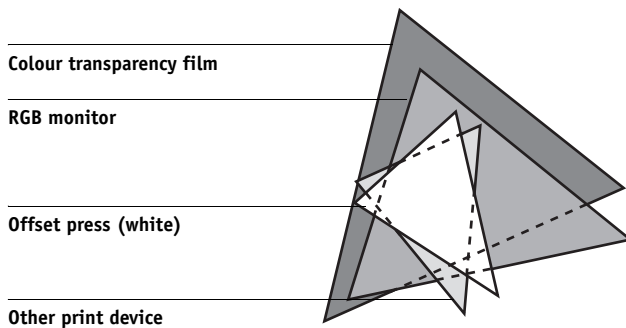
The subtractive colour model is the basis for colour printing, colour photographic prints, and transparencies. While the additive colour model simulates the visible spectrum of colour by adding light of three primary hues, the subtractive colour model starts with a “white” or neutral light source containing light of many wavelengths. Inks, toners, or other **colourants** are used to selectively absorb (subtract) certain wavelengths of light that otherwise would be reflected or transmitted by the media in use.

The **subtractive primaries** are cyan, magenta, and yellow; they absorb red, green, and blue light, respectively (as shown in the following figure). Combining any two subtractive primaries creates a new colour that is relatively pure or saturated. For example, you can make red by combining magenta and yellow, which absorb green and blue light, respectively. White occurs when no colourant is applied. In theory, combining all three subtractive primaries yields black, but due to deficiencies of cyan, magenta, and yellow colourants, combining these three primaries actually yields a muddy brown. Black colourant is added to compensate for the deficiencies of cyan, magenta, and yellow colourants. Consequently, colour printing uses four **process colour**: Cyan, Magenta, Yellow, and black (CMYK). The use of black toner produces rich, solid blacks and allows for improved rendering of black text.



## Understanding colour gamut

Different colour reproduction techniques have different colour capabilities, or **gamuts**. Colour transparency films have comparatively large gamuts, as do colour monitors. The colour gamut that can be produced using process inks or **CMYK** toners on paper is smaller. This is why some colours that can be displayed on a colour monitor, especially bright saturated colours, cannot be reproduced exactly by your Fiery—nor, for that matter, can they be reproduced on a press using **process colours**. Moreover, different printers have different gamuts—some colours your printer can produce cannot be reproduced on an offset press, and vice versa. The following figure illustrates this concept of differing gamuts.



You must account for the gamut of your printer when designing on a colour monitor. When printed, colours that fall outside the printer gamut are “mapped” to printable colours. This process, referred to as **gamut mapping**, takes place when colour data is converted or adjusted to meet the gamut requirements of a printer.

The Fiery is specially designed to perform gamut mapping at high speed with high-quality results. It provides these colour management features automatically, using either built-in default settings or settings you select for a particular print job. For added flexibility, you can also use the Fiery colour management system in combination with the colour management systems on Windows and Mac OS computers.

## Printing techniques

Until recently, most colour printing was done on printing presses using one of several printing techniques—**offset lithography**, **flexography**, or **gravure**, to name a few. All traditional printing techniques require lengthy preparation before a press run can take place. Short-run colour printing, including Fiery printing, eliminates most of this preparation. By streamlining the process of colour printing, the Fiery makes short print runs economically feasible.

In contemporary offset lithographic printing, digital files from desktop computers are output to an **imagesetter**, which creates film separations. The film is used to make a **prepress proof**, which is an accurate predictor of the final print job and allows you to make corrections before going to press. Once the proof is approved, the printer makes plates from the film and runs the print job on the press.

With the Fiery, you simply print the file. The Fiery processes the **PostScript** information in the file and sends four **bitmaps** (one each for cyan, magenta, yellow, and black) to the printer. The ease of Fiery printing makes possible experimentation that would be too costly on a press, allowing unlimited fine-tuning of colour and design elements.

