ColorFlow

Software

Version 2.1

User Guide

English

2014-05-06

Copyright

Trademarks

FCC compliance

Any Kodak equipment referred to in this document complies with the requirements in part 15 of the FCC Rules for a Class A digital device. Operation of the Kodak equipment in a residential area may cause unacceptable interference to radio and TV reception, requiring the operator to take whatever steps are necessary to correct the interference.

http://graphics.kodak.com/

Revised 2014-05-06

Contents

1 Introduction

ColorFlow software

ColorFlow software delivers color relationship management that unifies all of the color control elements, such as ICC device profiles, device link profiles, and plate and print curves. ColorFlow software manages the relationship between the color control elements and device print conditions.

ColorFlow software enables you to define the color relationships between your devices. ColorFlow software is where the color characterization data is stored and where you generate and edit curves; import ICC device profiles; and import, generate, or edit ICC device link profiles for use in the refine and output processes of Kodak Prinergy workflow.

After you set up a device in ColorFlow software, you can easily create variations of that setup. For example, envision that you invest a considerable amount of time measuring color responses and creating conversion and simulation links within a particular color setup. You establish your press condition as a color reference point. Now, if you want to simulate a different color response, all you need to do is duplicate the color setup and choose the new simulation target in ColorFlow software. Using traditional methods, you would need to manually create several, individual conversion device link profiles to align with the new target.

ColorFlow software, Workflow edition, is integrated with Kodak Prinergy software, and is shipped with Prinergy version 6.1 and later.

For information about using ColorFlow software, see the *Help* or *User Guide*.

Editions of ColorFlow software

ColorFlow software is available in three editions.

ColorFlow software, Workflow edition

This edition is included with Prinergy Connect, Prinergy Powerpack, and Prinergy Evo 6.0 and later software. With this edition, you can:

- generate and edit curves
- import ICC device profiles
- import ICC DeviceLink profiles

ColorFlow software, Pro Workflow edition

This edition includes all of the functionality of the Workflow edition, and it also enables you to generate and edit:

- ICC device profiles
- ICC DeviceLink profiles

The ColorFlow Pro Workflow edition also includes the **ColorMatching on Output** licensed Prinergy feature.

ColorFlow software for Kodak Proofing Software

ColorFlow software, version 2.1, will be released in a future release of Kodak Proofing Software.

The following table summarizes the features of the editions of ColorFlow software. An "x" indicates that the feature is included in the edition.

Feature	ColorFlow software, Workflow edition	ColorFlow software, Pro Workflow edition	ColorFlow software for Proofing Software
ICC device profile and DeviceLink creation		x	x
ICC device profile and DeviceLink editing		x	x
Color element import–ICC device profiles, DeviceLinks, measurement data	x	x	x
Color element import-device links, measurement data	x	x	x
Report generation	x	x	x

Feature	ColorFlow software, Workflow edition	ColorFlow software, Pro Workflow edition	ColorFlow software for Proofing Software
Chart generation and chart reading	x	x	x
Support for many industry standards and specifications	x	x	x
Prinergy 6.0 software integration	x	x	
Client for Mac OS and Microsoft Windows	x	x	Windows only
Multiple clients (single concurrent connection)	x	x	
Curve creation	x	x	
Curve editing	x	x	
Kodak Harmony software curve support	x	x	
Support for multiple print technologies (offset-sheetfed, web, digital print, flexographic, inkjet)	x	x	Kodak Approval and Kodak Matchprint Inkjet

Additional options

Ink Optimizing Solution option

The Ink Optimizing Solution is a licensed feature that enables you to improve print stability and to reduce ink consumption on offset presses.

When this option is licensed and enabled, you can minimize ink consumption in print jobs while maintaining the same overall color by using an ICC device link profile to apply gray component replacement (GCR) while limiting total ink coverage.

The Ink Optimizing Solution is available for the ColorFlow Pro Workflow edition.

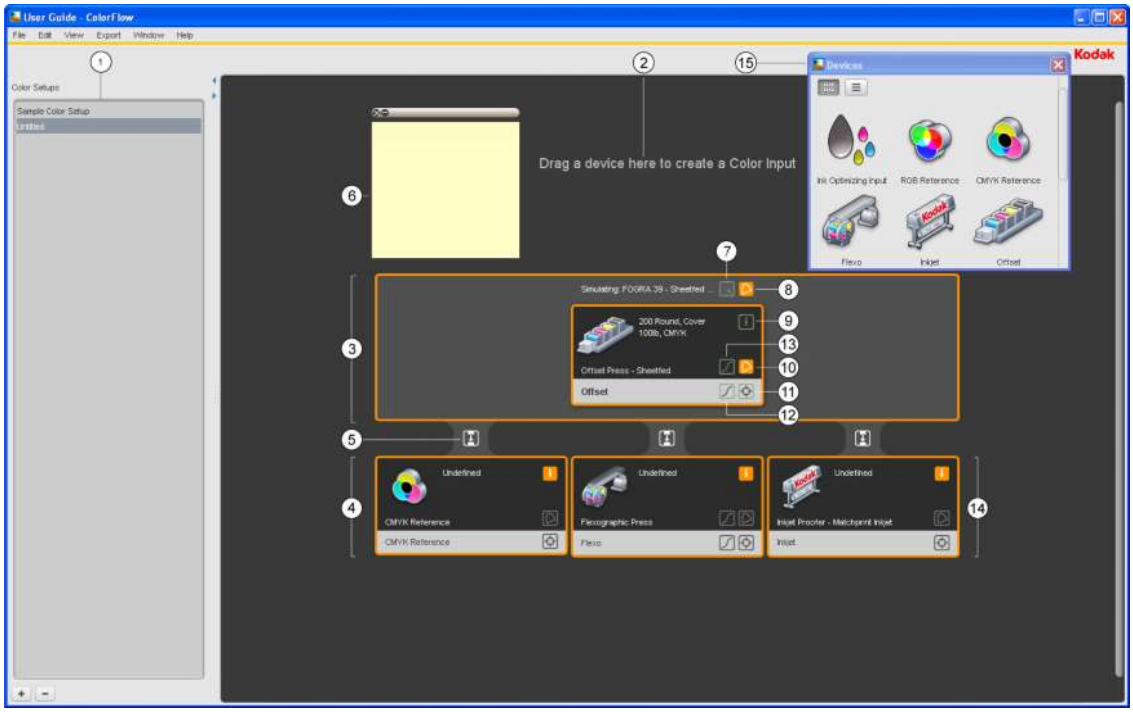
See also:

About the Ink Optimizing Solution on page 205

Components of the ColorFlow window

The ColorFlow window consists of two major panes: **Color Setups** list and **color setup viewer**.

When you select a color setup in the **Color Setups** list, that color setup appears in the **color setup viewer**. A color setup may consist of a primary color output (PCO), a number of secondary color outputs (SCO), and a number of color inputs (CI). The color setup in the following example includes a PCO, three SCOs, and no CI.



1. **Color Setups** list: Displays all of the color setups that have been created
2. **Color setup viewer**: Displays the color setup that is currently selected in the **Color Setups** list
3. Primary color output (PCO): The color reference point to which all devices in the color setup will be aligned
4. Secondary color output (SCO): A device that aligns to the PCO
5. **Conversion** icon: Click to define or adjust a conversion.

6. Sticky note: An optional, virtual note that you can attach to any color setup
7. **Simulation** icon: Click to define or adjust a simulation.
8. **PCO profile** icon: Click to select or import a profile for the PCO.
9. **Properties** icon: Click to define device condition properties.
10. **Device condition profile** icon: Click to select or import a profile for the device condition.
11. **Measurements** icon: Click to work with charts and measurements.
12. **Device Curves** icon: Click to define or import device curves.
13. **Default Device Curves** icon: Click to define default device curves for all devices below.
14. Device condition: A device and its operating properties.
15. **Devices** dialog box: The **Add device** drop-down is always open to make it easier for you to add a new device. In addition, you can right-click to delete a device.

System requirements

ColorFlow 2.1, client software for Windows OS-based computers

- Microsoft Windows 7, 8, or 8.1, or Microsoft Windows Server 2008
- Microsoft Internet Explorer 6.0 or later (recommended) or other browser software, to display the Help for ColorFlow software
- Adobe Reader software (to display reports)
- Sun Oracle Java Standard Edition runtime environment 1.6
- Microsoft .NET Framework 2.0 or later, included in the ColorFlow installer
- 1 GB RAM (minimum); 2 GB RAM (recommended)
- Intel Core 2 Duo processor (2.0 GHz minimum)
- Microsoft Visual C++ 2005 Service Pack 1 Redistributable Package ATL Security Update

ColorFlow 2.1, client software for Macintosh computers

- Apple Macintosh computer with an Intel processor running Mac OS 10.7, 10.8, or 10.9. To install ColorFlow software, you must have a user account with administrator privileges.

Note: ColorFlow client startup is approximately one to two minutes slower on computers running Mac OS 10.9 than on computers running other supported versions of the operating system. This happens because Mac OS 10.9 uses the 64-bit version of Java 1.7, while ColorFlow software continues to use the 32-bit version of Java 1.6, which is the version required to support the 32-bit-only drivers for the X-Rite iSis spectrophotometers used for measurement purposes. All other ColorFlow client functions continue to work normally. A future ColorFlow software release will support Java 1.7.

- Apple Safari 5.1.10 (recommended), Mozilla Firefox 2.0.0.14 or later (recommended), or other browser software, to display the Help for ColorFlow software
- Adobe Reader software (to display reports)
- Intel Core 2 Duo processor (2.0 GHz minimum)
- 1 GB RAM (minimum); 2 GB RAM (recommended)
- Sun Java Standard Edition runtime environment 1.6

  Note: Client software for Windows OS-based and Macintosh computers is not supported on virtual operating systems.

Overview of color setups

A color setup is the virtual structure that you build to define the color relationship of all of the devices in your printing task.

Concept of a color setup

A color setup consists of one primary color output (PCO), and any number of secondary color outputs (SCO) and color inputs (CI).

The PCO is at the center of the color setup—it is a color reference point to which all devices in the color setup will be aligned. The color setup describes how color is converted between devices so that all devices produce the same color output as the PCO. Rather than the actual color response of the PCO device, the PCO can be a simulation target—for example, it can be the color that the device in the PCO prints as it simulates an industry specification such as GRACoL C1.

After you define the relationship of all devices in the printing environment and provide ColorFlow with information about how each device in the color setup currently prints color, ColorFlow calculates color control elements such as ICC device profiles, DeviceLink profiles, and curves, and ensures that they are used at the appropriate place in the Prinergy workflow.

You can create a color setup for each type of printing that you do and name the color setup after its commercial purpose—for example, "Glossy brochures." The length of time that it takes to complete a color setup depends on whether you characterize devices in the color setup

by printing and measuring a ColorFlow-generated chart, and on the type of chart that you create.

After you complete a color setup, you should rarely change it. To create a similar, new color setup—for example, a color setup that has a different simulation target or a different SCO—you can duplicate the original color setup and make changes to it.

Device conditions

In order to measure how a device prints color, we need to know its device condition. A device condition consists of a device type and the operating properties of the device—for example, its inks, paper, and resolution. Every device condition has a measurable color response.

The color response of a device condition is determined by printing a ColorFlow-generated chart and measuring the chart using a spectrophotometer, or by importing a CGATS measurement file. ColorFlow uses the color response of a device condition to calculate color control elements that align the PCO to the simulation target that you specify, and that align any SCOs to the PCO.

If you change a device condition in the color setup, ColorFlow automatically adjusts the affected color control elements to reflect your changes. If a physical change in the device—such as new blankets on a press—causes the device condition's color response to change from what it was when it was first measured, you can update the device's color response to reflect its new color response.

See also:

Device conditions on page 45

Appearance of a color setup

When you select a color setup in the **Color Setups** list, the color setup appears in the **color setup viewer**.

The color setup shows the relationships between devices in a printing task, including the conversions that occur between color outputs. A color setup describes relationships, not a workflow—that is, it describes *what* conversions occur, but not *when* a conversion occurs in the workflow process.

A complete color setup must include the following:

- One PCO
- A defined simulation target for the PCO, unless the PCO uses a CMYK Reference device condition
- A color response for each device condition
- ICC device profiles (may be required by the Prinergy workflow)

A color setup may also include the following:

- One or more SCOs
- One or more CIs
- Other color control elements, such as curves and DeviceLink profiles

The ColorFlow interface uses the colors green and orange to guide you through the creation of a color setup. When you start a new color setup, the borders and **Properties** icons of all device conditions in the **color setup viewer** are orange. After you define the properties of a device condition, other icons in the device condition become orange to indicate that they need to be defined next. When all elements of the color setup have been defined and all color control elements have been calculated, all icons and borders in the color setup are green.

ColorFlow Icons

The color and animation of an icon indicates the processing state of the element that is associated with it.

Icons

Icon	Function
Properties	Opens a dialog box in which you can specify condition properties to define a device condition
Profile	Opens a dialog box in which you can manage the profile of a device condition or PCO
Curves	Opens a dialog box in which you can define or adjust device curves for curve-controlled devices
Measurements	Opens a dialog box in which you can create a chart, measure a printed chart, import measurement data, and generate a report
Simulation	Opens a dialog box in which you can define or adjust how the PCO simulates a target
Conversion	Opens a dialog box in which you can define or adjust how the SCO is calibrated to align to the PCO color space or define how CI data is modified for the PCO color space

Icon color and animation

Because ColorFlow processes are interdependent, many tasks must be done in a specific order. The ColorFlow interface guides you through the completion of tasks using a graphic indication of what needs to be defined next, what is currently being calculated, and what has completed calculation.

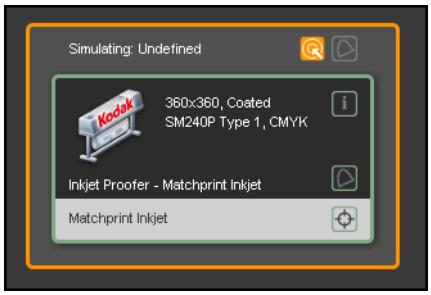
The color and animation of each icon indicate the processing state of the element that is associated with the icon.

Color or animation	Icon examples	Processing state
Orange		Not complete. Define this element before all other elements.
Black, white, or gray		Not complete. This element cannot be defined until the calculation for another element is completed.
Spinning		(Optional) Queued, waiting to calculate. **Note:** Do not redefine a queued element.
Slow sweep		(Optional) Calculating. The green portion of the icon indicates the amount of calculation that is complete.
Solid green		Complete

Border color

When all elements in a device condition or PCO have been created, the border around the device condition or PCO changes from orange to green.

The following example shows a completed device condition in an incomplete PCO.

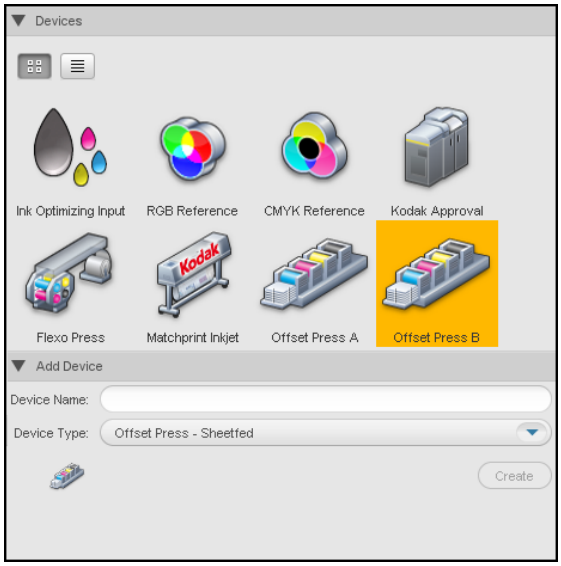


General steps for creating a color setup

To create a color setup, you must add devices that represent the physical devices in your shop, choose a device to go in the PCO position, specify the device condition of that device, establish its color response, and select its simulation target.

Add your shop devices

Before you create a color setup, you must add the devices that are required in the color setup.



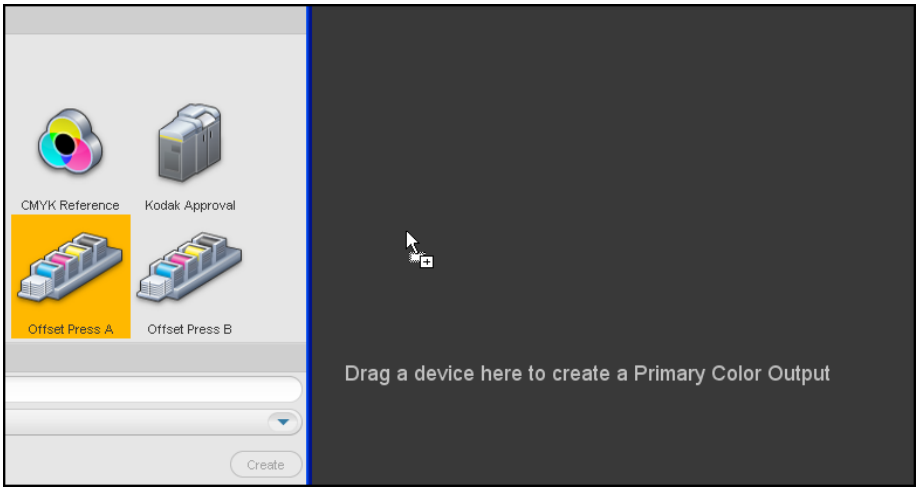
In the **Devices** dialog box, you can model your print environment by creating devices that represent specific output devices in your shop. Examples of devices include an offset printing press, a flexographic printing press, an inkjet printer, a digital press, and a halftone proofer.

See also:

Devices on page 41

Choose a PCO device

To create a color setup, you must drag a device from the **Devices** dialog box into the PCO position in the **color setup viewer**.



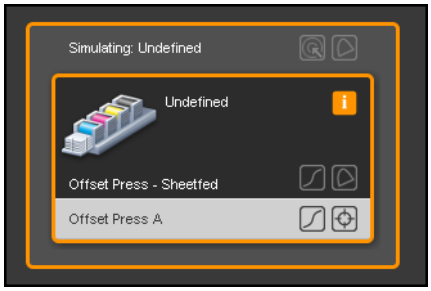
The device that you drag into the PCO position is the device with the color response to which you want all other devices in the color setup to align. This device may be the most important or most stable device in your shop. For example, if you use a particular proofer to create contract proofs, you may want to choose this proofer as the PCO device, to ensure that all devices in the color setup print the same colors as the contract proofer. The PCO device can also be a reference device that uses the color response of an industry specification.

To add devices to the SCO position or CI position, drag devices from the Devices dialog box to the appropriate locations in the **color setup viewer**.

After you drag a device into the **color setup viewer**, you must define its device condition.

Select device condition properties

After dragging a device into a color setup, you must specify its operating properties in the Device Condition Properties dialog box.



When you specify the operating properties of a device in the Device Condition Properties dialog box, if you select a unique combination of properties, ColorFlow creates a new device condition. If you select a combination of properties that is already used by the device in a color setup, ColorFlow uses the existing device condition.

If the device is a curve-controlled device, and you select a combination of properties that is already used by a device of the same type, ColorFlow adds both devices into the same device condition. For example, two offset presses that use the same ink, paper, and screening, can be added to the same device condition, creating pooled devices.

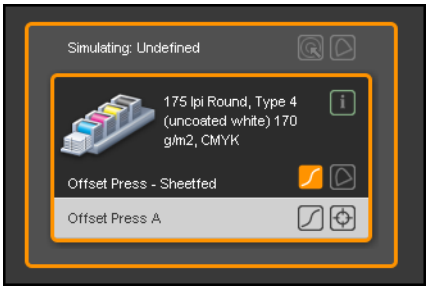
You can establish the color response of each device in PCO, SCO, and CI positions of the color setup after you define their device conditions.

See also:

Device conditions on page 45
Pooled devices in a device condition on page 61

Establish the color response of a device in a device condition

You must determine the color response of each device condition in the color setup in order for ColorFlow to create color control elements such as ICC device profiles, curves, and DeviceLinks.



You can establish the color response of a device condition by creating and measuring a ColorFlow-generated chart, measuring a standard chart supported by ColorFlow, or by importing existing measurement information. It is best practice to print and measure a ColorFlow-generated chart in order to obtain a color response for a device condition.

In the Charts dialog box, you can create a color characterization chart, a tonal characterization chart, or a tint ramp. After you print the chart using your device condition, you can measure the output color using a spectrophotometer, and enter the measurement information into ColorFlow. On the **Measurements** tab of the Measurements dialog box, you can import a `.cgt` or `.txt` measurement file that you previously created.

Tip: If you want to practice building a color setup using the sample data provided with ColorFlow software, you can import a sample `.cgt` file from `C:\Program Files\Kodak\ColorFlow\SampleData\Measurements`.

For curve-controlled devices, you must define device curves in the Default Device Curves - Definition dialog box before you can access the Measurements dialog box. If two curve-controlled devices are pooled in the same device condition, you must establish the color response of each individual device. ColorFlow requires the color response of each device in the device pool in order to create device curves that align their color outputs.

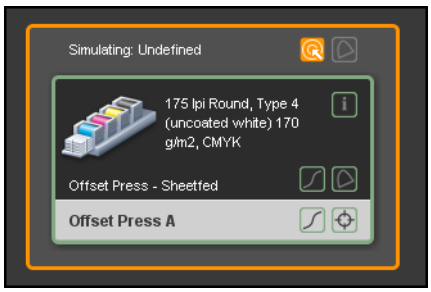
After you establish the color response of all devices in the color setup, you must choose a simulation target for the PCO.

See also:

Measurement charts on page 65
Color response on page 81

Choose a simulation target for the PCO

After you establish the color response of the device in the PCO position, you must specify the color response that you want the PCO to simulate.



In the Simulation Definition dialog box, you select the color response that you want the PCO to simulate. The PCO can simulate any of the following color responses:

- An industry specification—for example, GRACoL 2006 Coated 1
- The color response of a different device condition—for example, a reference device condition or device condition that you previously characterized
- The PCO device condition's actual color response—no simulation occurs in this case. (The simulation target is set to **None** and no simulation curves or DeviceLinks are generated.)

It is a best practice to use a default simulation method based on the simulation target that you select. The simulation method is the type of curves and/or DeviceLinks that ColorFlow will generate in order to achieve the simulation target. You can select a different simulation method than the default recommendation, and further adjust the generated curves and/or DeviceLinks in order to fine-tune the simulation.

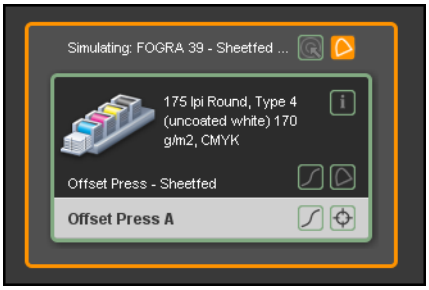
The simulation curves and DeviceLinks that ColorFlow generates are available in the Prinergy workflow. Prinergy refines jobs to the color response that the PCO simulates.

See also:

The color setup and the primary color output on page 89
How Prinergy uses ColorFlow elements on page 183

Define an ICC device profile

You can define an ICC device profile for each device condition in the color setup, as well as for the PCO.



After you establish the color response of a device condition, the best practice is to define a profile for the device condition in the Device Condition Profile dialog box.

After you define the PCO simulation, it is best practice to define a profile for the PCO in the Primary Color Output Profile dialog box.

All profiles that are used in ColorFlow conform to the standards of the International Color Consortium (ICC). You can generate a profile by using ColorFlow or by importing a profile that was generated using other software. Profiles may be required in the Prinergy workflow.

See also:

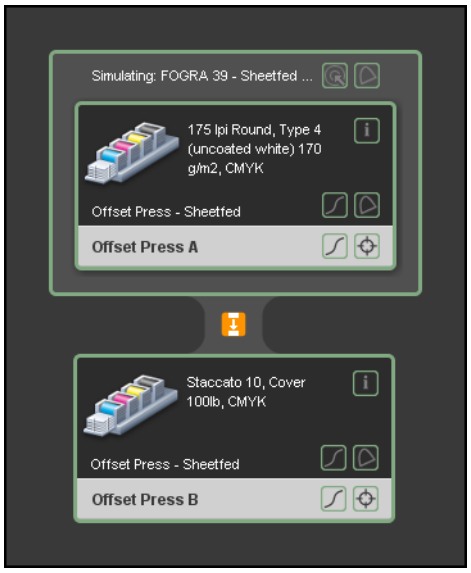
Device profiles on page 121
How Prinergy uses ColorFlow elements on page 183

Define the conversion method for SCOs and CIs

If your color setup contains any SCOs and/or CIs, you must define the conversion method between the PCO and SCO and/or between the CI and PCO.

You can add an SCO or CI to your color setup at any time, by performing the same actions that you performed to add the PCO. You do not need to select a simulation target for SCOs and CIs.

PCO to SCO conversion

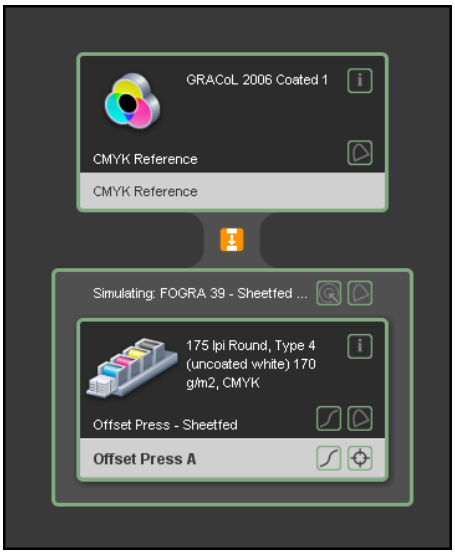


After you create a device condition for an SCO and define the simulation target for the PCO, you must define the conversion between the PCO and SCO. In the Conversion - Definition dialog box, you define how ColorFlow is to convert data between the PCO and SCO, so that the SCO produces the same color as the PCO.

When you open the Conversion - Definition dialog box, ColorFlow provides a default conversion method based on the devices that are used in the PCO and SCO. The conversion method is the type of curves and/or DeviceLinks that ColorFlow will generate in order to align the SCO color output to that of the PCO. You can select a different conversion method than the default recommendation, and later adjust the generated curves and/or DeviceLinks in order to fine-tune the conversion.

The conversion curves and DeviceLinks that ColorFlow generates are made available in your Prinergy process templates in the Prinergy workflow.

CI to PCO conversion



A CI describes how input files were prepared for a job, and how those files should be converted for the PCO. The device condition that you add to the CI position is usually a reference device condition that describes an industry specification such as GRACoL.

After you create a device condition for a CI and define the simulation target for the PCO, you must define the conversion between the CI and PCO. In the Conversion - Definition dialog box, you define how ColorFlow will use DeviceLinks or Profile Pairs to convert data between the CI and the PCO, so that input files are converted to the color space of the PCO. You can specify a different conversion method for image content (raster objects) and graphic content (vector objects, such as text and linework).

The color input device conditions that you define in the color setup are made available in your Prinergy process templates in the Prinergy workflow. ColorFlow delivers the conversion DeviceLinks or Profile Pairs to Prinergy for content conversion.

See also:

Secondary color outputs on page 95
Color inputs on page 101
How Prinergy uses ColorFlow elements on page 183

How ColorFlow works with Prinergy

Client-server model

ColorFlow server software is installed on the Prinergy server, and ColorFlow client software can be installed on one or more Mac or Windows workstations.

The connection between the ColorFlow client software and the ColorFlow database (all of the color control elements, such as curves, profiles, and so on) depends on how ColorFlow is licensed.

- **Standalone edition**: ColorFlow software and its database exist on the same Mac or Windows workstation.
- **Workflow edition** and **Pro Workflow edition**: The ColorFlow database is on the Prinergy server. ColorFlow software exists as a client on one or more Mac or Windows workstations.

The ColorFlow database is called the colorstore. The colorstore includes information about all color control elements that ColorFlow creates. The colorstore and ColorFlow server reside on the Prinergy server. ColorFlow client software connects to a Prinergy server and uses the license of the Prinergy server.

Although many users can connect from the client software to the ColorFlow server, only one user has access to the server at any moment. A user must wait for another user to quit his or her client software in order to start a client and gain control of the ColorFlow server.

See also:

Prinergy workflows on page 181

ColorFlow-Prinergy terminology

Some of the objects used in ColorFlow are named differently in Prinergy.

ColorFlow term	Prinergy term
Primary color output (PCO) profile	Final output process profile (refine process template)
Color input	Source or DeviceLink profile (refine process template)
Device condition profile	Proof process (Destination) profile (output process template)
Plate setup curve	Plate curve
Calibration curve	Print curve (Calibration)

2 Getting started

ColorFlow server software installation

ColorFlow server software is included in the Prinergy installer. These instructions are for the Workflow edition and Pro Workflow edition.

Workflow editions include a ColorFlow component on the Prinergy server, in addition to ColorFlow software on each workstation.

New Prinergy 6.0 systems are provided with ColorFlow server software installed. If you are upgrading to Prinergy 6.0, the Prinergy installer automatically performs the following:

- For Kodak Prinergy Connect and Kodak Prinergy Powerpack, installs `ColorFlowServer.exe` in `C:\program files\Kodak \ColorFlowServer`.
- For Kodak Prinergy Evo, installs `ColorFlowServer.exe` in `C: \program files\Kodak\Evo\<current version> \ColorFlowServer`.
- Installs the *ColorFlow User Guide* into the Prinergy Eclipse plug-ins directory, so that you can access the *ColorFlow User Guide* from Prinergy.
- Creates a shared network folder called `ColorFlowInstaller`.

When you upgrade to a newer version of ColorFlow software, ColorFlow software automatically migrates your colorstore from the previous version.

Installing ColorFlow client software

Install ColorFlow client software on each workstation that you will use to create color setups.

Requirements: For Windows, Microsoft .NET framework 3.5 is required for installing the ColorFlow client software. The user account must have administrator privileges.

1. Locate the shared `ColorFlowInstaller` folder on the Prinergy system.
2. Run the appropriate ColorFlow software installer for your computer's operating system. Perform one of the following actions:
   - For Mac OS X, open the `MacOSX` folder and run `ColorFlow.dmg`.
   - For Windows, open the `PC` folder and run `ColorFlowSetup.exe`.
3. Follow the installation prompts.

ColorFlow provides device drivers for the supported measurement devices. If you connect a measurement device to a Windows-based workstation running the ColorFlow client software, the Windows New Hardware Wizard should appear. If the wizard cannot automatically find the drivers, they can be found at c:\Program Files\Kodak \colorflow\drivers.

When you install a new version, ColorFlow automatically migrates your data from the previous version.

Starting the ColorFlow client software

Start the ColorFlow client software to build color setups.

➢ Perform one of the following actions:
   - For Windows, select **Start** > **Programs** > **Kodak** > **ColorFlow** > **ColorFlow**.
   - For Mac OS X, select **Go** > **Applications** and, in the Applications folder, select **Kodak** > **ColorFlow** > **ColorFlow**.

Licenses

The editions of ColorFlow software require different types of licenses. The ColorFlow software, Workflow edition, and ColorFlow software, Pro Workflow edition, obtain their licenses from the Prinergy server to which they are connected.

The Licensing dialog box appears when you start ColorFlow software for the first time or when a license has expired. In the Licensing dialog box of the Colorflow Workflow and Pro Workflow editions, you can specify the primary Prinergy server to which you want to connect.

ColorFlow software, Workflow edition, is included in the license for Prinergy version 5.1 and later. The ColorFlow software, Pro Workflow

edition, requires an additional Prinergy license key. For more information about license options, see the *Prinergy System Administration Guide*.

Note: There is an optional license for the Kodak Ink Optimizing Solution with only the Pro Workflow edition.

ColorFlow software for Kodak Proofing Software runs under a single-user license. In the Licensing dialog box of ColorFlow software, you can connect with the Kodak licensing server. After you supply a valid license, ColorFlow software (or ColorFlow option) will run until the license expires.

Activating a Workflow edition license

Connect ColorFlow to a Prinergy server to use the server's license.

Note: At any time, only one ColorFlow client can access the licensing server on the Prinergy system.

1. In the Licensing dialog box of ColorFlow, select **Workflow Edition**. ColorFlow automatically finds the available Prinergy servers in the local network.
2. If you want to view additional servers that are not on the local network, click the **add** button + and, in the **Server Name** box, type the name or IP address of the server to which you want to connect, then click **OK**.
3. In the **Prinergy Primary Server** list, select a server to view its licensed ColorFlow edition and licensed options.
4. When you have selected the required server, click **OK.** ColorFlow connects to the Prinergy server, and the features that are licensed by the server become available.

Changing the language of the user interface

You can change the language of the user interface to any of the following: English, French, Italian, German, Spanish, Russian, Japanese, or Chinese (simplified).

Note: If you create color setups in one language and then change the user interface to another language, any custom property values that you defined in the original language will stay in the original language.

1. Perform one of the following actions:
   - For Mac OS X, select **ColorFlow** > **Preferences**
   - For Windows, select **File** > **Preferences**
2. On the **User Interface** tab in the **Select Language** list, select your preferred language, then click **OK**.

Sticky notes

You can attach sticky notes to a color setup in the **color setup viewer**.

Creating a sticky note

You can attach a sticky note to a color setup.

1. Do one of the following:
   - For Mac OS X, press Ctrl-click anywhere in the **color setup viewer**.
   - For Windows, right-click anywhere in the **color setup viewer**.
2. Select **New Sticky Note**.
3. Type the sticky note.

The sticky note remains with this color setup until you hide or delete the sticky note. To edit a sticky note at any time, click anywhere in the note, and type your changes.

Moving or resizing a sticky note

Change the size or location of a sticky note in the **color setup viewer**.

- Do one of the following:
  - To change the location of a sticky note, drag its title bar.
  - To resize a sticky note, drag any edge or corner of the note.
  - To minimize or maximize a sticky note, click the **minimize** button or the **maximize** button in the title bar.

Hiding sticky notes

You can hide all sticky notes in all color setups.

1. Do one of the following:
   - For Mac OS X, press Ctrl-click in the **color setup viewer**.
   - For Windows, right-click in the **color setup viewer**.
2. Select **Hide Sticky Notes**.
   When you hide sticky notes, the notes are hidden in all color setups.

Showing sticky notes

You can show all sticky notes in all color setups.

When sticky notes are hidden, you can display them by selecting **Show Sticky Notes**.

1. Do one of the following:
   - For Mac OS X, press Ctrl-click in the **color setup viewer**.
   - For Windows, right-click in the **color setup viewer**.
2. Select **Show Sticky Notes**.
   When you show sticky notes, the notes are displayed in all color setups.

Deleting a sticky note

You can delete a sticky note from a color setup.

Click the **close** button in the title bar.

Quitting ColorFlow software

Quit ColorFlow software when you finish building color setups, or when you want to finish building a color setup at a future time.

Requirements:

Ensure that all calculations are complete before you quit ColorFlow.

Important: When you quit ColorFlow, it scans its colorstore to remove objects that are no longer needed. This may take several seconds or minutes to complete. If you force ColorFlow to quit during this process, the colorstore may be corrupted.

Do one of the following:

- For Windows, select **File** > **Exit**.
- For Mac OS X, select **ColorFlow** > **Quit**.

3 Working with ColorFlow software

Aligning an offset press to another press

There are two methods of aligning an offset press to a house standard or another press in your shop. You can align to the press in the PCO or you can simulate the other press.

Aligning to the press in the PCO

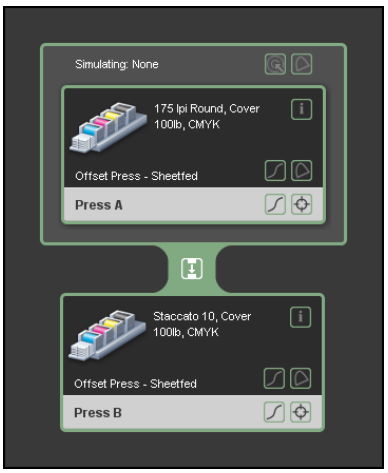
The typical method for aligning a press to another press is to add the press whose color you want to simulate as the PCO.

Requirements: Your offset presses should be in good condition, and have good process control to ensure that they produce a consistent result from the time of characterization and beyond.

1. Add the press that you want to simulate as the PCO, then characterize its device condition.
2. Specify no simulation for the PCO.
   Select **None** as the PCO's simulation target.
   All devices added as SCOs in this color setup will align to the actual color response of this PCO press (your house standard).
3. Add the second press as an SCO, then characterize its device condition.
4. Define the PCO to SCO conversion.

Example color setup

Press B is aligning to the color response of Press A.



Note: The example above shows the alignment of sheetfed offset press conditions. The technique applies to all device types in ColorFlow software.

Simulating the other press's color response

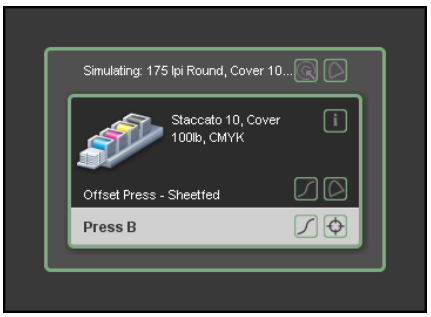
Another method for aligning one press to another press is to select the press whose color you want to simulate as the simulation target of the PCO.

If you previously created the device condition of the press whose color response you want to simulate, you can select this device condition as your simulation target.

1. Add the press that you want to align to another press as the PCO, then characterize its device condition.
2. Select the device condition of the other press as the PCO's simulation target.
   For example, if the device condition of the device you want to simulate is called "PressA, 175lpi, Cover 100lb, Offset Press - Sheetfed, CMYK," select **PressA, 175lpi, Cover 100lb, Offset Press - Sheetfed, CMYK** in the simulation target list.

Example color setup

Press B is simulating the color response of Press A's device condition.



Note: The example above shows the alignment of sheetfed offset press conditions. The technique applies to all device types in ColorFlow software.

Aligning an offset press to an industry specification

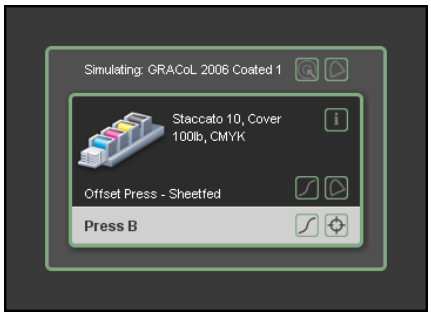
You can align an offset press to an industry specification, such as FOGRA or GRACoL.

Simulating the industry specification

One method for aligning to an industry specification is to select the industry specification as the simulation target of your PCO device condition.

1. Add the press as the PCO, then characterize its device condition.
2. Select an industry specification as its simulation target.
   For example, if you want to simulate GRACoL C1 2006, in the **Target** list, select **GRACoL C1 2006**.

Example color setup



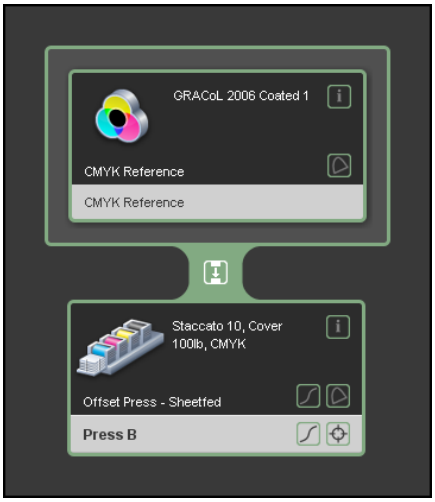
Aligning to a reference device condition in the PCO

Another method for simulating an industry specification is to add the color response of the industry specification as the PCO.

