



Fiery Color Reference

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Introduction to Fiery Color Reference (FS400 and later)

This Fiery Color Reference provides information about optimizing color printing with the Fiery server and improving color quality and performance for all Fiery server models. Specific features and options may vary, depending on the Fiery server at your site.

Note: This document uses the term "toner" to refer to toner or ink.

This document provides:

- An overview of general color concepts, with a specific focus on color management for print output.
- Descriptions of workflows in which you can specify color information.

Color management concepts

Using the features of color management software as implemented by the Fiery server and on your desktop computer, you can create successful color documents and presentations. This chapter describes various elements of color management that contribute to predictable color results.

Color management system

A color management system (CMS) is a "translator" between the color space of the source device (for example, a monitor or scanner) and the color space of the destination device (for example, the printer).

A CMS compares the color space in which the source object is created to the color space in which the job is output, and adjusts the colors in the document to maintain consistency across different devices. A CMS typically uses a device-independent color space, such as CIELAB, as its intermediate color space.

To perform its translation, a CMS needs information about the source object's color space and the printer's gamut. This information is provided through profiles, often created by the manufacturers of the computer monitor or printer. A CMS conversion results in a printed document or object file in the gamut of a particular printer.

Progress is being made toward standardization in the field of digital color management systems. Windows and Mac operating systems support an industry standard format developed by the International Color Consortium (ICC). This ICC format is implemented on Windows and Mac computers. Other software developers are also incorporating a CMS into high-end applications. The Fiery server CMS, Color Management, supports this standard profile format.

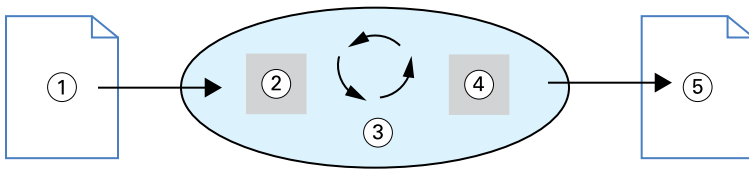
You can use Fiery Color Profiler Suite (an optional software package) to create color profiles that are fully compliant with ICC standards, evaluate the profiles, edit them, and test them. Fiery Color Profiler Suite includes a spectrophotometer that you can use to create profiles.

How color management works

Before you can print a color document, the document's color data must be converted to the printer's gamut.

Whether performed by the Fiery server or a host-based CMS, converting color data for a printer is the same process: The CMS interprets RGB object data according to a specified source profile and adjusts both RGB and CMYK data according to a specified output profile. (Some color management systems call this a destination profile.)

The source profile defines the RGB color space of the object's source: characteristics such as the white point, gamma, and type of phosphor used. The output profile defines the gamut of a printer or offset press. The Fiery server (or host-based CMS) uses a device-independent color space to translate between the source color space and the color space of the printer or offset press.



1. *Input data*
2. *Source profile*
3. *Device-independent color space*
4. *Output profile*
5. *Printed output*

The Fiery server lets you specify default and override settings for the source color space information and the output profile information. When you use these settings, you do not need to use the features of other color management systems. Your Fiery server software includes ICC profiles for use with other color management systems, although conflicts may arise when the Fiery server CMS is used in conjunction with a host CMS.

Color management systems can also adjust color data to the gamut of a printer or offset press other than the one to which you are printing. This process of simulating another printer or offset press is commonly used for proofing jobs that will be printed on another printer or offset press.

The type of print job and the Fiery server or offset press determines the workflow that provides the best results.

Fiery server color management and application color management

The Fiery server Color Management provides the best color output for a variety of purposes. Several applications also provide their own CMS. To optimize print output, it is typically better to use the Fiery server Color Management instead of application color management.

The Fiery server intelligently manages the printed appearance of RGB, CMYK, and spot colors. You can allow the Fiery server to manage color for most color printing jobs without adjusting any settings.

A desktop (host-based) CMS uses ICC profiles to convert colors from one device gamut to another. The color 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 server.

Conventional color management systems typically address only color conversions, and they occupy your computer processor. When you use Color Management, jobs leave your computer and are processed faster on the Fiery server.