## Halftone and continuous tone devices

Halftoning is used in offset printing to print each process colour at a different intensity, allowing millions of different colours to be reproduced using only the four process colours. Depending on the required intensity of a given colour, toner is placed on paper in dots of different size. The grid of dots used for each toner colour is called a screen. Halftone screens are aligned to unique angles designed to eliminate interference patterns called **moiré** that can arise with halftoning.

Some colour printers are commonly referred to as **continuous tone (contone)** devices. They do not use traditional halftone screen patterns and angles. Contone devices are capable of varying the intensity of individual dots.

Even if your colour printing is done exclusively on the Fiery, you will encounter concepts from offset printing if you use high-end graphics applications. For example, colour controls in illustration applications, such as Adobe Illustrator, are geared toward specifying colour for offset printing using process and **spot colours**. Many applications allow you to specify the screening used for each printing plate.

## Using colour effectively

The ability to print in colour can greatly increase the effectiveness of your message, whether you are printing a presentation or newsletter (short-run printing), or proofing an ad concept that will later be printed on a press (colour proofing). Some potential benefits of using colour include:

- Conveying information rapidly by using colour cues
- Making use of the emotive aspects of different colours
- Increasing impact and message retention

Colour can also be a source of distraction and discord if it is used poorly. This section outlines some tips and concepts to consider as you approach designing colour materials.

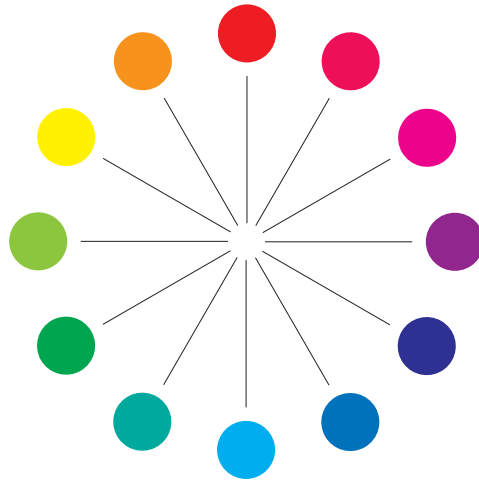
## A few rules of thumb

Try some of the following strategies for creating successful colour materials:

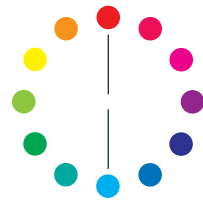
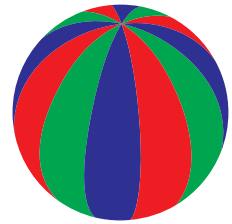
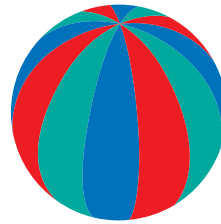
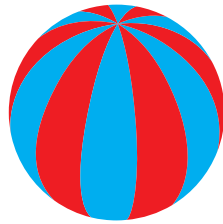
- Use colour to aid comprehension, rather than applying colours indiscriminately. In colour presentations, graphs, and charts, use colour to highlight patterns and emphasize differences.
- Use colour sparingly. In general, fewer colours work better than many colours.
- Use red as an accent colour. Red is particularly effective when used in otherwise monochromatic materials.
- Consider the tastes of your target audience when choosing colours.
- Keep a file of printed colour pieces that appeal to you or strike you as effective. Refer to it for ideas when designing your own documents.

## Colour wheel

A colour wheel like the one in the following figure is a helpful tool for understanding the interrelation of colours. The colours on one side of the colour wheel, from magenta to yellow, appear to most people to be warm colours, while those on the other side, from green to blue, appear to be cool. The distance between two colours on the colour wheel can help predict how they will appear when seen side by side.