This configuration limits the scope of your color relationship management because you cannot adjust the simulation of a reference device. Also, if you add multiple SCOs to this color setup, while all SCOs will all align to the industry specification, they may not align with each other because the PCO to SCO conversion for each SCO device condition may be different.

1. Add a reference device condition as the PCO and select an industry specification as its color response.
   For example, if you want to simulate GRACoL C1 2006, in the **Name** list, select **GRACoL C1 2006**.
2. Add the press as the SCO, then characterize its device condition.

Example color setup



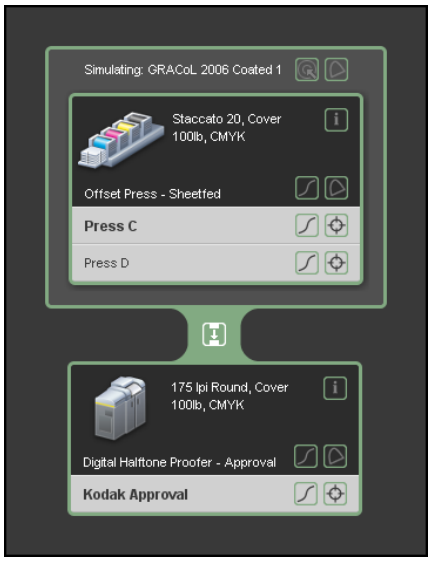
Aligning the color response of presses within one device condition

To align the color response of multiple curve-controlled devices that have the same device condition properties, you can create a device condition that contains pooled devices.

1. Create a device condition with pooled devices.
2. Select one press as the promoted device.
   ColorFlow generates device curves to align the color response of all other devices in the device condition with the color response of the promoted device.

Example color setup

The PCO device condition in this color setup contains two pooled devices. Press C is the promoted device, and Press D aligns to the color response of Press C.



Aligning a proofer to an offset press

You can simulate on proofs, the color that you print from an offset press.

Requirements:

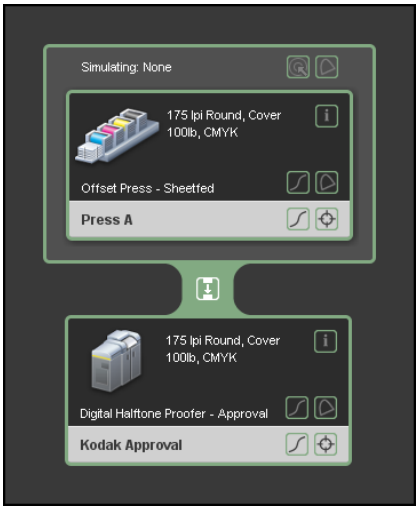
Your offset press should be in good condition and have good process control to ensure that it produces a consistent result from the time of characterization onwards.

1. Add the press to the PCO position, then characterize its device condition.
2. Decide what you want the press to simulate:
   - If your press was characterized to a proprietary *house standard* and you want it to operate as-is with no simulation, select **None** as your simulation target.
   - If you want to simulate an industry specification or the color response of a user-defined device condition, select the appropriate simulation target. For example, if you want to simulate GRACoL C1 2006, in the **Target** list, select **GRACoL C1 2006**.
3. Choose a simulation method.
   It is a best practice to use a curves method only—for example, **Gray Balance**.
   After the simulation is calculated, a set of curves is available for export (ColorFlow Standalone) or integrated use with Prinergy.

4. If the color result of the simulation is not meeting your expectations on press, examine the process control of your press and/or use the curve editing tools in ColorFlow to adjust the simulation curves.
5. After your press achieves your desired color result, add proofers to align to your press as it simulates the target.
   For example, after you verify that the color result on press with the ColorFlow curves is meeting the GRACoL specification, add proofers to align to your press as it simulates GRACoL.
   a. Add an inkjet proofer or halftone proofer to the SCO position, then characterize its device condition.
6. Define the PCO to SCO conversion.
   ColorFlow provides a default recommended conversion method based on the device types used in the PCO and SCO:
   - If the conversion is from a press to inkjet proofer, the default **DeviceLink Method** is set to **Full Reseparation**.
   - If the conversion is from a press to halftone proofer, the default **Curves Method** is set to **Gray Balance** with **DeviceLink Method None**. However, you can use curves and a DeviceLink in the conversion if you find a DeviceLink is needed to achieve a better color alignment between the SCO and PCO.

   Note: The proofer's gamut may limit its ability to fully simulate the colors produced by the four-color inkset of the press.
7. Add as many inkjet proofers and halftone proofers as SCOs as you require.

Example color setup



Next: Create a ColorFlow report to compare the color responses of your device conditions. The report may reveal large differences in gamut that can lead to disparity in color fidelity.

See also:
Reporting on page 193

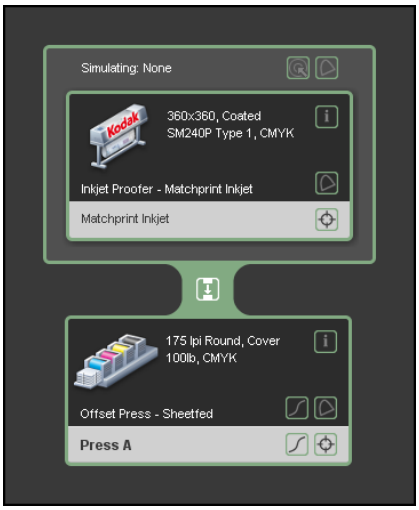
Aligning an offset press to an inkjet proofer

Simulate on press the color that you print from an inkjet proofer.

Because an inkjet proofer is likely to be a very stable device, you may want to configure a proofer as the PCO in a color setup and simulate an industry specification or a user-defined device condition.

1. Add the proofer to the PCO position, then characterize its device condition.
2. Select a simulation target for the proofer.
   You can simulate any of the following items:
   - An industry specification—for example, GRACoL 2006 Coated 1.
   - The color response of a different device condition—for example, a reference device condition or device condition that you previously characterized.
   - The PCO device condition's actual color response—no simulation occurs in this case. (The simulation target is set to **None** and no simulation DeviceLink is generated.)
3. Add the press to the SCO position, then characterize its device condition.
   a. Set up the press with device curves that ensure a good starting point for characterization.
      For example, if you are printing with a high gain Kodak Staccato screening process, select a cutback device curve. In most cases, using the default linear device curve should provide a good starting point for characterizing most AM print conditions.
      When the press is characterized, the device curve that was used to produce the characterization is captured. If you try to redefine the device curve after characterization, your initial characterization is deactivated.
   b. Print and measure a color characterization chart to characterize the press.
4. Define the PCO to SCO conversion.

Example color setup



Aligning an offset press to a halftone proofer

On press, you can simulate the color that you print from a halftone proofer.

Using a halftone proofer as a PCO to simulate an industry specification or a user-defined device condition has the following advantages:

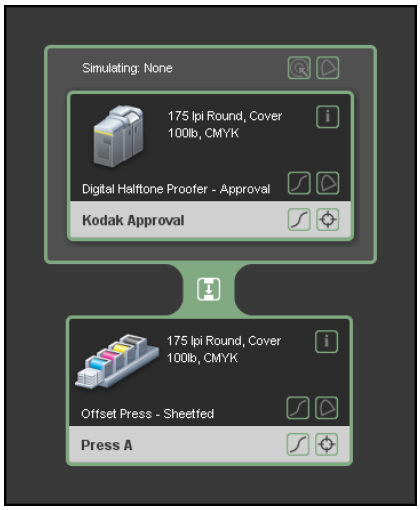
- The halftone proofer is likely a very stable device.
- Halftone donor material has pigmentation properties similar to offset ink pigmentation. While this is not the only factor in achieving a good colorimetric alignment, it is essential for achieving a proper metameric alignment to your press sample.
- You may be familiar with the gamut range of your halftone proofer. This allows you to edit color control elements, see the effects of your edits immediately on proof output, and propagate these edits to the offset press.

1. Add the proofer to the PCO position, then characterize its device condition.
2. Select a simulation target for the proofer.
   You can simulate any of the following:
   - An industry specification—for example, GRACoL 2006, Coated 1.
   - The color response of a different device condition—for example, a reference device condition or a device condition that you previously characterized.
   - The PCO device condition's actual color response—no simulation occurs in this situation. (The simulation target is set

to **None**, and no simulation curves or DeviceLinks are generated.)

3. Add the press to the SCO position and characterize its device condition.
   a. Set up the press with a device curve that ensures a good starting point for characterization.
   For example, if you are printing with a high gain Kodak Staccato screening process, select a cutback device curve. In most cases, using the default linear device curve should provide a good starting point for characterizing most AM print conditions.
   When the press is characterized, the device curve that was used to produce the characterization is captured. If you attempt to redefine the device curve after characterization, your initial characterization is deactivated.
   b. Print and measure a color characterization chart to characterize the press.
4. Define the PCO to SCO conversion.

Example color setup



Propagating PCO simulation adjustments to an SCO

When you adjust the PCO simulation, ColorFlow automatically adjusts the SCO conversion link to reflect the change.

The color relationship management of ColorFlow can track color adjustments from device condition to device condition.

1. Create a complete color setup that has a PCO and an SCO.
   For example, create a color setup with a proofer as the PCO and a press as an SCO, and define all simulations and conversions.

2. Make a change to the PCO simulation.
   Your change is propagated to the SCO.
   The specific changes that are tracked from PCO to SCO are:

   - If the simulation uses curves only—edits to simulation curves
   - If the simulation uses curves and a DeviceLink, or only a DeviceLink—edits to simulation DeviceLink Input Tonality only

Example

Using the following color setup, you can proof a change to the simulation, and the change is automatically applied to the press color response. Note that the PCO profile is being recalculated because you changed the simulation.

Note: When you make a change to the simulation, ColorFlow maps the color conversion to preserve the color alignment between PCO and SCO. However, while your modification on proof may be within the proofer's gamut, the press may not be able to fully represent the modification.

Using an SCO device condition as the PCO device condition in another color setup

You can use the SCO device condition in one color setup as the PCO device condition in another color setup.

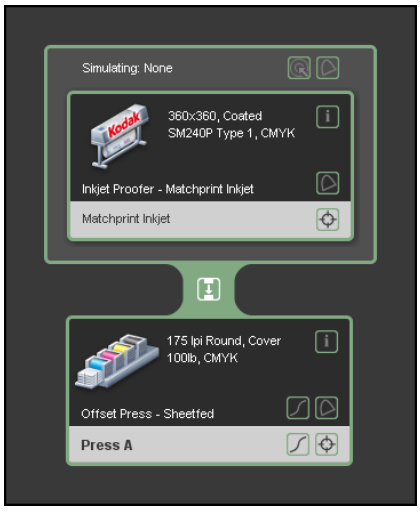
1. Create a new color setup.
2. From the Devices dialog box, drag a device into the PCO position. This should be the same device that you used in the SCO position in another color setup.
3. When you define the device condition properties for the device, select the same properties that you selected for the device in the other color setup.

The same device condition is used in both color setups. You do not need to print and measure a chart again for this device condition.

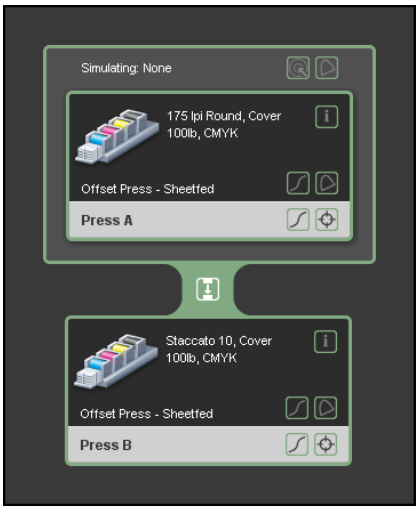
Note: If you use the same device condition in more than one color setup and you make changes to the device condition in one color setup, the device condition is affected in *all* color setups where it is used. For example, if the same device condition is used in color setup A and color setup B, and you make a change to the device curves in color setup A, the device curves for the device condition are automatically changed in color setup B. If you change the **Selection Properties** of a device condition in a color setup, you are choosing a different device condition for use *only* in the color setup shown in the viewer. The original device condition will continue to be used (unaffected) in other color setups that use it.

Example

The device condition for Press A is used as an SCO in the following color setup.



The same device condition, for Press A, is used as the PCO in the following color setup.



See also:

How device conditions are created on page 47

Linearizing platesetter output

You can use plate setups to create ColorFlow plate lines that linearize plates for your offset device.

1. When you create the device condition for an offset press, assign a plate setup to the device condition.
2. Add the required plate lines to the plate setup.
   Each plate setup can contain multiple plate lines. Plate lines are used to compensate for variable differences between output devices and plate processing units.
   For example, you may have two plate processors, Processor A and Processor B, that produce slightly different outputs. In this case, you can create two different plate lines, **LotemFibrehead-Wednesday_Chemistry-ProcessorA-Prebake**, and **LotemFibrehead-Wednesday_Chemistry-ProcessorB-Prebake**.
3. For each plate line, determine the measured reading of the Image Control Strip and type the reading values into the **Measured Tint (uncalibrated)** boxes in the Plate Setups dialog box.
   A plate line in ColorFlow creates a plate curve in Prinergy. In Prinergy, you can select the appropriate plate line to use for a job based on the output device that will be used.

See also:

Plate setups on page 157

Printing as you did with Harmony, without characterizing device conditions

If you previously used Kodak Harmony software to create a transfer calibration curve that produces a desired color response on a device, you can use this transfer calibration curve as a device curve in ColorFlow so you can continue printing the same color using ColorFlow as you did when you used Harmony.

In order to characterize a device condition in ColorFlow, it is best practice to print and measure a chart. If you do not want to print and measure a chart for your device immediately, you can import an existing transfer calibration curve from Harmony. The transfer calibration curve that you import is used as a device curve in ColorFlow. You can use this device curve to continue printing in ColorFlow without characterizing the device condition.

Note: When you import a Harmony transfer calibration curve without characterizing the device condition, you cannot use ColorFlow computations to manage the color response of the device condition. You cannot generate any color control elements in ColorFlow until you characterize the device condition using measurement data. When you use an uncharacterized device condition as a PCO or SCO, the simulation or conversion curves are linear, and the response will be the same as when you used Harmony.

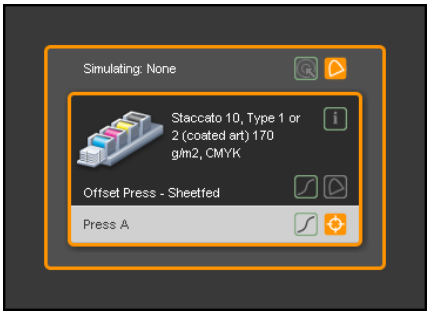
1. To the PCO position, add the device for which you previously created Harmony transfer calibration curves.
2. Define the device condition for this device.
3. In the device condition, click the **Default Device Curves** icon .
4. In the Default Device Curves Definition dialog box, in the **Curve Origin** area, select **Imported**, and click **Import.**
5. Locate the `.hmy` file you want to import, and click **Open**.
6. In the Import Harmony Transfer Curve dialog box, select the transfer calibration curve for this device, and click **OK**.
   In the Default Device Curves Definition dialog box, the curve name that you selected appears.
7. Click **OK**.
8. In the PCO, click the **Simulation** icon .
9. In the **Target** list, select **None**, and click **OK**.
   You can now use this color setup to print the same color that you printed when you used Harmony. The color setup contains only a device curve; it does not contain measurement data or simulation.

Note: You can adjust the simulation curves to alter the color response of the device or pool of devices.

You can also adjust the device curves imported from Harmony to alter the color response of one of the devices. When you import a Harmony curve in the Default Device Curves Definition, the imported curves will be used by default for devices added to a device pool. You can import unique Harmony curves for each device by clicking the Device Curves icon for a device, and redefining the device curves.

Example

Note that various elements in this color setup are orange, indicating that the color setup is not complete.



Next:

At a later time, characterize the device condition by printing and measuring a chart so you can use the full capabilities of ColorFlow.

Note: If you do not update the simulation curves, the device(s) will print the same color as it did before the response measurement. You can also reuse the device condition in another color setup, where you can align its response to a desired target.

Importing elements from other products

You can import ICC device profiles and ICC DeviceLink profiles that you generated from Kodak Profile Wizard or other software.

1. To import an ICC device profile for a device condition, click its **Profile** icon , and import the profile in the Device Condition Profile dialog box.

   Note: If none of the devices in the device condition have a measured response, the imported profile will define the color response of the device condition. If the device condition already has a color response that was derived from measurement data, importing a profile will not replace this color response.

2. To import a DeviceLink profile for a PCO, click the **Simulation** icon , and select DeviceLink method: Imported in the Simulation - Definition dialog box to import the profile. For an SCO or color input, click the **Conversion** icon between the PCO and SCO or color input, and import the DeviceLink profile in the Conversion - Definition dialog box.

4 Devices

About ColorFlow devices

A ColorFlow device is a representation of a particular physical device in your printing environment.

The Devices dialog box shows all of the devices that have been defined for your shop. When you create a device in ColorFlow, you select a device type from a list and assign a meaningful name to it in order to identify it as a particular device in your shop. The device type you select determines what types of properties can be associated with the device. To add a device to a color setup, you drag it from the Devices dialog box to the PCO, SCO, or CI position in the **color setup viewer**.

A device in ColorFlow does not contain any information about its operating conditions, such as the paper, inks, and other parameters that it uses to print. When you specify these operating properties for a device, you create a device condition. One device can be associated with many device conditions. If you rename a device, the device name changes in all color setups where all of its device conditions are used. You can delete any device that you create if it is not currently used in any device conditions. You cannot delete a reference device.

Curve-controlled devices

A curve-controlled device is a print device for which a curve can be applied during output in order to modify color response. Curve-controlled devices that have the same device type and device condition properties are automatically pooled into one device condition.

The following ColorFlow devices are curve-controlled devices:

- Offset Press – Sheetfed
- Offset Press – Heatset Web
- Offset Press – Coldset Web
- Flexographic Press
- Digital Halftone Proofer – Approval
- Digital Halftone Proofer – Spectrum
- Digital Halftone Proofer – Other
- Digital Press - Versamark
- Digital Press - Prosper

Non-curve-controlled devices

A non-curve-controlled device is a print device that normally does not use curves to control color. Non-curve-controlled devices cannot be pooled in the same device condition, even if they are of the same device type.

The following ColorFlow devices are non-curve-controlled devices:

- Digital Press – Kodak NexPress
- Digital Press – Other
- Inkjet Proofer – Matchprint Inkjet
- Inkjet Proofer – Veris
- Inkjet Proofer – Other

Reference devices

Reference Device Conditions are available for both RGB and CMYK. ColorFlow has built-in devices named **CMYK Reference** and **RGB Reference**. You can use the **CMYK Reference** device to specify a print device condition that has a color response for which there is no physical device—for example, for an industry specification such as FOGRA 39. Similarly, you can create a custom **CMYK Reference** that represents a proofing system from which you receive proofs, by measuring a test proof in ColorFlow.

Use the **RGB Reference** to define the RGB capture or display devices. You can select from one of the built-in RGB device conditions, or create a custom RGB Reference device condition with an imported RGB device profile, such as a camera or scanner profile.

See also:

ColorFlow device conditions on page 45
Reference device conditions on page 51
Ink Optimizing Input device on page 206

Creating a ColorFlow device

You can add a device to represent a physical device in your shop.

1. The Devices palette automatically appears in the ColorFlow workspace, with the Add device drop-down already open to make it easier for you to add a new device. If the Devices palette is not open in your ColorFlow workspace, select **View** > **Devices**.

   Tip: You can double-click anywhere in the background of the color setup viewer to open the Devices palette.

2. In the **Device Name** box, type a name for the device you want to add.
3. In the **Device Type** list, select the device type.
4. Click **Create**.
   The new device appears in the **Devices** section.

Before you can determine the color response of this device, you must define its device condition.

See also:
ColorFlow device conditions on page 45

Renaming a ColorFlow device

You can change the name of an existing device.

You cannot change the name of a reference device.

1. The Devices palette automatically appears in the ColorFlow workspace, with the Add device drop-down already open to make it easier for you to add a new device. If the Devices palette is not open in your ColorFlow workspace, select **View** > **Devices**.

   Tip: You can double-click anywhere in the background of the color setup viewer to open the Devices palette.

2. In the **Devices** section, double-click the device.
3. Type a new **Device Name**.

The device name is changed in all color setups where the device is used. To refresh its name in the color setup viewer, select a different color setup.

Deleting a ColorFlow device

You can delete a device that you no longer need.

Note: You cannot delete a reference device or a device that is used in a device condition.

1. The Devices palette automatically appears in the ColorFlow workspace, with the Add device drop-down already open to make it easier for you to add a new device. If the Devices palette is not open in your ColorFlow workspace, select **View** > **Devices**.

   Tip: You can double-click anywhere in the background of the color setup viewer to open the Devices palette.

2. In the **Devices** section, select the device and perform one of the following actions:
   - For Windows, press Delete.
   - For Mac OS X, press Fn (Function key)+Delete.

   Tip: You can right-click the device in the **Devices** section, and select Delete.

5 Device conditions

ColorFlow device conditions

Device conditions are the basic building-blocks of a color setup. You assign a device condition to a device after you drag the device into the **color setup viewer**.

To create a device condition, you need to specify a device's operating properties—for example, the ink type, paper type, and screening that the device uses. The following two sets of properties are examples of two different device conditions:

- Offset press A, using Staccato 10 screening, Cover 100lb paper
- Offset press A, using Staccato 20 screening, Cover 100lb paper

A device condition *is uniquely defined by its properties*. That is, there can be only one device condition that has a particular set of properties. For example, if you add a device to the PCO position of one color setup and assign to it a particular combination of operating properties, and you add the same device to the SCO position of another color setup and assign to it the same combination of operating properties, the *same* device condition is used in both color setups. If you make a change to this device condition in one color setup, the device condition is changed in both color setups.

After you create a device condition, it appears in the Device Conditions dialog box, which is available from the **View** > **Device Conditions** menu item. In the Device Conditions dialog box, you can view the device conditions that have been created for each device type or delete a device condition from the system. Device conditions that you create also appear in the list of simulation targets and in the **Name** list in the Device Conditions Properties dialog box for reference device conditions.

Device condition properties

Depending on the device type that is used in a device condition, you are required to specify different device condition properties in the Device Condition Properties dialog box. For example, for a digital halftone proofer, you are required to specify values for **Screening** and **Substrate**. For an inkjet proofer, you are required to specify values for **Resolution** and **Substrate**. You cannot add, change, or delete a device condition property. You can only customize the list of values that are available for each device condition property.

The list of values for a device condition is shared among some, but not all, device types that use the property. For example, the device condition property **Screening** is used for offset presses, digital presses, and digital halftone proofers. If, while creating a device condition for an offset press, you add **133lpi** as a value for **Screening**, this value also becomes available for most digital presses and digital halftone proofers. But this value is not available for Versamark digital press device conditions, because this device type uses special screens.

Similarly, **Substrate** values are shared among offset presses and digital halftone proofers, because these devices can often use the same substrates. But Matchprint Inkjet device conditions have a unique set of substrate values to reflect media that is qualified for these devices.

If you want to use the same **Screening** or **Substrate** value with two device types that do not share property values, add the value when defining the device conditions for each device type.

The **Other** property allows you to associate custom values with a device condition. You can use this property to create a difference between two similar device conditions. For example, if two offset presses use the same inks, screening, and paper, but you want to create a unique device condition for each press, you can use an **Other** value to differentiate the two device conditions. Similarly, you can declare **Other** values **Standard Inks** and **Fine Art Inks** to distinguish device conditions that use these two ink sets with the same **Screening** and **Substrate** values.

The properties identified above appear in the **Selection Properties** section of the dialog to indicate that they are used to differentiate device conditions. The **Spot Inks** property allows you to declare spot ink channels for the device condition, and designate the curve channel that the workflow uses for a separation with the spot ink name. The curve channel may be another ink's curve or a custom curve. You can add as many spot inks as you require. When you add a spot ink to an existing device condition, it does not create a new device condition. The existing device condition is modified to include the spot ink wherever it is used.

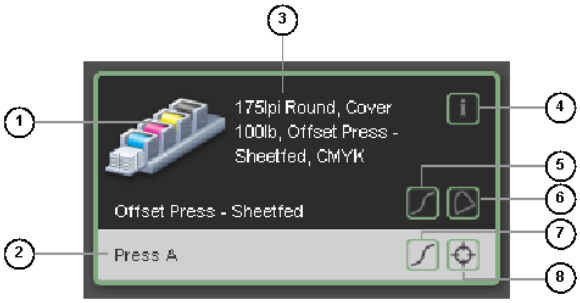
See also:

Ink Optimizing Device Condition on page 206

Components of a device condition

In the **color setup viewer**, a device condition is displayed inside a green or orange border.

All elements inside the border, including device curves, measurements, and profiles, are part of the device condition.



1. **Device type:** a visual representation of the device
2. **Device name:** the name that you assigned to this device
3. **Device condition name:** the name that is automatically generated for this device condition
4. **Properties** icon: use to specify device condition properties
5. **Default Device Curves** icon: use to define initial device curves for all devices
6. **Device Condition Profile** icon: use to manage the device profile
7. **Device Curves** icon: use to define and adjust device curves
8. **Measurements** icon: use to establish the color response of the device condition

How device conditions are created

If you select a unique combination of **Selection Properties** when you specify the device condition **Selection Properties** for a device, ColorFlow creates a new device condition. If you select the same combination of **Selection Properties** that are found in an existing device condition for the device, ColorFlow uses the existing device condition.

ColorFlow does not let you create two device conditions that have the same device type and **Selection Properties**—for example, the same device type, screening, substrate, etc. This has several advantages:

- It eliminates needless duplication of device conditions.
- It forces the reuse of device conditions across color setups. After you characterize a device condition once, you do not need to print and measure charts again every time you need to use the device condition in a new color setup.
- Except for reference device conditions, you do not need to name a device condition. A device condition name is automatically generated based on its properties. Every device condition name is unique and describes the device condition fully. Reference device conditions, however, can have user-defined names.

In some cases, you may require two distinct device conditions even though both device conditions have the same device type, screening, substrate, and so on. You can use the **Other** device condition property to create custom values that can be used to differentiate two device conditions, making them separate device conditions.

If you add a new device and try to create a device condition that uses the same properties as an existing device, the following actions occur:

- If the device is a curved-controlled device, ColorFlow pools the device into the existing device condition.
- If the device is a non-curve controlled device, it cannot be pooled into an existing device condition. You can use the existing device condition as a generic device condition for both devices, or you can create a second device condition for this device by making its properties unique. You can use the **Other** device condition property to include custom values that differentiate this device condition from the existing device condition.

Note: If you use the same device condition in more than one color setup and you make changes to the device condition in one color setup, the device condition is affected in *all* color setups where it is used. For example, if the same device condition is used in color setup A and color setup B, and you make a change to the device curves in color setup A, the device curves for the device condition are automatically changed in color setup B. If you change the **Selection Properties** of a device condition in a color setup, you are choosing a different device condition for use *only* in the color setup shown in the viewer. The original device condition will continue to be used (unaffected) in other color setups that use it.

See also:

Pooled devices in a device condition on page 61

Defining a device condition

You can select device condition properties to create a new device condition or to use an existing device condition.

1. In the **color setup viewer**, click the **Properties** icon in a device condition.
2. In the Device Condition Properties dialog box, select the appropriate **Selection Property** values for your device type: Different **Selection Properties** are available depending on your device type.

   Plate Setup

   Enable the Plate setup check box to select a plate setup from the list. The list is filtered to display plate setups for the chosen device type. Click the **edit** icon to display the

Plate Setups dialog box, where you can add or edit a plate setup.

Screening

Select the type of screening used in this device condition. You can select the type of screening only if you did not select a plate setup. If you need to add more values, click the **edit** button.

Resolution

Select the resolution used in this device condition (inkjet only). If you need to add more values, click the **edit** button.

Substrate

Select the type of paper or substrate used in this device condition. The list is filtered based on the device type. If you need to add more values, click the **edit** button.

3. Define spot inks for the device condition; click the **add** button  to add any number of inks. (The Spot Inks section appears for curve-controlled device conditions only. It lets you select which curve channel will be used for declared spot inks. The ink named "Default" determines the curve channel that will be used for undeclared spot inks.)
   a. Double-click under **Color** to choose a suitable color (for visual recognition only).
   b. Click under **Name** to enter the name of the spot ink.
   c. Click under **Curves** to assign a curve channel to be used for the spot ink. Selectable curve channels include **Custom**, all process ink names, and all other spot ink names that use Custom curves. Selecting **Custom** creates a custom curve channel for the spot ink. Initially, the custom curve is identical to the curve channel previously selected for the spot ink, but can be adjusted without affecting other curve channels.
4. Click **OK**.

If you selected a unique combination of Selection Property values, ColorFlow software creates a new device condition. If you selected a combination of properties that can be found in an existing device condition for this device, ColorFlow software uses that device condition. If the device is a curve-controlled device, and you selected a combination of properties that is already used by a device of the same type, ColorFlow software pools both devices into the same device condition.

Next:

If you created a new device condition, you must establish the color response of the device condition. If the device condition contains a curve-controlled device, you must select a device curve to use when printing a chart to establish the color response of the device condition.

See also:

Device curves on page 54
Ways to establish the color response of a device condition on page 84

Deleting a device condition from the system

You can delete a device condition that you no longer need.

Note: Removing a device condition from a color setup does not delete the device condition from the system. When you remove a device condition from a color setup, the device condition can still be viewed from the Device Conditions dialog box.

You cannot delete a device condition that is used in a color setup.

1. Select **View** > **Device Conditions**.
2. In the **Device Types** list, select the device condition's device type.
3. In the **Device Conditions** list, select the device condition and click the **delete** button.
4. Close the Device Conditions dialog box.

Add, delete, or rename values of a device condition property

You can modify the list of values that are available for a device condition property.

Your changes will affect the property values in all the device types that share the same property values.

1. In the Device Condition Properties dialog box, click the **edit** button beside a property whose values you want to modify.
2. In the dialog box that appears, perform one of the following actions:
   - To add a value, click the **add** button and type a name for the value.
   - To delete a value, select the value and click the **delete** button .
   - To rename a value, double-click the value and type a new name for the value.
3. Close the Device Conditions dialog box.

Reference device conditions

Reference device conditions are used in ColorFlow software to represent the color response of inputs or outputs for which there is no physical device. They most commonly represent published characterization data or printing aim points of industry specifications, such as GRACoL C1 and Fogra 39. These are called CMYK Reference device conditions in ColorFlow software. ColorFlow software also supports RGB Reference device conditions.

Reference device conditions are defined using the built-in CMYK Reference or RGB Reference device, instead of a physical device that you declare.

You can use the built-in measurement data of an industry specification as the color response of a reference device condition. You can also use an arbitrary color response that you have measured from a printed sample, such as a supplied proof or purchased reference sheet.

CMYK reference device conditions

CMYK reference device conditions are often used in a color input to define the color space of CMYK input files. They may also serve as a PCO or SCO, when you want to output CMYK files instead of printed output. Finally, they are often used as the simulation target of a PCO.

Because they are not associated with physical output devices, reference device conditions do not have device condition properties relating to inks, substrate, screening, or resolution. The **Separate Same As** property of the **CMYK Reference** device defines the default black generation parameters of the device condition. Because black generation parameters are different for different device types, you can choose the device type whose black generation strategy should be provided by default for the reference device condition that you create.

Using a built-in reference device condition

ColorFlow software includes built-in CMYK Reference device conditions that encapsulate the color response of industry specifications or printing aim points.

1. From the Devices dialog box, drag the **CMYK Reference** into the **color setup viewer**.
   - To create output that aligns to an industry specification, drag the device into the PCO position.
   - To specify that input files should be reseparated from the color space of an industry specification to the PCO color space, drag the device into the CI position.
2. In the **color setup viewer**, click the **Properties** icon in the **CMYK Reference** device condition.
3. In the **Name** list, select an industry specification such as GRACoL C1 or FOGRA 39.

Note: There are tonal responses added to the GRACoL C1, SWOP C3, and SWOP C5 built-in device conditions that are estimated from their colorimetric response, according to ISO recommendations. This facilitates their use as a simulation target with the Tonal Match curves method.

Next:

Generate a device profile for the reference device condition.

Using a custom CMYK reference device condition

You can create a reference device condition that uses a color response that you supply.

1. Drag the **CMYK Reference** from the Devices dialog box to the **color setup viewer**.
   - To create output that aligns to this color response, drag the device to the PCO position.
   - To specify that input files should be reseparated from the color space of this color response to the PCO color space, drag the device to the CI position.
2. In the **color setup viewer**, click the **Properties** icon in the **CMYK Reference** device condition.
3. In the **Name** list, type a name for the reference device condition.
4. In the **Separate Same As** list, select a device type that best represents the printing technology of the reference device condition. This will determine the black generation strategy for separating content for this device condition.
   For example, if your reference device condition color response will be measured from a supplied sheetfed press sample, select **Offset Press - Sheetfed**.
5. Characterize the reference device condition.
   You can measure a chart or import existing measurements.

The reference device condition that you created is now defined for use as a color input or output, and is also available in the list of simulation targets.

RGB reference device conditions

RGB reference device conditions are used exclusively for color inputs to define the color space of RGB input files. An RGB reference cannot be used as a PCO.

You can select from one of the following built-in RGB reference device conditions:

- Adobe RGB (1998)
- eciRGB v2
- ProPhoto RGB
- sRGB IEC61966-2.1

You can also create a custom RGB Reference device condition to represent the color response of an RGB scanner or camera.

Using a built-in RGB reference device condition

You can select a built-in RGB reference for a color input.

1. From the Devices dialog box, drag the **RGB Reference** into the color input position of the **color setup viewer**.
2. In the **color setup viewer**, click the **Properties** icon in the **RGB Reference** device condition.
3. In the **Name** list, type a name for the reference device condition.

Note: These built-in device conditions are based on published RGB profiles. You cannot adjust or replace these profiles. Click the **Profile** icon to view profile properties.

Using a custom RGB reference device condition

You can select a custom RGB reference for a color input.

1. From the Devices dialog box, drag the **RGB Reference** into the color input position of the **color setup viewer**.
2. In the **color setup viewer**, click the **Properties** icon in the **RGB Reference** device condition.
3. In the **Name** list, type a name for the reference device condition and close **Properties**.
4. In the **color setup viewer**, click the **Profile** icon in the **RGB Reference** device condition.
5. Click **Import**, and browse to an RGB ICC device profile.

Device curves

You can select the device curve that is applied to a curve-controlled device during plate making to control color. You can also define bump or cutoff curves for flexographic printing.

Before you can characterize the device condition of a curve-controlled device, you must select a device curve to use with the device condition. Because a device curve is used during the initial characterization of the device, it remains as part of any calibration curve that is subsequently calculated and used on the device.

The device curve that you select can be a linear curve, cutback curve, or Harmony transfer calibration curve that you import into ColorFlow software. A linear curve does not change the color output of a device—no calibration is applied during output. You can use a cutback curve to compensate for the high dot gain of some screening methods. If you used a Harmony transfer calibration curve to print a chart, or if you previously created a Harmony transfer calibration curve for the device,

you can import the curve to calibrate the device to a desired color response.

Device curves provide a separate curve channel for each process ink in the device condition. Spot inks may have custom curve channels, or they may use another ink's curve.

After you characterize a device, you should only adjust device curves in order to correct the device's color response—for example, in case of a color shift.

If a device condition contains pooled devices, ColorFlow software can generate device curves that align the color response of non-promoted devices in the device condition to that of the promoted device. This occurs automatically when you characterize any non-promoted device.

If the color response of either the promoted or non-promoted device contains tonal response information only, ColorFlow software calculates the non-promoted device curves for process inks according to the Tonal Match method. If the color response of both devices contains colorimetric response information, ColorFlow software uses the Gray Balance method to calculate the process ink curves.

ColorFlow software always uses the Tonal Match method to calculate spot ink device curves.

See also:

Pooled devices in a device condition on page 61
Correcting a color shift on a curve-controlled device on page 86

Selecting default device curves

Select the device curves that curve-controlled devices should use by default, during plate making.

1. In a device condition in the **color setup viewer**, above the devices, click the **Default Device Curves** icon .
2. In the Default Device Curves - Definition dialog box, in the **Curve Origin** area, select **Preset**.
3. Select one of the following options:
   - To characterize the device condition in an uncalibrated state, in the list, select **Linear**.
   - If you know that the uncalibrated device's dot gain (or TVI) is in excess of 30%, select **15% Cutback** in the list.
   - If the device condition is for the Flexographic press device type, you can select from a family of preset curves designed for printing with Kodak Flexcel NX plates.

   For example, if you are characterizing a coldset web press that is printing on newsprint with Staccato 35, select **15% Cutback**.

Note: If you have characterized a device response with the **20% Cutback** curve, you can continue to use it. For new characterization of high-gain device conditions, the **15% Cutback** curve is recommended.

4. To view the default device curves you have selected, click **View Curves**.
5. If the device condition is for the Flexographic Press device type, define **Mindot Bump / Cutoff** curve values.
6. Click **OK**.
   The default device curves that you selected will be used as device curves for all devices in the device condition. The device curves will be used to print the measurement chart, and are part of the calibration curves for each device.

Importing default device curves

You can import a Harmony transfer calibration curve set as ColorFlow default device curves.

Note: You can only import a Harmony *transfer* calibration curve into ColorFlow. You cannot import a Harmony *derived* calibration curve.

1. In a device condition in the **color setup viewer**, above the devices, click the **Curves** icon .
2. In the Device Curves - Definition dialog box, in the **Curve Origin** area, select **Imported**, and click **Import**.
3. Locate the `.hmy` file that you want to import, and click **Open**.
4. In the Import Harmony Transfer Curve dialog box, select a CMYK curve set to use for CMYK device curve channels.
   In the Device Curves Definition dialog box, the curve name that you selected appears.
5. To use the Black Harmony curve for custom spot ink curve, select **Import Black curve for all Custom spot ink curves**.
6. Click **OK**.
7. Import Harmony spot ink curves for use as Custom spot ink curve channels.
   a. Locate the `.hmy` file and click **Open**.
   b. Select a Spot curve and click **OK**.
   If the device condition has a spot ink with the same name that uses a Custom curve, the Harmony Spot curve will be imported.
8. To view the default device curves you have selected, click **View Curves**.
9. If the device condition is for the Flexographic Press device type, define **Mindot Bump / Cutoff** curve values.

10. Click **OK**.
    The curves that you imported are used as device curves for all devices in the device condition. The device curves will be used to print the measurement chart, and are part of the calibration curves for each device.

See also:

Defining bump and cutoff curves on page 57
About importing curves on page 109
Viewing curves using the Curves View-Edit tool on page 117

Defining bump and cutoff curves

You can define bump or cutoff curves separately for process and spot ink curve channels of a device condition for the Flexographic Press device type. The ColorFlow controls described in this section do not appear for device types other than Flexographic Press.

1. In a flexographic press device condition in the color setup viewer, above the devices, click the Default Device Curves icon .
2. In the Default Device Curves - Definition dialog box, use controls in the **Mindot Bump / Cutoff** area to define curve settings below.
3. In the **Process Inks (CMYK) - Tint In** box, enter the CMYK input file tint percentage that you want to produce the minimum printable dot on plate.
   All input tints less than this value will produce no dot on the plate.
4. Select the setting you want for **Snap Tint In to 8-bit values**:
   - If **Snap Tint In to 8-bit values** is selected, the **Tint In** value you enter is snapped to a tint percentage value that corresponds to an 8-bit value between 0 and 255, commonly called a system value. For example, if you enter 0.5%, the value snaps to 0.39%, which corresponds to system value 1.
   - To preserve a **Tint In** value as entered, such as 1.00%, clear **Snap Tint In to 8-bit values** and re-enter the value.