Fiery server Color Management versus desktop (application) color management advantages include:

- Relieving your computer from performing additional processing. Delaying color conversions until the color data reaches the Fiery server frees your computer for other tasks. Color conversions on the Fiery server are, in most cases, much faster than similar conversions on a host computer.
- Eliminating the potential for undesirable color management-related conflicts, such as iterative color conversions and inconsistent color between applications. The Fiery server applies global corrections to specific groups of RGB, CMYK, and spot colors 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.

Color Management uses ICC profiles to convert colors to the device gamut or simulate other devices, such as an offset press. Color Management manages color conversions for all users printing to the Fiery server from Windows

and Mac computers. It allows users to follow a simple workflow with minimal intervention using robust default settings, while giving advanced users the control and precision that they need.

Color management workflows

This chapter introduces issues with color management in specific desktop applications and discusses the interaction between those applications and Fiery server Color Management.

Fiery server workflows

The Fiery server supports a variety of workflows with different levels of complexity. You can perform color management at several points in the workflow. The information provided at each step (for example, the type of color used) impacts the job's workflow.

Always consider the complexity of the workflow. Every color conversion affects performance and color accuracy. A workflow with a minimum number of steps minimizes the risk of error.

Standard recommended workflow

The Fiery server is highly optimized for the specific printer it supports. Color Management addresses issues unique to your printer, including halftones, individual toner response, interactions among toners, natural smoothness of blends, and the capability to render spot and custom colors.

The Fiery server distinguishes text and graphics from image elements, so that you can preserve black channel information while maintaining parameters used for CMYK color separations.

The recommended standard color workflow uses Fiery server Color Management. The Fiery server comes into play near the end of the color workflow.

For this workflow:

- Bypass any color management of printed output in the application and operating system. In the source document, turn off application and operating system color management. (See the documentation that accompanies your application.)

This ensures that the colors you select reach the Fiery server and Color Management in a usable form. Consider, however, that Fiery server Color Management fully supports color management from applications and printer drivers.

Note: You cannot disable color management between the display device and the application.

- Save the file in a file format based on the desired output. EPS data is not manipulated. Other formats can be used if the file is saved with the appropriate settings.

- In the print job, set the RGB/CMYK/Grayscale Source option in Color Management to Use RGB/CMYK/Gray embedded profiles.

Some examples of CMYK/Grayscale Source settings are SWOP or ISO Coated in the U.S., Euroscale in Europe, and DIC or Japan Color in Japan. If colors have been selected specifically for your calibrated Fiery server, set CMYK/Grayscale Source to None.
- Set other Color Management print options as appropriate. For a list and descriptions of Color Management print options that affect CMYK, RGB, spot, and other colors, see *Color Printing*.

Disable any operating system color options or any CMS provided by the operating system.

Choosing colors for Fiery server workflows

After you make aesthetic decisions about the colors you use, you must make the best use of the Fiery server capabilities to realize your design in print.

Your color 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 server, you want the printed colors to match the design specification.
- If you are printing presentations on the Fiery server, you want to preserve the vivid colors that you see on the monitor.
- If you are printing on an offset press, you want the Fiery server output to match other prepress proofs or PANTONE color swatch books.

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

Color management can control color output by:

- Selecting a color model - Different types of applications use different color models. The color model you select, and whether or when data is converted from one color model to another, influences the final color output.
- Optimizing for output type - The type of final output influences your color and application choices.

Color models used on the Fiery server

You can define colors in several different color models, most commonly RGB, CMYK, and a spot color matching system (such as PANTONE). Depending on the application you use, you may or may not have a choice of the color model.

RGB colors are used when you take output from an RGB device such as a digital camera or scanner. Another use of the RGB color model is for displaying colors on a monitor.

CMYK colors are what most printers use. These are referred to as process colors. Keep in mind that printers might have additional colors used as process colors to extend the range of colors that can be simulated.

Spot colors, such as PANTONE, are special inks manufactured to run on an offset press. Spot colors can be simulated using process colors. With the Spot Color Matching print option, you can determine how spot colors are printed at the Fiery server:

- **Spot Color Matching On** - Uses color libraries built into the Fiery server to simulate the spot color with the closest equivalent available, using the process colors of the printer connected to the Fiery server. The spot color libraries define colors by name, using the L*a*b* color space. The L*a*b* color space provides device-independent accuracy. With Spot Color Matching On, you can adjust spot colors without editing the file, and is used to accurately simulate a printer or offset press that has spot colors installed.