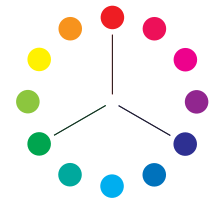
Colours opposite one another on the colour wheel are called complements (see example a in the following figure), and create a striking contrast side by side. This can be the basis for a bold graphical design, but it is an effect you should use with discretion, since it can be visually fatiguing. Other bold combinations to consider are split complements—a colour and the two colours adjacent to its complement (example b)—and triads (three colours evenly spaced on the colour wheel (example c). Colours adjacent to one another on the colour wheel result in subtle harmonies.



a



b



c

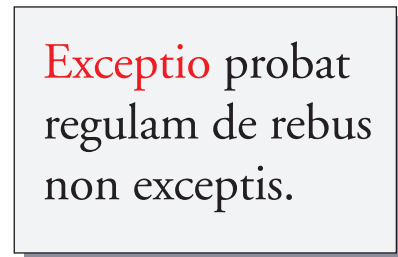
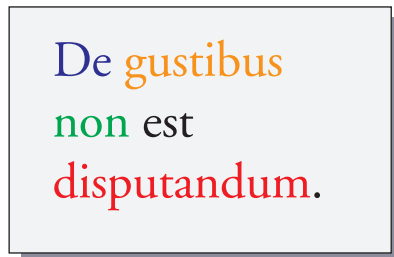
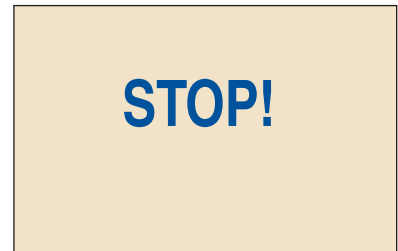
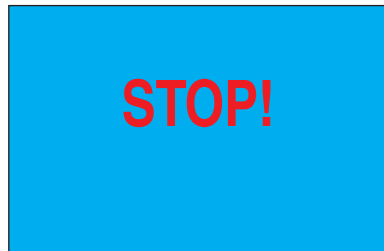
The colour wheel simplifies colour relationships for the purpose of clarity, showing only saturated or pure colours. Adding the myriad variations of each hue to the palette (more or less saturated, darker, or lighter) creates a wealth of possibilities. Taking a pair of complements from the colour wheel and varying the saturation and brightness of one or both colours produces a very different result from the pure complements. Combining a light tint of a warm colour with a darker shade of its cooler complement often gives pleasing results. Combining a darker shade of a warm colour with a light tint of its cooler complement produces an unusual effect that may appeal to you.

Once you have mastered the concept of the colour wheel, you have a good framework for experimenting with colour combinations. Many books targeted at graphic designers show groups of preselected colour combinations. Some are organized by themes or moods, and some are based on a **custom colour system**, such as PANTONE. The more you develop a critical facility for judging colour combinations, the more you will be able to trust your own eye for colour. The “**Bibliography**” on page B-1 at the back of this manual includes books on design.

## Colour and text

It is not a coincidence that the overwhelming majority of text you see is printed in black on white paper. Text in black on white is highly legible and is not fatiguing to read for extended periods. For many colour materials, using black text on a white background and confining colour to graphic elements and headings is a good choice.

When used skillfully, colour text can add flair to documents printed on paper. This technique is widely used in presentations. When using colour text, avoid dazzling text and background combinations created from primary complements, especially red and cyan or red and blue; they are visually fatiguing and hard to read. Colour text is more legible when distinguished from its background by a difference in lightness—for example, dark blue text on a light beige background. In addition, using many different colours in a string of text makes for a confused appearance and is hard to read. However, using a single highlight colour is an effective way to draw the reader's eye to selected words. For colour text samples, see the following figure.



When using colour text, keep in mind that small font sizes typically do not print in colour with the same sharpness as in black. In most applications, black text prints exclusively in black toner, while colour text usually prints with two or more toners.



Any misregistration between the different toners on paper causes colour text to lose definition. You can make test prints to find the smallest point size at which colour text prints clearly. When using high-end graphics applications that allow you to specify colour as percentages of cyan, magenta, yellow, black, you can create pure cyan or pure magenta text that prints with the same sharpness as black text. (Pure yellow text is extremely hard to read on anything but a dark or complementary background.)

## Raster images and vector graphics

Two broad categories of artwork can be printed from a personal computer to a colour printer: **raster images** and **vector graphics**.