   When you enter a **Tint In** value, ColorFlow sets the **Minimum Tint Out** to the output value of the Preset or Imported curves that you have defined in the **Curve Origin** area, evaluated at the **Tint In** value. A file input value equal to **Tint In** produces an output tint equal to **Minimum Tint Out** in the halftone output image delivered to plate imaging. For some plating and screening technologies, the dot produced by this output tint is printable. If this is the case for your plate and imaging system, leave the **Minimum Tint Out** value.

5. If this evaluated output value does not produce a printable dot, enter the minimum printable dot in the **Process Inks (CMYK) - Minimum Tint Out** box. You cannot enter a value less than the evaluated curve output value.
   The **Process Inks (CMYK) - Minimum Tint Out** values define the process inks Mindot.
6. Define the desired Mindot behavior with **Allow Tint Out increase to improve color match**. Selecting **Allow Tint Out increase to improve color match** is recommended.
   For more information, see the *Defining Mindot Behavior* section.
7. To view the curves that you have defined, click **View Curves**.
   The process inks Mindot appears as a solid dot on the C, M, Y, and K curves.
   If you have entered a **Minimum Tint Out value**, the Mindot you defined will lie above the curve defined in **Curve Origin**. ColorFlow creates a smooth curve from the Mindot to the curve you have defined.
8. To adjust the transition from the Mindot to the defined curve, adjust the **Highlight Contrast** slider. You can also enter a value in the box. For most cases, the default value of 70% is acceptable.
   - Reducing **Highlight Contrast** produces a curve that is flatter near the Mindot, meeting the defined curve at a lower point but reducing contrast in this region.
   - Increasing **Highlight Contrast** produces a curve that preserves highlight contrast, but meets the defined curve at a higher point.
9. Enter **Spot Inks - Tint In** and **Minimum Tint Out** values to define the spot inks Mindot.
10. Click **OK**.
    The bump or cutoff default device curves you have defined are used as device curves for all devices in the device condition. The device curves will be used to print the measurement chart, and are part of the calibration curves for each device.

See also:

Selecting default device curves on page 55
Importing default device curves on page 56
Defining Mindot behavior on page 58
Viewing curves using the Curves View-Edit tool on page 117
Bump and cutoff curves on page 164

Defining Mindot behavior

You can configure ColorFlow-generated device curves to ensure that a file input value equal to the Mindot **Tint In** value always produces an output tint equal to the Mindot **Minimum Tint Out** in the halftone

output image delivered to the plate imaging system. Or, you can configure ColorFlow to increase the output value produced by Mindot **Tint In** to improve color match in the Mindot and highlight region.

1. In the Default Device Curves - Definition dialog box, perform one of these actions:
   - Clear the **Allow Tint Out increase to improve color match** check box to ensure that a file input value equal to the Mindot **Tint In** value always produces an output tint equal to the Mindot **Minimum Tint Out** in the halftone output image delivered to the plate imaging system.
   - Select the **Allow Tint Out increase to improve color match** check box to increase the output value produced by Mindot **Tint In** to improve color match in the Mindot and highlight region.

2. Click **OK**.
   The **Allow Tint Out increase to improve color match** setting takes effect when ColorFlow generates device curves for a demoted device in a device pool of Flexographic Press devices. The setting in the Default Device Curves - Definition dialog box provides a default value for each device that you add to the pool. You can change the setting for individual devices. The setting also provides a default value for simulation and conversion curves of PCOs and SCOs that use the device condition you are defining. You can change the setting for individual PCOs and SCOs.

See also:

Allow Tint Out increase to improve color match control on page 170

Specifying device curve selection for Prinergy

The device curves you define are part of the calibration curves delivered to Prinergy. The device curves are normally fetched from the snapshot selected in Prinergy for output.

For Prinergy output from the Approved snapshot, you can configure ColorFlow to deliver device curves from the ColorFlow current state, instead of device curves from the Approved snapshot. This lets you adjust and use device curves to reflect a change in press behavior, without needing to capture and approve a snapshot for production output.

1. In a device condition in the color setup viewer, above the devices, click the **Default Device Curves** icon .
2. In the **Device Curve Selection for Prinergy** area, specify what should happen when Prinergy requests curves from the Approved snapshot:
   - To deliver device curves from the current state, select the **Use Current State for Approved Snapshot** check box.
   - To deliver device curves from the Approved snapshot, clear the **Use Current State for Approved Snapshot** check box.

   The selection applies to device curves for all devices in the device condition.

See also:

Prinergy and snapshots on page 181

Defining device-specific device curves

You can define the device curves that a specific curve-controlled device in a device condition will use during plate making, replacing the default device curves for the specific device. You can also define device-specific bump or cutoff curves for flexographic printing.

1. In a device condition in the color setup viewer, next to the device for which you want to define specific device curves, click the **Curves** icon .
2. In the Device Curve Adjustments dialog box, click **Redefine**.
3. In the Device Curves - Definition dialog box, in the **Curves Origin** area, select preset curves or import Harmony curves as described for default device curves. View the curves if desired.
4. If the device condition is for the Flexographic Press device type, define Mindot Bump / Cutoff curve values.
5. Click **OK**.
   The specific device curves will be used to print the measurement chart, and are part of the calibration curves for the device.

See also:

Selecting default device curves on page 55
Importing default device curves on page 56
Defining bump and cutoff curves on page 57
Pooled devices in a device condition on page 61
Viewing curves using the Curves View-Edit tool on page 117

Reverting to default device curves

If you have defined specific device curves for a device, or adjusted its device curves, you can revert the device curves to the default device curves.

1. In a device condition in the color setup viewer, next to the device for which you want to revert the device curves to default curves, click the **Curves** icon .
2. In the Device Curve Adjustments dialog box, click **Redefine**.
3. In the Device Curves - Definition dialog box, click **Default**.
4. To view the curves that you have preset or imported, click **View Curves**.
5. Click **OK**.
   The default device curves will be used to print the measurement chart, and are part of the calibration curves for the device, until you make changes to the device curves.

Pooled devices in a device condition

With curve-controlled devices, you can include more than one device in a device condition.

In order to add more than one device in the same device condition, the devices must have the same device type and device condition properties. For example, if you have two offset presses that use exactly the same ink, paper, and screening, you can pool the presses into one device condition. After you add pooled devices to a device condition, the devices are pooled in all color setups where the device condition is used. If you remove a pooled device from a device condition, the device is removed from the device condition in all color setups where the device condtition is used.

There are several advantages to pooling devices:

- Fewer ICC device profiles
- Fewer DeviceLink profiles
- Simpler color setups

One device in the device condition is the *promoted* device. The name of the promoted device appears in bold. The color response of the promoted device is used as the color response of the device condition. Pooled devices in a device condition do not need to have identical uncalibrated color responses. ColorFlow automatically calculates device curves that align to the color responses of all other devices in a

device condition to the color response of the promoted device. A device can only be promoted after it is characterized.

When ColorFlow calculates device curves to align a device to the promoted device response, it automatically changes the device curves **Curve Origin** to **ColorFlow Generated**. It does this for each non-promoted device when it is characterized. The device curves of the promoted device retain their original **Preset** or **Imported** origin.

See also:

Color response of a pooled device condition on page 83

Adding a curve-controlled device to an existing device condition

You can create a device condition with pooled devices.

Requirements: You can only add a pooled device to a device condition if both devices are curve-controlled devices, and if they have the same device type and device condition properties.

1. The Devices palette automatically appears in the ColorFlow workspace, with the Add device drop-down already open to make it easier for you to add a new device. If the Devices palette is not open in your ColorFlow workspace, select **View** > **Devices**.

   Tip: You can double-click anywhere in the background of the color setup viewer to open the Devices palette.

2. Drag a device from the Devices dialog box into an existing device condition in the **color setup viewer**.
3. Characterize the devices in the device condition.
   By default, the first device that you characterize becomes the promoted device.

   ColorFlow calculates device curves that align the color response of all other devices in the device condition with the color response of the promoted device.

After you characterize another device in the device condition, you can manually select it as the promoted device.

Promoting a pooled device in a device condition

You can select a different device in a pooled device condition to be the promoted device.

1. In the **color setup viewer**, in a device condition with pooled devices, click the **Measurements** icon for the device that you want to promote.
2. Click the **Measurements** tab.
3. Click **Promote Device**.

The color response of the device you promoted is now the color response of the device condition. Any affected color control elements are automatically recalculated.

6 Measurement charts

About the measurement chart

ColorFlow can generate charts that are suited to your device inkset, the size of your printing device, and your measuring instrument.

You can generate the following chart types:

Color Characterization

Measure this chart with a spectrophotometer to establish a colorimetric response and a tonal response.

Tonal Characterization

Measure this chart with a spectrophotometer to establish only a tonal response.

Tint Ramp

Measure this chart manually, and enter values into ColorFlow to establish a tonal response.

In order to characterize a printing device, it is best practice to create and print a ColorFlow characterization chart. You can also import a measurement file that you previously created. The measurement data that you import must be in a `.cgt` file, CGATS.5 format, or `.txt` file.

You can measure a ColorFlow-generated chart with any of the following measurement devices:

- X-Rite Eye-One Pro Spectrophotometer,* with or without UV filter
- X-Rite i1 iO Table with X-Rite Eye-One Pro Spectrophotometer,* with or without UV filter
- X-Rite iSis Spectrophotometer*
- X-Rite iSis XL Spectrophotometer*
- Techkon RS-800 (supported on a PC only)

*Spectrophotometer available from Kodak.

Note: [X-Rite Isis Revision, version model E, Spectrophotometer should work but has not been fully tested.]

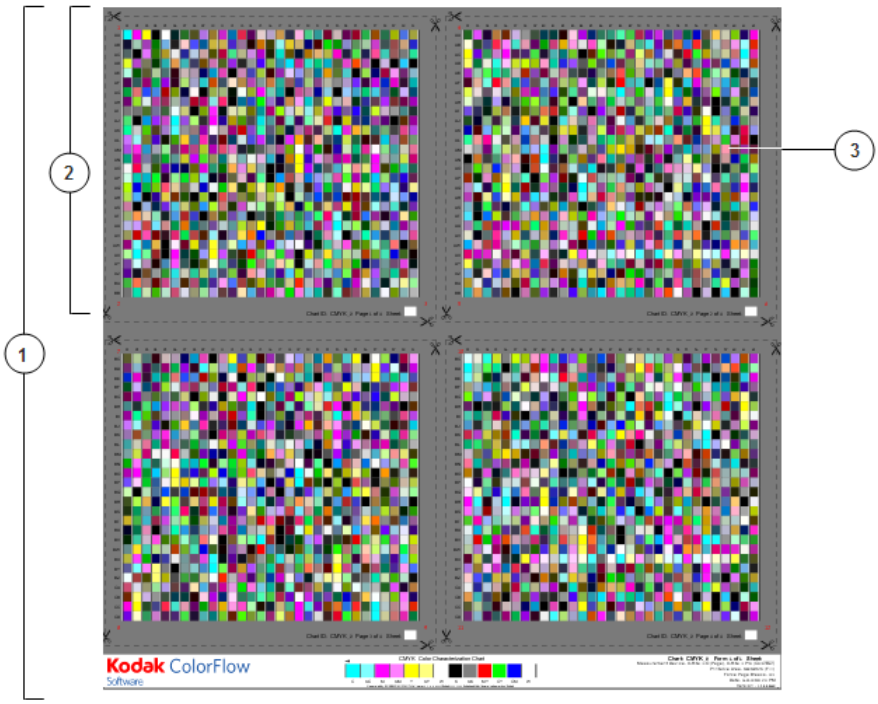
Forms

The entire measurement chart, including footer, is often printed on a single form which is ready for imposition. However, if you are using a very small press, your chart may be distributed across multiple forms.

A form contains several measurement pages that are suited to your color measuring device. After printing the chart, you may need to physically cut out each page from the press sheet(s) in order to measure the color patches.

Each measurement page contains color patches that are a few millimeters in width. The total number of patches that are printed in a chart depends on the number of process inks that are used. The standard four-color CMYK inkset requires about 1600 patches.

The chart in the following example consists of four measurement pages which are contained in a single form.



1. Form
2. Measurement page
3. Patch

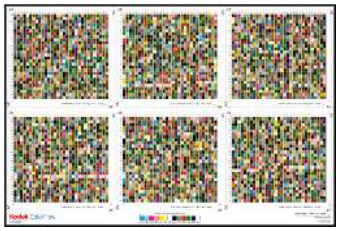
Fold lines and cut lines

When you create a color characterization chart or tonal characterization chart, you can specify the fold lines and/or cut lines that will be used by the in-line folder of your web press. Because

folding or other mechanical action on paper affects color, measurement pages are not printed on fold lines and/or cut lines.

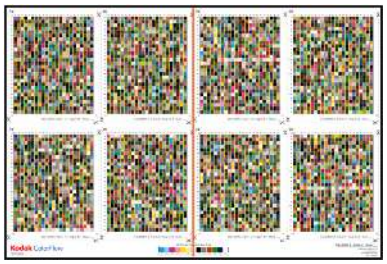
To specify fold lines and/or cut lines, in the **Force Page Breaks** area, select the number of partitioned areas you want to have across and down the form. The default value is 1 across, 1 down—that is, one contiguous area with no fold and/or cut lines.

In the following example, a chart was created with no fold lines and/or cut lines.



In this chart, the printable area is divided into six measurement pages to accommodate the measurement device.

When the value for **Across** is changed to **2**, the measurement pages are resized in order to avoid a vertical fold and cut line in the center of a chart, as indicated by the orange line in the chart illustration in ColorFlow. (This orange line does not appear in the exported PDF file.)



In this chart, each half of the printable area is subdivided into four measurement pages to accommodate the measurement device.

Chart naming

When a new chart is added to the workflow and processed for output, it is automatically assigned a default name CMYK_0, CMYK_1, etc. You can rename these charts and give them a name that is more meaningful.

Dimensions

You can specify chart measurements in inches, points, or millimeters.

Creating a color characterization chart to fill the printable area

You can create a full-color chart that completely fills the printable area you have specified.

If all the required color patches do not fit on a single form, a second form will be created. Each form is the same size, but reduced in width (as much as possible).

1. Select **View** > **Charts**.
2. Click the **add** button +.
3. In the **Chart Type** list, select **Color Characterization**.
4. In the **Page** list, select the spectrophotometer that you will use to measure the pages of this chart.
   The measuring device type that you select determines the maximum size of measurement pages in the chart.
5. In the **Color Bar** list, select the device that you will use to scan the color bar at the bottom of each form.
   The color bar may be used to perform sheet selection from a press run.

   Note: If your chart size is too narrow, the color bar will not appear and you will not be able to use it to perform sheet selection.
6. In the **Height** box, type the height of the form(s) that you want to create. In the **Width** box, enter the maximum allowable width of the form(s).
   Usually, this is the safe printable width on your printing device, excluding marks and color bars.
7. In the **Form Layout** area, select **Fill Printable Area**.
8. If the substrate is not completely opaque and you need to print the same color patches on both sides of the sheet, select **Front and Back Forms**.
9. In the **Across** and **Down** lists in the **Force Page Breaks** area, specify the areas where measurement pages should not be placed.
   Typically, these are the fold and/or cut lines that the in-line folder of a web press will use.

   For example, for a typical 8-up layout, select **4** for **Across** and select **2** for **Down**.

10. Perform one of the following actions:
    - If you want to apply a uniform background tint in all areas outside the measurement pages to assist with ink takeoff on all ink channels, select the **Background Tint** check box.
    - If you do not want to use a tinted background, clear the **Background Tint** check box.
11. Roll your mouse over the chart.
    If the chart extends over multiple forms, an indicator appears and displays the form number of the form that you are current viewing. Click the arrows on the indicator to view a different form.
12. Rename the chart (as required) by selecting the name in the Charts pane.
13. Click **Save**.
14. Export the chart.
    a. Click **Export**.
    b. Browse to the location where you want to export the chart for later imposition and printing, then click **Save**.

The color characterization chart is created as an imposition-ready PDF (`.pdf`) file. If the chart has multiple forms to accommodate a small printable area, each form is a separate page in the exported PDF file.

You can use the same chart to characterize different devices in the same device condition, or different device conditions, if the devices can accommodate the chart size.

Creating the smallest possible color characterization chart

By default, the specified printable area of the chart is filled with as many patches as possible to maximize the quality of the measured characterization data. You can create a full-color chart that contains only the minimum number of color patches needed to characterize the printing device. The height of the chart will be set equal to the height specified for the printable area; the width of the chart will be reduced without eliminating necessary patches.

If all the required color patches do not fit on a single form, a second form will be created. Each form is the same size, but reduced in width (as much as possible).

1. Select **View** > **Charts**.
2. Click the **add** button .
3. In the **Chart Type** list, select **Color Characterization**.
4. In the **Page** list, select the spectrophotometer that you will use to measure the pages of this chart.
   The measuring device type that you select determines the maximum size of measurement pages in the chart.
5. In the **Color Bar** list, select the device that you will use to scan the color bar at the bottom of each form.
   The color bar may be used to perform sheet selection from a press run.

   Note: If your chart size is too narrow, the color bar will not appear and you will not be able to use it to perform sheet selection.
6. In the **Height** box, type the height of the form(s) that you want to create. In the **Width** box, enter the maximum allowable width of the form(s).
   Usually, this is the safe printable width on your printing device, excluding marks and color bars.
7. In the **Form Layout** area, select **Minimize Form Size**.
8. Change the chart **Height** dimension if necessary to adjust the aspect ratio of the form(s).
9. If the substrate is not completely opaque and you need to print the same color patches on both sides of the sheet, select **Front and Back Forms**.
10. In the **Across** and **Down** lists in the **Force Page Breaks** area, specify the areas where measurement pages should not be placed.
    Typically, these are the fold and/or cut lines that the in-line folder of a web press will use.

    For example, for a typical 8-up layout, select **4** for **Across** and select **2** for **Down**.
11. Perform one of the following actions:
    - If you want to apply a uniform background tint in all areas outside the measurement pages to assist with ink takeoff on all ink channels, select the **Background Tint** check box.
    - If you do not want to use a tinted background, clear the **Background Tint** check box.
12. Roll your mouse over the chart.
    If the chart extends over multiple forms, an indicator appears and displays the form number of the form that you are current viewing. Click the arrows on the indicator to view a different form.

13. Rename the chart (as required) by selecting the name in the **Charts** pane.
14. Click **Save**.
15. Export the chart.
    a. Click **Export**.
    b. Browse to the location where you want to export the chart for later imposition and printing, then click **Save**.

The color characterization chart is created as an imposition-ready PDF (`.pdf`) file.

You can use the same chart to characterize different devices in the same device condition, or different device conditions, if the devices can accommodate the chart size.

Creating a tonal characterization chart

You can create a chart that will produce only tonal information.

A tonal characterization chart has fewer patches than a color characterization chart.

1. Select **View** > **Charts**.
2. Click the **add** button +.
3. In the **Chart Type** list, select **Tonal Characterization**.
4. In the **Page** list, select the spectrophotometer that you will use to measure the pages of this chart.
   The measuring device type that you select determines the maximum size of measurement pages in the chart.
5. In the **Height** box, type the height of the form(s) that you want to create. In the **Width** box, enter the maximum allowable width of the form(s).
   Usually, this is the safe printable width on your printing device, excluding marks and color bars.
6. If the substrate is not completely opaque and you need to print the same color patches on both sides of the sheet, select **Front and Back Forms**.
7. In the **Across** and **Down** lists in the **Force Page Breaks** area, specify the areas where measurement pages should not be placed.
   Typically, these are the fold and/or cut lines that the in-line folder of a web press will use.
   For example, for a typical 8-up layout, select **4** for **Across** and select **2** for **Down**.

8. Perform one of the following actions:
   - If you want to apply a uniform background tint in all areas outside the measurement pages to assist with ink takeoff on all ink channels, select the **Background Tint** check box.
   - If you do not want to use a tinted background, clear the **Background Tint** check box.
9. Rename the chart (as required) by selecting the name in the **Charts** pane.
10. Click **Save**.
11. Export the chart.
    a. Click **Export**.
    b. Browse to the location where you want to export the chart for later imposition and printing, then click **Save**.

The tonal characterization chart is created as an imposition-ready PDF (`.pdf`) file.

You can use the same chart to characterize different devices in the same device condition, or different device conditions, if the devices can accommodate the chart size.

Creating a tint ramp chart

You can create a tint ramp chart to manually measure tint values.

The size of the tint ramp chart is fixed. You can only measure it using a hand-held measuring device.

1. Select **View** > **Charts**.
2. Click the **add** button +.
3. In the **Chart Type** list, select **Tint Ramp**.
4. Click **Save**.
5. Export the chart.
   a. Click **Export**.
   b. Browse to the location where you want to export the chart for later imposition and printing, then click **Save**.

The tint ramp chart is created as an imposition-ready PDF (`.pdf`) file.

Exporting a chart

You can export a chart that you previously created, in order to print it.

You can export a chart any time after you create and save it.

1. Select **View** > **Charts**.
2. In the **Charts** list, select the chart that you want to export.
3. Click **Export**.
4. Browse to the location where you want to export the chart, and click **Save**.
   All charts are saved as imposition-ready PDF files.

Printing the chart and selecting sample sheets

You can print the chart from your press and select sample sheets for measurement. The following instructions apply mostly to offset presses, but you can modify them to suit other types of output devices.

Requirements:

- Print the chart using the same substrate, screening, and ink that you specified in the ColorFlow device condition.
- Print the chart on a warm press only. Do not print the chart on a press that has been idle for an extended length of time.
- Ideally, the press should be in the middle of a maintenance cycle when printing the ColorFlow chart.
- Check form roller stripes 8 hours before printing the chart.
  - If necessary, reset roller stripes to the manufacturer's specifications.
  - Replace any damaged rollers as part of regular maintenance. Do not change rollers specifically for printing the ColorFlow chart.
- Check blanket height.
  - If necessary, repack blankets.
  - Replace any damaged or worn blankets as part of regular maintenance. Do not change blankets specifically for printing the ColorFlow chart.
- Ensure that the dampening solution's conductivity, pH, and temperature are within tolerance levels. Do not change the dampening solution specifically for printing the ColorFlow chart.

1. Locate the ColorFlow chart that you exported.
2. Impose it as an entire sheet and, if appropriate, apply a color bar for press and plate marks.
3. In ColorFlow, create a snapshot in order to make the new device condition available in Prinergy.

   Note: You do not have to approve the snapshot.
4. Create a test job in Prinergy to print the chart.
5. In the Prinergy process template editor, select the appropriate device and device condition to output the chart.
   Prinergy applies the device curves that you selected for this device.
6. Operate the press in the same way that you operate during regular production.
   a. Print the ColorFlow chart with uniform solid ink densities across the entire form, at densities within ±0.05 density of house or standard target values.
      If solid ink densities vary by more than 0.10 density units across the target press sheet, you should not use the press sheet to characterize your press.

      Note: If you applied a background tint on the form, the background tint color should be consistent across the form, but it does not need to be a neutral color.
   b. Inspect the lithographic performance to ensure correct ink and water balance, and correct wet trap.
      Ensure that no tinting or toning is present in the live area of the sheet and check slur targets for doubling or sheet movement issues.
   c. Print to the target values of your house standard densities or an industry standard.
      Avoid making density adjustments based on visual assessment of color.
7. Maintaining correct solid ink densities, print at least 500 sheets.
8. Select 5 to 10 sample sheets from a point in the press run where you confirmed densities to be accurate and stable.

   Note: If you replaced any blankets for this press run, check the blanket packing again before you select any press sheets.

   The sample sheets should be at least 25 sheets from the end of the run to avoid shutdown color drift. If the chart includes a color bar, ColorFlow can perform sheet selection to choose one or more printed sheets that are deemed to best represent the color response of the device condition.
9. Visually inspect the sample sheets for printing defects in the color patches area.

Next:

Ensure that the printed sheets are sufficiently dried before you measure them.

Measuring the chart

You can measure the color on your printed chart using a supported measurement device.

Requirements: If necessary, allow sheets to dry for several hours before measuring. For inkjet printing technologies, wait at least 30 minutes before measuring a printed chart.

1. Examine the chart that you printed to determine the chart name.
2. In a device condition in the **color setup viewer**, click the **Measurements** icon next to a device.
3. Click the **Charts** tab.
4. In the **Charts** list, select the chart that you want to measure.
5. Click **Measure**.
   - If you are measuring a color characterization chart or tonal characterization chart, follow the instructions in the Chart Measurement wizard.
   - If you are measuring a tint ramp chart, use a hand-held measuring device to determine the EDA value for the tint of each ink, and enter the value in the Tint Ramp Chart Measurement dialog box.

   When you have measured all the required sheets for a color characterization chart or tonal characterization chart, ColorFlow activates the characterization data and creates a color response for this device condition.

Suspending measurement

Measuring multiple sheets to accurately characterize a print device is a time-consuming process. It may be convenient to suspend measurement, in order to perform other ColorFlow tasks or other responsibilities.

ColorFlow lets you suspend measurement at many points in the measurement process. For automated devices, you can suspend measurement before any page measurement. For the X-Rite i1 Pro, you can suspend measurement prior to scanning any row of patches.

To suspend measurement, click **Suspend** in any measurement control dialog.

Suspend will save all acquired measurements and close the measurement control dialog. The suspended measurement data set will not appear in the Measurements tab, because it is incomplete. If you close the Measurements dialog and quit ColorFlow, your suspended measurement will be retained.

After suspending measurement, you can start a measurement session for any other device or device condition. You can also resume any suspend measurement.

To resume a suspended measurement:

1. In a device condition in the **color setup viewer**, click the **Measurements** icon next to the device whose measurement you suspended.
2. Click the **Charts** tab.
3. In the **Charts** list, select the chart whose measurement you suspended.
4. Click **Measure**.

For hand-held devices, ColorFlow will indicate the sheet, page, and row you were measuring when you suspended measurement. You can resume the measurement, or discard the saved measurements and restart the measurement process. If you resume measurement, the process will continue as though you had not suspended the session. You can suspend the session at any time.

While you are measuring, ColorFlow automatically saves all measurement data and information. If a system or power failure causes ColorFlow to quit unexpectedly, your measurements are retained as though you suspended the measurement session. To recover, resume the measurement as described above.

Remeasuring pages

When you are measuring charts, it is possible for ColorFlow to acquire bad data samples from the measurement device. Bad measurements are often caused by an incorrect scanning path of the measurement head, whether it is scanned automatically or manually.

As measurements are acquired from the measurement device, ColorFlow performs a cursory data check that may result in another scan of the page row. It is difficult to detect errors at this stage without the risk of rejecting good measurements. Consequently, this check has

a very wide tolerance, making it possible for measurement errors to remain in the data set after measurement is complete.

When ColorFlow activates a complete measurement set, it can perform a more thorough and stringent data check. This test allows for the detection of measurement errors that were previously overlooked.

If a patch measurement error is detected, ColorFlow tries to correct the error using other patch measurements with the same tint value. If a correction is not possible, ColorFlow launches the **Remeasure Pages** control dialog.

In the **Remeasure Pages** control dialog, ColorFlow identifies the form, sheet, and patches that contain errors. If you choose to **Continue** the process, ColorFlow will prompt you to load each page containing errors for remeasurement. If you are measuring with the X-Rite i1 Pro, you will be prompted to remeasure only those page rows that contain errors.

After remeasuring the necessary patches, ColorFlow will repeat the data check with the new measurement values. If errors remain, the **Remeasure Pages** dialog is launched again, perhaps identifying another sheet that contains errors.

There may be situations where the form contains a large number of printing defects, making remeasurement unsuccessful. In this case, reprinting the form is necessary. To affect this action in the **Remeasure Pages** dialog, click **Reprint**, instead of **Continue**. This provides three options in the measurement process:

- Suspend measurement while the form is being reprinted.
- Remeasure newly printed sheets, discard all the measurements for the form, but keep measurements of other forms (if the chart contains more than one form).
- Return to the **Remeasure Pages** dialog.

Activating a measurement set

You can establish a new color response for a device condition based on measurement data that you previously collected for the device condition.

1. In a device condition in the **color setup viewer**, click the **Measurements** icon next to a device.
2. In the Measurements dialog box, click the **Measurements** tab.
3. Expand the **Inactive Measurements** section, and select a measurement set.
4. Click **Activate**.
   A color response is calculated from the measurement set that you selected, and replaces the previous color response of this device condition.

Exporting measurement data

You can export a measurement data set from ColorFlow.

1. In a device condition in the **color setup viewer**, click the **Measurements** icon next to a device.
2. In the Measurements dialog box, click the **Measurements** tab.
3. In the **Active Measurement** area, select a measurement set.
4. Click **Export**.
5. Browse to the location where you want to save the measurement set, and click **Save**.
   The measurement data is saved as a `.cgt` file, in CGATS.5 format.

Importing measurement data

Instead of printing and measuring a chart, you can import measurements that you previously saved for a device condition.

Requirements: Before you can import measurement data for the device condition, you must define the device condition.

1. In a device condition in the **color setup viewer**, click the **Measurements** icon next to a device.
2. In the Measurements dialog box, click the **Measurements** tab.
3. In the list, select **Measurement Data**, then click **Import**.
4. Locate the measurement file that contains the measured data for your device condition, and click **Open**.
5. If a previous measurement already exists for this device condition, click **Yes** to deactivate the previous measurement.
   Information about the measurement file that you imported appears in the **Active Measurement** area.

7 Color response

About color response

Color response describes the relationship between input values of a digital file and the output color, such as the color on a press sheet.

If an output device, using one device condition, is maintained in a stable operating state, its color response remains the same from day to day. If you change the device condition of the output device—for example, if you change its paper type—the color response of the device changes.

The color response of the same device, under different device conditions, is different for each device condition. ColorFlow uses the color response of each device condition to generate color control elements that produce the color you want on output.

The color you want on output is defined by the color response of the primary color output (PCO). You define the color response of the PCO by defining the PCO simulation target. Rather than the *actual* color response of the simulation target, the color response of the PCO is the *predicted* color response of your PCO device condition when it simulates the target. For example, if you select GRACoL C1 as the simulation target for your press, the color response of the PCO is the press's color response when it simulates GRACoL C1. Depending on inherent limitations of your press, the PCO color response may or may not achieve GRACoL C1.

Colorimetric response and tonal response

Color response can be categorized into two types:

Colorimetric response

The relationship between input data (in the color space of the device) and output colors (in a device-independent color space such as CIELAB), is known.

Tonal response

The relationship between input data and the resulting effective dot area (EDA) on the printed sheet is known. A tonal response contains no color data.

The type of color response that you obtain from a chart depends on the type of chart that you measure and how you measure it. When you print a ColorFlow color characterization chart and measure it with a

spectrophotometer, you can determine the colorimetric response and tonal response of a device condition.

ColorFlow requires colorimetric data to generate profiles or DeviceLinks. After you have established the color response of a device condition, the device condition's color response type is displayed in the **Type** column on the **Measurements** tab of the Measurements dialog box.

- **Color Only** indicates a CIELAB colorimetric response
- **Tonal Only** indicates a tonal response
- **Tonal and Color** indicates a CIELAB colorimetric and tonal response, obtained from spectral or CIELAB and density measurements

When you define the PCO simulation, the PCO device condition's color response type affects the simulation targets and simulation methods that you can use.

Type of color response	Available for device types	Obtained from	Use with simulation targets	Allows simulation methods
Colorimetric (spectral)	any	One of the following: • Measure ColorFlow color characterization chart • Import suitable ColorFlow measurements	Fogra, GRACoL, SWOP, ISO TVI curves	Gray Balance curves, DeviceLink, Tonal Match curves
Colorimetric (CIELAB)	any	One of the following: • Measure ColorFlow color characterization chart • Import suitable CIELAB measurements • Import ICC profile	Fogra, GRACoL, SWOP	Gray Balance curves, DeviceLink
Tonal (density, EDA)	curve-controlled devices	One of the following: • Measure ColorFlow color characterization chart • Measure ColorFlow tonal characterization chart • Measure tint ramp • Import density measurements	ISO TVI curves	Tonal Match curves

Color response of a device condition

Before ColorFlow can generate color control elements to calibrate a device condition, you must establish the color response of the device condition.

After you establish the color response of a device condition, you should not change it. If you use a device condition in several color setups, changing the device condition's color response will cause elements in all color setups to be recalculated.

Occasionally, the color produced by a curve-controlled device may change from the color that it produced when you first characterized its response in a device condition. For example, the dot gain of an offset press may vary with temperature or a change in the blanket type, causing a color shift. You can correct this shift in color by adjusting device curves to return the device to its original printing behavior.

You can view the color response of a device condition in the following ways:

- If the device is a curve-controlled device, and the device condition has a tonal response, click **Device Tonality** in the Device Curves - Adjustment dialog box to view the tonal response of the device condition. This response does not include a device curve—it shows the uncalibrated device tonality and does not show any device curve that may have been applied when you printed the measurement charts.
- Print a press sheet or proof to see evidence of the color response.
- Use other software to look at a device condition profile and obtain information about the device condition's color response.

See also:

Correcting a color shift on a curve-controlled device on page 86
Uncalibrated Device Tonality dialog box on page 235

Color response of a pooled device condition

When multiple devices are pooled in the same device condition, the color response of the *promoted* device is the color response of the entire device condition.

If you select a different device to be the promoted device, you change the color response of the device condition to be the color response of the newly promoted device. ColorFlow automatically calculates new device curves to align the color response of all other devices in the device condition to the color response of the newly promoted device. It

also recalculates appropriate color control elements that reflect the device condition's new color response.

Ways to establish the color response of a device condition

There are several ways to establish the color response of a device condition.

You can do any of the following:

- Measure a ColorFlow chart
- Activate an existing measurement set
- Import existing measurements
- Import a ICC device profile. This only produces a colorimetric response. If the device condition already has a color response that was derived from measurement data, importing a profile does not replace the existing color response.

See also:

Measuring the chart on page 75
Activating a measurement set on page 78
Importing measurement data on page 78
Importing a device profile on page 124

Color response of the PCO

ColorFlow uses the color response that you establish for the PCO device condition to calculate color control elements that allow the PCO device condition to simulate a target color response.

The PCO device condition, simulating the target that you select, is the color response of the PCO. For example, after you establish the color response of the PCO device condition, you can use it to simulate an industry specification such as GRACoL. In this case, the PCO device condition as it simulates GRACoL is the color response of the PCO.

The color response of the PCO is a *predicted* color response. The PCO device condition may or may not achieve the simulation target exactly, depending on its inherent limitations.

While the color response of a device condition should not be adjusted after it is established, you can adjust the color response of the PCO at any time by adjusting simulation curves and DeviceLinks. When you adjust the PCO color response, ColorFlow automatically propagates

necessary changes to any secondary color outputs (SCOs) and/or color inputs (CIs) in the color setup.

Ways to establish the color response of the PCO

You can establish the color response of the PCO by selecting a simulation target or by importing an ICC device profile for the PCO.

The PCO may have a colorimetric response or tonal response, depending on the way the simulation target is defined, and depending on the PCO device condition's color response type.

If the device condition in the PCO has a colorimetric color response, you can generate ICC profiles and DeviceLinks, and use the tonal-match or gray-balance method to generate curves. If the device condition in the PCO has a tonal color response, or if the simulation target only contains tonal data—for example, if the simulation target is an ISO TVI curve—you can only use the tonal-match method to generate simulation curves.

The principal way to establish a PCO color response is to define the simulation. You define the simulation by clicking the **Simulation** icon , and selecting a simulation target and simulation method.

Another way to establish a PCO color response is to import an ICC device profile as the PCO profile. You import a profile by clicking the **Profile** icon in the PCO, and selecting **Imported**.

Note: If measurement data is available for the PCO device condition, ColorFlow uses the measurement data for calculations by default. A PCO profile that is generated by ColorFlow is not used as the color response of the PCO, and is not used in any calculations.

PCO color response adjustment

You can adjust the color response of the PCO by adjusting simulation curves and DeviceLinks.

Adjusting the PCO color response is an overall adjustment. When you adjust the color response of the PCO, your adjustments may propagate changes to CIs and SCOs in the color setup.

When you adjust the color response of the PCO, your adjustments do not affect the device condition(s) in the PCO, and they do not affect any other color setups.

You can force ColorFlow to recalculate any calibration curves or DeviceLinks for the PCO, as well as any calibration curves or

DeviceLinks for any SCOs. When you recalculate a calibration curve, any adjustments that you previously made to the curves are lost.

See also:

Propagating PCO simulation adjustments to an SCO on page 33

Correcting a color shift on a curve-controlled device

Occasionally, the color produced by a curve-controlled device may change from the color that it produced when you first characterized its response in a device condition. For example, the dot gain of an offset press may vary with temperature or a change in the blanket type, causing a color shift. You can correct this shift in color by adjusting device curves to return the device to its original printing behavior.

If you notice that the color produced by a device has shifted from when you first established its color response, you can recharacterize the device condition by printing and measuring a chart, or you can adjust the device's device curves. Device curve adjustments let you compensate for a change in the response of the device without recharacterization. When you adjust device curves, ColorFlow updates the uncalibrated color response of the device to reflect its current printing behavior. For example, if you notice that a device is printing less magenta in the midtones than it printed when it was first characterized, you can adjust its device curves using the Curve Adjustments tool to indicate that more magenta is required in the midtones.

1. In a device condition in the **color setup viewer**, next to the device for which you want to adjust a device curve, click the **Curves** icon .
   The Device Curves - Adjustment dialog box appears and displays the Curve Adjustments tool.
2. Make your adjustments.
   For example, move the 50% slider for the magenta channel upwards to indicate a required increase in tonality.
   When you move the slider upwards, the following changes can be observed:
   - In the Device Curves dialog box, the magenta curve rises to darken the magenta tonality on output.
   - In the Uncalibrated Device Tonality dialog box, the magenta tonality decreases.
   - In the Image Preview window, the *current* section of the preview image changes to contain less magenta.

   These changes indicate that the color response of the device in the device condition, without its magenta device curve, contains less

magenta tonality, or gain, than the previously established color response for the device condition. That is to say, this device condition currently prints less magenta than it printed when you first characterized it. When you print with the updated magenta device curve, the output device will print with the desired magenta tonality, despite the decrease in its uncalibrated magenta tonality. The effect of the adjustment to correct the tonality back to the measured response is indicated by the *corrected* section of the preview image remaining constant.

Correcting the color response of a curve-controlled device by adjusting device curves has no effect on the color response of the device condition. Instead, the uncalibrated response of the device is deemed to have changed; therefore, its device curves are updated to align the device color response, including device curves, to the desired color response of the device condition.

When you update the uncalibrated color response of a device in a device condition by adjusting its device curves, the update takes effect not only for that device, but in all color setups that use the device condition. However, any simulations and/or conversions that use the device condition are not recalculated, because simulation and conversion curves exist independently of device curves. When you output a file, the updated device curve is combined with a conversion curve or simulation curve to form the print calibration curve that produces your desired color output.

See also:

About previewing images on page 149
Device Curves dialog box on page 234
Uncalibrated Device Tonality dialog box on page 235

8 The color setup and the primary color output

About the color setup and the primary color output

Every color setup has a primary color output (PCO), and every PCO has a simulation target.

The PCO is at the center of the color setup—it is a color reference point to which all devices in the color setup will be aligned. The PCO includes a device condition and a simulation target.