If your Fiery server supports the Spot-On or Spot Pro application in Command WorkStation, you can customize the spot color definitions used by the Fiery server.

Spot-On is a standard feature on most Fiery servers. If you choose to activate the Fiery Graphic Arts Pro Package for the standard Fiery server or the Fiery ColorRight Package for the integrated Fiery server, you will use Spot Pro instead of Spot-On.

- **Spot Color Matching Off** - Instructs the Fiery server to simulate the spot color using process color values defined within the file. With Spot Color Matching Off, spot colors cannot be edited using Spot-On or Spot Pro, and spot colors will be color-managed along with other colors. Spot Color Matching Off is used to simulate a printer or offset press that does not have spot colors installed.

The color model your application uses determines the methods available for choosing colors, as well as the way color data is transmitted to the Fiery server:

- Office applications, such as word processing, spreadsheet, and presentation graphics applications, use the RGB color model. They typically transmit only RGB data to the Fiery server.
- Illustration applications use both the RGB and CMYK color models, but typically transmit only CMYK data to the Fiery server.
- Pixel-editing applications use both the RGB and CMYK color models. They transmit RGB or CMYK data to the Fiery server.

Optimizing Spot Color Matching for output type

You can use the Spot Color Matching feature for on-demand color printing and color proofing. On-demand color printing refers to those jobs for which the Fiery server is the final print device.

Printing jobs to the Fiery server in preparation for printing on another printer or offset press is referred to as color proofing. Both types of Fiery server print jobs can use RGB, CMYK, and spot colors.

Characteristics of on-demand jobs	Characteristics of color proofing jobs
Production is done only on the Fiery server with Spot Color Matching On to produce the widest gamut and most accurate color possible.	Accurately simulates a printer or offset press equipped with spot colors using Spot Color Matching On.
Spot Color Matching Off is used for printing jobs that do not contain spot colors, or to use the spot color definitions found within the file rather than in the Fiery server spot color libraries.	Accurately simulates a printer or offset press that is not equipped with spot colors using Spot Color Matching Off.

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

The type of printing you plan for a document, on-demand color printing on the Fiery server versus color proofing for eventual printing on an offset press, determines the way you define colors, as well as the print option settings you choose.

- For on-demand color printing on the Fiery server, use any application and define colors in RGB or CMYK. If your application supports it, you can also choose colors from the PANTONE color library. Choose the appropriate settings for print options affecting color output (for descriptions of the print options, see *Color Printing*).
- For color proofing, use a PostScript-defined color in CMYK or choose colors from color libraries, such as the PANTONE color library. Placed objects can also be defined in RGB or CMYK. Choose the appropriate settings for print options affecting color output (see *Color Printing*).

Note: The Fiery server lets you use RGB or CMYK data when printing proofs for an offset press run. However, sending data for offset printing usually requires CMYK data.

Maintaining color accuracy

For the colors you see on your monitor to match those on your printed output, they must go through color management, including precise calibration of your monitor and Fiery server.

If viewing colors on the monitor is critical, consider using a professional profiling software package and instrument, such as Fiery Color Profiler Suite, to create a monitor profile. A monitor profile enables the application to compensate for the monitor's color behavior when displaying colors. As a result, colors previewed on the monitor more closely match the colors in your printed output.

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

- If printed colors are your priority, choose colors from printed samples. Sample colors ensure that your printed output remains consistent, regardless of how the colors appear on different monitors. Print the palette of available colors from business applications and select colors from the printed samples.

You can also print color reference charts from the Fiery server using Spot-On or Spot Pro (spot color editors in Command WorkStation) and select colors by name or number from the printed samples. Advanced applications let you define colors in the easier-to-control spot and CMYK color spaces.

Spot-On is a standard feature on most Fiery servers. If you choose to activate the Fiery Graphic Arts Pro Package for the standard Fiery server or the Fiery ColorRight Package for the integrated Fiery server, you will use Spot Pro instead of Spot-On.

- If on-screen (displayed) colors are more important, trust your eyes and your monitor. Visually select colors on your monitor, but be aware that colors are optimized only for your monitor. On other monitors, the colors may look different. Even though printed colors may not match those on your monitor, they still print to the Fiery server with good results.