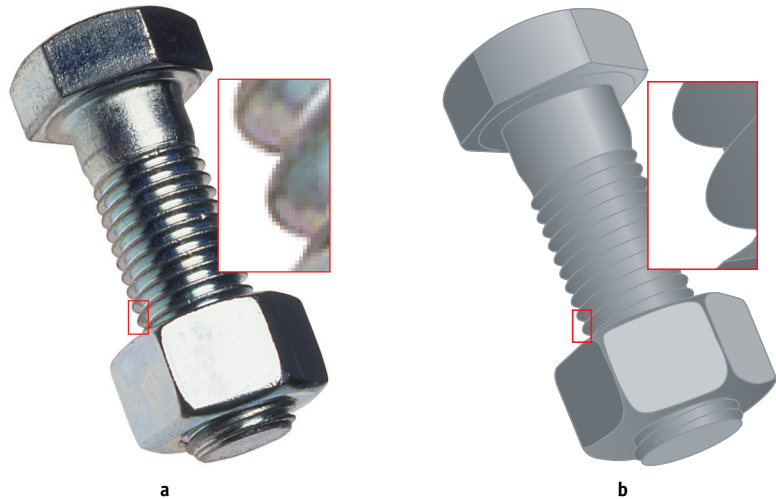
A raster image, also referred to as a bitmap, is composed of a grid of **pixels**, each assigned a particular colour value (as shown in example a in the following figure). The grid, when sufficiently enlarged, resembles a mosaic made from square tiles. Examples of raster images include scans and images created in painting or pixel-editing applications, such as Photoshop and Corel Painter.

The amount of data found in a raster image depends on its **resolution** and **bit depth**. The resolution of a raster describes the compactness of the pixels and is specified in pixels per inch (ppi). The bit depth is the number of bits of information assigned to each pixel. Black and white raster images require only one bit of information per pixel. Grayscale images require 8 bits per pixel. For photographic quality colour, 24 bits of RGB colour information are required per pixel, yielding 256 levels of red, green, and blue. For CMYK images, 32 bits per pixel are required.

When printing raster artwork, the quality of the output depends on the resolution of the source raster. If the raster resolution is too low, individual pixels become visible in the printed output as small squares. This effect is sometimes called “pixelation.”

In **vector graphics**, picture objects are defined mathematically as lines or curves between points—hence the term “vector” (see example b). Picture elements can have solid, **gradient**, or patterned colour fills. Vector artwork is created in illustration and

drawing applications, such as Illustrator and CorelDRAW. Page layout applications, such as QuarkXPress, also allow you to create simple vector artwork with their drawing tools. PostScript fonts are vector-based, as well.



Vector artwork is resolution-independent; it can be scaled to any size and resolution without danger of pixels becoming visible in printed output.

## Optimizing files for processing and printing

The following sections provide tips on how to create image files that produce the highest possible print quality while minimizing the processing time and disk space they require.

### Resolution of raster images

While a 72-ppi raster image appears sharp on a monitor, the same image would likely appear pixelated when printed to the Fiery. Colour printers are capable of much greater detail than computer monitors, and require correspondingly higher resolution image files. However, high-resolution files can be large and, therefore, cumbersome to transmit over a network, process for printing, store on disk, and edit.

Beyond a certain threshold, a higher image resolution greatly increases file size while having a minimal effect on output quality. The optimal image resolution depends on the resolution of the final print device. Aim for the resolution that optimizes both file size and output quality.

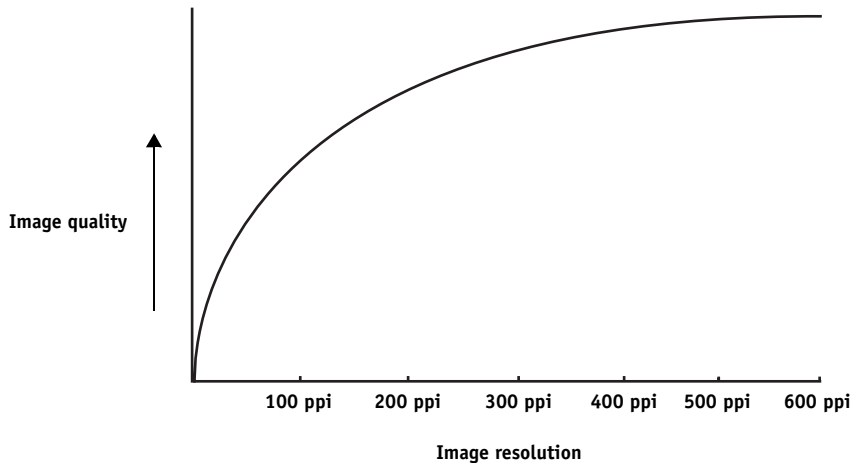
The resolution of a raster image, along with its bit depth and physical dimensions, determine its file size. The following table shows the file sizes of colour raster images at different dimensions and resolutions.