After you define the device condition of the device in the PCO position, you can define the PCO's simulation target. The PCO's simulation target is the color response that the PCO device condition simulates, using curves and/or DeviceLinks that ColorFlow generates.

When you click the **Simulation** icon in the PCO, the Simulation Definition dialog box appears. In the Simulation Definition dialog box, you can choose a simulation target for the PCO device condition. The simulation target can be any of the following:

- An industry specification—for example, GRACoL 2006 Coated 1
- The color response of a different device condition—for example, a reference device condition or device condition that you previously characterized
- The PCO device condition's actual color response—no simulation occurs in this case. (The simulation target is set to **None** and no simulation curves or DeviceLinks are generated.)

Based on the PCO device type and simulation target that you select, ColorFlow displays a recommended simulation method. ColorFlow can use curves and/or DeviceLinks to transform the color response of the device condition in the PCO to the simulation target that you specify. When you add a secondary color output (SCO) to the color setup, devices in SCOs will align to the PCO's simulation target.

For example, if you select **GRACoL 2006 Coated 1** as your simulation target, the default simulation method for curves is **Gray Balance**.

See also:

Simulation targets and methods on page 268

Creating a color setup

You can add a new, empty color setup to the **Color Setups** list to start a new color setup.

1. In the **Color Setups** list, click the **add** button +.

   Note: If you are starting ColorFlow for the first time, an empty color setup automatically appears in the **Color Setups** list.

   The Devices dialog box appears, and a new empty color setup named **Untitled_<*n*>** appears in the **Color Setups** list.

2. Double-click **Untitled_<*n*>**, and type a new name for the color setup.
3. Create the PCO device condition.

See also:

Creating the PCO device condition on page 91

Duplicating a color setup

You can duplicate an existing color setup to create a similar color setup with a different simulation target.

1. In the **Color Setups** list, select the color setup that you want to duplicate.
2. Select **Edit** > **Duplicate Color Setup**.
   The color setup you duplicated appears in the **Color Setups** list as **<*color setup*> copy**.
3. To change the name of the new color setup, double-click its name in the **Color Setups** list, and type a new name.

Deleting a color setup

You can delete a color setup that you no longer need.

1. In the **Color Setups** list, select the color setup that you want to delete.
2. Click the **delete** button −.
3. In the dialog box that appears, click **Yes** to confirm the deletion.

Creating the PCO device condition

You can add the PCO of a color setup.

1. Drag a device from the Devices dialog box into the PCO position in the **Color Setup Viewer**.
2. Define the device condition for the PCO device.

Next: Define the PCO's simulation target.

See also:

Defining a device condition on page 48

Simulating a target

You can simulate an industry specification, the color response of a different device condition, or use the PCO device condition's actual color response.

Simulating an industry specification

You can simulate an industry specification such as GRACoL or a FOGRA specification.

1. In the **color setup viewer**, in the PCO, click the **Simulation** icon.
2. In the Simulation Definition dialog box, in **Target** list, select the industry specification that you want the PCO to simulate.
   It is a best practice to use a default simulation method based on the simulation target that you select. The simulation method is the type of curves and/or DeviceLinks that ColorFlow will generate in order to achieve the simulation target. You can select a different simulation method than the default recommendation, and further adjust the generated curves and/or DeviceLinks in order to fine-tune the simulation.
3. To select a different curve or DeviceLink than the default recommendation, use the **Curves Method** or **DeviceLinks Method** selector to select the method.
   If the PCO device is not a curve-controlled device, the **Curves Method** selector is not available.
4. Click **OK**.
   ColorFlow calculates the required color control elements. The **Simulation** icon shows the progress of the calculation.

See also:

Simulation Definition (PCO to target) dialog box on page 236
Simulation targets and methods on page 268

Simulating another device condition

Simulate a reference device condition, or the color response of a device condition that you previously defined and characterized.

1. In the **color setup viewer**, in the PCO, click the **Simulation** icon.
2. In the Simulation Definition dialog box, in **Target** list, select the device condition that you want the PCO to simulate.
   It is a best practice to use a default simulation method based on the simulation target that you select. The simulation method is the type of curves and/or DeviceLinks that ColorFlow will generate in order to achieve the simulation target. You can select a different simulation method than the default recommendation, and further adjust the generated curves and/or DeviceLinks in order to fine-tune the simulation.
3. To select a different curve or DeviceLink than the default recommendation, use the **Curves Method** or **DeviceLinks Method** selector to select the method.
   If the PCO device is not a curve-controlled device, the **Curves Method** selector is not available.
4. Click **OK**.
   ColorFlow calculates the required color control elements. The **Simulation** icon shows the progress of the calculation.

See also:

Simulation targets and methods on page 268

Using the PCO device condition's actual color response

You can use the PCO device condition's color response without simulating another target.

1. In the **color setup viewer**, in the PCO, click the **Simulation** icon.
2. In the Simulation Definition dialog box, in **Target** list, select **None**.
3. Click **OK**.
   No DeviceLink is generated. If the PCO device condition is a curve-controlled device, a linear simulation curve is generated.

Note: This simulation curve may be adjusted to modify the PCO color response away from the device condition's actual color response. The device condition remains unaffected.

Adjusting simulation curves

After you examine the color output of the PCO, if you want to produce a closer color alignment between the PCO and its simulation target, adjust the simulation curves that ColorFlow has calculated.

Simulation curves are available only for curve-controlled devices.

1. In the **color setup viewer**, in the PCO, click the **Simulation** icon .
2. In the Simulation Adjustment dialog box, click the **Curves** tab (this is selected if the DeviceLink method is **None**).
   The Curve Adjustment tool appears.
3. Make the appropriate adjustments.
4. Click **Apply** to save your changes.

See also:

About adjusting curves on page 111
Adjusting curves using the Curve Adjustments tool on page 113

Adjusting a simulation DeviceLink

After you examine the color output of the PCO, if you want to produce a closer color alignment between the PCO and its simulation target, adjust the simulation DeviceLink that ColorFlow has calculated.

1. In the **color setup viewer**, in the PCO, click the **Simulation** icon .
2. In the Simulation Adjustment dialog box, click the **Adjust DeviceLink** tab.
3. Make the appropriate adjustments.
4. Click **Apply** to save your changes.

See also:

Adjusting curves using the Curve Adjustments tool on page 113
About adjusting DeviceLinks on page 133

Changing the simulation target or method

You can recalculate the curves and/or DeviceLinks that ColorFlow has generated for a simulation.

1. In the **color setup viewer**, in the PCO, click the **Simulation** icon .
2. In the Simulation Adjustment dialog box, click **Redefine**.
3. Select a new simulation target and simulation method.

See also:

Simulating a target on page 91

9 Secondary color outputs

About secondary color outputs

ColorFlow calculates color control elements that calibrate a secondary color output (SCO) to align to the color space of the primary color output (PCO) so that the color produced by the SCO device appears very similar to the color produced by a PCO device.

After you define the simulation target for the PCO and you define the device condition of an SCO, you can select the conversion method that is used to transform data from the SCO to the color space of the PCO. You can use both curves and DeviceLinks in a conversion, depending on your device type.

When you click the **Conversion** icon between an SCO and the PCO, the Conversion - Definition dialog box appears and displays a recommended conversion method based on the types of devices that are used in the PCO and in the SCO. The conversion method may include **Tonal Match** or **Gray Balance** curve transformations, and/or full color management DeviceLinks. If required, you can select a different conversion method than the default recommendation. For example, you can select a DeviceLink in addition to a curve when the default recommendation only includes a curve.

Note: Depending on the DeviceLink options you choose, the gamut of the SCO is either mapped or clipped. Only when the SCO's gamut entirely encompasses the PCO's gamut, can all colors from the PCO can be reproduced on the SCO.

After you examine the actual output from the SCO device, you can adjust the PCO to SCO conversion curves and/or DeviceLink in order to fine-tune the color alignment from the PCO to the SCO.

Creating an SCO

You can add an SCO to a color setup.

1. The Devices palette automatically appears in the ColorFlow workspace, with the Add device drop-down already open to make it easier for you to add a new device. If the Devices palette is not open in your ColorFlow workspace, select **View** > **Devices**.

   Tip: You can double-click anywhere in the background of the color setup viewer to open the Devices palette.

2. Drag a device from the Devices dialog box to the SCO position in the color setup viewer.
3. Define the device condition for the SCO device.

Next: You can add additional SCOs to a color setup at any time. After you define a device condition for the SCO, establish the PCO-to-SCO conversion method.

See also:
Defining a device condition on page 48

Defining a conversion method for the SCO

You can define how data should be transformed from the SCO to the color space of the PCO.

Requirements: The SCO device condition must be defined and its color response must be established.

1. In the **color setup viewer**, click the **Conversion** icon between the PCO and an SCO.
   The Conversion-Definition dialog box appears and displays a recommended conversion method based on the device type that is used in the SCO.
   For example, if the SCO is an inkjet proofer, the default conversion **DeviceLink Method** is set to **Full Reseparation**.
2. To select a different curve or DeviceLink than the default recommendation, use the **Curves Method** or **DeviceLinks Method** selector to select the method.
   If the SCO device is not a curve-controlled device, the **Curves Method** selector is not available.
3. Click **OK**.
   ColorFlow calculates the required color control elements. The **Conversion** icon and conversion link show the progress of the calculation.

See also:
Conversion Definition (PCO to SCO) dialog box on page 243

Adjusting SCO conversion curves

After you examine the color output of the SCO, if you want to produce a closer color alignment between the SCO and the PCO, adjust the conversion curves that ColorFlow has calculated.

Conversion curves are available only for curve-controlled devices.

1. In the **color setup viewer**, click the **Conversion** icon between the PCO and the SCO.
2. In the Conversion Adjustment dialog box, click the **Curves** tab (this is selected if the DeviceLink method is **None**).
   The Curve Adjustment tool appears.
3. Use the Curve Adjustments tool to adjust the conversion curve.
   - If you are not satisfied with the way the SCO reproduces the PCO color output in one channel only, select and adjust that channel. For example, you notice that the SCO has an overall magenta cast across all tones, adjust the **M** channel.
   - If you want the SCO color output to be lighter or darker in a certain range but you want to maintain the overall color, or if you want to correct a color cast in a certain range of gray, select and adjust the **CMY** channels.
4. To edit a specific curve, click **Conversion Curves** and use the Curve View-Edit tool.
5. Click **Apply** to save your changes.
   Depending on the nature of your adjustments, ColorFlow may need to recalculate certain color control elements.

See also:

About adjusting curves on page 111
Adjusting curves using the Curve Adjustments tool on page 113
Adjusting curves using the Curve View-Edit tool on page 117

Adjusting an SCO DeviceLink

After you examine the color output of the SCO, if you want to produce a closer color alignment between the SCO and the PCO, you can adjust the conversion DeviceLink that ColorFlow has calculated.

1. In the **color setup viewer**, click the **Conversion** icon between the PCO and the SCO.
2. In the Conversion - Adjustment dialog box, click the **Adjust DeviceLink** tab.
3. Select the type of adjustment that you want to make.
   If you select **Input Tonality** or **Output Tonality**, the Curve Adjustments tool appears.

4. Make the required adjustments, and click **Apply** to commit your changes.
   Depending on the nature of your adjustments, ColorFlow may need to recalculate certain color control elements.

See also:

Adjusting curves using the Curve Adjustments tool on page 113
About adjusting DeviceLinks on page 133

Removing an SCO from a color setup

You can delete an SCO from the color setup in the **color setup viewer**.

Note: Removing a device condition from a color setup does not delete the device condition from the system. When you remove a device condition from a color setup, the device condition can still be viewed from the Device Conditions dialog box.

1. Click the border of the of the SCO device condition.
   The border becomes purple.
2. Perform one of the following actions:
   - For Windows, press Delete.
   - For Mac OS X, press Fn+Delete.
3. Click **Yes** to confirm the deletion.

The SCO and any PCO to SCO conversions that you have created are removed from this color setup. The device condition that was used in this SCO still exists, and can be viewed from the Device Conditions dialog box.

See also:

Deleting a device condition from the system on page 50

Defining a new method for SCO conversion

You can recalculate the curves and/or DeviceLinks that ColorFlow has generated for an PCO to SCO conversion.

1. In the **color setup viewer**, click the **Conversion** icon between the PCO and the SCO.
2. In the Conversion - Adjustment dialog box, click **Redefine**.
3. Select a new conversion method.

See also:

Defining a conversion method for the SCO on page 96

10 Color inputs

About color inputs

Color inputs (CIs) describe the color space of input files so that ColorFlow can generate color control elements that convert data in the input color space to the color space of the primary color output (PCO).

The use of a CI in a color setup is optional. When you define a CI, Prinergy uses that CI as the source space to reseparate input files to the destination color space of the PCO. This conversion is defined in ColorFlow by specifying a profile pair or DeviceLink conversion between the CI and PCO. If you do not want to reseparate all input files using the color space of the CI, you do not need to include a CI in your color setup.

Having a color input in your color setup may be useful if, for example, you receive a CMYK input file that exceeds the maximum ink coverage of your press because it was incorrectly separated from RGB during the design stage. In this case, by defining a CI, you can choose to reseparate your received CMYK content in order to assign a more desirable Total Area Coverage (TAC) value to your press-ready separations.

After you define the simulation target for the PCO and you define the device condition of a CI, you can select the conversion method that is used to transform input data from the CI to the color space of the PCO. When you click the **Conversion** icon between an CI and the PCO, the Conversion - Definition dialog box appears and displays a recommended conversion method. If required, you can select a different conversion method than the default recommendation. You can also specify a different conversion method for raster content (such as images) and vector content (such as text).

Note: ColorFlow 1.2 supports RGB devices and RGB color inputs, as well as color input conversion. RGB and CMYK color input conversions are enhanced to include profile pair conversion to current DeviceLinks or RGB-to-CMYK DeviceLinks (for RGB color input conversions).

See also:

Ink Optimizing Input device on page 206
Ink Optimizing Device Condition on page 206

Creating a CI

You can add a CI to a color setup.

1. The Devices palette automatically appears in the ColorFlow workspace, with the Add device drop-down already open to make it easier for you to add a new device. If the Devices palette is not open in your ColorFlow workspace, select **View** > **Devices**.

   Tip: You can double-click anywhere in the background of the color setup viewer to open the Devices palette.

2. Drag a device from the Devices dialog box into the CI position in the **color setup viewer**.
   The CI is usually a reference device that you use to define the color space of input files.
3. Define the device condition for the CI device.

Next:

After you define a device condition for the CI, establish the CI-to-PCO conversion method.

See also:

Reference device conditions on page 51

Conversions for input types

When you define the conversion between the CI and the PCO, you can choose between two conversion methods for image (raster) content and another conversion method for graphic (vector) content.

In the Input Conversion - Definition dialog box, there are two conversion methods you can apply to your images and graphics. For each content type you can select either **Profile Pair** or **DeviceLink**. In the **Image** tab, you can define the conversion method for raster content. On the **Graphic** tab, you can define the conversion method for vector content.

Note: The options in the dialog box vary depending on the **RGB Reference** or **CMYK Reference** device you selected.

The way that ColorFlow handles raster vs. vector content reflects the way that input data is processed as either image or graphic data in the Prinergy workflow.

Input data type	Prinergy treats as
Pictures	Image
Text	Graphic

Input data type	Prinergy treats as
Linework	Graphic
Gradient (shading)	Image or graphic, operator choice

See also:

Conversion Adjustment (Color Input to PCO) dialog box on page 253

Defining a conversion method for the CI

Define how input data should be transformed to the color space of the PCO.

Requirements: The CI device condition must be defined and its color response must be established.

1. In the **color setup viewer**, click the **Conversion** icon between the CI and the PCO .
   The Input Conversion - Definition dialog box appears.
2. Select the **Conversion Method**, either **Profile Pair** or **DeviceLink**.
3. Click the **Image** tab.
   These settings vary depending on the selected conversion method.
4. Adjust the settings accordingly.
5. Click the **Graphic** tab.
   These settings vary depending on the selected conversion method.

   Note: To use the same settings for text or linework as you do for pictures, select the **Graphic Conversion Same as Image Conversion** check box.
6. Click **OK**.
   ColorFlow calculates the required DeviceLinks. The **Conversion** icon and conversion link show the progress of the calculation.

See also:

Input Conversion Definition (Color Input to PCO) dialog box on page 248

Adjusting a CI conversion

After you examine the separations that are produced by the CI, you can adjust the CI to PCO conversion DeviceLink to fine-tune the conversion.

For example, you can adjust the input tonality of a single ink channel to modify how the ink channel is reseparated.

Note: Making a single-channel curve adjustment has a high impact because it changes the way separations are created for all output devices.

1. In the **color setup viewer**, click the **Conversion** icon between the CI and the PCO.
2. In the Input Conversion - Adjustment dialog box, select the **Conversion Method**.
3. Make the required adjustments, and click **Apply** to commit your changes.
   Depending on the nature of your adjustments, ColorFlow may need to recalculate certain color control elements.

See also:

Adjusting curves using the Curve Adjustments tool on page 113
About adjusting DeviceLinks on page 133

Removing a CI from a color setup

Delete a CI from the color setup in the **color setup viewer**.

Note: Removing a device condition from a color setup does not delete the device condition from the system. When you remove a device condition from a color setup, the device condition can still be viewed from the Device Conditions dialog box.

1. Click the border of the CI device condition.
   The border becomes purple.
2. Perform one of the following actions:
   - For Windows, press Delete.
   - For Mac OS X, press Fn+Delete.
3. Click **Yes** to confirm the deletion.

The CI and any CI-to-PCO conversion that you created are removed from this color setup. The device condition that was in this CI still exists; you can view it from the Device Conditions dialog box.

See also:

Deleting a device condition from the system on page 50

Defining a new method for CI-to-PCO conversion

Recalculate the DeviceLinks that ColorFlow generated for a CI-to-PCO conversion.

1. In the **color setup viewer**, click the **Conversion** icon between the CI and the PCO.
2. In the Conversion - Adjustment dialog box, click **Redefine**.
3. Select a new conversion method.

See also:

Defining a conversion method for the CI on page 103

11 Curves

About curves

Applying calibration curves to a printing plate is a standard method of controlling color on curve-controlled devices such as offset presses and digital halftone proofers.

A calibration curve changes the natural color response of a device by adjusting the tint percentage in the digital file when the device images plates. Curves can either reduce a tint (cutback) or increase a tint (bump) in a file when imaging a plate.

There are two methods of calibrating a press using calibration curves:

- **Tonal Match** refers to tonal value increase (TVI), also known as dot gain, and uses the calculated Effective Dot Area (EDA) for calibration. Calculations are based on the density measurements of each ink or colorant. The same target response can be used for each process color, or different target responses can be used for optimizing color builds.
- **Gray Balance** uses the CIELAB values of the neutral or near-neutral axis to calibrate the chromatic process colors (CMY), while black ink is calibrated based on L* (lightness) or density. Unless the device and device condition produce good gray balance when uncalibrated, the process colors will have separate targeted responses.

You can choose either method when you calibrate the primary color output (PCO) to the simulation target, or when you calibrate a device condition such as a secondary color output (SCO) to align to the PCO.

Curves in ColorFlow

ColorFlow can use five types of curves to control the color that is imaged on a plate.

Device curves

Are specific to a device and device condition. When you characterize a device, you can choose a device curve to exercise the working range of the device. You can also import a Harmony transfer calibration curve as a ColorFlow device curve. When multiple devices are pooled in a device condition, ColorFlow calculates device curves in order to align the color response of

all devices in the device condition with the color response of the promoted device.

Simulation curves

Calibrate the device condition in the PCO to the simulation target.

Conversion curves

Calibrate SCO device conditions in a color setup to the same gray balance or tonality as the PCO.

Calibration curves

Used by the workflow when imaging a plate. Calibration curves are:

- For a device in a PCO, the combination of a simulation curve and a device curve
- For a device in an SCO, the combination of a conversion curve and a device curve

Plate setup curves

Linearize a plate for a particular plate type, device type, screening, and plate line. Plate setup curves are identical for each separation. They are typically used for process control in the plate room.

ColorFlow manages a calibration curve as if it is made up of discrete components—for example, a device curve plus a simulation curve. Before providing a calibration curve to a workflow, ColorFlow combines the calibration curve's components into a single curve. You can export a calibration curve or a device curve from ColorFlow, but you cannot export a simulation curve or a conversion curve.

A linear calibration curve makes no change to the digital file before imaging on plate. You can start off with a linear calibration curve in ColorFlow and later adjust the curve so that it changes the file in the way that you want.

The curves that ColorFlow calculates are smooth and monotonic, increasing continuously from 0% tint (paper) to 100% tint (solid). Using smooth curves provides for smooth vignettes and reduces "flashing" (or hue changes) in color builds when moving through the tonal scale.

The curve types described above are explicitly defined and identified in ColorFlow. Curves also exist inside device profiles and DeviceLinks. These profile curves can be viewed and adjusted using tools similar to those used for explicit ColorFlow curves.

About importing curves

You can import Harmony transfer calibration curves into ColorFlow.

After you specify the properties of a device condition, you can click the **Curves** icon to import a Harmony transfer calibration curve to be used as a ColorFlow device curve.

The following are situations in which you might import a device curve:

- You have a legacy Harmony transfer calibration curve that already produces the desired color response on the PCO device condition. If you import the curve and select no simulation for the PCO (set the simulation target to **None**), ColorFlow will use the Harmony transfer calibration curve as the calibration curve.
- You are about to measure a chart generated by ColorFlow, but the device curve that was used to print the chart is not the device curve that is currently configured in ColorFlow. You can import the device curve that was used to print the chart in order to obtain correct measurement information.

See also:

Printing as you did with Harmony, without characterizing device conditions on page 37
Importing default device curves on page 56

Viewing a device curve

After you define a device curve for a device in a particular device condition, you can view the curve using the Curve View-Edit tool.

1. In the **color setup viewer**, click the **Curves** icon next to the device name.
   The Curve Adjustments tool appears in the Device Curve – Adjustments dialog box.
2. Click **Device Curves** to view the actual device curves.

See also:

About the Curve View-Edit tool on page 116

Viewing a simulation curve

After you define a curve method for a simulation, you can view the calibration curve using the Curve View-Edit tool.

1. In the **color setup viewer**, click the **Simulation** icon  .
2. In the Simulation Adjustment dialog box, click the **Curves** tab (this is selected if the DeviceLink method is **None**).
   The Curve Adjustments tool appears in the Simulation Adjustment dialog box.
3. Click **Calibration Curves** to view the actual calibration curves.
   Each calibration curve consists of a device curve and a simulation curve. If the device condition contains pooled devices, select the appropriate device in the **Device** list.
4. To see only the simulation curve, click **Show Simulation Curves only**.

See also:

About the Curve View-Edit tool on page 116

Viewing a conversion curve

After you define a curve method for a conversion, you can view the calibration curve using the Curve View-Edit tool.

1. In the **color setup viewer**, click the **Conversion** link  .
2. In the Conversion Adjustment dialog box, click the **Curves** tab (this is selected if the DeviceLink method is **None**).
   The Curve Adjustments tool appears in the Conversion Adjustment dialog box.
3. Click **Calibration Curves** to view the actual calibration curves.
   Each calibration curve consists of a device curve and a conversion curve. If the device condition contains pooled devices, select the appropriate device in the **Device** list.
4. To see only the conversion curve, click **Show Conversion Curves only**.

See also:

About the Curve View-Edit tool on page 116

Viewing plate setup curve values

You can view the tint values for the plate line.

1. Select **View** > **Plate Setups**.
2. Select a device type in the **Device Type** list.
3. Select a **Plate Setup** and a **Plate Line**.
   Tint values for the plate line appear in the **Tint Values** list.
   ColorFlow does not display a graph of a plate curve.

About adjusting curves

You can adjust curves to fine-tune or update the color response of a device in a device condition.

The following are three common types of curve adjustments:

Device Curve Adjustment

A local adjustment that affects only a single device. A device curve adjustment may be required when a physical change in the device—such as new blankets on a press—causes a color shift. You can update the uncalibrated color response of the device to reflect the change by adjusting the device curve.

Simulation Curve Adjustment

A global adjustment affecting all devices in the PCO device condition and all the devices in the color setup, including those in any SCOs. A simulation curve adjustment can be used to fine-tune a simulation, and may propagate changes to SCOs and color inputs of the color setup.

Conversion Curve Adjustment

A global adjustment affecting all devices in a particular SCO. A conversion curve adjustment can be used to fine-tune the color alignment between the PCO and an SCO.

You can adjust curves in ColorFlow using the Curve Adjustments tool or the Curve View-Edit tool.

Curve Adjustments tool

Use this tool to make general tonal and color adjustments at fixed curve points, with fixed ranges.

Curve View-Edit tool

Use this tool to view and edit curves directly. The Curve View-Edit tool lets you change the curve in the exact range and at the

exact center that you specify. This is an advanced tool which provides more precise control than the Curve Adjustments tool.

Both tools offer the following adjustment modes:

- Single channel C, M, Y, or K: The curves can be adjusted separately for each ink channel.
- Coordinated CMY: You can request a specific color cast and/or lightness shift in a given range of the neutral axis, and ColorFlow calculates and applies the appropriate coordinated changes to the C, M, and Y curves simultaneously. In the CMY adjustment mode, one curve may move in one direction while the other two curves move in the opposite direction to achieve the overall result that you specified.
- Spot: Enables you to make adjustments to a selected custom spot ink curve defined in the device condition.

See also:

Correcting a color shift on a curve-controlled device on page 86
Adjusting simulation curves on page 93
Adjusting SCO conversion curves on page 96

Curve Adjustments tool

Use the Curve Adjustments tool to specify a general change in tonal response. This tool lets you adjust all ColorFlow curve types and profile input/output curves.

About the Curve Adjustments tool

The Tonal Adjust tool can be used for simple adjustments. When you use the Curve Adjustments tool, you request a change to the tonality of a device and ColorFlow adjusts curves appropriately in order to produce that tonality.

The Curve Adjustments tool includes a graph and five sliders that represent different points in the tonal range. The value in the box under each slider is a change percentage. Because the graph shows only curve changes, it appears flat until an adjustment is made. This helps you make adjustments based on the desired overall effect, rather than adjustments based on how the actual curves appear. You can directly view or change actual curves with the Curve View-Edit tool. When you make a change in either tool, you can see the change in both tools.

You can adjust individual ink channels separately, adjust the CMY channels together, or adjust a spot color curve.

Table 1: Use the following keyboard shortcuts to select a channel:

To select	In Windows	In Mac OS X
C	Ctrl+1	Command+1
M	Ctrl+2	Command+2
Y	Ctrl+3	Command+3
K	Ctrl+4	Command+4

Note: Spot color curves appear only in ColorFlow curves, not in device profile or DeviceLink input/output curves.

Adjusting curves using the Curve Adjustments tool

You can use the Curve Adjustments tool to adjust individual curve channels, or to adjust CMY gray balance lightness or cast.

Using the Curve Adjustments tool on individual color channels

You can use the Curve Adjustments tool to change the curves of individual ink channels.

1. Select the channel you want to adjust (**C**, **M**, **Y**, or **K**, or **Spot**).
2. If you selected the **Spot** channel, use the **Spot Ink** selector to choose the specific spot ink channel.
3. Move the appropriate slider to adjust the corresponding tonal range.
   - Slider at 10% (Highlight): affects 0 to 25%
   - Slider at 25% (Quartertone): affects 0 to 50%
   - Slider at 50% (Midtone): affects entire tonal range
   - Slider at 75% (3/4-tone): affects 50 to 100%
   - Slider at 90% (Shadow): affects 75 to 100%

   You can also enter a value in the box under the slider to indicate the curve change percentage.

   Limitations are applied for each slider, in each direction, to prevent unwanted artifacts.
4. At any time, you can do the following:
   To see the calculated tonal response (EDA) resulting from your adjustment, click:
   - **Device Tonality** (device curve adjustment)
   - **Expected Tonality** (simulation or conversion curve adjustment)

To see the effect of your adjustment on the underlying curve, click:

- **Device Curves** (device curve adjustment)
- **Calibration Curves** (simulration or conversion curve adjustment)
- **Input Curves** (device profile or DeviceLink input tonality adjustment)
- **Output Curves** (device profile or DeviceLink output tonality adjustment)

To see the immediate color effect of the adjustments on an image, click **Preview**.

To refine the curves or profile that you are adjusting, click **Redefine**.

5. Repeat these steps to adjust each channel.

See also:

About the Curve View-Edit tool on page 116
About previewing images on page 149

Using the Curve Adjustments tool on neutral balance

Use the Curve Adjustments tool to adjust a color cast, lightness error, or both in near-neutral CMY colors. ColorFlow adjusts CMY curves simultaneously to achieve the color change you request.

1. Click **CMY**.
2. Select the tonality range in which you want to adjust the neutral balance.
   Click **Highlight**, **Quartertone**, **Midtone**, or **3/4-tone**.
3. Use the lightness (L*) slider together with the cast (a*b*) selector to adjust the color in the chosen range.
   You can also type values directly in **L***, **a***, and **b*** boxes in the **Color Change** area.

   Your movement in the color selector may be constrained to prevent unwanted artifacts.

   The displayed color patches demonstrate the effect of all the adjustments specified in this dialog box. The color produced by the curves or profile before your adjustment is shown on the left (**Before**). The color produced by the curves or profile after your adjustment is shown on the right (**After**).

   Note: In the case of device curve adjustments, the color that is currently being produced is shown on the left (**Current**), and can be adjusted to reflect any changes in the device color output that require correction. The desired color output is shown on the right (**Corrected**) and remains constant, as a reference to the expected color output after correction.

4. If the neutral gray that is displayed in the color patch does not visually align to the neutral gray on your proof or press sheet, adjust the displayed color of the patch on your viewing monitor.
   a. Select the **Adjust Displayed Colors** check box.
   b. Use the lightness (L*) slider and the cast (a*b*) selector to change the displayed color to align to the color on your proof or press sheet.
   This color change does not affect any curves or color control elements. You are only adjusting the displayed color of the patches.
   c. To move the sample point to the color at the center of your adjustment range, click **Reset**.
   d. When you achieve the correct color, clear the **Adjust Displayed Colors** check box.
5. To display the color patches in a larger view for easier color comparison, click a color patch.
   The color patches open in a new window.
6. At any time, you can do the following:
   To see the calculated tonal response (EDA) resulting from your adjustment, click:
   - **Device Tonality** (device curve adjustment)
   - **Expected Tonality** (simulation or conversion curve adjustment)

   To see the effect of your adjustment on the underlying curve, click:
   - **Device Curves** (device curve adjustment)
   - **Calibration Curves** (simulation or conversion curve adjustment)
   - **Input Curves** (device profile or DeviceLink input tonality adjustment)
   - **Output Curves** (device profile or DeviceLink output tonality adjustment)

   To see the immediate color effect of the adjustments on an image, click **Preview**.
   To refine the curves or profile that you are adjusting, click **Redefine**.

See also:

About the Curve View-Edit tool on page 116
About previewing images on page 149

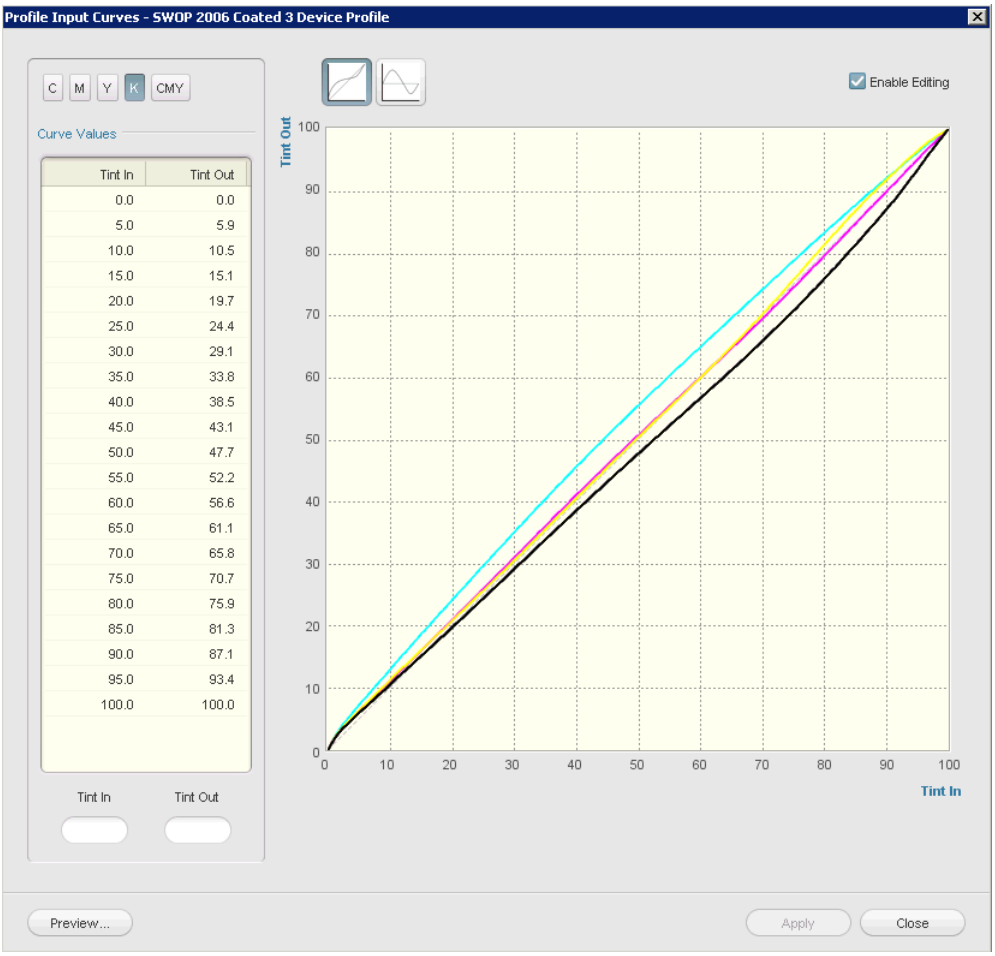
Curve View-Edit tool

Use the Curve View-Edit tool to view and edit curves directly. This is an advanced tool that lets you change curves in the exact range and at the

exact center that you specify. It applies to all ColorFlow curve types and profile input/output curves.

About the Curve View-Edit tool

The Curve View-Edit tool can be used for viewing and advanced adjustments of curves. When you use the Curve View-Edit tool, you can precisely adjust the shape of a curve.



The Curve View-Edit tool shows the curve values and a graph of the curve. If you are viewing or editing a calibration curve and the device condition contains pooled devices, you must select the device with the calibration curve you want to view.

You can view or adjust each ink channel (C, M, Y, K) separately or adjust the CMY channels together. You can also view and edit spot ink channels of ColorFlow curves.

Table 2: You can use the following keyboard shortcuts to select a channel:

To select	In Windows	In Mac OS X
C	Ctrl+1	Command+1

To select	In Windows	In Mac OS X
M	Ctrl+2	Command+2
Y	Ctrl+3	Command+3
K	Ctrl+4	Command+4

You can view and edit curves in either of two modes: Tint Out and Tint Change. Tint Out mode shows the actual curve output value corresponding to each Tint In value. Tint Change mode shows the amount by which each Tint In value is increased or decreased by the curve.

To change the view/edit mode, click the icons above the top left corner of the graph.

Viewing curves using the Curves View-Edit tool

You can use the Curves View-Edit tool to view channels of ColorFlow curves or profile input/output curves.

Requirements: If you are viewing ColorFlow curves of a device condition that contains pooled devices, ensure that the correct device is selected in the **Device** list.

If you are adjusting curves of a simulation or conversion, the curves that you see are the complete calibration curves for the device. They contain the simulation curve or conversion curve, and the device curve. To exclude the device curve from the graph and table, select **Show Simulation/Conversion Curves only** radio button. To show complete calibration curves, select **Include Device Curves**.

If you are adjusting device curves or profile input/output curves, the **Device** selector and radio button controls do not appear.

Using the Curve View-Edit tool to view curves

1. In the Curve View-Edit tool, deselect **Enable Editing**.
2. Select the channel you want to view (**C, M, Y, K,** or **Spot**).
3. If you selected the **Spot** channel, use the **Spot Ink** selector to choose the specific spot ink curve channel.
   The selected channel is highlighted in the graph and **Curve Values** are displayed.
4. Click a point on the curve whose input and output you want to view, or type a value in the **Tint In** or **Tint Out** box.
   A point appears on the curve, and **Tint In** or **Tint Out** values are updated.

Adjusting curves using the Curve View-Edit tool

You can use the Curve View-Edit tool to edit individual curve channels directly, or to adjust CMY gray balance lightness or cast. This tool

shows the actual curves and gives you flexible control over the edit point and range.

Using the Curve View-Edit tool on individual color channels

You can use the Curve View-Edit tool to directly change the shape of a curve. ColorFlow constrains curves to be monotonic and continuous.

Requirements:

If you are viewing ColorFlow curves of a device condition that contains pooled devices, ensure that the correct device is selected in the **Device** list.

If you are adjusting curves of a simulation or conversion, the curves that you see are the complete calibration curves for the device. That is, they contain the simulation or conversion curve, and the device curve. To exclude the device curve from the graph and table, select **Show Simulation/Conversion Curves only** radio button. To show complete calibration curves, select **Include Device Curves**.

If you are adjusting device curves or profile input/output curves, the **Device** selector and radio button controls do not appear.

1. In the Curve View-Edit tool, select **Enable Editing**.
2. Select the channel you want to adjust (**C**, **M**, **Y**, **K**, or **Spot**).
3. If you select the **Spot** channel, use the **Spot Ink** selector to choose the specific spot ink curve channel.
4. Click the part of the curve that you want to adjust, or type the curve value in the **Tint in** box.
   An adjustment point appears on the curve.
5. Create two anchor points to constrain the range of your adjustment.
   The curve will not be affected at tint values outside of these anchor points. There are implied anchor points at 0% and 100%.
   a. Click two points on either side of the point on the curve that you want to adjust.
6. Drag the adjustment point up to darken the output or drag it down to lighten the output.
   You can also type a value in the **Tint Out** box.
   Your adjustment may be restricted in order to keep the curves monotonic.
7. To remove an adjustment point, right-click the point and select **Delete selected point**, or click to select the point, and type `<Delete>`.

Using the Curve View-Edit tool on neutral balance

You can use the Curve View-Edit tool to adjust a color cast, a lightness error, or both in near-neutral CMY colors. ColorFlow adjusts CMY curves simultaneously to achieve the change you request.

Requirements:

If you are viewing ColorFlow curves of a device condition that contains pooled devices, ensure that the correct device is selected in the **Device** list.

If you are adjusting curves of a simulation or conversion, the curves that you see are the complete calibration curves for the device. That is, they contain the simulation or conversion curve, and the device curve. To exclude the device curve from the graph and table, select **Show Simulation/Conversion Curves only** radio button. To show complete calibration curves, select **Include Device Curves**.

If you are adjusting device curves or profile input/output curves, the **Device** selector and radio button controls do not appear.

1. In the Curve View-Edit tool, select **Enable Editing**.
2. Click **CMY**.
3. Move the sliders below the graph to constrain the range of your adjustment and to select the center of your adjustment.
   The curve will not be affected at tint values outside of this range. There are implied anchor points at 0% and 100%.
4. Use the lightness (L*) slider together with the cast (a*b*) selector to adjust the color in the chosen range.
   You can also type values directly in **L***, **a***, and **b*** boxes in the **Color Change** area.

   Your adjustment may be restricted in order to keep the curves monotonic.

   The displayed color patches demonstrate the effect of all the adjustments that are specified in this dialog box. The color produced by the curves or profile before your adjustment is shown on the left (**Before**). The color produced by the curves or profile after your adjustment is shown on the right (**After**).