Image size	File size at				
	100 ppi	150 ppi	200 ppi	400 ppi	600 ppi
	RGB/CMYK	RGB/CMYK	RGB/CMYK	RGB/CMYK	RGB/CMYK
3" x 4"	0.4/0.5 MB	0.8/1.0 MB	1.4/1.8 MB	5.5/7.3 MB	12.4/16.5 MB
5" x 7"	1.0/1.3 MB	2.3/3.0 MB	4.0/5.3 MB	16.0/21.4 MB	36.1/48.1 MB
8.5" x 11"	2.7/3.6 MB	6.0/8.0 MB	10.7/14.3 MB	42.8/57.1 MB	96.4/128.5 MB
11" x 17"	5.4/7.1 MB	12.0/16.1 MB	21.4/28.5 MB	85.6/114.1 MB	192.7/256.9 MB

In this table, the shaded areas indicate that 200 ppi is typically the best trade-off between image quality and file size. However, higher resolutions (for example, 250 to 300 ppi) may be necessary for offset printing, when quality is of the utmost importance, or for images containing sharp diagonal lines.

To find the best image resolution for your purposes, make test prints of some raster artwork at different resolutions. Start with a high-resolution image (400 ppi) and save versions at progressively lower resolutions, down to 100 ppi, using a pixel-editing application, such as Photoshop. Always save a copy of the original high-resolution version, in case you must revert to it. The high-resolution data cannot be recreated from a lower resolution version.

Print the files and examine the output. You will likely begin to see a marked deterioration in output quality at resolutions below 200 ppi, while above 200 ppi the improvement may be very subtle.



Raster images prepared for offset printing may need to be at higher resolutions than necessary for proofing on your Fiery.

## Scaling

Ideally, each raster image should be saved at the actual size, and it will be placed in the document at the optimal resolution for the printer. If the image resolution is correct for the printer, there is no quality advantage to be gained by scaling an image to a percentage of its actual size. If you scale a large image to a percentage of its actual size, you incur unnecessary file transfer time, because the image data for the entire large image is sent to the printer. If an image is placed multiple times at markedly different sizes in a document, save a separate version of the image at the correct size for each placement.

If you need to place an image at greater than 100% in a document, remember that the output image resolution is affected. For example, if you scale a 200 ppi image to 200%, the image is printed at 100 ppi.



# Glossary

**additive colour model**

A system in which colours are produced by combining red, green, and blue light (the additive primaries). An RGB video monitor is based on an additive colour model.

**additive primaries**

Red, green, and blue light used in additive colour systems. When blended together in proper amounts, these colours of light produce white.

**artifact**

A visible defect in an image, usually caused by limitations in the input or output process (hardware or software); a blemish or error.

**banding**

Visible steps between shades in a colour gradient.

**bit depth**

Amount of information used for each pixel in a raster image. Black and white images require only one bit per pixel. Grayscale images with 256 shades of gray require 8 bits (or 1 byte) per pixel. Photographic quality colour images can require 24 bits per pixel (RGB images) or 32 bits per pixel (CMYK images).

**bitmap (or raster)**

An image comprised of small squares arranged in a grid. Each square in the grid is a pixel. The number of pixels per inch defines the resolution of a bitmap.

**blasting**

An undesirable effect that occurs when excess amounts of toner, possibly combined with certain types of paper stock, cause objects in an image to spread beyond the boundaries defined in the file.

**BMP**

A graphics file format established by Microsoft; native to the Windows operating system.

**calibration**

The process of ensuring that a device behaves consistently with respect to a set of specifications.

**calibration target (or calibration set)**

A set of measurements that describe the expected density response of a printing device. Calibration targets are associated with the output profile of the device.

**CMS**

See [colour management system](#).

**CMYK**

A subtractive colour model that uses cyan, magenta, yellow, and black, or process colours, used in colour printing; a colour model used in the printing of colours in four-colour process printing.

**colour channel**

A single-colour image that can be edited separately from the other colour channels comprising a colour space—for example, the red channel of an RGB image.

**colour gamut**

See [gamut](#).

**colour management system (CMS)**

System used to match colour across different input, display, and output devices.

**colour rendering dictionary**

See [CRD](#) (Colour Rendering Dictionary).

**colour separation**

The process of separating a colour image into the colour components for printing—cyan, magenta, yellow, and black. Also used to refer to the four sheets of film that result from the process of separating a colour image.

**colour space**

A model for representing colour in terms of measurable values, such as the amount of red, green, and blue in an image. RGB and CMYK colour spaces correspond to colour devices—monitors and printers,

respectively. Other colour spaces, such as CIE Lab, are based on mathematical models and are device-independent (that is, not based on the colour response of a particular device). See [gamut](#).

**colourant**

An ink, dye, toner, paint, or other pigment that modifies the colour of media to which it is applied.

**ColorWise**

See [ColorWise colour management](#).

**ColorWise colour management**

An ICC-open colour management solution, which is an easy-to-use system that addresses the needs of both casual and experienced colour management users.

**composite printer**

Any output device that can print directly in colour without first creating colour separations. A composite print can be used as an early proof of an offset print job.

**continuous tone (contone)**

Describes a photographic image that contains gradient tones from black to white (such as a 35mm transparency or a photograph). Continuous tones cannot be reproduced in that form for printing, but must be screened to translate the image into dots.

**continuous tone (contone) image**

An image containing fine gradations of tones, such as a photographic image.

**CRD (Colour Rendering Dictionary)**

A feature of colour management systems and PostScript Level 2 and PostScript 3 colour devices that maintains the best possible translation of colour from one colour device to another. A colour rendering dictionary (CRD) is used by the colour management system or the device's PostScript interpreter when converting data between colour spaces. The Fiery includes several CRDs, each of which provides a different colour rendering style.

**custom colour system**

A system of named colour swatches that can be matched on press using spot colours or approximated using process colours. PANTONE and TruMatch are examples of custom colour systems.

**DCS (Desktop Colour Separation)**

A data file standard defined by Quark, Inc., to assist in making colour separations with desktop publishing systems; five files are created—four colour files (one each for C, M, Y, and K) and a composite colour preview file of the colour image. It allows an image-editing application to perform colour separation and pass it through to final output with its integrity intact.

**densitometer**

An instrument commonly used in the graphic arts industry to measure density according to a specified standard.

**density**

A measurement of the light-absorbing quality of a photographic or printed image.

**desktop colour separation**

See **DCS**.

**DIC**

A Japanese standard of specifications for separations, proofs, and colour printing.

**EPS (or EPSF)**

See **Encapsulated PostScript**.

**Encapsulated PostScript**

A PostScript file format designed to be embedded in another PostScript stream.

**Euroscale**

A European standard of specifications for separations, proofs, and colour printing.

**flexography**

A printing technology that uses flexible raised-image plates. Flexography can be used to print on non-flat materials such as cans.

**four-colour printer**

A printing device that uses cyan, magenta, yellow, and black ink or toner.

**gamma**

A numeric value representing the relationship (gamma curve) between the input and output values of a colour device. If gamma equals 1, input values are mapped exactly to output values.



**gamut**

A range of colours. A device gamut is the range of colours that a device, such as a device, can produce. An image gamut is the range of colours in a particular image.

**gamut mapping**

The conversion of colour coordinates from one device's gamut to another—usually accomplished with algorithms or look-up tables.