   Note: In the case of device curve adjustments, the color that is currently being produced is shown on the left (**Current**), and can be adjusted to reflect any changes in the device color output that require correction. The desired color output is shown on the right (**Corrected**) and remains constant, as a reference to the expected color output after correction.
5. To display the color patches in a larger view for easier color comparison, click a color patch.
   The color patches open in a new window.

6. If the neutral gray that is displayed in the color patch does not visually align to the neutral gray on your proof or press sheet, adjust the displayed color of the patch on your viewing monitor.
   a. Select the **Adjust Displayed Colors** check box.
   b. Use the lightness (L*) slider and the cast (a*b*) selector to change the displayed color to align to the color on your proof or press sheet.
      This color change does not affect any curves or color control elements. You are only adjusting the displayed color of the patches.
   c. To move the sample point to the color at the center of your adjustment range, click **Reset**.
   d. When you achieve the correct color, clear the **Adjust Displayed Colors** check box.

Exporting a curve

You can export a curve from ColorFlow to use it in a non-integrated workflow or in external software.

In the Workflow and Pro Workflow editions of ColorFlow software, you do not need to export any color control elements in order to use them in your Prinergy Connect or Prinergy Evo workflow.

1. In a color setup in the **color setup viewer**, perform one of the following actions:
   - To export a device curve, click the device in a device condition, and select **Export** > **Device Curves**.
   - To export a calibration curve for the PCO, click the border of the PCO, and select **Export** > **Calibration Curves**.
   - To export a calibration curve for an SCO, click anywhere in the conversion connection area, and select **Export** > **Calibration Curves**.
2. In the Save Curves dialog box, browse to the location where you want to save the curve.
3. Use the default file name for the curve or type a new file name, and click **Save**.
   The curve is saved in Harmony format, as a `.hmy` file.

12 Device profiles

About device profiles

ColorFlow software manages ICC device profiles that can be used in the Prinergy workflow.

A device profile represents the relationship between colorant tint values of a device condition and the resulting color. Device profiles describe colorimetric color response and do not contain any tonal information.

Every device profile has two sets of color lookup tables, called tags, for transforming color. One set, called *source* tags, transform from *device-dependent* color coordinates, like CMYK or RGB, to *device-independent* color coordinates that model human vision. The other set, called *destination* tags, transform from device-independent color coordinates to device-dependent coordinates.

Each set has three *rendering intents* to describe the different methods of mapping the device gamut to the full color gamut of human vision, making a total of six tags. A seventh tag, the Media White Point tag, describes the substrate color for CMYK devices, or the white point of an RGB device.

Each of the six tags contains a set of curves at its inputs and outputs, one curve for each input and output channel. The device-dependent CMYK curves are visible in ColorFlow for print device profiles, identified as **Input Tonality** and **Output Tonality** curves for source and destination tags respectively. These curves are distinctly different from ColorFlow device, simulation and conversion curves. They exist in device profiles for both curve-controlled and non-curve-controlled device conditions. You can view and adjust the **Input Tonality** and **Output Tonality** curves of device profile tags in the Device Condition Device Profile or PCO Device Profile dialog boxes.

Any color input, PCO or SCO, in a color setup that will be used in Prinergy with color management, requires a device profile for each device condition and the PCO. In a device condition or in a PCO in the color setup, you can click the **Profile** icon to open a dialog box in which you can import or calculate a profile for the device condition or PCO that you selected.

If you have an ICC device profile that you created with Kodak Profile Wizard software, Kodak Spotless Color Toolkit, Kodak Spotless Software, or other software that supports the ICC profiles, you can

import the profile into ColorFlow as the device profile of a device condition or PCO.

If you import a device profile into a device condition that has not been characterized with measurement data, the imported profile will define the device condition's colorimetric response. The tonal response will remain undefined.

Note: If the device condition already has a color response that was derived from measurement data, importing a profile will not replace this color response.

You can import or calculate profiles in ColorFlow Pro Workflow edition. In ColorFlow Workflow edition, you can use profiles only by importing them.

From the **ICC Profiles** tab of the Preferences dialog box, you can choose the ICC profile format that you want ColorFlow to use. When you generate a device profile, you can specify the total ink limit and black generation separation settings that will be used for the separation tags of the profile.

Profiles that ColorFlow has generated can be exported. You can also export the measurement set that was used to generate a profile. If you export a device profile, ColorFlow assigns a default profile name based on the device condition or PCO properties.

Depending on your ColorFlow edition, the following device profile functionalities may be available:

- Generate device profiles with user specified parameters
- Import device profiles that were created outside of ColorFlow
- Adjust device profiles that are imported or generated in ColorFlow
- Export device profiles

Note: You can import, generate, and adjust device profiles in ColorFlow Pro Workflow edition. In ColorFlow Workflow edition, you can only use device profiles by importing them.

Selecting an ICC profile format

You can select the default ICC profile format that you want ColorFlow to use when it calculates device profiles.

1. Perform one of the following actions:
   - For Windows, select **File** > **Preferences**
   - For Mac OS X, select **ColorFlow** > **Preferences**
2. Click the **ICC Profiles** tab.
3. In the **ICC Profile Format** list, select the format that you want to use.
   When you generate a device profile, ColorFlow will use the ICC profile format that you selected.

Generating a device profile

You can specify the total ink limit and black generation settings to use when generating a device profile.

Requirements: You must establish the color response of a device condition before calculating a device profile for the device condition.

1. In a color setup in the **color setup viewer**, perform one of the following actions:
   - To generate a profile for a device condition, click the **Profile** icon in the device condition.
   - To generate a profile for the PCO, click the **Profile** icon in the PCO.

   If you clicked the **Profile** icon in a device condition, the Device Condition Profile dialog box appears. If you clicked the **Profile** icon in a PCO, the Primary Color Output Profile dialog box appears.
2. In the **Origin** area, select **ColorFlow Generated**.

   Note: For all of the separation settings identified below, ColorFlow provides recommended default values. These values are tailored to the device type of the device condition.
3. Specify the maximum sum of tint values of all the inks.

   Total Ink Limit

   240 to 400%

4. Specify the start point on the neutral axis for black ink.

   Black Start

   0 to 50%

   For example, if you set the start point value to 20%, tones less than 20% down from the white point will print with CMY ink only.

5. Specify the maximum allowable percentage of black ink used in the black separation.

   Max Black

   70 to 100%

6. Specify the relative quantity of black vs cyan, magenta, and yellow used to generate the neutral gray component of colors.

   Black Strength

   Use the slider or the text box to select a value between 5 and 75%.

   As you move the slider towards the maximum value, colors can contain more black.

   Note: With the optional Kodak Ink Optimizing Solution, you can generate a PCO device profile with a Black Strength value up to 100%, for ink savings and color stability.

7. Click **OK**.

The **Profile** icon shows the progress of the profile calculation.

See also:

How Prinergy uses ColorFlow elements on page 183

Importing a device profile

You can use a device profile that was generated outside of ColorFlow.

Note: If none of the devices in the device condition have a measured response, the imported profile will define the color response of the device condition. If the device condition already has a color response that was derived from measurement data, importing a profile will not replace this color response.

1. In a color setup in the **color setup viewer**, perform one of the following actions:
   - To import a profile for a device condition, click the **Profile** icon in the device condition.
   - To import a profile for the PCO, click the **Profile** icon in the PCO.

   If you clicked the **Profile** icon in a device condition, the Device Condition Profile dialog box appears. If you clicked the **Profile** icon in a PCO, the Primary Color Output Profile dialog box appears.
2. In the **Origin** area, select **Imported**.
3. Click **Import**.
4. Locate the profile that you want to import, and click **Open**.
   Information about the profile that you selected is displayed.
5. Click **OK**.

Exporting a device profile

You can export a device profile from ColorFlow to use it in a non-integrated workflow or in external software.

In the Workflow and Pro Workflow editions of ColorFlow software, you do not need to export any color control elements in order to use them in your Prinergy Connect or Prinergy Evo workflow.

1. In a color setup in the **color setup viewer**, perform one of the following actions:
   - To export the device profile of a device condition, click the border of the device condition.
   - To export the device profile of the PCO, click the border of the PCO.
2. Select **Export** > **Device Profile**.
3. In the Save Device Profile dialog box, browse to the location where you want to save the device profile.
4. Use the default file name for the device link or type a new file name and click **Save**.
   The device profile is saved as an `.icc` file.

13 DeviceLinks

About DeviceLinks

ColorFlow creates and manages ICC DeviceLink profiles which can be used in the Prinergy workflow.

ICC DeviceLink profiles are a powerful application of the mathematics of device profiles. They effectively combine two device profiles to create a one-way link with a single rendering intent, and can be used to align color on different output devices. In ColorFlow, ICC DeviceLink profiles are referred to as DeviceLinks.

A DeviceLink uses color lookup tables to transform every color point in an image from the source (device-dependent) color space to the destination color space. This method of transformation is called **Full Reseparation**. When you define a DeviceLink, you can select the method that it uses to transform color. For example, you may not always want the full color transformation that occurs with the **Full Reseparation** method. Sometimes, you may not want areas in a file that are totally black (K channel only) to contain CMY after a DeviceLink is applied. When you define the DeviceLink, you can constrain various aspects of the transformation. For example, you can define the DeviceLink so that black, and other primary colors, remain pure after the DeviceLink is applied.

A DeviceLink contains one set of curves for each primary color at the input of its lookup table, and another set of curves at the output. These **Input Tonality** and **Output Tonality** curves are distinct from other types of curves in ColorFlow, such as device, simulation, or conversion curves. **Input Tonality** and **Output Tonality** curves exist in a DeviceLink whether or not a simulation or conversion uses curves, and they exist for both curve-controlled devices and non-curve-controlled devices. You can view and adjust the **Input Tonality** and **Output Tonality** curves of a DeviceLink in the Simulation Adjustment or Conversion Adjustment dialog boxes.

You can use DeviceLinks in the following areas in a color setup:

- In the PCO, to simulate a target
- In the PCO to SCO conversion, to align the SCO color response to the PCO
- In the CI to PCO conversion, to convert input data to the PCO color space

Depending on your ColorFlow edition, the following DeviceLink functionalities may be available:

- Generate CMYK to CMYK or RGB to CMYK DeviceLinks with user-specified parameters.
- Generate DeviceLinks from imported profiles or profiles that are generated in ColorFlow.
- Import DeviceLinks that were created outside of ColorFlow.
- Adjust DeviceLinks that are imported or generated in ColorFlow.
- Export DeviceLinks from ColorFlow.

Note: You can import, calculate, and adjust DeviceLinks in ColorFlow Pro Workflow edition. In ColorFlow Workflow edition, you can only use DeviceLinks by importing them.

See also:

About the Ink Optimizing Solution on page 205

Generating a DeviceLink

Create a DeviceLink and specify how the DeviceLink will preserve some aspects of the image separation.

Requirements: You must establish the color response of device conditions that use the DeviceLink before generating the DeviceLink.

1. In a color setup in the **color setup viewer**, perform one of the following actions:
   - To generate a DeviceLink for a simulation, click the **Simulation** icon in the PCO.
   - To generate a DeviceLink for a conversion, click the **Conversion** icon between the CI and the PCO or between the PCO and the SCO.

   If you clicked the **Simulation** icon in a PCO, the Simulation Definition dialog box appears. If you clicked a **Conversion** icon, the Conversion Definition dialog box appears.
2. Use the **DeviceLink Method** selector to select a desired generation method.
   Depending on the device type, some positions may be unavailable.

   Ink Optimizing Solution

   This method is available if your license includes the Ink Optimizing Solution feature. Select **Ink Optimizing Solution** to apply a high level of gray component replacement (GCR)

to optimize ink usage, by replacing the neutral component of combined cyan, magenta, and yellow tints with black.

Full Reseparation

Completely reseparated. Solid colors in the original file may not remain solid. The black generation parameters that you specify are used, which may result in using less chromatic ink and more black ink.

CMYK Integrity

All color builds can be adjusted. The relative amount of black vs CMY will be preserved in content processed through the DeviceLink.

Black Purity Only

Any colors other than black channel (solid K, K-grays) can be adjusted.

Color and Black Purity

Same as **Fully Constrained** but solid colors can be reduced to a tint.

Fully Constrained

A DeviceLink is used to change data in the digital file. However, it is constrained, so that any color made with only one or two inks will not have other inks added. Solid (100% tints) primaries and secondaries are not affected and remain solid.

Imported

Import an existing DeviceLink. Click **Import** to browse to a DeviceLink.

None

A DeviceLink is not used to change data in the digital file.

3. In the **Rendering Intent** list, choose the gamut mapping that should be used when mapping colors from one color gamut to another.

Perceptual

Fits all colors in the source space into the destination space while preserving overall color relationships. This method is suitable for images that contain significant out-of-gamut colors; it is recommended, and the default selection for RGB color inputs.

Relative Colorimetric

Maps white in the source to white in the destination, reproduces all in-gamut colors and clips out-of-gamut colors to the closest reproducible hue. This method preserves more of the original colors than the **Perceptual** method; it is recommended, and the default selection for CMYK color inputs and output simulation or conversion DeviceLinks.

Saturation

Converts saturated colors in the source to saturated colors in the destination. This method is suitable for pie charts or business graphics, but may not be suitable for preserving original colors in an image.

Absolute Colorimetric

Maintains color accuracy and does not change any colors that fall inside the destination color gamut (including white). This method is most suitable for proofing.

4. Select the black generation parameters.
The **DeviceLink Method** selector determines which options are available.

Note: For all of the separation settings identified below, ColorFlow provides recommended default values. These values are tailored to the device type and device condition.

a. Specify the maximum sum of tint values of all the inks.

Total Ink Limit

200 to 400%

b. Specify the start point on the neutral axis of black ink.

Black Start

0 to 60%

For example, if you set the start point value to 20%, tones less than 20% down from the white point will print with CMY ink only.

c. Specify the maximum allowable percentage of black ink used in the black separation.

Max Black

70 to 100%

d. Specify the relative quantity of black vs cyan, magenta, and yellow used to generate the neutral gray component of colors. As you move the slider towards the maximum value, colors can contain more black.

Black Strength

Use the slider or text box to select a value between 5 and 100%.

5. Select whether you want to transform colors visibly on curved devices with the Ink Optimizing Solution. (Not applicable to color inputs and non-curved outputs.)
   Target Simulation or **Color Space Conversion**
   The name of this option depends on whether you are in the PCO or SCO.
   For curve-controlled devices, select this option to achieve a closer color match to your source color space while achieving ink savings. When this option is selected, gamut mapping will occur between two different color spaces.
   When this option is not selected, the DeviceLink optimizes ink usage but does not visibly convert colors.
6. Select **Black Point Compensation**, if desired, for relative colorimetric DeviceLinks. Select this option to perform perceptual-like gamut mapping of the lightness scale.
7. When you are finished defining the simulation or conversion, click **Apply**.
   ColorFlow calculates the DeviceLink.

   Note: There may be a slight delay before the **Simulation** or **Conversion** icon shows the progress of the DeviceLink calculation.

See also:

How Prinergy uses ColorFlow elements on page 183
About the Ink Optimizing Solution on page 205

Importing a DeviceLink

You can use a DeviceLink profile that was generated outside of ColorFlow.

1. In a color setup in the color setup viewer, perform one of the following actions:
   - To import a DeviceLink for a simulation, click the **Simulation** icon in the PCO.
   - To import a DeviceLink for a conversion, click the **Conversion** icon between the CI and the PCO or between the PCO and the SCO.

   If you clicked the **Simulation** icon in a PCO, the Simulation Adjustment dialog box appears. If you clicked a **Conversion** icon, the Conversion - Definition dialog box appears.
2. Use the **DeviceLink Method** selector to choose **Imported**.
3. Click **Import**.
4. Locate the DeviceLink profile that you want to import, and click **Open**.
   Information about the DeviceLink that you selected is displayed.
5. Click **OK**.

Exporting a DeviceLink

You can export a DeviceLink from ColorFlow to use it in a non-integrated workflow or in external software.

In the Workflow and Pro Workflow editions of ColorFlow software, you do not need to export any color control elements in order to use them in your Prinergy Connect or Prinergy Evo workflow.

1. In a color setup in the **color setup viewer**, perform one of the following actions:
   - To export a simulation DeviceLink, click the border of the PCO.
   - To export a conversion DeviceLink, click anywhere in the conversion connection area.
2. Select **Export** > **DeviceLink Profile**.
3. In the Save DeviceLink Profile dialog box, browse to the location where you want to save the DeviceLink.
4. Use the default file name for the DeviceLink or type a new file name and click **Save**.
   The device profile is saved as an `.icc` file.

About adjusting DeviceLinks

After ColorFlow calculates a DeviceLink, you can adjust the DeviceLink in several ways.

You can adjust the white point and the input tonality or output tonality of a DeviceLink. To adjust the input tonality or the output tonality of a DeviceLink, you can use the Curve Adjustments tool or Curve View-Edit tool.

Before you adjust simulation a DeviceLink, you should consider what other elements may be dependent on the DeviceLink. When you adjust the input tonality of a simulation DeviceLink, ColorFlow recalculates dependent color control elements, and any adjustments you previously made to those elements will be lost.

You can only adjust the white point of a DeviceLink if its rendering intent is **Absolute Colorimetric**. White point adjustment is used to adjust the paper tint simulation. The size of the surrounding area that is affected by your adjustment depends on how much you adjusted the white point. Because white point adjustments may affect the highlights area, when you make a white point adjustment, you should check its effects before you adjust output tonality.

Adjusting the output tonality of a DeviceLink is the recommended method for global color adjustments. The effect of adjusting the output tonality of a simulation or conversion DeviceLink is similar to adjusting a simulation or conversion curve. However, if a simulation uses both curves and a DeviceLinks, only DeviceLink adjustments are tracked to SCOs.

Unless a DeviceLink uses the **Full Reseparation** method, the effect of adjusting the input tonality of the DeviceLink is similar to adjusting the output tonality of the DeviceLink. If the DeviceLink uses the **Full Reseparation** method, CMYK input content is completely reseparated

and, for example, a black-channel gradient may become a CMY gradient. In this case, adjusting the input tonality for black is not the same as adjusting the output tonality for black.

You can only adjust DeviceLinks in the Workflow Pro edition of ColorFlow.

Adjusting DeviceLink white point

You can adjust how a DeviceLink transforms the meaning of *white* from one device to the other to simulate paper tint.

Requirements: You can only adjust a DeviceLink white point when the DeviceLink's rendering intent is **Absolute Colormetric**.

1. In a color setup in the **color setup viewer**, perform one of the following actions:
   - To adjust a DeviceLink white point for a simulation, click the **Simulation** icon in the PCO.
   - To adjust a DeviceLink white point for a conversion, click the **Conversion** icon between the CI and the PCO or between the PCO and the SCO.

   If you clicked the **Simulation** icon in a PCO, the Simulation Adjustment dialog box appears. If you clicked a **Conversion** icon, the Conversion - Adjustment dialog box appears.
2. In the Conversion - Adjustment or the Simulation Adjustment dialog box, on the **Adjust DeviceLink** tab, click **White Point**.
3. Change the output value for *white* input in any of the following ways.
   Your changes may be constrained by the gamut of the output device.
   - Use the lightness (L*) slider together with the cast (a*b*) selector.
   - Type values directly in the **Out** column.
   - Type L*a*b*values directly in the **Change** column.
4. To see the effect of your adjustments on an image, click **Preview** and place a colorimeter on a white area of the image that you preview.
5. When you are satisfied with your changes, click **Apply**.

See also:

About previewing images on page 149

Adjusting the input or output tonality of a DeviceLink

You can adjust the **Input Tonality** and **Output Tonality** of a DeviceLink to fine-tune a transformation.

1. In a color setup in the **color setup viewer**, perform one of the following actions:
   - To adjust the input or output tonality of a DeviceLink for a simulation, click the **Simulation** icon in the PCO.
   - To adjust the input or output tonality of a DeviceLink for a conversion, click the **Conversion** icon between the CI and the PCO or between the PCO and the SCO.

   If you clicked the **Simulation** icon in a PCO, the Simulation Adjustment dialog box appears. If you clicked a **Conversion** icon, the Conversion - Adjustment dialog box appears.
2. In the Conversion - Adjustment or the Simulation Adjustment dialog box, click the **Adjust DeviceLink** tab.
3. Perform one of the following actions:
   - To adjust color on the input device and output device, click **Input Tonality**.
   - To adjust color on the output device but not on the input device, click **Output Tonality**.
4. Adjust the curves at the input or output of the DeviceLink color lookup table.
5. To see the effect of your adjustments on an image, click **Preview**.
6. When you are satisfied with your changes, click **Apply**.

See also:

About previewing images on page 149

14 Profile Adjustments

Overview

You can adjust and edit devices profiles and DeviceLink profiles, including source, destination, and white point tags. ColorFlow includes the following modes for adjusting profiles:

- **White Point**
- **Input Tonality**
- **Output Tonality**
- **Dark Point**
- **Gray Balance**
- **Selected Color**

Note: In order to prevent anomalies when you are making adjustments to profiles, do not edit the profile with multiple modes at the same time. Adjust the profile in one mode and then test the output before making more changes.

Adjustment ranges for DeviceLink and source tag adjustment can be localized in a device coordinate space to ensure, for example, that adjusting the CMY-only gray balance does not affect the K-only ramp. This localization can also be disabled.

Why do you need to adjust profiles

You can adjust profiles in order to correct for an error that was introduced when the profile was created.

These are some of the main reasons for adjusting profiles:

- Human error, caused by misaligning the device when measuring the profile.
- Measurement error, caused by a problem with the spectrophotometer.
- Subjective reasons for making adjustments to the profile to improve the reproduction of a specific color.

About Rendering Intents

All output devices, have a gamut or range of colors that they can output. If a color needs to be output and is outside the gamut of the

output device, it must be mapped or approximated to some other color that exists within the gamut. Rendering Intent describes the strategy for compressing or mapping out of gamut colors from one color space to another.

Rendering intents in profiles

A profile is composed of a number of tags that describes how a color space is converted from one space to another.

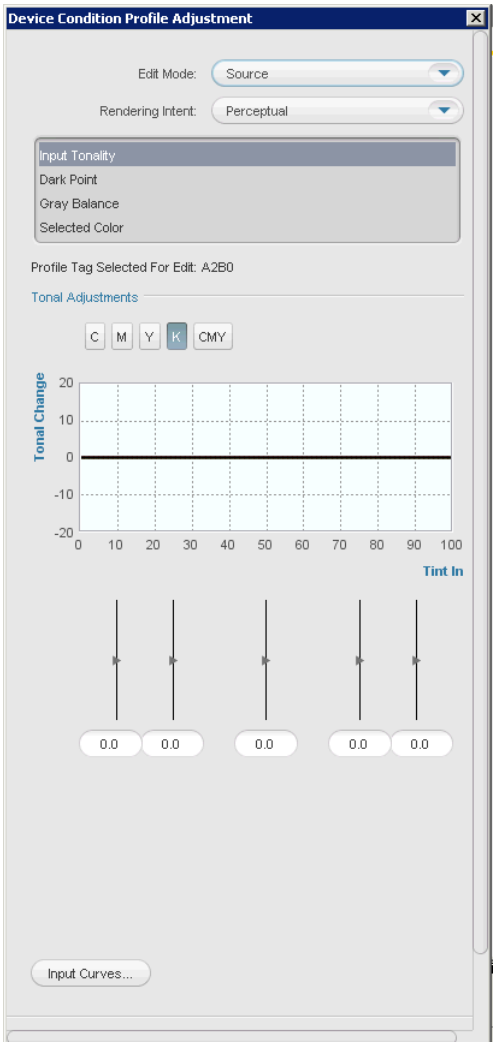
Every device ICC profile has seven different tags (white point included) that encodes different rendering intents for the source and destination.

- Perceptual—With this rendering intent, the full gamut of the source space is compressed or expanded to fill the gamut of the destination space. This preserves some relationship between out of gamut colors, even if this results in inaccuracies for in gamut colors. Used predominantly when converting from large to small volume gamuts (RGB to CMYK). This rendering intent is usually used when working with realistic images such as photographs, including scans and images. All or most colors in the original images are changed, but the relationship between the colors does not change.
- Saturation—The saturation of the source space is preserved, at the expense of hue accuracy and lightness. Used predominantly with content such as business graphics (charts, solid colors).
- Relative Colorimetric—This rendering intent, maintains a near exact relationship between in gamut colors, even if this clips out of gamut colors. Most often used in proof output where the destination gamut is larger than source gamut. This is the default option for CMYK.
- Absolute Colorimetric—Absolute colorimetric and relative colorimetric uses the same table except for the way the white point is adjusted for the different media types. Absolute colorimetric is manipulated by the white point tag and is used in addition to the relative colorimetric rending intent (wtpt) tag. It is similar to relative colorimetric (clips out of gamut colors), but handles the color white (purest and lightest white in the color space) differently. Most often used for proof output where the media white color of the source needs to be reproduced on the destination media.

Adjusting a device profile

You can adjust the **Input Tonality**, **Output Tonality**, **DarkPoint**, **Gray Balance**, or **Selected Color** of a device profile to fine-tune a transformation.

1. In a color setup in the **color setup viewer**, click the **Profile** icon in the PCO.
   The PCO window appears.



2. Select the **Edit** mode, either **Source** or **Destination.**
3. Select the suitable **Rendering Intent** (RI).

   Note: In many cases, users will adjust the Absolute Colorimetric intent because they want all of the in gamut colors to be reproduced exactly without modification. In this case, they may or may not want the media white point reproduced on the destination device. For the same RI, they may want the media white point of the source gamut to reproduce on the destination substrate. This is a predominant proofing use case.

4. Select from one of the following adjustment modes:
   - **Input Tonality** or **Output Tonality** (depending on which **Edit** mode you selected, **Source** or **Destination**).
   - **Dark Point**
   - **Gray Balance**
   - **Selected Color**

   Note: See the sections following this for detailed steps on how to set the **Dark Point**, **White Point**, **Gray Balance**, and **Selected Color**.
5. To see the effect of your adjustments on an image, click **Preview**.
6. When you are satisfied with your changes, click **Apply**.
7. When you are finished, click **OK**.

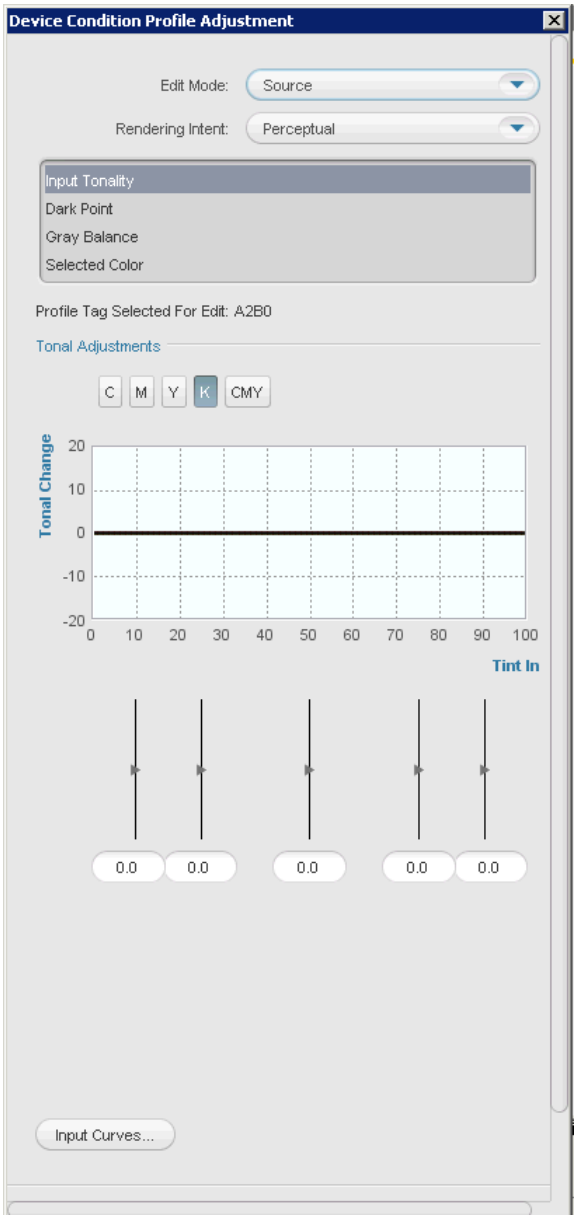
   Note: You can undo or redo any changes from the History window. See the chapter on *History and undo* later on in this guide.

Adjusting a device profile input or output tonality

You can adjust the **Input Tonality** or **Output Tonality** of a device profile to fine-tune a transformation.

1. In a color setup in the **color setup viewer**, click the **Profile** icon in the PCO.
   The Device Condition Profile Adjustment window appears.
2. Select the **Edit** mode, either **Source** or **Destination.**
3. Select the **Rendering Intent** (RI) that is suitable for this profile.

4. Select **Input Tonality** or **Output Tonality** (depending on which **Edit** mode you selected, **Source** or **Destination**).



Adjusting the Dark Point of a device profile overview

Editing the dark point of a device profile is often used for newspaper proofing, since the dark colors on the newspaper print often appear darker than on a proof, even though they have the same measured colors. With ColorFlow, you can adjust the color look-up table (CLUT) of the device profile source tag at one of four selectable dark points: Solid K (input tints 0, 0, 0, 100), Solid CMY (100, 100, 100, 0), Solid CMYK (100, 100, 100, 100), or the darkest pixel of a Preview image.

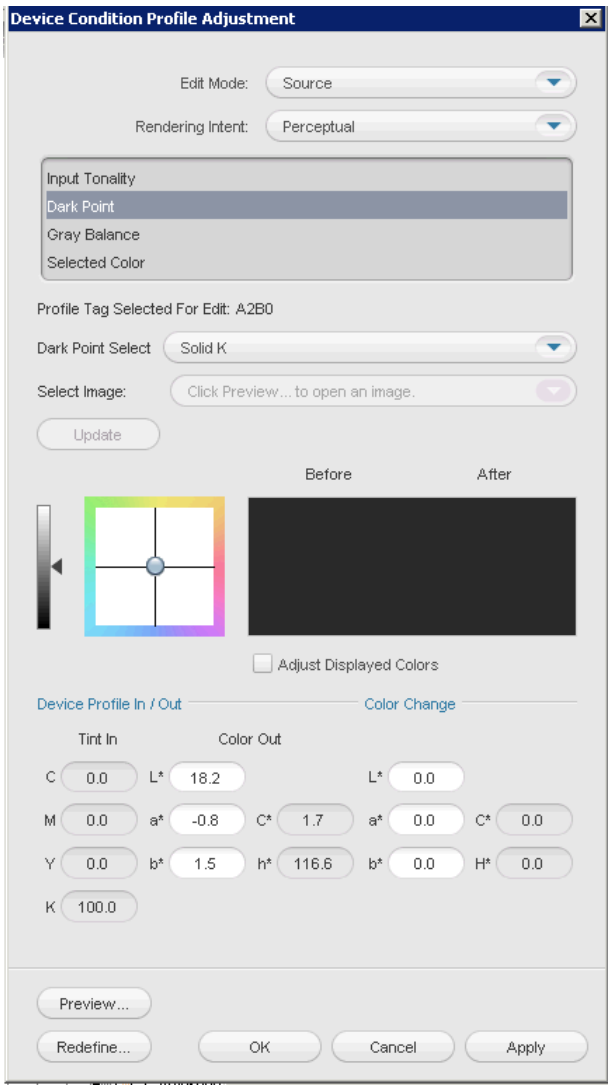
Adjusting the dark point, allows for more accurate rendition across the lightness scale when you are converting from one gamut to another, where the dark points are substantially different. This occurs when you are using a rendering intent other than perceptual, as the perceptual rendering intent maps the dark point.

Note: One exception is if you use the Black Point compensation which also maps the dark point from the source to the destination profile.

Editing the Dark Point values

Adjust the **DarkPoint** of a device profile to fine-tune a transformation.

1. In a color setup in the **color setup viewer**,click the **Profile** icon in the PCO.
   The Device Condition Profile Adjustment window appears.
2. Select the **Edit** mode, either **Source** or **Destination.**
3. Select the **Rendering Intent**, for example **Relative Colorimetric**.
4. Select the **Dark Point** adjustment mode:



5. From the **Select Dark Point** list, choose one of the following:

Option	Description
Solid K	(0,0,0, 100)
Solid CMY	(100, 100, 100, 0)
Solid CMYK	(100, 100, 100, 100)
From Preview Image	Select from an image that contains specific content suitable for the darkest value for the reproductive colors for the majority of your work.

6. Adjust the dark point as required, by either entering a L*a*b* value or use the **Adjustment** or **Cast** slider.
7. To see the effect of your adjustments on an image, click **Preview**.
8. When you are satisfied with your changes, click **Apply**.
9. When you are finished, click **OK**.

Adjusting the Gray Balance overview

Adjusting the Gray Balance lets you adjust the source (A2Bx) tags at a selected point on one of two selectable gray ramps: **K only** and **CMY only**.

When you select **Gray Select and Range**, you can choose the point on the gray axis that is being edited, and the range of the source tag inputs over which the adjustment is applied.

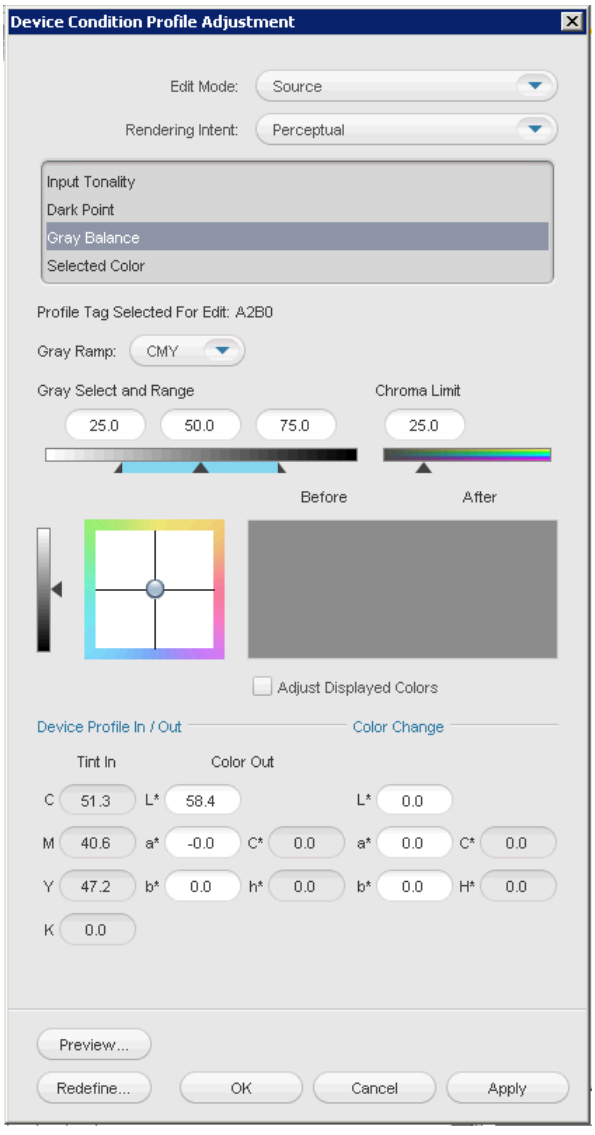
You can also control how far away the **Chroma Limit** is from the selected gray ramp adjustment that is applied.

One example of adjusting the Gray Balance is when you want to make a localized correction to an inaccurate color on the neutral axis of a device profile.

Adjusting the Gray Balance

You can adjust the **Gray Balance** of a device profile to fine-tune a transformation.

1. In a color setup in the **color setup viewer**, click the **Profile** icon in the PCO.
   The Device Condition Profile Adjustment window appears.
2. Select the **Edit** mode, either **Source** or **Destination.**
3. Select the **Rendering Intent**, for example **Relative Colorimetric**.
4. Select the **Gray Balance** adjustment mode.



5. Select the **Gray Ramp**, for example, **K only**.
6. To see the effect of your adjustments on an image, click **Preview**, and then select an image that you want to adjust.

7. In the Image Preview window, add colorimeter points to the areas that require the adjustments.

   Note: It is recommended that you keep the History window open so you can later view the adjustments applied.

8. Using the adjustment tools, adjust the Gray Balance as required. Check the image preview to review the changes and the colorimeter points that there are no drastic changes. In the History window, you can see the adjustments that you made.

   Note: If you've made changes to the **K only** ramp, you can then go back and adjust the **CMY ramp** and adjust the neutral grays. You can use this to correct any unwanted casts. Keep the image open when adjusting **CMY ramp**, so that you can preview your changes.

9. When you are done, click **Apply** to apply the changes.
   In the History window, you can now see the adjustments you made to both the **K only** and **CMY Ramp**.

10. When you are finished, click **OK**.

Adjusting a Selected Color overview

You can adjust a selected color from an image in the Image Preview window and use the **Cast** and **Lightness** adjustment tools to apply the changes to the source side of the ICC profile.

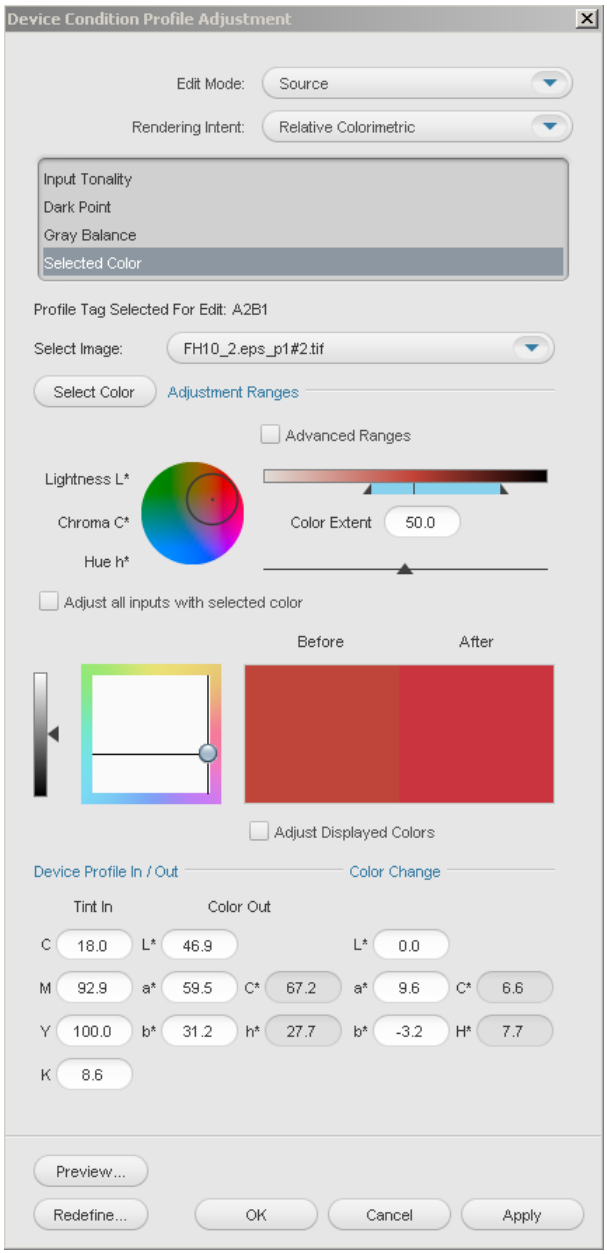
You can fine-tune and adjust the selected color by restricting the ranges of **Lightness**, **Chroma**, and **Hue** with the **Adjustment Range** sliders.

A scenario where you would use this would be when certain input color builds have a degree of lightness or color inaccuracy that requires adjustments to another CIELAB value. For example, a brand color that is not mapped corrected and has little impact on the surrounding colors.