**GCR**

See [gray component replacement](#).

**GDI (Graphics Device Interface)**

Graphics and display technology used by computers running Windows. GDI applications rely on GDI (rather than the PostScript language) to send text and pictures to devices.

**GIF (Graphics Interchange Format)**

A standard developed by CompuServe for bitmap graphics of up to 256 colours and used for posting photographic images on the Internet or intranet pages; rarely used for professional printing.

**gradient**

A smooth transition between two different colours or two shades of a colour.

**Graphics Device Interface**

See [GDI](#).

**Graphics Interchange Format**

See [GIF](#).

**gravure**

A printing technology that uses an etched cylinder that has been immersed in ink. The ink that remains in the etched areas is applied to the paper. The non-etched surfaces of the cylinder are non-printing areas.

**gray component replacement (GCR)**

A method for improving wet ink trapping and reducing ink costs in process colour printing. In shadow, midtone, and quarter-tone areas where all three process colours (C, M, Y) overprint, the gray components of those colours are reduced and replaced by black.

**halftoning**

A method for representing an original continuous tone image using a pattern of dots, lines, or other patterns.

**HSB**

A colour model where each colour is represented by its hue, saturation, and brightness components; supported by most colour applications.

**HSL**

A colour model where each colour is represented by its hue, saturation, and lightness components.

**ICC profile**

An industry standard colour profile format developed by the International Colour Consortium (ICC) that describes the colour capabilities, including the gamut, of a colour device based on the differences between an ideal and the

current device. The ideal is often provided by the manufacturer as a colour reference file. ICC profiles are implemented on Mac OS computers in ColorSync and on Windows computers in Image Colour Matching (ICM). The Fiery colour management system, ColorWise, supports ICC profiles.

**imagesetter**

Raster-based film output device; a high-resolution laser output device that writes bitmapped data onto photosensitive paper or film.

**JPEG**

A graphics file format defined by the Joint Photographic Experts Group committee of International Standards Organization (ISO); a standard for digital compression of still image graphic data.

**metamerism**

Phenomenon in which two colours composed of different combinations of light wavelengths appear identical under a specific light source, but may look different under other light sources. The colours are called “metamers.”

**moiré**

An undesirable pattern in images made using halftone screens. Moiré can be caused by the improper line frequency of the screens, improper screen angles, improper alignment of halftone screens, or by the combination of a halftone screen with patterns in the image itself.

**named colour**

A colour that is defined according to a custom colour system. For example, PANTONE 107 C is a named colour. (Also referred to as a spot colour).

**office applications**

Software applications commonly used for business purposes, including presentation applications, spreadsheets, and word processing programs.

**offset lithography**

Printing in which ink is transferred from printing plates to a rubber blanket and then from the blanket to paper.

**output**

See [output profile](#).

**output profile**

A file that describes the colour characteristics of a printing device. The output profile is associated with a calibration target that defines the expected density response of the device.

**phosphor**

Material used in making computer monitors; phosphors glow and emit red, green, and blue light when struck by an electron beam, thus creating an image.

**photographic rendering**

A colour rendering style that preserves tonal relationships in images. Unprintable colours are mapped to printable colours in a way that retains differences in lightness, sacrificing colour accuracy as necessary.

**pixel**

The smallest distinct element of a raster image. The term is a combination of the words “picture” and “element.”

**PostScript**

A device-independent page description language developed by Adobe, which is used to print and display pictures and text. PostScript 3 includes many enhancements to older versions of PostScript, including improved image quality and colour.

**PPD (PostScript Printer Description file)**

A file containing information about a particular PostScript print device’s capabilities and restrictions. The information in the PPD is presented via the printer driver.

**prepress proof**

A print made from a set of film separations or other file to simulate the results of printing. A prepress proof is the last opportunity to catch problems before the print job goes to press.

**presentation graphics rendering**

A colour rendering style that creates saturated colours but does not match printed colours precisely to displayed colours. It is appropriate for bright saturated colours used in illustrations and graphs.

**process colours**

The colours used in printing to simulate full-spectrum colour images: Cyan, Magenta, Yellow, black (CMYK).