Adjusting a Selected Color of a device profile

You can adjust a **Selected Color** of a device profile to fine-tune a transformation.

1. In a color setup in the **color setup viewer**, click the **Profile** icon in the PCO.
   The Device Condition Profile Adjustment window appears.
2. Select the **Edit** mode, either **Source** or **Destination.**
3. Select the **Rendering Intent** that is suitable for this profile, for example **Relative Colorimetric**.
4. Select **Selected Color** adjustment mode.



5. Click **Preview** and select an image where you want to apply the adjustments. When prompted select the destination profile.
6. In the Image Preview window, add a colorimeter and position it on the on the point in the image that you want the profile adjustments to be applied.
7. In the Conversion Adjustments window, click **Select Color**.

   Note: It is recommended that you leave the default ranges for **Lightness**, **Chroma** and **Hue**. This displays the range the will be affected by the adjustment.
8. Adjust the color using either the cast adjustments tool or enter the specific values in the **Device Profile In / Out** fields.
9. Click **Apply**. In the Image Preview window, slide the divider to see the adjustments before and after.

   Note: Open the History window to view the adjustments applied.
10. When you are finished, click **OK**.

15 Image preview

About previewing images

As you adjust color control elements in ColorFlow, you can use the Image Preview window to see the real-time effect of your adjustments on an image file in a split-screen view.

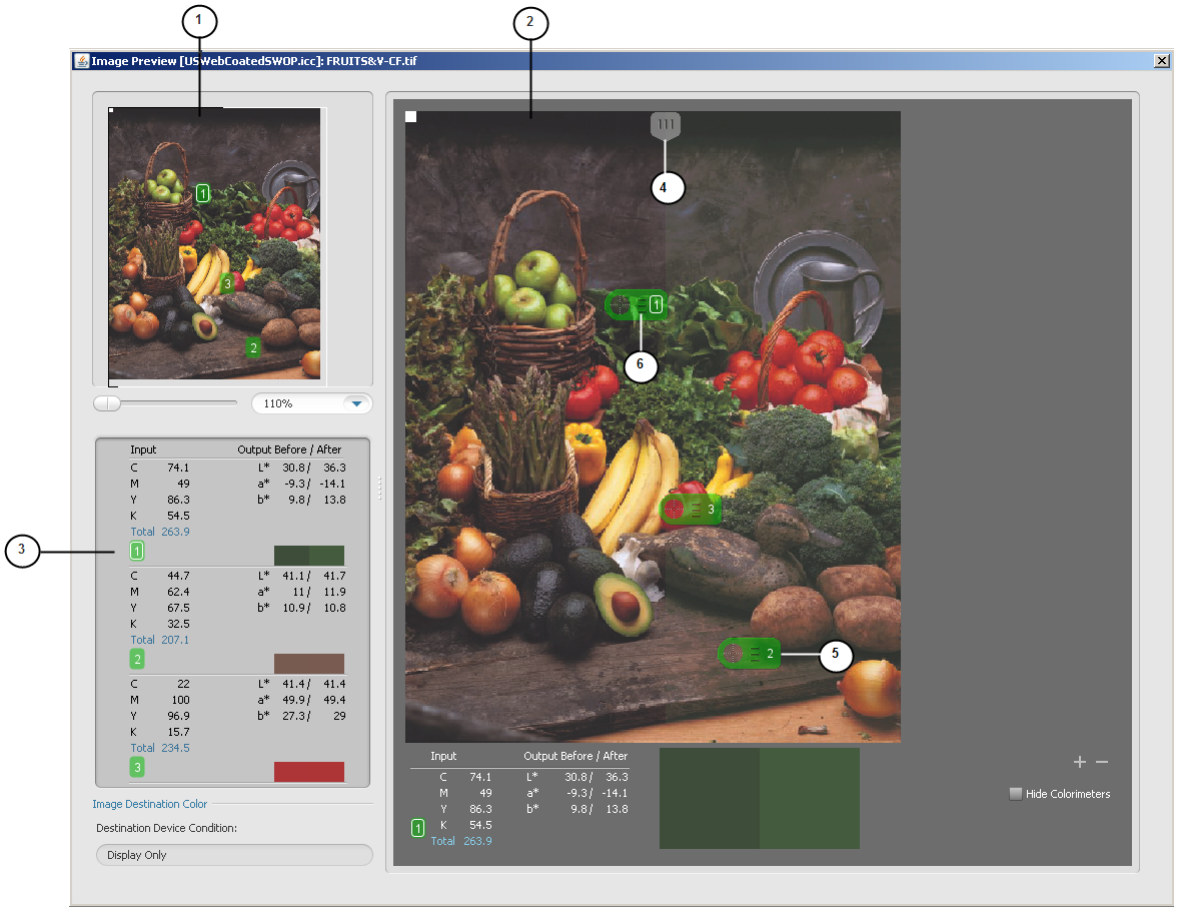
In any of the adjustment dialog boxes in ColorFlow, you can click **Preview** to browse to an image and see the effect of your adjustments on the image that you select.

You can preview only images that are 8-bit TIFF or JPEG images that in the CMYK color space. You can open both CMYK and RGB image files when you are adjusting device destination profiles.

You can use the Image Preview window to preview images when:

- Adjusting simulation and conversion curves and DeviceLinks
- Converting a color input for a DeviceLink
- Adjusting ICC device profiles
- Adjusting and editing device curves
- Adjusting the PCO profile

Note: The Image Preview window options vary depending on the circumstance that you are previewing.



1. **navigation** pane
2. **image preview** pane
3. **colorimeter** pane
4. Divider
5. Colorimeter
6. Colorimeter (magnified)

A movable divider in the **image preview** pane of the Image Preview window allows you to divide the image into two sections. One section shows the image as it would have appeared prior to your adjustments, and one section shows the image as it would appear after your adjustments. You can move the divider along any edge of the **image preview** pane and around any corners. When you move the divider to the lower edge of the **image preview** pane, the two sections of the image switch positions.

Note: The image in the navigation pane shows the regions of the image that are affected by the selected adjustment modes and ranges for all curve and profile adjustment settings.

See also:

Colorimeter tool on page 154

Kodak Matchprint Virtual technology

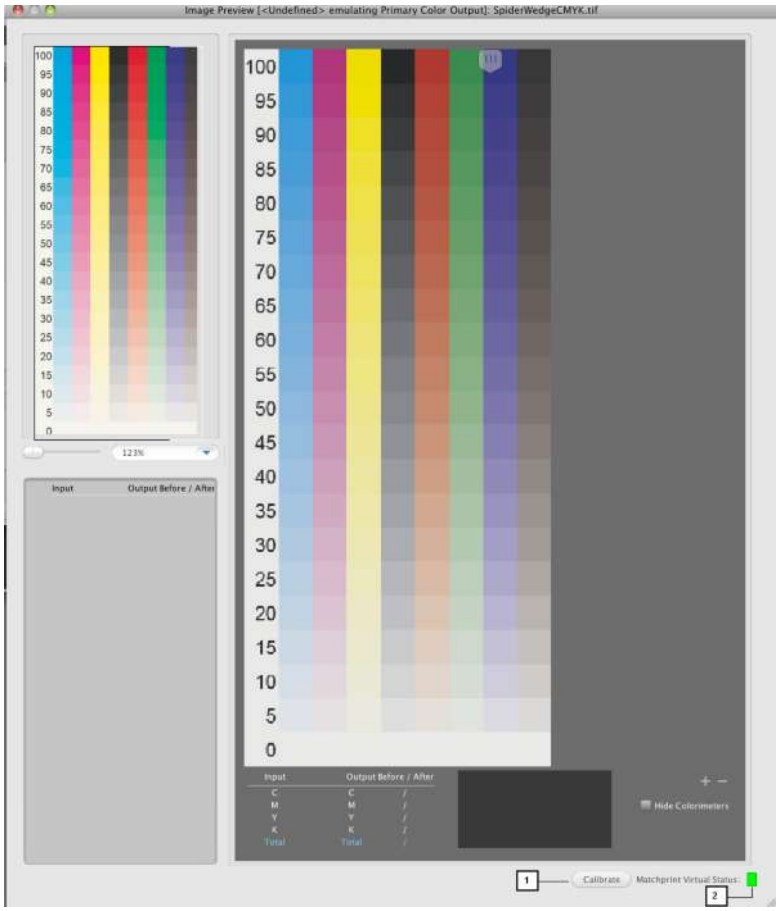
If you have a Matchprint Virtual qualified monitor, you can make curve and profile edits with accurate display color.

Matchprint Virtual Software must be installed on the qualified Macintosh workstation where the ColorFlow client is installed. (Matchprint Virtual preview is only supported in the Macintosh ColorFlow client.) You can open the Matchprint Virtual software in the ColorFlow Preview window.

The status of the calibration of the monitor is indicated by the color in the lower right-hand corner of the window.

- red — the monitor has never been calibrated
- yellow — the monitor was previously calibrated, but requires recalibration (Matchprint Virtual requires the monitor to be recalibrated every 24 hours)
- green — the monitor is calibrated

When a qualified monitor for color is used, the RGB display device profile selection is not available in the ColorFlow client preferences. Matchprint Virtual licensing is controlled from the Kodak InSite Prepress Portal, InSite Creative Workflow, or Kodak PressProof Software. The MatchPrint Virtual license needs to be renewed every 60 days. To renew the Matchprint Virtual Monitor license, launch Smart Review or the PressProof client. Opening the preview image in ColorFlow will not renew the license.



1	Calibrate button
2	Matchprint Virtual status

Previewing the effect of your adjustments

You can open the preview window to see the effect of your adjustments on an image file that you specify.

The Preview option is available in any of the adjustment dialog boxes in ColorFlow.

1. In the adjustment dialog box, click **Preview**.
2. Browse to an image file, and click **Open**.
   Make sure that your image file is in the correct format. You are prompted with an error message if the file is in the wrong color space or format.
3. In the Image Preview window, use the input-output divider to see the effect of your adjustments before and after they are applied. You can drag the divider along any edge of the **image preview** pane.

Next: You can open additional preview windows as needed, and you can use colorimeters to view the tint values of specific points in the image.

See also:
Colorimeter tool on page 154

Zoom and pan in the Image Preview window

You can zoom and pan a previewed image in several ways.

Zoom

The current magnification of the image is shown in the text box below the **navigation** pane. A magnification of 100% indicates that the image is displayed using one screen pixel for each pixel in the image file. Similarly, 500% indicates that ten screen pixels are used for each pixel in the image file.

You can zoom the image in any of the following ways:

- Use the slider below the **navigation** pane:
  - Drag the slider right or left to zoom in or zoom out.
  - Select the slider and use the left and right arrow keys on the keyboard to nudge it.
- Use the text box below the **navigation** pane:
  - Type a zoom percentage value in the text box.
  - Select a zoom percentage value in the list.
- Use your mouse:
  - In the **navigation** pane, drag a rectangle around a portion of the image that you want to fill the viewing area.
  - For Windows, click the image and Ctrl+drag a rectangle around a portion of the image that you want to fill the viewing area.
  - For Mac OS X, click the image and Command+drag a rectangle around a portion of the image that you want to fill the viewing area.
  - Click the image and roll your mouse wheel away from the monitor to zoom in and towards the monitor to zoom out.

Pan

You can pan the viewed area by dragging the image. You can also click a point in either the image or the **navigation** pane to select a new center-point.

Colorimeter tool

You can use a colorimeter to display the tint values of colors at selected points in the preview image.

When you add a colorimeter in the Image Preview window and drag it over the point you want to examine, tint information about the selected point is displayed below the image and in the **colorimeter** pane.

Note: You can add and remove a colorimeter as required.

The **Input** column displays the tint values of inks in the input file at the colorimeter location. Values in the **Input** column do not change with your adjustments.

The **Output** column displays the tint values of inks in the output file at the colorimeter location. Values in the **Output** column change as you adjust a color control element. The **Output** column consists of two sides which correspond to the two sections of the preview image. Depending on the type of color control element that you are adjusting, values on the left or right side of the **Output** column will change.

- When you adjust a simulation or conversion curve or DeviceLink, the tint values of inks in the output, prior to your adjustments, are shown on the left side of the column, and remain constant. Tint values of inks in the output, after your adjustments, are shown on the right side of the column, and change with your adjustment.
- When you adjust a device curve, the current tint values of inks in the output are shown on the left side, and change with your device curve adjustment. Your desired tint values of inks in the output are shown on the right side of the column, and remain constant as a reference to the expected output tint after you correct a color shift.

You can place a colorimeter in either section of the image preview—this does not affect the values that are displayed in the **colorimeter** pane. For example, if you drag the image preview divider to the left side of a colorimeter, the same values are displayed in the **colorimeter** pane as when you drag the divider to the right side of the colorimeter.

See also:

Correcting a color shift on a curve-controlled device on page 86

Working with colorimeters

You can use colorimeters in the Image Preview window to display the tint values of colors at selected points in the image.

1. To add a floating colorimeter, click the **add** button under the image. You can add as many colorimeters as you need, although only one colorimeter can be selected at a time.
2. Drag a colorimeter to any point in the image.
   The **Input** and **Output** columns below the image display the tint value for each ink and the total tint value for all inks.
3. To select a colorimeter, roll your mouse over the colorimeter or click the colorimeter.
   A white box appears around the colorimeter number.
4. To magnify a colorimeter, perform one of the following actions:
   - For Windows, select the colorimeter and press the Ctrl key.
   - For Mac, select the colorimeter and press the Command key.

   Magnifying a colorimeter allows you to see detail without having to magnify the entire image.
5. To maintain the magnification on a colorimeter, perform one of the following actions:
   - For Windows, hold down Ctrl while you move your mouse away from the colorimeter.
   - For Mac, hold down Command while you move your mouse away from the colorimeter.

   The colorimeter remains magnified until you select it again and press Ctrl or Command.
6. To temporarily hide all colorimeters from the image, select the **Hide Colorimeters** check box.
   Colorimeter information is still displayed in the **navigation** pane and the **colorimeter** pane.
7. To delete a colorimeter, select the colorimeter and click the **delete** button under the image.

16 Plate setups

About plate setups

ColorFlow can use plate setups to isolate the effect of the plating line so that different platesetting devices can be substituted in a color setup without recalculation of color control elements.

A **Plate Setup** is an optional device condition property that is available for offset press and flexographic press device types. You can use plate setups to create plate setup curves that linearize the plates for your offset or flexographic press device.

Each plate setup describes a particular combination of device type, plate type, and screening, and contains one or more ColorFlow plate lines. A plate setup is uniquely identified by its properties. You do not need to assign a name to a plate setup. When you select a plate setup as a device condition property for an offset device, the screening information in the plate setup is used for the device condition. Any screening options that you may have previously specified in the **Screening** list are ignored.

Each plate setup can contain multiple ColorFlow plate lines. ColorFlow calculates a plate setup curve for each plate line to linearize that plating process. When you create a job in Prinergy, you can select the plate line that the job should use.

Plate setups curves are independent of calibration curves and any other types of curves in ColorFlow.

You cannot import an existing plate curve into ColorFlow from any other software.

Plate lines

A ColorFlow plate line represents a physical platesetter and plate processing system.

Each combination of a particular plating line in your shop, plate type, and screening, has a measurable response. To determine the behavior of a particular plating line, plate type, and screening combination you must image a plate control strip (such as the Kodak Image Control Strip test image) on a plate, manually measure the resulting dot area values on the plate, and type your required values in the Plate Setups dialog box in ColorFlow.

A single ColorFlow plate line is associated with only one plate setup. In your shop, you may use one physical platesetter and processing chemistry to process several different screenings. To model this in ColorFlow, you can create similar plate lines in different plate setups and name the plate lines to match the physical equipment in your plant.

You can create several different plate lines to reflect changing chemistry. For example, if you routinely change solutions on Mondays, you may want to create different ColorFlow plate lines for Monday, Wednesday, and Friday—for example, `LotemFibrehead-Monday_Chemistry-ProcessorA-Prebake`, `LotemFibrehead-Wednesday_Chemistry-ProcessorA-Prebake`, and `LotemFibrehead-Friday_Chemistry-ProcessorA-Prebake`.

Creating a plate setup

You can create a plate setup that you can use in a device condition.

Requirements: You must have imaged a plate control strip using this particular combination of press type, plate type, screening, and plating line.

You cannot create a new plate setup that has the same screening and plate type as an existing plate setup.

1. In the Device Condition Properties dialog box for an offset press, select **Plate Setup** and click the **edit** button  .
2. In the Plate Setups dialog box, below the **Plate Setups** list, click the **add** button  .
3. In the New Plate Setup dialog box, select the appropriate options.
   a. In the **Device type** list, select the offset device type for which you are creating this plate setup.
   b. In the **Plate Type** list, select the plate type for which you are creating this plate setup.
      If you need to add a plate type to the list, click the **edit** button  and add the new plate type. A plate type can be used in many plate setups for the same device type.
   c. In the **Screening** list, select the screening for which you are creating this plate setup. Use the edit button if you need to add screening values to the list.
      If you need to add a screening value to the list, click the **edit** button  and add the new screening value. A screening value can be used in many plate setups.
      Screening values added here will be available everywhere the screening property for this device type appears.

4. Click **OK** to create the plate setup.
   The new plate setup appears in the **Plate Setups** list, named by its properties.
5. Add a plate line to the plate setup.
   a. In the **Plate Lines** area, click the **add** button .
   b. In the **Name** column, double-click the default name of the plate line that you just added and type a name that describes your platesetter and chemistry.
      For example, if you routinely change solutions on Mondays, type a name like `LotemFibrehead-Monday_Chemistry-ProcessorA-Prebake`.
   c. Use your plate reader to measure the patches on the plate control strip.
      Measure the lower half of the tone scale, which is made with reference screening, independent of job settings. Ensure that the correct Plate Control Strip was used for this particular resolution and screening.
   d. In the **Tint Values** area for this plate line, in the **Measured Tint (Uncalibrated)** column, click a desired row and type the measured tint value as a number between 0.0 and 100.0 percent for the input tint value.
      You do not have to type a measured value for every input tint value.
6. Click **Close**.

A plate setup has been created for the given device type. You can select it in the **Plate Setup** list in the Device Condition Properties dialog box.

Assigning a plate setup to a device condition

You can use a plate setup in a device condition to make linear plates for an offset press.

Requirements: If the plate setup that you want to use does not exist, you must create it.

1. In a color setup in the **color setup viewer**, click the **Properties** icon in the device condition of an offset press.
2. In the Device Condition Properties dialog box, select **Plate setup**.
3. In the **Plate Setup** list, select the plate setup that you want to use for this device condition.
   The screening information in the plate setup is used for this press, and any screening option that you previously selected for the press in the Device Condition Properties dialog box is ignored.

See also:

ColorFlow device conditions on page 45

Adding a plating line to a plate setup

You can configure another platesetter and its processing line as an alternative plate line in an existing plate setup.

Requirements: You must have imaged a plate control strip using this particular combination of press type, plate type, screening, and plating line.

1. Select **View** > **Plate Setups**.
2. In the Plate Setups dialog box, in the **Device Types** list, select the offset device type for which this plate setup was defined.
3. In the **Plate Setups** list, select the plate setup to which you want to add the plate line.
4. In the **Plate Lines** area, click the **add** button .
5. In the **Name** column, double-click the default name of the plate line that you just added and type a name that describes your platesetter and chemistry.
   For example, if you routinely change solutions on Mondays, type a name like `LotemFibrehead-Monday_Chemistry-ProcessorA-Prebake`.
6. Use your plate reader to measure the patches on the plate control strip.
   Measure the lower half of the tone scale, which is made with reference screening, independent of job settings. Ensure that the correct Plate Control Strip was used for this particular resolution and screening.
7. In the **Tint Values** area for this plate line, in the **Measured Tint (Uncalibrated)** column, click a desired row and type the measured tint value as a number between 0.0 and 100.0 percent for the input tint value.
   You do not have to type a measured value for every input tint value.
8. Click **Close**.

An additional plate line is now available in the plate setup.

Exporting plate setup curves

You can export plate setup curves from ColorFlow to use the curves in a non-integrated workflow or in external software.

In the Workflow and Pro Workflow editions of ColorFlow software, you do not need to export any color control elements in order to use them in your Prinergy Connect or Prinergy Evo workflow.

1. Select **View** > **Plate Setups**.
2. In the Plate Setups dialog box, in the **Device Types** list, select the offset device type for which this plate setup was defined.
3. In the **Plate Setups** list, select the plate setup that you want to export.
4. Click **Export**.
5. Browse to the location where you want to export the plate setup, and click **Save**.

ColorFlow exports a single-curve Harmony `.hmy` file containing a plate curve for each plate line in the plate setup.

Remeasuring tints in a plate line

You can adjust the measured tint densities on plate after some change has occurred to a plate line in an existing plate setup.

Requirements: You must have imaged a plate control strip using this particular combination of press type, plate type, screening, and plating line.

1. Select **View** > **Plate Setups**.
2. In the Plate Setups dialog box, in the **Device Types** list, select the offset device type for which this plate setup was defined.
3. In the **Plate Setups** list, select the plate setup in which you want to remeasure the plate line.
4. In the **Plate Lines** list, select the plate line that you want to remeasure.
5. Use your plate reader to measure the patches on the plate control strip.
   Measure the lower half of the tone scale, which is made with reference screening, independent of job settings. Ensure that the correct Plate Control Strip was used for this particular resolution and screening.

6. In the **Tint Values** area for this plate line, in the **Measured Tint (Uncalibrated)** column, click a desired row and type the measured tint value as a number between 0.0 and 100.0 percent for the input tint value.
   You do not have to type a measured value for every input tint value.
7. Click **Close**.

The plate setup curve for this combination of plate setup and plate line is changed.

17 Flexographic printing setup

Flexographic printing has some unique properties and requirements for setting up curves and profiles. ColorFlow software has a variety of capabilities for setting up flexographic devices and device conditions, and for accurately simulating their color response on proofing devices. This chapter provides a summary of flexographic printing, and how ColorFlow software supports its setup.

Overview

Flexographic printing technology uses a flexible relief plate that transfers ink from a roller, called the *anilox* roller, to the substrate with a rubber-stamp mechanism. Ink-carrying surfaces protrude above the recessed base. Total plate thicknesses range from about 0.05 to 0.25 in. or 1.2 to 6.4 mm, with the base comprising about two-thirds of the thickness.

Like offset printing, flexographic printing (or *flexography*) uses halftone screens to render tints, but the protrusion of flexographic halftone dots above the base of the plate produces some physical effects that uniquely affect the color response of this technology. Two primary effects must be considered in controlling and proofing flexography: highlight gain and minimum printable dot.

Highlight gain—Small halftone dots form rubber pillars on the flexographic plate. Under compression, these pillars expand in diameter, transferring more ink to the substrate than expected from the intended halftone dot area. This results in large physical dot gain in the highlight region. Accurate color control and proofing require special treatment of this large highlight gain.

Minimum printable dot—Some flexographic plate technologies cannot reliably image and print a halftone dot smaller than about 5%. For lighter tints, halftone dot pillars may form on the plate, but they collapse under compression. This collapse causes excessive physical gain, smearing, and color instability—an effect called *scum dots.*

The smallest tint value that can be reliably imaged and printed is called the *minimum printable dot.* This dot varies according to screen ruling, plate thickness, web width, and other physical factors. To avoid scum dots, it is essential that dots smaller than the minimum printable dot are never imaged on the plate. This is accomplished by using the special curves described below.

Bump and cutoff curves

Two approaches to curve shape are used to ensure that dots smaller than the minimum printable dot are not imaged on a flexographic plate: *bump and cutoff curves*.

Bump curves—Bump curves map a low input tint value, typically between 0.3% and 1.0%, to the minimum printable dot. Lower input tint values are mapped to zero output, ensuring that no dots smaller than the minimum printable dot appear on the plate. The curve has a discontinuity, where the selected input tint value is "bumped" to the minimum printable dot. Above this discontinuity, the curve increases smoothly to 100%. The curve typically becomes linear (output = input) at some intermediate point.

It is common practice to select 0.39% as the input tint value that is bumped up to the minimum printable dot. This value represents the first tint level above zero in 8-bit image files. This ensures, for example, that a gradient that extends down to 0% produces non-zero output on the plate over the maximum possible extent of the gradient. However, the bump causes the gradient to be darker than expected in the highlight region.

Cutoff curves— Cutoff curves are typically linear from 100% down to the curve point where input and output equal the minimum printable dot. Below this point, input tint values are mapped to zero output, ensuring that no dots smaller than the minimum printable dot appear on the plate. Cutoff curves, like bump curves, are discontinuous. They differ only in the input tint value that is chosen to reproduce the minimum printable dot on the plate.

Reproducing a gradient with a cutoff curve ensures that the gradient has the correct tonality down to the minimum-printable-dot cutoff point. The disadvantage is that a substantial portion of the gradient will be reproduced with zero output. For example, if a cutoff curve is used with a 10% minimum printable dot, then one-tenth the length of a gradient from 0% to 100% will have zero output.

The capabilities of ColorFlow software support the generation of bump and cutoff curves, with a variety of options.

Color response

With the exception of flexography, most printing technologies can print sufficiently light tints that the device response is considered to

progress smoothly and continuously from the substrate color through highlights and across the tonal scale.

Some measurements from the device condition for a typical sheetfed offset press provide an example of this continuous response:

- The color change from the substrate to a 1% magenta dot is 0.7 DeltaE—a marginally noticeable color change. The 1% tint has a tonal response, or Effective Dot Area (EDA), of 1.4%.
- The color change from the substrate to a 2% magenta dot is 1.4 DeltaE—twice that produced by the 1% dot, yielding an EDA of 2.8%.

In contrast to other printing technologies, flexographic printing typically exhibits a discontinuous response due to the effects of highlight gain and minimum printable dot. That is, there is a large step in the color response between the substrate color and the color produced by the smallest printable dot of ink. This step is called a flexo discontinuity. It affects all process and spot inks to varying degrees, and is evident in the colorimetric (CIELAB) and tonal (EDA) responses of flexographic printing conditions.

The term discontinuity also refers to the step function in bump and cutoff curves, as well as profiles and other curves generated by ColorFlow software, when setting up flexographic printing.

The technology effects of Flexographic plates

The extent of the flexo discontinuity depends primarily on the technology of the flexographic plate. Two plate types are commonly used: Kodak Flexcel NX plates and Laser Ablative Mask System (LAMS) plates. The properties of these plates that affect color response and the behavior of ColorFlow software are described below. For more information about these plates, see the technical reference material provided by their manufacturers.

Kodak Flexcel NX plates

Highlight gain is the dominant effect with Flexcel NX plates. Halftone dots as small as one or two pixels at 2400 dpi (0.4 or 0.8 percent at 150 lpi) can be imaged and printed reliably, but these small halftone

dots are subject to compression dot gain, causing a small flexo discontinuity.

A typical flexographic press device condition using Flexcel NX plates at 175 lpi has the following behavior, demonstrating the effect and magnitude of the discontinuity:

- The color change from the substrate to a 1% magenta dot is **3.7 DeltaE**—an easily noticeable difference. The 1% tint has a tonal response or EDA of **9%**.
- The color change from the substrate to a 2% magenta dot is **4.5 DeltaE**—less than twice that exhibited by the 1% dot—and the 2% tint has an EDA of **10%**.

The color change from substrate to 1% is much larger than that from 1% to 2%. Compare this color response to the typical offset color response (described earlier), in which there are similar color changes from 0% to 1%, and 1% to 2%.

Laser Ablative Mask System (LAMS) plates

LAMS plates have a minimum printable dot ranging from about 4% to 10%, depending on screen ruling and physical configuration.

A typical flexographic press device condition using LAMS plates at 133 lpi has a minimum printable dot of 7%. Applying a bump curve that maps 1% to 7% produces the following behavior:

- The color change from the substrate to a 1% magenta dot is **6.1 DeltaE**—a very noticeable difference. The 1% tint has a tonal response or EDA of **15%**.
- The color change from the substrate to a 2% magenta dot is **8.2 DeltaE**—less than twice that exhibited by the 1% dot; the 2% tint has an EDA of **17%**.

The color change from substrate to 1% is much larger than that from 1% to 2% The response is similar to that of the Flexcel NX plates, but the flexo discontinuity is larger with LAMS plates (that is, the color change from substrate to 1% tint).

The flexo discontinuity is not caused entirely by the inherent response of flexographic printing. In the case of LAMS plates in particular, halftone dots smaller than the minimum printable dot are capable of forming on the plate and transferring ink to the substrate; but their formation and behavior is unreliable and unstable, so they are eliminated by using bump or cutoff curves. It is the combination of this bump or cutoff curve, and the inherent device response, that determines the input tint value at which the discontinuity occurs, and the magnitude of its color change.

While the magnitude of the flexo discontinuity varies according to plate type and other factors, a common set of capabilities in ColorFlow

software manages the discontinuity for all flexographic press device conditions.

Screening effects

Halftone screen ruling affects the nature of the flexo discontinuity. Generally speaking, increasing the ruling increases the highlight gain for all plate technologies, which increases the magnitude of the flexo discontinuity. A screen ruling increase also increases the minimum printable dot for LAMS plates, and as a result, increases the magnitude of the flexo discontinuity.

The factors that cause flexo discontinuity can be mitigated by using hybrid screening technologies, such as Kodak Maxtone Screening. Hybrid screening systems use conventional (AM) halftone dots through most of the tonal range, but change to stochastic (FM) screening in the highlight region. Use of FM screening in the highlights produces a continuous color transition from an input tint gradient that extends down to 0%, at the expense of increased grain and an apparent visual transition from FM to AM screening.

Flexographic press device type

ColorFlow software includes a device type for defining flexographic presses in the Devices palette. A flexographic press is a curve-controlled device type.

When you define a device condition for a Flexographic Press, specific features for setting up and proofing flexographic presses are enabled in the device condition and in color setups that use the device as the PCO or SCO. These features are described below.

Note: A flexographic press device condition cannot function as a color input for a color setup.

See also:

Devices on page 41

Flexographic plate setups and curves

Flexographic press device conditions in ColorFlow software have the same plate setup and plate curve capabilities as offset press device conditions. A flexographic plate setup is identified by a combination of Screening and Plate Type attributes, has one or more plate lines, and may be associated with one or more flexographic press device

conditions. For output to a specific plate type, the same plate curve applies to all separations for process and spot inks.

The response of a flexographic plate is typically measured by a system that captures a camera image of a tint patch on the plate, and then performs an image analysis to estimate the relative area of the protruding, ink-carrying surfaces. You can enter these dot area estimates into the plate setup in ColorFlow software.

The response of a flexographic plate is considered to be continuous, and so is the plate curve that ColorFlow software calculates to linearize the response. The flexo discontinuity is managed by special device curves.

See also:

Plate setups on page 157

Flexographic press device curves

Device curves define bump or cutoff curves for each device in a flexographic press device condition. The point at which the discontinuous curve steps from zero to the minimum printable dot is called the *Mindot* of the curve. The Mindot has a **Tint In** value that specifies the input tint value where you want the discontinuity to occur, and a **Minimum Tint Out** value that you set to the minimum printable dot.

It is common to print spot inks with operating conditions that are different from those used for process inks. For example, different screening systems (AM versus hybrid) or anilox roller conditions can be applied. This may result in different minimum printable dot values for spot inks versus process inks. To accommodate these differences, ColorFlow software provides two separate Mindot definitions: one for process inks and another for spot inks. This capability lets you use bump curves for process inks and cutoff curves for spot inks.

You define device curve Mindot settings in the Default Device Curves Definition for a flexographic press device condition.

Each device that you add to the device condition will inherit the default device curves, and their Mindot settings for its device curves.

The Mindot **Tint In** and **Minimum Tint Out** values only define the discontinuity of flexo bump or cutoff curves. Above the Mindot, the shape of the curve is defined by preset or imported curves, using the same controls as for other curved device types.

You can view the device curve Mindot settings for any device in the Device Curves Definition dialog.

See also:

Pooled devices in a device condition on page 61

Adding a curve-controlled device to an existing device condition on page 62

Preset device curves for Flexcel NX plates

The preset device curves in ColorFlow software include 13 recommended curve shapes for setting up printing with Flexcel NX plates. These curves are only available for flexographic press device conditions.

Highlight Contrast control

When you define bump or cutoff curves, it is likely that the Mindot definition you provide will not coincide with the preset or imported curves that you choose. For example, you may want to use Linear

curves with a Mindot that bumps 0.39% to 7.0% for LAMS plates. The Mindot lies above the linear curve.

The **Highlight Contrast** control determines how the curve tapers from the Mindot point to the preset or imported curve. With a low **Highlight Contrast** value, the curve converges quickly to the selected curve. This flattens the curve in the highlight region, and sacrifices highlight contrast. Increasing the **Highlight Contrast** value improves contrast in this tonal region, but extends the darkening effect of the Mindot bump further up on the tonal range.

Allow Tint Out increase to improve color match control

The **Allow Tint Out increase to improve color match** option controls whether ColorFlow software increases the Mindot **Tint Out** value of a device curve when it calculates device curves for non-promoted devices. It also has a similar effect on simulation and conversion curve calculation.

With some flexographic press device conditions, the minimum printable dot is small enough that it is not necessary to use a bump or cutoff curve. Nevertheless, this type of device condition may have a large enough highlight gain that its color response is discontinuous. In this situation, you would use the default Mindot settings to ensure that ColorFlow software accurately models the discontinuous color response.

If the discontinuity of the color response is negligible for process and/or spot inks, set the corresponding Mindot **Tint In** values to zero. This eliminates the Mindot and indicates to ColorFlow software that the device condition color response is continuous, giving it the same capabilities as other types of curve-controlled device conditions.

See also:

Device curves on page 54
Pooled devices in a device condition on page 61
Device curves generated with ColorFlow software on page 172
DeviceLink restrictions for discontinuous color responses on page 179

Flexographic press device curve adjustment

You can adjust bump and cutoff device curves using the same tools that you use for other device curves. You can also adjust the Mindot of discontinuous process or spot ink device curves.

Mindot adjustment lets you increase the Mindot **Tint Out** value for any process or spot ink device curve, to make a tonal correction or to accommodate an increase in the minimum printable dot. You can also adjust the cast of the CMY Mindot point.

The Mindot adjustment does not let the Mindot **Tint Out** value be less that the **Minimum Tint Out** setting in the Default Device Curves. This ensures that the curves cannot generate output less than the minimum printable dot.

You cannot adjust the Mindot **Tint In** value of any process or spot ink device curve. The **Tint In** value is an important attribute of the device color response. If you need to change a Mindot **Tint In** value, you must redefine the device condition default device curves, and the device curves of the affected device. This requires you to re-characterize the device response.

Discontinuous color response

When ColorFlow software models the color response of flexographic printing with flexo discontinuity, the resulting color response is called a *discontinuous color response*. ColorFlow software accurately represents the flexo discontinuity in both types of a color response: tonal response and colorimetric response.

The input tint value at which the discontinuity occurs, and the corresponding color response of a spot or process ink channel, is called the *Mindot* of the discontinuous color response.

If a discontinuous color response has tonal and colorimetric components, they have the same Mindot **Tint In** value.

See also:

About color response on page 81

Discontinuous tonal response

Tonal response comprises the EDA of each ink channel whose response is measured. If a process or spot ink has a flexo discontinuity, its tonal response has a step change, at the Mindot **Tint In** value, from zero to the EDA value printed by the Mindot.

As with continuous tonal color responses, the tonal response component of a discontinuous color response is used for tonal match curve generation, and is reflected in tonal response graphs of devices, device conditions, PCOs, and SCOs.

Discontinuous colorimetric response

Colorimetric response comprises the CIELAB color response of process ink ramps and overprinted combinations. It also includes the CIELAB color response of spot ink ramps. If a process or spot ink has a flexo discontinuity, its colorimetric response has a step change at the

Mindot **Tint In** value, from the substrate color to the color printed by the Mindot.

As with continuous tonal color responses, the colorimetric response component of a discontinuous color response is used for gray balance curve, device profile, and DeviceLink generation.

Discontinuous device response

If the device curves Mindot **Tint In** value of a flexo device is non-zero, ColorFlow software models the device response with a discontinuous color response. The Mindot response of a given process or spot ink is equal to the color printed by the Mindot **Tint Out** value of the device curve in effect when the device is characterized.

ColorFlow software uses the discontinuous response of a non-promoted device to generate its device curves, as described below. The discontinuity is also reflected in the Device Tonality graph.

See also:

Uncalibrated Device Tonality dialog box on page 235

Device curves generated with ColorFlow software

When you characterize the response of a non-promoted device in a flexographic press device condition, ColorFlow software calculates device curves to align the device response to the promoted device response—just as it does for other curved device types. When performing this calculation for a flexo device with bump or cutoff curves, ColorFlow software uses the device curve Mindot settings to ensure that scum dots are not generated.

For example, consider a non-promoted device that has a darker response in the highlight region than the promoted device. ColorFlow software will not reduce the Mindot **Tint Out** value of the curves in an attempt to match the lighter promoted device response. Instead, the response of the non-promoted device will remain darker in the highlight region.

Further up the tonal scale, the calculated device curves align the non-promoted device response to the promoted device response. The **Highlight Contrast** control determines how the curves taper from their Mindot points to the curves that provide exact alignment.

See also:

Device curves on page 54
Highlight Contrast control on page 169

Aligning highlight response

If the non-promoted device has a lighter response in the highlight region than the promoted device, ColorFlow software can increase the Mindot **Tint Out** value of the calculated curves to match the darker promoted device across the entire tonal range. Alternatively, it can leave the Mindot **Tint Out** value unchanged, leaving the non-promoted device response lighter in the highlight region.

In this situation the **Allow Tint Out increase to improve color match** control determines the behavior of ColorFlow software. If you select the **Allow Tint Out increase to improve color match** check box, ColorFlow software increases the Mindot **Tint Out** value of each curve to match the promoted device response across the entire tonal range. If you clear the **Allow Tint Out increase to improve color match** check box, ColorFlow software does not change the Mindot **Tint Out** values of the curves. It tapers the curves from their Mindot to the shapes required for exact alignment, according to the **Highlight Contrast** control.

See also:

Highlight Contrast control on page 169
Allow Tint Out increase to improve color match control on page 170

CMY highlight cast alignment

For all curved device types, ColorFlow software calculates non-promoted device process ink curves using the Gray Balance method, provided both devices have colorimetric response information. When performing this operation for bump or cutoff device curves, ColorFlow software can calculate CMY curves that correct the cast of the non-promoted device highlight response to match the gray balance of the promoted device. The correction includes the Mindot response.

The **Allow Tint Out increase to improve color match** control determines if this cast correction is performed. If you clear the control, Mindot **Tint Out** values are unaffected and the highlight cast is not corrected.

If you select **Allow Tint Out increase to improve color match**, ColorFlow software performs this cast correction if the non-promoted device response is darker or lighter than the promoted device response in the highlight region. If the non-promoted response is lighter, ColorFlow software increases the Mindot **Tint Out** value of cyan, magenta, and yellow curves to exactly align the cast and lightness of the non-promoted device to the promoted response. If the non-promoted response is darker, ColorFlow software increases the Mindot **Tint Out** value of one or two of the cyan, magenta, and yellow curves to exactly align only the cast of the non-promoted device to the promoted response. The non-promoted response will remain darker in

the highlight region. The **Highlight Contrast** control determines the tint values at which the lightness of the non-promoted response also matches that of the promoted response.

Discontinuous device condition

If the promoted device of a flexographic press device condition has a discontinuous color response, the device condition has a discontinuous color response and is called a *discontinuous device condition*. ColorFlow software uses the discontinuous color response to generate and adjust the device condition profile, and the simulation and conversion curves of PCOs and SCOs that use the device condition. The resulting profile and curves are discontinuous.

If you characterize a flexographic device condition by importing a discontinuous device profile for the device condition profile, the device condition becomes a discontinuous device condition, independent of the color response of its devices.

Discontinuous device condition profile

When ColorFlow software generates a device condition profile for a discontinuous device condition, the source tags (A2B tags) of the profile reflect the discontinuous color response of the device condition. The resulting ICC device profile is called a *discontinuous device profile*.

The destination tags (B2A tags) of the device condition profile are continuous, despite the discontinuous device condition color response. ColorFlow software generates B2A tags that provide optimal color separations when the discontinuous profile is used as a destination profile in a profile pair workflow for RGB image separation.

Discontinuous device profile input curves

The input curves of each source tag (A2B tag) provide accurate simulation of the flexo discontinuity. They have a Mindot whose **Tint In** value equals that of the discontinuous color response from which they are generated.

Note: Other than this **Tint In** value, the source tag input curve Mindots do not reflect the color response of the device condition, nor any curves associated with it. For ColorFlow software-generated CMYK device profiles, the Mindot **Tint Out** values are equal to 6.25%. This is a reflection of the internal profile structure.

Discontinuous PCO

If the PCO in a color setup uses a discontinuous device condition, the PCO has a discontinuous color response and is called a *discontinuous PCO*. If the simulation target is continuous, or set to **None**, then the PCO Mindot **Tint In** value equals the device condition Mindot **Tint In** value.

If the simulation target is a discontinuous device condition, the PCO is discontinuous.The PCO Mindot **Tint In** value equals that of the simulation target.

ColorFlow software uses the discontinuous color response of the PCO to generate and adjust the PCO profile and SCO conversion curves or DeviceLinks. The resulting profile, curves, and DeviceLink are discontinuous, and have Mindot **Tint In** values equal to that of the PCO response.

See also:

DeviceLink restrictions for discontinuous color responses on page 179

PCO Simulation Curve Generation

If the simulation target is discontinuous and the PCO uses a continuous, curve-controlled device condition, ColorFlow software calculates Gray Balance or Tonal Match simulation curves to exactly align the PCO color response to the target response across the entire tonal scale.

Aligning highlight response

When ColorFlow software calculates Tonal Match or Gray Balance simulation curves for a discontinuous device condition, it is likely that the device condition's color response in the highlight region is darker than the target response, unless the target is also discontinuous. The device condition response cannot be aligned to the target response in this region, because the device condition cannot print lighter than its Mindot response. In this case, simulation curves have no effect at the Mindot; **Tint Out** equals **Tint In**.

Further up the tonal scale, the calculated simulation curves align the PCO device condition response to the target response. The **Highlight Contrast** control of the PCO device condition determines how the curves taper from their Mindot points to the curves that provide exact alignment.

If the PCO target and device condition are discontinuous, the possibility of alignment in the highlight region is determined by the relative darkness of the target and device condition Mindot responses.

If the target Mindot response is darker than that of the device condition, ColorFlow software can generate simulation curves that increase the Mindot **Tint Out** for the device condition, providing exact alignment across the entire tonal range. Alternatively, it can generate simulation curves that have no effect at the Mindot, leaving the PCO response lighter that the target in the highlight region.

The **Allow Tint Out increase to improve color match** control of the PCO device condition determines the behavior of ColorFlow software in this situation. If you select the **Allow Tint Out increase to improve color match** check box, ColorFlow software increases the Mindot **Tint Out** value of each simulation curve to match the target response across the entire tonal range. If you clear the **Allow Tint Out increase to improve color match** check box, ColorFlow software will not affect the Mindot of the curves. It tapers the curves from the Mindot to the shapes required for exact alignment, according to the **Highlight Contrast** control of the PCO device condition.

See also:

Highlight Contrast control on page 169
Allow Tint Out increase to improve color match control on page 170

CMY highlight cast alignment

When ColorFlow software generates Gray Balance simulation curves for a discontinous PCO device condition, it can calculate CMY curves that correct the cast of the device condition highlight response to match the gray balance of the target. The correction includes the Mindot response.

The **Allow Tint Out increase to improve color match** control of the PCO device condition determines whether or not this cast correction is performed. If you clear the control, calculated simulation curves have no effect at the Mindot, and the highlight cast is not corrected.

If you select **Allow Tint Out increase to improve color match**, ColorFlow software performs this cast correction when the PCO device condition response is darker or lighter than the target response in the highlight region. If the device condition response is lighter, ColorFlow software increases the Mindot **Tint Out** value of cyan, magenta and yellow simulation curves to exactly align the cast and lightness of the PCO to the target. If the device condition response is darker, ColorFlow software increases the Mindot **Tint Out** value of one or two of the cyan, magenta and yellow simulation curves to exactly align the cast only of the PCO to the target. The PCO response will remain darker in the highlight region. The **Highlight Contrast** control of the PCO device condition determines the tint values at which the lightness of the PCO also matches that of the target.

PCO Simulation DeviceLink generation

If the simulation target is discontinuous and you select a ColorFlow software-generated simulation DeviceLink method, ColorFlow software calculates a DeviceLink that accurately simulates the discontinuous target color response on any PCO device condition. The resulting DeviceLink is called a *discontinuous DeviceLink*.

See also:

Discontinuous DeviceLink input curves on page 178

SCO Conversion Curve generation

If the PCO is discontinuous and the SCO uses a continuous, curve-controlled device condition, ColorFlow software calculates Gray Balance or Tonal Match conversion curves to exactly align the SCO color response to the PCO response across the entire tonal scale.

When ColorFlow software calculates Tonal Match or Gray Balance conversion curves for a discontinuous SCO device condition, it is likely that the color response of the device condition in the highlight region is darker than the PCO response, unless the PCO is also discontinuous. Alternatives exist for controlling curve calculation in the Mindot and highlight region that depend on the PCO and SCO device condition color responses.

In these situations, the calculation of the SCO conversion curve is similar to PCO simulation curve calculations (described above), with the simulation target response for PCO simulation curve calculations replaced by the PCO response for SCO conversion curve calculations.

The **Allow Tint Out increase to improve color match** and **Highlight Contrast** controls of the SCO device condition determine conversion curve calculation in these cases.

See also:

Highlight Contrast control on page 169
Allow Tint Out increase to improve color match control on page 170
Aligning highlight response on page 175
CMY highlight cast alignment on page 176

SCO Conversion DeviceLink generation

If the PCO is discontinuous and you select a ColorFlow software-generated conversion DeviceLink method for an SCO, ColorFlow software calculates a DeviceLink that accurately reproduces the

discontinuous PCO color response on the SCO device condition. The resulting DeviceLink is called a *discontinuous DeviceLink*.

Discontinuous DeviceLink input curves

The input curves of a discontinuous DeviceLink provide accurate simulation of the flexo discontinuity. They have a Mindot whose **Tint In** value equals that of discontinuous color response of the DeviceLink source; that is, the PCO response for SCO conversion DeviceLinks.

Note: Other than this **Tint In** value, the input curve Mindots do not reflect the color response of the DeviceLink source, nor any curves associated with it. For ColorFlow software-generated CMYK-input DeviceLinks, the input curve Mindot **Tint Out** values are equal to 6.25%. This is a reflection of the internal profile structure.

Discontinuous PCO profile

When ColorFlow software generates the PCO profile of a discontinuous PCO, the source tags (A2B tags) of the profile reflect the discontinuous color response of the PCO. The resulting ICC device profile is called a *discontinuous device profile*. Each process ink channel of the source tags has a Mindot whose **Tint In** value equals the color response Mindot **Tint In** value.

The destination tags (B2A tags) of the PCO profile are continuous, despite the discontinuous PCO color response. ColorFlow software generates B2A tags that provide optimal color separations when the discontinuous profile is used as a destination profile in a profile pair workflow for RGB image separation.

See also:

Discontinuous device profile input curves on page 174

Separating and editing images with the PCO profile

You can use the PCO profile to separate RGB image and graphic content, or to reseparate CMYK content. If you use the Prinergy Refine process to separate or reseparate content, ColorFlow software delivers the PCO profile to Prinergy for use as a destination profile.

You can also export the PCO profile to use in other applications that perform image separation, such as Adobe Photoshop.

When images are printed with flexography, the discontinuous color response may produce undesirable artifacts. For example, any separation with highlight tints that vary down to 0 percent will produce shade stepping equal to the magnitude of the Mindot color. The larger

the flexo discontinuity, the more severe the artifacts generated by shade stepping.

It is common to use Adobe Photoshop (or another application that performs image editing) to edit images to avoid these problems. You can use the PCO profile in these applications to provide an accurate preview of how the image will appear when printed with flexographic printing.

See also:

Prinergy workflows on page 181

Previewing images with the PCO profile in Adobe Photoshop

You can use the PCO profile from ColorFlow software to preview images in preparation for flexographic printing.

1. Export the PCO profile from ColorFlow software.
2. In Adobe Photoshop:
   a. Select **Edit** > **Color Settings**.
   b. Select **Working Spaces - CMYK: Load CMYK**.
   c. Browse to the exported PCO profile, and select it.

See also:

Exporting a device profile on page 125

DeviceLink restrictions for discontinuous color responses

ColorFlow software cannot generate or adjust a DeviceLink if the destination color response is discontinuous. It applies these restrictions to flexographic printing setup:

- You cannot use the Ink Optimizing Input in a color setup whose PCO is discontinuous.
- You cannot select the ColorFlow software-generated Conversion DeviceLink method for CMYK color inputs. You can import a DeviceLink, but you cannot adjust it.
- You cannot define a simulation DeviceLink for a PCO that uses a discontinuous device condition.
- If you define a PCO with a continuous, curve-controlled device condition, a discontinuous target, and any simulation DeviceLink, ColorFlow software will use Curves Method: Manual Adjustments

Only. The simulation curves are linear, and the simulation DeviceLink performs the target simulation.

- If the PCO is discontinuous and you define an SCO with a continuous, curve-controlled device condition and any conversion DeviceLink, ColorFlow software will use Curves Method: Manual Adjustments Only. The conversion curves are linear, and the conversion DeviceLink performs the conversion from the PCO color response to the SCO device condition.

If the flexographic device condition uses a hybrid screening system that delivers a smooth, continuous color response from the substrate color through the highlights of all inks, then the flexo discontinuity is eliminated. In this situation, set the Mindot Tint In value to zero. The flexo device condition behavior in ColorFlow software will be similar to that of other device types, and the discontinuity-related restrictions will be eliminated.

18 Prinergy workflows

How a Prinergy job uses color setups

A color setup name and snapshot number is embedded at a page (1-up) level during the refine process of a Prinergy job.

After pages for a job have been refined, if you want to change the color setup or a color control element that the job uses, you must refine the job's input files again so that the new color setup and/or snapshot number is embedded its pages.

It is best practice *not* to modify a color setup to adjust the color of a single job. If, for example, you need to adjust the simulation method for a single job, you can duplicate the color setup, make your simulation adjustment in the second color setup, and use the second color setup for the Prinergy job.

Prinergy and snapshots

Prinergy can only access ColorFlow color control elements that have been captured in a snapshot.

About snapshots

A ColorFlow snapshot captures the state of the entire colorstore, making its elements available to the Prinergy workflow.

The snapshots feature makes it unnecessary for you to manually save and name multiple versions of individual color control elements after creating and adjusting them. When you capture a snapshot, the current state of all color control elements in all color setups are captured and made available in Prinergy. At any time, you can roll back (revert) to the state of a previous snapshot. When you revert to a previous snapshot, all color setups are restored to their state at the time the previous snapshot was captured. Any color control elements and color setups that you created after the snapshot that you revert to are deleted.

Important: Since snapshots capture the entire colorstore instead of individual color setups, when you approve or revert a snapshot, multiple color setups may be affected.

You specify a snapshot number in the refine process template or the output process template in Prinergy. By default, the **Approved** snapshot

is used for all Prinergy jobs. If you are creating a Prinergy job for testing or for setting up the color on a device for the first time, you may want to select a snapshot that you captured after the **Approved** snapshot in order to test the output. During testing, it is best practice to capture a snapshot after each change you make in order to easily identify the result of your changes.

When you are satisfied with the color control elements in all color setups, you can capture a snapshot and approve it. Only one snapshot can be in the **Approved** state at any time. When you approve a snapshot, any snapshots taken before the snapshot that you approve are deleted.

Taking a snapshot

You can capture a snapshot of all color control elements in all color setups at this moment.

Requirements: You must apply all the adjustments that you want to include in a snapshot before you can take the snapshot. You cannot take a snapshot when calculations are pending or in progress.

1. Select **View** > **Snapshots**.
2. Click **Capture**.
   The snapshot appears in a new row in the table. The table lists a sequential ID and the date and time when the snapshot was captured.
3. To add a note about a snapshot, double-click in the **Notes** column of the snapshot.

The ColorFlow elements that you captured in the snapshot are now available to the Prinergy workflow.

Next: To set the elements in this snapshot to be the default elements in the Prinergy workflow, you must approve it.

See also:

Approving a snapshot on page 183

Reverting to an earlier snapshot

You can restore all color setups to their conditions as they were at the time of a previous snapshot.

Important: When you revert to a previous snapshot, any color control elements and color setups that you created since the previous snapshot are permanently deleted.

1. Select **View** > **Snapshots**.
2. In the table, select the snapshot to which you want to revert.
3. Click **Revert**.

All ColorFlow elements are restored to their state when this snapshot was taken. Snapshots that were taken after this snapshot are deleted.

Approving a snapshot

You can set elements in a particular snapshot to be the default set of elements that are used in the Prinergy workflow.

1. Select **View** > **Snapshots**.
2. In the table, select the snapshot that you want to approve.
3. Click **Approve**.
   This snapshot becomes the approved snapshot, and any snapshots taken before this snapshot are deleted.

How Prinergy uses ColorFlow elements

A color setup must be defined in the job attributes of a Prinergy job in order for ColorFlow-generated elements to be applied correctly in job processing.

In Prinergy Connect and Prinergy Powerpack, you can set job attributes when you create a job, or afterwards, from the **Edit** menu of Prinergy Job Manager. After you assign a color setup to a Prinergy job, the ColorFlow server provides all of the necessary color control elements for the job. If you need to change the color setup of a job from the color setup that is assigned in the job attributes during the refine stage, you can select a new color setup in the refine process template.

In Prinergy Evo, you associate color setup information with process templates based on your output intent.

The following table lists elements and settings that ColorFlow can provide to Prinergy.

Element	Where defined in ColorFlow	Where used in Prinergy	Without ColorFlow, Prinergy would define the item in
Color Input (CI) to primary color output (PCO) DeviceLink	Conversion link between the device condition of the CI and the PCO	Refine to PCO color space (Images and Graphics) of CMYK defined objects*	the refine process template, in the **CMYK Images** and **CMYK Graphics** fields

Element	Where defined in ColorFlow	Where used in Prinergy	Without ColorFlow, Prinergy would define the item in
CI ICC device profiles (source profiles)	Device condition of the CI	Refine to PCO color space (Images and Graphics) of CIELAB objects	the refine process template, in the **CMYK Images** and **CMYK Graphics** fields
PCO simulation DeviceLink	Simulation Definition dialog box	During output to the PCO device condition—links the color response of the PCO device to the color response of the simulation target	
PCO ICC device profile	Simulation of the PCO	During output to the PCO device condition—converts CIELAB content to CMYK	an output process template, as either a source profile or a destination profile
PCO to SCO DeviceLink	Conversion link between the PCO and the device condition of the SCO	During output to an SCO device condition	
SCO ICC device profiles	Device condition of the SCO	During output to an SCO device condition—converts CIELAB content to CMYK	an output process template, as either a source profile or a destination profile
Calibration curves	Generated within a PCO (Simulation Definition dialog box) or from PCO to SCO (Conversion - Definition dialog box)	Dynamically served on output based on the device condition selected in the output process template	an output process template, in the **Print Curve (Calibration)** list in the **Calibration & Screening** section. The curve would have been generated in Harmony or another curve generation program.
Plate curves	Plate Setups dialog box	In the **ColorFlow** section of the output process template, you can select a plate line from the plate setup that is used for the device condition.	

*ColorFlow software 1.0 cannot generate elements to handle RGB input. At this time, if you want to convert RGB content, you must do so in a non-ColorFlow-enabled refine process template.

ColorFlow variable marks in Prinergy

The following ColorFlow-related variable marks are available in Prinergy.

Information	Variable mark
Color setup name	`$[ColorSetupName]`
Snapshot number	`$[SnapshotNumber]`
Device condition name	`$[DeviceConditionName]`
Plate line name	`$[PlateLineName]`
Device name	`$[DeviceName]`

For more information about variable marks, see the *Prinergy Workshop User Guide*.

Using ColorFlow software

ColorFlow software is integrated with Prinergy Evo.

ColorFlow software delivers color relationship management that unifies color control elements—such as ICC profiles, DeviceLink profiles, and calibration curves—and manages the relationships between color control elements and device print conditions. Specifically, ColorFlow simplifies the process of setting up color and ensuring that Prinergy work is processed using the correct color settings. Specifically, ColorFlow simplifies the process of setting up color and ensuring that Prinergy jobs are processed using the correct color settings.

Getting started with ColorFlow

Complete these steps, in this order	Notes
Install ColorFlow software on client computers.	Prinergy Evo uses a client-server system, meaning that there can be many client computers connected to and running from one server. As part of Prinergy, ColorFlow Workflow Edition software and colorstore database are automatically installed on the PrinergyPrinergy Evo server. The ColorFlow server runs as a process on the Prinergy primary server. You must install the ColorFlow software on one or more client computers that connect to a Prinergy server. **Note:** Only one user can modify the colorstore database at one time. Therefore, only one ColorFlow client computer can be running at a time. For instructions on installing the ColorFlow software on client computers, see the *ColorFlow User Guide*.

Complete these steps, in this order	Notes
Consider if you will import Harmony tonal calibration curves.	Decide whether you'll use the ColorFlow software to create and manage color control elements, or import existing Harmony tonal calibration software curves. If you use Harmony, you can delay using some capabilities of ColorFlow until you have time to print and measure charts with your device conditions. **Note:** When using ColorFlow with Prinergy, we recommend building new curves rather than importing existing Harmony tonal calibration curves. For more information about importing Harmony curves, see chapter 11 of the *ColorFlow User Guide*.
Configure ColorFlow.	**a.** Create a color setup. A color setup is the virtual structure that you build to define the color relationships among the devices in your printing task. It includes devices, device conditions, a simulation target, and color control elements, such as DeviceLink profiles and curves. A color setup manages how its device conditions simulate the primary color output (PCO). If you edit the color response of a device condition, ColorFlow ensures that related color control elements in the color setup are updated to reflect the edit. **b.** Add device conditions. A device condition is the combination of a device and the operating conditions in which the device captures or produces an image. It has a measurable color response. A device condition can include more than one device. If it does, all devices must have the same device type and must use the same consumables and operational settings. The devices must be able to be calibrated to yield a similar color response. Note that this applies to curve-controlled devices only. For more information about configuring ColorFlow, see chapters 3, 4, and 5 of the *ColorFlow User Guide*.
Measure or import the color response of your device.	Perform either of the following actions: • Create and measure a ColorFlow characterization chart. • Import an existing measurement set. The attributes of the chart must be suited to the inks you are using on the output device, your measuring device, and the size of your press. For more information about measuring color response, see chapter 6 of the *ColorFlow User Guide*.

Complete these steps, in this order	Notes
Define simulation and conversion settings.	Use the Simulation Definition dialog box in ColorFlow to control how a primary color output (PCO) simulates the color target. ColorFlow can perform the simulation using tonal curves or DeviceLinks or a combination. a. In the **Target** list, select the color response whose colors the PCO will attempt to simulate. Often this will be an industry reference. b. Using the **Curves** slider (for offset presses and halftone proofers only), select how you want to use tonal curves. For an explanation of each option, see chapter 11 of the *ColorFlow User Guide*. c. Using the **DeviceLink Method** selector, select how you want to use DeviceLinks. For some types of devices, not all values are available. Because the DeviceLink is used in the context of a simulation, the DeviceLink source is the color space selected in the **Target** list; the destination is the device condition inside the PCO. For an explanation of each option, see chapter 13 of the *ColorFlow User Guide*. For more information about simulation and conversion, and the options in the Simulation Definition dialog box, see the *ColorFlow User Guide*.

Using ColorFlow in Prinergy

After you configure the ColorFlow software, you must select the **Enable ColorFlow** check box in the **Match Colors** section of the refine to PDF and output process templates.

After you have configured the ColorFlow software, you can use the ColorFlow settings in the refine, loose 1-up artwork output, layout output, and final output process templates to apply color control elements during processing.

In the refine process template, you select a color setup. The available color setups are in the ColorFlow colorstore database on the primary server. When a page or artwork file is refined using the refine process template, the color setup specified in the process template is assigned to the page or file.

In each output process template, you select the **Color Setup**, **Device**, **Device Condition**, **Plate Setup**, and **Plate Line** color control elements. During output processing, the color setup assigned to each page or artwork file (during refining) defines the specific color control elements that are applied on output, unless you choose to override the color setup tagged to the file during refining.

In addition, when you create a new job, you must enable ColorFlow in the job and select a default color setup for the job. You do this in the job's attributes. To successfully process job files with ColorFlow enabled, you must configure the process templates to use ColorFlow *and* enable ColorFlow in the job.

When a job's pages or artwork are refined using a refine process template in which you have enabled ColorFlow, the color setup that is assigned depends on the ColorFlow settings in the refine process template:

- If the refine process template indicates to use the default color setup selected for the job, the job's color setup is assigned during refining.
- If a color setup is specified in the refine process template, the settings in the template override the default color setup selected for the job, and the color setup specified in the refine process template is assigned.
- If a color setup is specified in the refine process template but ColorFlow is not enabled for the job, refining will fail. For a job to be processed using ColorFlow, the job must be ColorFlow-enabled and a default color setup must be selected for the job, even if the default color setup is not assigned during refining.

In Job Manager, the **Color Setup** column in the **Pages** and **1-Up Artwork** pane indicate the color setup assigned to each page.

Note: If the refine process template is not ColorFlow-enabled, but the job has a default color setup selected, what happens during refining depends on whether the **Match Colors** option is selected in the process template. If **Match Colors** is *not* selected, the job's default color setup is registered with the refined files, but no color conversion is applied. If **Match Colors** *is* selected, refining will fail.

It is also possible to change a refine process template's ColorFlow settings when you refine specific pages, to change the selected color setup. It is also possible to change a refine process template's ColorFlow settings when you refine specific artwork files, to change the selected color setup. This is useful when you plan to print parts of a job differently, such as on different presses or with different ink sets. For example, for a book that consists of a cover and body pages, you might want to print the cover CMYK but print the body pages in black only.

Note: After you run a job with ColorFlow enabled, you cannot rerun the job without ColorFlow enabled, unless you re-create the job.

Setting the halftone output modes

You can select one of four modes for output to halftone devices or files, in the output process template. These modes control the curves that are applied upon output, corresponding to your output goals.

Print Production

Reflects the standard operation of Prinergy and ColorFlow for production. When this option is selected, a *print calibration curve* and a *plate calibration curve* are applied to each output separation.

Print Characterization

Is used to print and measure the response of a print device. When this option is selected, a *device curve* and *plate calibration curve* are applied to each output separation.

Plate Verification

Is used to verify the linear response of plates produced by a particular plate line (consisting of the computer-to-plate device, plate processor setup, and chemistry), with a selected screening system. When this option is selected, only the *plate calibration curve* is applied to input tints of all separations.

Plate Characterization

Supports imaging and measuring the uncalibrated (or intrinsic) response of a plating line, such that a plate linearization curve can be computed. When this option is selected, no calibration curves are applied to input tints of any separations.

Applying ColorFlow curves and making curve adjustments

If a printing plate has imaged and run on press, but the press is not printing with the desired response, you may need to recreate the plate using a different ColorFlow curve channel for one or more separations. You can also make curve adjustments to the assigned ColorFlow curve channel. These adjustments, made on-the-fly from the Start Process dialog box, are appended to the ColorFlow calibration curves and have no effect on ColorFlow colorstores. This feature is only available in Prinergy Connect.

ColorFlow and archiving

If you retrieve an archived job for which ColorFlow is enabled, the ColorFlow server will request the name of the color setup and the number of the **Snapshot** that was used to initially process files within that job. If you have modified any of the elements within the color setup from the initial time of output, these modified elements will be used to output the archived job.

In addition, if the initial color setup was deleted or renamed, the job will fail processing. If you want to change a color setup, duplicate the original one and make changes to the duplicated and newly named color setup. You can use the **Allow undefined color setup or color setup mismatch** check box to output the archived job when the selected color setup differs from the color setup assigned by the refine process.

ColorStore database and backups

If you are running the Windows 2003 Server operating system on your Prinergy primary server, the Microsoft Windows NT Backup utility

automatically backs up your colorstore database. If you are running the Windows 2008 Server operating system on your Prinergy primary server, the System Configuration Backup Utility performs the backup process of the colorstore database. If you are using Prinergy with Hot Standby (Hot Standby combines the basic functionality of failover, allowing a Prinergy secondary server or render station to take over primary server functions if the primary server fails), the colorstore database is also automatically backed up.

Issues to consider when using ColorFlow

- Sharing ColorFlow-enabled work between plants or servers is not possible unless you change the **Prinergy Job Color Setup** defaults to an available color setup, and you select the **Allow color setup mismatch** check box in the output process template. Note that your output could be significantly different.
- If you refine a file with ColorFlow selected, ensure that you select **Match Colors** and **Enable ColorFlow** if you refine the file again. If you refine a file with ColorFlow selected, ensure that you select **ColorConvert** and **Enable ColorFlow** if you refine the file again. Otherwise, an error message appears.
- If you want to change the tagged color setup of a PDF file that has been refined, you must refine the PDF file again with a new color setup specified in the process template.
- You may encounter a situation in which you have two objects with the same CMYK input in a single PDF file. One object is *tagged* with an ICC-based CMYK profile; the other object is *untagged* using Device CMYK. Conversion of the ICC-based CMYK content will happen via embedded profiles for one object. In contrast, the untagged content will be converted via a DeviceLink from ColorFlow, if a DeviceLink is present in the selected color setup. To avoid complication, override the embedded profile in the refine to PDF process template, which will ensure that all content is managed via DeviceLink. To avoid complication, override the embedded profile in the refine process template, which will ensure that all content is managed via DeviceLink.
- If you refine a file with the Prinergy Bypass Refine feature, ensure you refine the file again to tag a color setup in the PDF file.
- When using ColorFlow, you can assign one color setup per page in the refine to PDF process template. When using the output from the imposition process template with ColorFlow, you can output an imposition file that has different color setups for each page. When using ColorFlow, you can assign one color setup per page in the refine process template. When using the imposition output process template with ColorFlow, you can output an imposition file that has different color setups for each page. When outputting in this

situation, ensure that you select a device condition that is contained in all of the color setups assigned to all pages.

More information about ColorFlow and Prinergy integration

ColorFlow software, version 2.0 , is integrated with Prinergy Evo 6.0. ColorFlow software, version 2.0 , supports RGB devices and RGB color inputs, as well as CMYK devices and CMYK color inputs. You can select default CMYK or RGB source color spaces, and ColorFlow can provide CMYK and RGB device profiles in the Process Template Editor.

Background

- An ICC profile is a color space description that acts as a standard for accurate reproduction of colors across different platforms, devices, and applications, according to the standards of the International Color Consortium (ICC). For example—an ICC profile that describes a specific RGB device, such as a Kodak EasyShare camera, provides a mapping of the camera's red, green, and blue color space to device-independent L*a*b* coordinates (or CIE L*a*b* color space).

- A PDF file is composed of many objects, and each object may have come from a different source—for example, an RGB image captured from a digital scanner or digital camera, CMYK graphics from Adobe Illustrator, and so on. Each of these objects may be tagged with an ICC profile.

Prinergy refine process template setup

You can set up color conversion with or without ColorFlow.

- When you are setting up a refine process template *without* ColorFlow, the **ColorConvert** section allows you to select ICC profiles for color converting RGB and CMYK images and graphics. When you are setting up a refine to PDF process template *without* ColorFlow, the **Match Colors** section allows you to select ICC profiles for color converting RGB and CMYK images and graphics. These ICC profiles are only used by the Color Matcher JTP when an object in the PDF file is *not* tagged with an ICC profile. In the case of tagged PDF content, the ICC profile settings in the process template are ignored by the Color Matcher JTP, and the tagged profile is used.

Note: You can also use a DeviceLink profile that includes both the source and the destination ICC profiles. Note also that the tagged profile can be ignored if **Strip Embededded Profile** is enabled.

- In a ColorFlow-integrated environment, the color conversion that takes place is to the primary color output (PCO) profile. In Prinergy, a ColorFlow device condition is a named instance of a CMYK device color response with an ICC device profile. For example, FOGRA 39 is a built-in device condition for which ColorFlow can provide a CMYK device profile to Prinergy.

The following table summarizes how to configure the two options:

For this option	Do this
To use ColorFlow device conditions for color conversion	a. In the **ColorConvert Match Colors** section of the refine to PDF process template, in the **Match Colors** section, select the **Enable ColorFlow** check box. b. From the **Snapshot** list, select the desired snapshot from ColorFlow. c. From the **Color Setup** list, select the ColorFlow color setup from those available in the selected snapshot. d. Select each image type for which you want to enable ColorFlow color conversion, by selecting the relevant check boxes—**CMYK Images**, **CMYK Graphics**, **RGB Images** and **RGB Graphics**. e. From the lists next to the image type check boxes, select a ColorFlow device condition. The device conditions are the conditions that have been configured in ColorFlow, which then supplies the DeviceLinks or profiles for the CMYK-to-CMYK or RGB-to-CMYK conversion.
To use ICC profiles or DeviceLink profiles for color conversion	a. In the **ColorConvert Match Colors** section of the refine to PDF process template, clear the **Enable ColorFlow** check box. b. Select each image type for which you want to enable color conversion, by selecting the relevant check boxes—**CMYK Images**, **CMYK Graphics**, **RGB Images** and **RGB Graphics**. c. From the lists next to the image type check boxes, select the relevant ICC profile or DeviceLink profile. If an object in the input file does not have an embedded profile, the ICC profile selected for that object type is applied.

19 Reporting

ColorFlow reports

You can use ColorFlow reports to analyze a device in a device condition, compare a device to a target, or provide information for troubleshooting potential problems.

ColorFlow produces two types of reports:

- Print Characterization reports present information about a device that is based on measurement data.
- Print Comparison reports illustrate the differences between a device and a selected target.

Reports are generated from the **Measurements** tab of the Measurements dialog box by choosing the relevant measurement files for the selected device.

About Print Characterization reports

Print Characterization reports provide information about a device in a device condition, in its uncalibrated state. Print Characterization reports contain information on the key metrics of a print condition when no calibration is applied, even if a calibration curve was used to output measurement data. Print Characterization reports also show the effect of a calibration curve on curve-controlled devices.

Print Characterization reports are useful for documenting the state of a device in a device condition for future reference or for determining if a device is in an optimum state.

About Comparison reports

Comparison reports document the results of a calibration versus a target measurement data set or an ISO TVI curve. You can also use a Comparison report to compare a device to an existing device condition, or to another device. ColorFlow provides reference data sets from industry specifications including FOGRA, GRACoL, SWOP, IFRA, and PSR Gravure. ColorFlow also provides the data for the eight ISO 12647-2 Curves for TVI comparisons.

When comparing a calibration to an ISO TVI curve, you can use a single ISO TVI curve for CMYK, or use one ISO TVI curve for CMY and the next, higher ISO TVI curve for black (K). For example, in the **Compare to** list, if you select **ISO TVI Curve A**, ISO TVI Curve A is used for CMY

and K. If you select **ISO TVI Curve A and B**, ISO TVI Curve A is used for CMY and ISO TVI Curve B is used for K.

Comparison reports are useful for identifying problem color builds, or for determining the accuracy of a color reproduction. You can also use Comparison reports to analyze new stocks, inks or other variables.

Generating a Print Characterization report

You can create a Print Characterization report to see detailed information about the state of a device in a device condition.

1. In a device condition in the **color setup viewer**, next to the device name, click the **Measurements** icon  .
2. In the Measurements dialog box, click the **Measurements** tab.
3. In the **Active Measurement** area, select a measurement set or an individual sheet.
   To select multiple sheets, use Ctrl+click.
4. Click **Report**.
5. In the Print Report dialog box, clear the **Compare to** check box.
6. Specify the following information:

   Customer Name

   Appears on the cover of the report

   Workflow and Version

   Appears on the configuration page of the report

   Inks

   Appears on the configuration page of the report

   Process Ink Sequence

   Select the correct ink sequence. This is significant for measuring trap on overprint and appears on the configuration page of the report.

   Ink Color Target

   Appears on the configuration page of the report

   User Comments

   Appears on the front cover and the footer of every page. Although the entire text appears on the configuration page, only a line appears in the footer.

   Notes

   Appears on the configuration page of the report

7. Click **Save**, and browse to the location where you want to save the report file.
   The report is generated as a PDF file.

Generating a Print Comparison report

You can create a Print Comparison report to see the difference between a device and a target.

1. In a device condition in the **color setup viewer**, next to the device name, click the **Measurements** icon .
2. In the Measurements dialog box, click the **Measurements** tab.
3. In the **Active Measurement** area, select a measurement set or an individual sheet.
   To select multiple sheets, use Ctrl+click.
4. Click **Report**.
5. In the Print Report dialog box, select the **Compare to** check box.
6. Perform one of the following actions:
   - To compare to another device, select **Other Device**, and select the device in the list.
   - To compare to a device condition or an industry specification, select **Device Condition**, and select the device condition or industry specification in the list.
7. Specify the following information:

   Customer Name

   Appears on the cover of the report

   Workflow and Version

   Appears on the configuration page of the report

   Inks

   Appears on the configuration page of the report

   Process Ink Sequence

   Select the correct ink sequence. This is significant for measuring trap on overprint and appears on the configuration page of the report.

   Ink Color Target

   Appears on the configuration page of the report

User Comments

Appears on the front cover and the footer of every page. Although the entire text appears on the configuration page, only a line appears in the footer.

Notes

Appears on the configuration page of the report

8. Click **Save**, and browse to the location where you want to save the report file.
The report is generated as a PDF file.

Elements of a report

A report generated by ColorFlow contains several sections:

- Configuration
- Density of solid inks
- Tonality
- Color
- Measured values

Configuration

General

Measurement File

ColorFlow activated

ColorFlow software version

ColorFlow activated

Workflow and Version

User defined

Device Condition

ColorFlow activated

Target Device Condition

ColorFlow activated. Only applicable for the comparison reports.

Device Condition

Process Ink Sequence

User defined. The correct **Process Ink Sequence** must be selected to calculate the **Apparent Trap** values in Section 2.

Ink Color Target

User defined

Inks

User defined

Target Device

Identifies another device used for comparison. Only applicable for the Comparison reports.

Print Device

ColorFlow activated, identifies the device

Substrate

ColorFlow activated, identifies the device condition

Screening

ColorFlow activated, identifies the device condition

Notes

Notes

User defined. Notes can be used to record special variables.

Density of solid inks

Average Density

ColorFlow reports the minimum, maximum, and average density of a colorant to validate the print output.

Apparent Traps

Calculates the ability of a colorant to overprint on top of another colorant.

Density Across the Form

Charts solid density across the form.

Tonality

Tonal Value Increase

Charts the TVI or dot gain response of a device, in Print Characterization Reports, the TVI graphs are also displayed to show the natural response of the device without any curve applied. Comparison Reports graph the TVI in relation to the TVI response of the target data set, if the data set contains spectral or density data.

Tonal Value Increase, 40% and 50% tints

Displays the TVI of the 40% and 50% tints.

Print Contrast

75% tint compared to the solid patch for the measured data and with the curve removed (if applicable).

Color

Spider Plot of Primary and Overprint Ramps

a*b* values plotted for primaries and secondaries to represent the hue and saturation levels of the process colors and 2 color overprints.

Measured Solid and Overprint Colors

Shows the CIELAB values of primaries and selected color builds.

Color Difference Distribution and Cumulative Frequency

Contains the dE distribution of a standard color characterization chart and the cumulative frequency of ΔE values.

Grays

Plot of the a* and b* values of the calculated gray balance.

Gray Balance, Complete tonal range

Gray balance L*, a*, and b*, plotted across the entire tonal range.

Gamut

Color gamut boundaries plotted for a*, b*.

Measured Values

Effective Dot Area

Effective Dot Area (EDA) values in 5% increments.

Density of Black and Gray Balance

Density chart for black and 3 color gray balance across the tonal range.

20 History and undo

About history

ColorFlow maintains a history of the profile adjustments that you have applied, and the adjustments that you have made but not yet applied.

In the History window, you can view a list of all the adjustments that were made to a particular color control element. This list is useful when you are undoing actions for the color control element.

The History window shows the entire history of profiles, including definition, regeneration, and adjustment events. A separate history list is kept for each adjustable element in each color setup and device condition.

For device profile editing, individual adjustment histories are maintained for each adjustable tag.

For curve-controlled device conditions, individual histories are maintained for each spot ink curve. This applies to the device curve and simulation/conversion curves in each color setup that uses the device condition for a color output.

For the PCO of a color setup, the entire history of the simulation is recorded in a single list that includes the simulation definition, curves adjustments, DeviceLink adjustments, and regeneration of the simulation.

Similarly, the entire history of each SCO conversion is recorded in a single list that includes definition, conversion curves, DeviceLink adjustments, and regeneration.

When you make an adjustment to a color control element, each adjustment detail appears in the **Unapplied** section in the History window. These details include edit point selection, range selection, color changes, tint changes, and other settings, depending on the color control element and adjustment mode. When you click **Apply** in the adjustment dialog box, the unapplied adjustment details are combined into a single adjustment event, and are listed in the **<element type> Adjustment on <date and time>** section of history.

If you close the adjustment dialog box before you apply your adjustments, the adjustments are discarded, and disappear from the history list. Any adjustments that you have applied remain in the history list even after you restart ColorFlow.

You can use the **Undo** and **Redo** menu item on the **Edit** menu to undo or redo any adjustments that are displayed in the history list.

With unapplied adjustments, you can undo or redo each individual adjustment details. With applied adjustments, you can undo or redo each adjustment event recorded in the history.

You can use **Undo** and **Redo** when the **History** window is open or closed.

Undo can be performed for all adjustments to a color control element, back to the latest definition of regeneration of the object. The only exception is when **Commit All Adjustments** has been executed.

Execution of **Commit All Adjustments** is recorded in the history of all color control elements as **Commit Adjustments on <date>**. Undo cannot be performed for any adjustment events prior to this record.

Commit All Adjustments can be executed only after a snapshot capture. If you revert to the snapshot prior to **Commit Adjustments** in History, **Commit Adjustments** is removed, and **Undo** operations can be performed.

You can open the History window from the **View** menu. To display the history list of a particular color control element, the adjustment dialog box for the color control element must be open and the element must be selected. You can only display the History window for one color control element at a time. The color control element that is currently selected in the **color setup viewer** is the element whose adjustment history is displayed in the History window.

See also:

About snapshots on page 181
Committing all adjustments on page 202

Committing all adjustments

You can commit all color adjustments after capturing a snapshot.

When you select this option, you are unable to undo adjustments. The advantage of committing all the adjustments is that all the adjustment controls are reset to show no adjustments, and the before and after patches are now the same.

Note: This option is enabled only after you capture a snapshot.