**profile**

Systematically describes how a colour maps to a particular space. By identifying a source profile and an output profile, you initiate the appropriate workflow to maintain consistent colour values.

**QuickDraw**

Graphics and display technology built into Mac OS computers. QuickDraw applications rely on QuickDraw (rather than the PostScript language) to send text and pictures to devices.

**raster image**

Electronic representation of a page or image using a grid of points called pixels.

**rendering intent**

The style of colour rendering, or gamut mapping, designed for a particular type of colour job. An example of a rendering intent is Photographic rendering—also referred to as Image rendering or Contrast rendering—which is designed for photographic images.

**resolution**

The number of pixels per inch (ppi) in a bitmap image or the number of dots per inch (dpi) that a device can render.

**RGB**

An additive colour model that makes a range of colours by combining red, green, and blue light, called the additive primaries. Commonly used to refer to the colour space, mixing system, or monitor in colour computer graphics.

**simulation**

*See* simulation profile.

**simulation profile**

The simulation profile describes the colour characteristics of another print device, such as a printing press, that you want the Fiery to simulate.

**solid colour rendering**

A colour rendering style intended for use when colour accuracy is crucial. Unprintable colours are mapped to the closest printable colours. Solid colour rendering does the best job of preserving the saturation of displayed colours.

**source colour space**

The colour environment of the originating source of a coloured element, including scanners and colour monitors.

**source profile**

A file used by the colour management system to determine the characteristics of the colour values specified in a source digital image.

**spectral light**

The wavelengths of electromagnetic radiation emitted by a given light source that can be seen by the human eye.

**spectrophotometer**

An instrument commonly used in the graphic arts industry to measure spectral light according to a specified standard.

**spot colour**

A colour printed on its own separation plate when separations are specified. A spot colour is printed using a custom ink for that colour, in contrast to process colours that are printed using combinations of cyan, magenta, yellow, and black. (Also referred to as a named colour).

**Status T**

A spectral response for graphic arts reflection densitometers defined by ANSI (American National Standards Institute).

**subtractive colour model**

A system in which colour is produced by combining colourants such as paint, inks, or dyes on media such as paper, acetate, or transparent film. All printing devices use the subtractive colour model.

**subtractive primaries**

Cyan, magenta, and yellow colourants used in subtractive colour systems for colour printing. Combining the subtractive primaries produces darker colours. Black is added to the subtractive primaries to compensate for deficiencies of the toners or inks, and for more efficient black printing.

**substrate**

In printing, the material upon which the job is printed.

**SWOP**

The abbreviation for Specifications for Web Offset Publications. A standard of specifications for separations, proofs, and colour printing on a web offset press (*not* a sheet fed press).

**TIFF (Tag Image File Format)**

A common format for exchanging raster graphics (bitmap) images between application programs.

**undercolour removal (UCR)**

A method for improving wet ink trapping and reducing ink costs in process colour printing. In shadow areas where all three process colours (C, M, Y) overprint, the amounts of those colours are reduced and replaced by black.

**vector graphic**

Graphic illustration created on computers where picture objects are defined mathematically as lines or curves between points. These mathematical definitions are interpreted by an image language such as PostScript. Vector images include artwork created with illustration applications (such as Illustrator or FreeHand) and page layout applications (such as PageMaker).

**white point**

The colour temperature of any white light source, typically expressed in degrees Kelvin (for example, 6500 K, typical for the white of a monitor).

**workflow**

The path a print job follows from creation to destination. A workflow may originate with an RGB scan imported to the client workstation and opened on the desktop in an image processing application, such as Photoshop. After adjustments are made to the scanned image, it is evaluated on a colour proofing device for eventual colour printing on the same device or on press.

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## World Wide Web sites

International Colour Consortium: [www.color.org](http://www.color.org)

Graphic Arts Information Network: [www.gain.org](http://www.gain.org)

Seybold Seminars Online: [www.seyboldseminars.com](http://www.seyboldseminars.com)

Adobe Systems Incorporated: [www.adobe.com](http://www.adobe.com)



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