1. From the **Edit** menu, select **Commit All Adjustments**.
   The following message appears:

```
This will disable Undo of all previous adjustments.
Continue?
```

2. Click **Yes**, to commit to the adjustments.

Viewing the history of a color control element

You can view a list of adjustments that have been made to a particular color control element.

1. Open the Adjustment dialog box for a simulation, conversion, device profile, or device curves.
2. Open the History dialog box.
   Select **View** > **History**.
3. Expand the **History** section.
4. Perform one of the following actions:
   - To view adjustments that were made at one time, expand the appropriate **Adjustments to <element type> on <date>** section.
   - To view recent adjustments that have not yet been committed, expand the **Uncommitted** section.

   A list of adjustments appears under the expanded section.

Undoing previous adjustments

You can undo any adjustments that you previously made to a curve or a DeviceLink.

When you make an adjustment to a simulation, a conversion, or a curve, you can undo individual changes until you click **Apply**. After you click **Apply**, you can only undo a group of adjustments. You can use the History dialog box to view details on a list of the previous adjustments.

1. Open the Adjustment dialog box for a simulation, conversion, or a curve.
2. (Optional) Click **View** > **History** to open the History dialog box and view details about previous adjustments.
3. Click the **Edit** menu, note the adjustment that appears next to the **Undo** menu item.
   This is the adjustment that will be undone.
4. Click **Undo** to undo the adjustment.

21 Optimizing ink usage

About the Ink Optimizing Solution

The Ink Optimizing Solution is a licensed feature.

If your license includes the Ink Optimizing Solution, in the Licensing dialog box, in the **Features** list, **Ink Optimizing Solution** displays the expiration date.

Using the Ink Optimizing Solution, you can generate DeviceLinks or ICC DeviceLinks that use black strength to reseparate images and replace chromatic colors with black while limiting total ink coverage (TIC). Because the process of gray component replacement uses a non-chromatic color (black) throughout the tonal range, it reduces the amount of C, M, and Y inks used in the midtones and quartertones. This allows for increased savings in ink consumption and for improved color stability.

With ColorFlow, you can set the Total Ink Limit for fully constrained DeviceLinks. If you want to create a fully constrained DeviceLink, with TAC limiting with no optimization, you can set the Total Ink Limit for this type of DeviceLink.

Figure 1: Ink-optimized separation

For more information about gray component replacement, see *Reducing Ink Consumption on Press: Using GCR or UCR Separations and Re-separations for Offset Printing White Paper*.

Ink Optimizing Input device

When the Ink Optimizing Solution feature is licensed, an **Ink Optimizing Input** device appears in the Devices dialog box.

The **Ink Optimizing Input** device can only be used as a color input. When you drag **Ink Optimizing Input** to the color-input position of a color setup, it automatically becomes **Ink Optimizing Device Condition**.

See also:
Ink Optimizing Device Condition on page 206

Ink Optimizing Device Condition

The **Ink Optimizing Device Condition** is automatically defined when you drag the **Ink Optimizing Input** device to a color setup.

The color response of the **Ink Optimizing Device Condition** is a copy of the primary color output (PCO) color response. By adding an **Ink Optimizing Device Condition** to a color setup, you can define a device link between the **Ink Optimizing Input** device and the PCO. This allows you to optimize ink usage when you refine input files without changing the color space of the input files.

Optimizing ink usage

Optimizing ink usage on refine

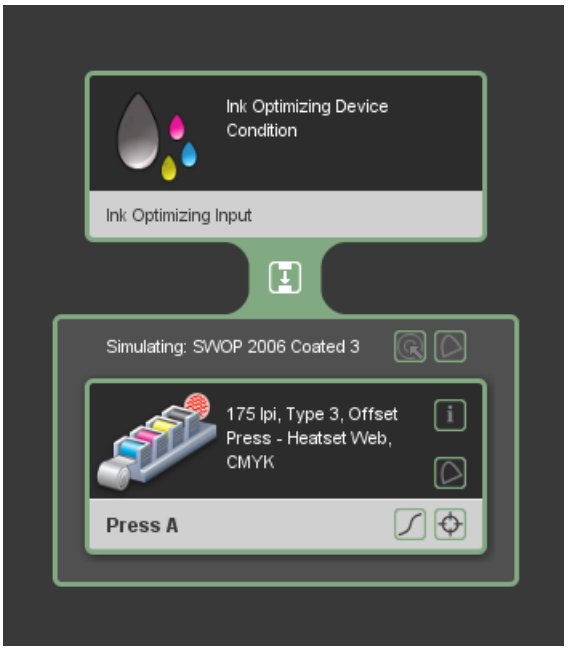
You can create a color setup to reseparate input files during the refine process and to optimize ink usage.

1. Add a new color setup.
2. In the Devices dialog box, drag the device for which you want to optimize ink usage to the color setup viewer as the PCO.
3. Define the PCO device condition.
4. In the Devices dialog box, drag the **Ink Optimizing Input** device to the color setup viewer as the color input (CI).
   The device automatically becomes a device condition called **Ink Optimizing Device Condition**.
5. Define a CI to PCO ICC DeviceLink.
   Perform the following actions on the **Image** tab and on the **Graphic** tab. To use the same settings for text or linework that you use for pictures, on the **Graphic** tab, select the **Graphic Conversion Same as Image Conversion** check box.

a. In the **Total Ink Limit** box, type a value.
   A lower value results in less ink consumption.

b. In the **Black Strength** box, type a value.
   A higher value results in additional replacement of CMY with black—that is, more chromatic ink is replaced with black.

During the refine process in the Prinergy workflow, the Ink Optimizing DeviceLink is applied to input files to produce ink savings but no color space mapping occurs.



Next:

You can verify your ink savings by using the Prinergy Virtual Proofing System (VPS).

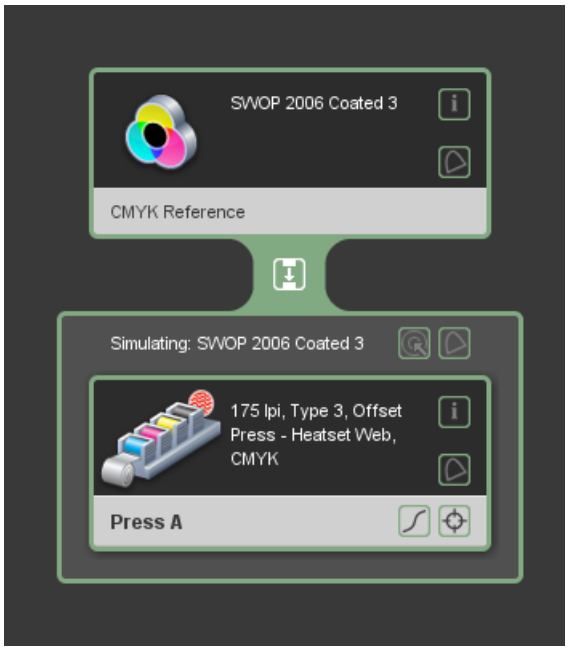
Optimizing ink usage with color conversion on refine

You can create a color setup to reseparate input files during the refine process to optimize ink usage and to convert files from their source color space to the PCO color space.

Proof refined files to verify ink savings before outputting the files to plate.

1. Add a new color setup.
2. In the Devices dialog box, drag the device for which you want to optimize ink usage to the **color setup viewer** as the PCO.
3. Define the PCO device condition.
4. In the Devices dialog box, drag the **CMYK Reference** device to the **color setup viewer** as the CI.
5. Define the CI device condition.
6. Define a CI to PCO DeviceLink.
   Perform the following actions on the **Image** tab and on the **Graphic** tab. To use the same settings for text or linework that you use for pictures, on the **Graphic** tab, select the **Graphic Conversion Same as Image Conversion** check box.
   a. From the **DeviceLink Method** drop-down list, select **Ink Optimizing Solution**.
      This enables you to select the maximum black strength.
   b. In the **Total Ink Limit** box, type a value.
      A lower value results in less ink consumption.
   c. In the **Black Strength** box, type a value.
      A higher value results in additional replacement of CMY with black—that is, more chromatic ink is replaced with black.

During the refine process in the Prinergy workflow, the Ink Optimizing DeviceLink is applied to the input files to produce ink savings, and input files are converted to the color space of the PCO. Because color mapping occurs in this case, some color shift may occur.



Next:

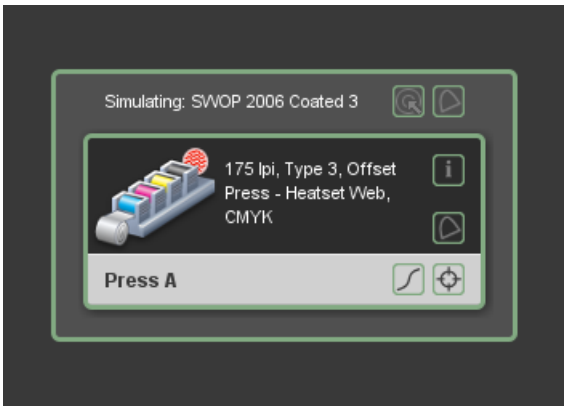
You can verify your ink savings by using the Prinergy Virtual Proofing System (VPS).

Optimizing ink usage on output

You can create a color setup to optimize ink usage on output.

1. Create a new color setup and define the device conditions in the color setup.
2. Specify the required simulation and/or conversion curves.
3. To optimize ink usage when the PCO aligns with its simulation target or when the secondary color output (SCO) aligns with the PCO, perform the following actions when you define the simulation or conversion device link.
   a. In the **DeviceLink Method** drop-down list, select **Ink Optimizing Solution**.
   This enables you to select the maximum black strength.
   b. In the **Total Ink Limit** box, type a value.
   A lower value results in less ink consumption.
   c. In the **Black Strength** box, type a value.
   A higher value results in additional replacement of CMY with black—that is, more chromatic ink is replaced with black.

During the output process in the Prinergy workflow, the Ink Optimizing DeviceLink is applied to files to produce ink savings but no color conversion occurs. The following screen capture is an example of what appears when the PCO aligns with its simulation target.



Next:

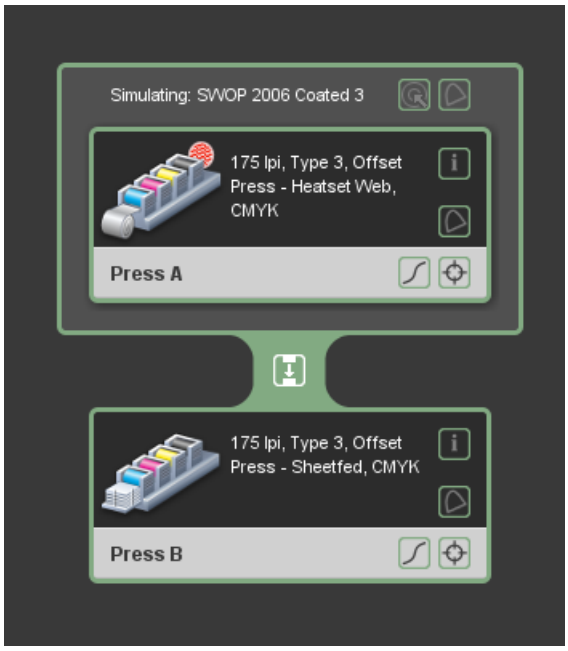
You can verify your ink savings by using the Prinergy Virtual Proofing System (VPS).

Optimizing ink usage with color conversion on output

You can create a color setup to optimize ink usage on output, and to perform color space remapping on output.

1. Create a new color setup and define the device conditions in the color setup.
2. Specify the required simulation and/or conversion curves.
3. To optimize ink usage when the PCO aligns with its simulation target or when SCO aligns with the PCO, perform the following actions when you define the simulation or conversion device link.
   a. From the **DeviceLink Method** drop-down list, select **Ink Optimizing Solution**.
   This enables you to select the maximum black strength.
   b. For a PCO, select the **Target Simulation** check box to enable color mapping on output, or for an SCO, select the **Color Space Conversion** check box.
   c. In the **Total Ink Limit** box, type a value.
   A lower value results in less ink consumption.
   d. In the **Black Strength** box, type a value.
   A higher value results in additional replacement of CMY with black—that is, more chromatic ink is replaced with black.

During the output process in the Prinergy workflow, the Ink Optimizing DeviceLink is applied to files and color space mapping occurs.



Next:

You can verify your ink savings by using the Prinergy Virtual Proofing System (VPS).

Verifying your ink savings

After generating an ink-optimized file in Prinergy or Prinergy Evo, you can use the Prinergy Virtual Proofing System (VPS) to determine the amount of ink that will be required for the press sheet and to compare the results with previous values.

1. In Prinergy Virtual Proofing System, add the VPS separations to the Ink Coverage tool.
   For more information, see the *Prinergy Virtual Proofing System User Guide*.
2. To determine your ink usage savings, compare the ink coverage value of the file with the ink coverage value of the same file before the ink optimizing DeviceLink was applied.

Best practices for Ink Optimizing Solution

Rendering intent

Rendering intent is the mapping strategy used to convert color spaces. In general, when creating ink-optimizing device links, when **Target Simulation** or **Color Space Conversion** is selected, select **Perceptual** in the **Rendering Intent** list. This is usually the best option when converting between two gamuts of greatly differing volume—for example, when converting from a larger gamut color input such as “GRACoL C1 2006” to a smaller gamut CMYK Reference PCO such as “SWOP C3."

When converting between two gamuts that are not different (such as when the **Target Simulation** or **Color Space Conversion** check box is cleared), when the **Ink Optimizing Solution** method is selected, select **Relative Colorimetric** in the **Rendering Intent** list.

You can select from the following rendering intents:

- **Perceptual**
- **Relative Colorimetric**
- **Saturation**
- **Absolute Colorimetric**

Total ink limit

Total ink limit (TIL) is a restriction on the maximum amount of ink allowed at one time during four-color printing. For example, if you allow 100% of all four inks to print at one time, it would be 400% coverage.

The best practice is to use the default TIL values that are recommended by the ColorFlow software, because these values are aligned with what the device is capable of for a given print condition. Test results show that if you decrease the TIL to values below normal operating conditions, increased ink savings do not occur.

For this device condition	Use this TIL range
Heated web offset press printing on coated paper	280–300%
Newspaper web offset press printing on uncoated paper	240%
Sheetfed offset press printing on coated paper	320–350%

Black Start

You can set the **Black Start** to any value from 0 to 60 (default is set to 0). However, it is not recommended to set the **Black Start** value to more than 30, preferably between 10 and 25, especially when defining the black start point for a press.

Maximum Black

Maximum black is the highest amount of black that can be introduced to a color build. Typical values for maximum black are between 90% and 100%. However, because of the increased use of black in the ink-optimized separation, you may want to set **Maximum Black** to **100%**.

Black strength

Black strength sets the level of available black in a color build.

Lower levels of black strength retain a corresponding amount of CMY in the color build. For an average printing condition, set the black strength to a value between 75 and 85%. If your process is under tight control, it is possible to use a black strength value higher than 85% and achieve a greater ink savings.

To run high levels of black strength, black ink must be printed at the density at which it was characterized. It is not uncommon to characterize black at a density of 1.8 and print it at 2.0 or higher, for work that contains images and text. With high levels of black strength, printing a higher density than is characterized darkens images and reduces chroma (also known as a “muddy” look). To avoid this,

maintain process control so that the density and TVI values of the production run match very closely with the density and TVI values of the characterization run.

Target Simulation and Color Space Conversion check boxes

Select these check boxes to change the output color to more closely match the source space that is defined.

For this scenario	Do this
You have defined an offset press with printing characteristics that match the device condition within a PCO and have created gray-balanced curves to simulate a target. You want to apply ink savings to this condition on output but not change the simulation color to press.	Select the **DeviceLink Method** type as **Ink Optimizing Solution**, and clear the **Target Simulation** check box. This device link does not change the overall color and provides ink savings.
You have defined an offset press with printing characteristics that match the device condition within a PCO and have created gray-balanced curves to simulate a target. You want better alignment to your source target—for example, better blue sky.	Select the **DeviceLink Method** type as **Ink Optimizing Solution**, and select the **Color Space Conversion** check box.
You have defined an offset press with printing characteristics that match the device condition within a PCO and have created gray-balanced curves and a device link. You would like to take advantage of the Ink Optimization feature.	Select the **DeviceLink Method** type as **Ink Optimizing Solution**, and select the **Color Space Conversion** check box.

The same principle applies in the context of an SCO. However, with an SCO, you are managing the conversion rather than the simulation. Consequently, when you select the **Color Space Conversion** check box, the source space is the color response of the PCO.

Troubleshooting the Ink Optimizing Solution

Problem	Solution
My presswork with Ink Optimizing Solution doesn't look like it did before.	Perform one or more of the following actions: • Ensure that the current press condition matches the initial characterization used to create the ink-optimizing device link. To accomplish this in ColorFlow, create a characterization report and compare it to current readings from the press run. • Check for common press issues (black unit issues). • Confirm that the proofing setup matches the press. • Run Prinergy Virtual Proofing System (VPS) separations as an acceptance procedure to verify that the ink-optimizing device link did not change the color.
I cannot change the color on-press for an Ink Optimizing Solution job.	Decrease the black strength, at the expense of press stability and ink savings.

22 Reference

ColorFlow menus

The menu bar in the ColorFlow software includes these menus.

ColorFlow menu (Mac OS only)

About ColorFlow

Displays the ColorFlow splash screen, which has ColorFlow software information, including the version number.

Preferences

Displays the Preferences dialog box where you can configure your default settings of some system parameters.

Services

Standard Mac menu option unrelated to the ColorFlow software.

Hide ColorFlow

Standard Mac menu option to hide the ColorFlow software.

Hide Others

Standard Mac menu option to hide all other open software.

Show All

Standard Mac menu option to show all software.

Quit ColorFlow

Closes the ColorFlow software.

See also:

Preferences dialog box on page 260

File menu (Windows only)

Preferences

Displays the Preferences dialog box where you can configure your default settings of some system parameters.

Exit

Closes the ColorFlow software.

See also:
Preferences dialog box on page 260

Edit menu

Undo

Applies only to device profile, DeviceLink, and curves adjustments. All adjustments to these color control elements are saved in history buffers, one for each object. Use the **Undo** menu item to remove the effect of the last adjustment. You can undo adjustments all the way back to the state of the element when it was created, regenerated, or imported. **Undo** can be applied either to an unapplied adjustment detail, such as a range selection or color change, or to an applied adjustment event. Adjustments are the only ColorFlow actions that are saved and can be undone.

Redo

Applies only to device profile, DeviceLink, and curves adjustments. Repeats the adjustment that was most recently undone.

Commit All Adjustments

Updates the state of adjustments to all color control elements, so that Color Change values are zero, Curve Change graphs are zero, and Before, After (or Current, Corrected) patches have the same visual color. The purpose is to facilitate visualization of further incremental adjustments. The adjusted color control elements are not affected.

This action can be performed only after a snapshot is captured, and is recorded in the history of all color control elements. Adjustments performed prior to the **Commit** action cannot be undone, except by reverting the snapshot immediately prior to the **Commit** action.

Duplicate Color Setup

Makes a copy of a selected color setup, and opens it in the Color Setup Viewer. It is convenient to use this menu item to start building a color setup that is similar to another color setup.

Cut

This standard **Cut** menu item does not cut ColorFlow elements. It is useful only for text boxes in dialog boxes.

Copy

This standard **Copy** menu item does not copy ColorFlow elements. It is useful only for text boxes in dialog boxes.

Paste

This standard **Paste** menu item does not paste ColorFlow elements. It is useful only for text boxes in dialog boxes.

See also:
History window on page 261

View menu

Devices

Displays the Devices dialog box, where you can create devices, modify device names, and drag devices into a color setup.

Snapshots

Displays the Snapshots dialog box, where you can capture a snapshot, approve a snapshot, or revert to the state of a previous snapshot. ColorFlow keeps all the snapshots when you Approve. You can select and delete any snapshot except the approved snapshot.

Note: Retaining a large number of snapshots reduces performance in ColorFlow and in Prinergy process template editor. It is a best practice to delete old snapshots. Selecting a snapshot is the only way to delete it.

Device Conditions

Displays the Device Conditions dialog box, where you can add or delete property values that are available for selection in a particular property. You can also use it to delete a device condition.

Plate Setups

Displays the Plate Setups dialog box, where you can create and edit plate curves to make your platesetter output linear.

History

Displays the History window, where you can view a list of DeviceLink and curves adjustments, both applied and not applied.

Charts

Displays the Charts dialog box, where you can view the properties of existing charts, create a new chart, or export a chart as a PDF file. These charts are for imposition and printing by the device on which you want to measure the color response.

Hide/Show Sticky Notes

Hides or shows the virtual notes that can be attached to any color setup.

Actual Size

Displays the preview image at 100% magnification.

Zoom To Fit

Fits the entire preview image in the current Image Preview window.

Zoom In

Zooms the preview image in.

Zoom Out

Zooms the preview image out.

See also:

Devices dialog box on page 220
Device Conditions dialog box on page 224
Charts dialog box on page 229
Image Preview window on page 256
Plate Setups dialog box on page 259
History window on page 261

Export menu

The **Export** menu is used to export the color control elements, mainly in a stand-alone environment.

In a Prinergy environment, the items on this menu are automatically exported to the workflow; you do not need to select them for export here. (Additional items, not offered here, are available for export in their respective dialog boxes.)

The color setup that is currently displayed and the object that you select in the **Color Setup Viewer** (the object turns blue) determine which items appear on this menu. The following items can be included:

Device Curve

Available when you click a device in a device condition.

Calibration Curve

Available when you click the border of the PCO (primary color output), or somewhere in the link to the SCO (secondary color output).

Measurement data

Available when you click a device in a device condition, or the border of a device condition.

Device Profile

Available when you click the border of the PCO, or the border of a device condition.

DeviceLink

Available when you click the border of the PCO, somewhere in the link to the SCO, or somewhere in the link to the color input.

Window menu

Close Window

Closes the selected window.

<Names of open windows>

Click the name of any window to make it the displayed window.

Help menu (Mac OS only)

Search

Searches for topics in the ColorFlow menu bar or the Mac OS help system.

ColorFlow Help

Displays the *ColorFlow User Guide* in the Eclipse help viewer.

View / Update License

Displays the Licensing dialog box so that you can view the status of the license for your edition and options or connect to a different Prinergy server.

See also:

Licensing dialog box on page 262

Help menu (Windows only)

ColorFlow Help

Displays the *ColorFlow User Guide* in the Eclipse help viewer.

About ColorFlow

Displays the ColorFlow splash screen, which has ColorFlow software information, including the version number.

View / Update License

Displays the Licensing dialog box so that you can view the status of the license for your edition and options or connect to a different Prinergy server.

See also:

Licensing dialog box on page 262

ColorFlow windows and dialog boxes

The ColorFlow software includes these windows and dialog boxes.

Devices dialog box

Use this dialog box to create a ColorFlow device to represent each physical printing device in your plant. The dialog box is available from **View** > **Devices**, or when you double-click the workspace surrounding a color setup. The dialog box also appears when a new, empty color setup opens.

Devices

(Images of physical devices and reference devices)

Each image represents a physical output device in your plant. Drag these images into the **Color Setup Viewer** to create a primary color output (PCO), a secondary color output (SCO), or a color input (CI). In the Devices dialog box, double-click a device to rename it.

A reference device image is available. You can use this device to create a reference device condition.

If the Ink Optimizing Solution is licensed, the **Ink Optimizing Input** device image is available. You can use this device to create a color input that can be used to optimize ink usage.

Add Device

Device Name

Enter a name for a physical output device in your plant.

Device Type

Select the appropriate type for the device you are creating.

Create

An image of the device with the specified name and type appears in the **Devices** section. You can drag this image into a color setup to create a device condition.

See also:

Devices on page 41

Device Condition Properties dialog box

Use this dialog box to set the properties of a device condition. To display the dialog box, click the **Properties** icon in a device condition in the **Color Setup Viewer**.

Selection Properties

Type

The type of device that is the basis of this device condition. This field is automatically populated with the type that you identified in the device that you selected. A device condition can have more than one device, but they must all be of the same type.

Description

This field is automatically populated from the properties that you select in the properties section.

Inks

The number and colors of inks of the output device in this device condition. This section is automatically populated.

Plate Setup

Enable the Plate setup check box to select a plate setup from the list. The list is filtered to display plate setups for the chosen device type. Click the **edit** icon to display the Plate Setups dialog box, where you can add or edit a plate setup.

Screening

Select the type of screening used in this device condition. You can select the type of screening only if you did not select a plate setup. If you need to add more values, click the **edit** button.

Resolution

Select the resolution used in this device condition (inkjet only). If you need to add more values, click the **edit** button.

Substrate

Select the type of paper or substrate used in this device condition. The list is filtered based on the device type. If you need to add more values, click the **edit** button.

Name

Select a built-in color response or type a name to distinguish this from other device conditions that are based on the same reference device (reference type only).

Other

Enter additional information that makes the device condition distinct from similar device conditions. To add your own values, click the **edit** button.

Other Properties

Values in this area never force the creation of a new device condition. If a device condition matching the values in **Selection Properties** exists, settings in this area will change it.

Spot inks

Enables you to designate the process ink channel from which the workflow copies the calibration curve for each spot color. The ink named "Default" will be used for unnamed spot inks.

Click the **add** button + to add any number of inks. Click under **Curve** to assign one of the process channels. Click under **Color** to choose a suitable color (for visual recognition only). Click under **Name** to enter the name of the spot ink.

Separate Same As

For device conditions that are based on a reference device, select a device type that has similar separation parameters.

OK

Every device condition must have a distinct combination of values in the **Selection Properties** area. Depending on the properties you select, ColorFlow either uses an existing device condition, or creates a new one.

See also:

Device conditions on page 45

Screening Values dialog box

Use this dialog box to manage the values that can be selected in the Screening property of a device condition. To display this dialog box,

click the **edit** button beside the **Screening** list in the Device Condition Properties dialog box.

The list shows the screening types that can be selected in the Screening property.

Use the **add** button + to add values to the list; use the **delete** button − to remove values. You cannot remove a value that is used in an existing device condition.

See also:

Device conditions on page 45

Substrate Values dialog box

Use this dialog box to manage the values that can be selected in the Substrate property of a device condition. To display this dialog box, click the **edit** button beside the **Substrate** list in the Device Condition Properties dialog box.

The list shows all of the paper and substrate types that can be selected in the Substrate property of the device condition.

Use the **add** button + to add values to the list; use the **delete** button − to remove values. You cannot remove a value that is used in an existing device condition.

See also:

Device conditions on page 45

Resolution Values dialog box

Use this dialog box to manage the values that can be selected in the Resolution property of an inkjet device condition. To display this dialog box, click the **edit** button beside the **Resolution** list in the Device Condition Properties dialog box of an Inkjet device type.

The list shows the resolutions that can be selected in the Resolution property of the device condition.

Use the **add** button + to add values to the list; use the **delete** button − to remove values. You cannot remove a value that is used in an existing device condition.

See also:

Device conditions on page 45

Other dialog box

Use this dialog box to manage the values that can be selected in the Other property of a device condition. To display this dialog box, click

the **edit** button beside the **Other** list in the Device Condition Properties dialog box.

The list shows the values that can be selected in this custom property of a device condition.

Use the **add** button + to add values to the list; use the **delete** button − to remove values. You cannot remove a value that is used in an existing device condition.

See also:

Device conditions on page 45

Device Conditions dialog box

Use this dialog box to add or delete the values that are available for selection in a particular property, or to delete a device condition. The dialog box is available by selecting **View** > **Device Conditions**.

Device Types

Select a device type to view device conditions based on that device type.

Device Conditions

Displays all of the device conditions that are based on the selected device type. Select a device condition to see its properties in the **Device Condition Properties** column. Position the mouse over a device condition to see which color setups it uses. Use the **delete** button − to delete the selected device condition.

Device Condition Properties

Displays the properties of the device condition that is selected in the **Device Conditions** column. Select a device condition property to see its values in the **Values** column.

Values

Displays the possible values for the property that is selected in the **Device Condition Properties** column. The actual value currently assigned to that property appears in bold. (You cannot change the assigned value from this dialog box; use the Device Condition Properties dialog box.) Use the **add** button + to add a value; use the **delete** button − to delete the selected value. Changes you make to the **Values** list affect all device types.

See also:

Device conditions on page 45

Measurements dialog box: Charts tab

Use the **Charts** tab to select or create a form or forms that are ready for imposition and printing by the device on which you want to measure the color response. This dialog box is available by selecting **View** > **Charts**, or clicking the **Measurements** icon next to a device in a device condition.

Charts

Displays a list of the existing charts for this device condition. Select a chart to see an image of it, and details in the right panel. Charts are named by their inkset and order of creation; they cannot be renamed.

(add)

Creates a new chart, using the panel on the right.

(export)

Prompts for a location to store the chart as a PDF file that is ready for imposition and printing.

(delete)

Deletes the selected, previously saved chart.

(chart preview area)

Preview one of the forms that the chart includes. Each form is numbered in the preview. To preview other forms, move your pointer into the preview area, and click the arrows that appear.

Ink Set

Is determined by the properties of the device condition, and you cannot change it.

Chart Type

Select one of three types of chart to create. The chart can contain 1600 or more color patches, enough to calculate the color response of the printing device, or it can contain only 14 tints for each of the process colors.

Color Characterization

Provides full tonal and colorimetric data.

Tonal Characterization

Provides tonal data only.

Tint Ramp

Lets you type in the tint ramp values and create tone value increase (TVI) curves.

Measurement Device

Select the type of spectrophotometer that you will use to measure the chart after it is printed. Individual measurement pages in the chart are sized and formatted for this device. Select one of the automated devices, or select **Hand held** if you will use a manual device.

Printable Area

Type the maximum **Width** and **Height** of the form or forms that you create. This is usually the size of your press. A small printable area may require more than one form to be created.

Form Layout

Select how you want to arrange the individual measurement pages within the form or forms. **Minimize Form Size** creates a form that contains only the minimum number of patches needed to characterize the device. **Fill Printable Area** creates a form that fills the entire printable area that you specified in the **Width** and **Height** boxes.

Front and Back Forms

Select to create a second form or set of forms, mirror images of the first. Printing the same color patch on both sides may be necessary for thin substrates.

Force Page Breaks

Use this option to keep measurement pages away from areas where folds or scuffing will occur. For example, in the usual 8-up layout, set **Across** to 4 and set **Down** to 2.

Background Tint

Select to apply a uniform background tint in all areas outside the measurement pages, on all ink channels. This makes ink takeoff more uniform.

Measure

Start sheet selection (optional) and page measurement. Before you click **Measure**, ensure that the selected chart matches the chart printed on the sheets that you are about to measure. (Typically, you would not measure a chart in the same session as you create a chart.)

See also:

Measurement charts on page 65

Measurements dialog box: Measurements tab

Use the **Measurements** tab to select the data for establishing the color response of a device. The dialog box appears when you click the **Measurements** icon next to a device in a device condition.

Active Measurement

Lists the collection of measurement (characterization) data that determines the color response of this device.

Origin

Indicates where the data came from.

Type

Indicates whether the type of data in the measurements is tonal and color, tonal only, or color only.

Sheet Number

If multiple sheets were measured, you can select an individual sheet for reporting.

Form Number

If the chart extended across multiple forms, you can select a particular form.

Date

Indicates the date that the measurement was made.

Chart ID

If the origin is a ColorFlow chart, the **Chart ID** displays its name.

Curve

Contains information about the device curve that was used in printing the chart.

Measurement Data / Harmony CMYK Current Curve

Allows you to select the type of data to import.

(import)

Displays a file selection dialog box where you can import measurement data for any type of device. The file may contain tonal and/or colorimetric data. It is not necessary to associate a chart because the file contains its own chart data. For devices that use curves, you can alternatively import a Harmony CMYK current curve.

(export)

Exports the active, selected measurement set.

Promote Device

The color response of this device (its active measurement) becomes the color response of the entire device condition. This has significance if there is more than one device in the device condition.

Report

Creates a Print Characterization Report or a Comparison Report using the active measurement set.

Inactive Measurements

Lists alternate sets of measurement data that could determine the color response, but are not being used. Column headings are the same as in **Active Measurement**.

(delete)

Deletes the selected measurement in the inactive table.

(export)

Exports the selected inactive measurement set.

Activate

Moves the selected measurement set in the table to the top table to become the active characterization.

See also:

Activating a measurement set on page 78

Chart Measurement wizard

Follow the instructions on these wizard panels to select the best press sheets for measuring the ColorFlow chart, and then measure the complete chart on one or more sheets.

See also:

Measuring the chart on page 75

Tint Ramp Chart Measurement dialog box

Use this dialog box to enter hand-measurement of a tint ramp chart. The dialog box is displayed as part of the wizard that is invoked by clicking the **Measure** button in the Measurements dialog box.

Tint in

Select the row that matches the tint that you are measuring.

(ink)

Type the measured EDA values in the respective ink columns.

See also:

Creating a tint ramp chart on page 72

Charts dialog box

Use this dialog box to view the properties of existing charts or to create a new chart. These charts are for imposition and printing on the device whose color response you want to measure. The dialog box is available from the **View** menu.

The options in this dialog box are almost the same as on the **Charts** tab in the Measurements dialog box. There is no **Measure** button in this dialog box.

See also:

Measurement charts on page 65

Print Report dialog box

Use this dialog box to request and produce a report derived from saved measurements taken from a sheet.

Comparison

Items in this section are used for comparison reports.

Compare to

Select to produce a comparison report; clear it to produce a characterization report.

Other Device

Select if you want to compare with another device in the same device condition. (Comparison reports only.)

Device Condition

Select if you want to compare with another device condition, and then from the list, select an industry specification, your own reference conditions, or one of the device conditions that exist in ColorFlow. (Comparison reports only.)

Characterization

Items in this section are used for both characterization and comparison reports.

Device Condition

Displays the device condition in the report. It is determined by the measurement set that you selected before requesting the report.

Device

Is determined by the measurement set that you selected before requesting the report.

Customer Name

Appears on the cover of the report

Workflow and Version

Appears on the configuration page of the report

Inks

Appears on the configuration page of the report

Process Ink Sequence

Select the correct ink sequence. This is significant for measuring trap on overprint and appears on the configuration page of the report.

Ink Color Target

Appears on the configuration page of the report

User Comments

Appears on the front cover and the footer of every page. Although the entire text appears on the configuration page, only a line appears in the footer.

Notes

Appears on the configuration page of the report

Save

Generate a report as a PDF file and specify where to save it.

See also:

Reporting on page 193

Device Condition Profile dialog box

The dialog box is available by clicking the **Profile** icon in a device condition.

Prinergy workflow requires profiles for all device conditions.

Origin

Select the source of the profile—**ColorFlow Generated** or **Imported**.

If the value of **Origin** is **ColorFlow Generated**, the dialog box contains the following options:

Total Ink Limit

240 to 400%

Black Start

0 to 50%

Max Black

70 to 100%

Black Strength

Use the slider or the text box to select a value between 5 and 75%.

If the value of **Origin** is **Imported**, the dialog box contains the following options:

(profile properties)

Displays a read-only list of the properties of the imported profile (if any) for this device condition. The list contains Profile Name, Date Created, Date Imported, Media White Point, Color Space, PCS Color Space, ICC Format Version, and Internal Name.

(import)

Use **Import** to navigate to an ICC profile.

See also:

Color response of a device condition on page 83
Device profiles on page 121

Primary Color Output Profile dialog box

The dialog box is available from the **Profile** icon outside the device condition in the PCO.

Origin

Select the source of the profile—**ColorFlow Generated** or **Imported**.

If the value of **Origin** is **ColorFlow Generated**, the dialog box contains the following options:

Total Ink Limit

240 to 400%

Black Start

0 to 50%

Max Black

70 to 100%

Black Strength

Use the slider or the text box to select a value between 5 and 75%.

If the value of **Origin** is **Imported**, the dialog box contains the following options:

(profile properties)

Displays a read-only list of the properties of the imported profile (if any) for this PCO. The list contains Profile Name, Date Created, Date Imported, Media White Point, Color Space, PCS Color Space, ICC Format Version, and Internal Name.

(import)

Use **Import** to navigate to an ICC profile.

See also:

Color response of the PCO on page 84
Device profiles on page 121

Device Curves Definition dialog box

The dialog box is available from the **Curves** icon next to a device in a device condition.

Origin

Select the source of the initial device curve. You can later adjust any device curve.

ColorFlow Generated

Uses curves calculated from chart measurements.

Preset Linear

Uses curves that are initially linear.

Preset Cutback

15% Cutback curve added to the preset selection list, providing pre-compensation for high-gain print conditions superior to 20% cutback curve.

Note: This is the recommended option to be used, especially for Staccato screening types.

Imported

Uses the Harmony calibration curve that you import with **Import**.

(import)

If **Imported** is selected, use **Import** to display a file selection dialog box where you can browse to a Harmony curve set (`.hmy` file). Then in the Import Harmony Transfer Curve dialog box, you can import a Harmony curve set.

See also:

Device curves on page 54

Device Curves Adjustment dialog box

Use this dialog box to make corrections in the color response of a device condition. If a curve has been defined, the dialog box is available from the **Curves** icon next to a device in a device condition.

(title bar)

Displays the device name.

(Curve Adjustments tool)

Use the graph and controls in this area to make curve adjustments. Adjustments that you make here affect the curves that change the color response of the device condition.

Device Tonality

Displays the Uncalibrated Device Tonality dialog box which contains a graph of the tonal response of the device in this device condition, excluding the effect of its device curve.

Device Curves

Displays the Device Curves dialog box where you can view and change the curves directly.

Preview

Enables you to see the effects of the requested change before you click **Apply**. You will see a before-and-after preview of all edits. The before-and-after view can be customized to show edits for any particular area of the image.

Redefine

Displays the Device Curves Definition dialog box where you can obtain a new device curve.

See also:

Correcting a color shift on a curve-controlled device on page 86
Device Curves Definition dialog box on page 233
Device Curves dialog box on page 234
Uncalibrated Device Tonality dialog box on page 235
Image Preview window on page 256
Curve Adjustments tool on page 263

Device Curves dialog box

Use this dialog box to view and directly adjust device curves. This dialog box is available from the **Device Curves** command in the Device Curves Adjustment dialog box.

(title bar)

Displays the device name.

(Curve View-Edit tool)

Use the graph and controls in this area to view device curves and directly adjust them.

Adjustments you make here change the color response of the device condition. In general, you should not change the color response after ColorFlow has calculated other elements based

on that device condition. Instead, use this dialog box only to make a needed *correction* to the device curves, after something has changed the originally-measured response.

When you correct the curves in CMY mode, you will notice that the **Current** patch changes. This reinforces the concept that the device response (represented in the **Corrected** patch) should be kept constant.

Preview

Enables you to see the effects of the device curve before you click **Apply**. You will see a before-and-after preview of all edits. The before-and-after view can be customized to show edits for any particular area of the image.

See also:

Correcting a color shift on a curve-controlled device on page 86
Image Preview window on page 256
Curve View-Edit tool on page 266

Uncalibrated Device Tonality dialog box

Use this dialog box to view the tonal response of a device in a device condition, excluding the effect of its device curves. This dialog box is available in the Device Curves Adjustment dialog box, from the **Device Tonality** command.

(title bar)

Displays the device name.

C, M, Y, K

Select the channel to view.

(Effective Dot Area View, Tone Value Increase View)

Select the type of table and graph you prefer—**Effective Dot Area** view or **Tone Value Increase** view. The displayed tonality is the same; only the presentation is different.

Tint in

Tint values at the device input, not including the device curve. Type a value to see the corresponding value for that channel in the other column.

EDA

Effective dot area as measured on a press sheet, and then adjusted to remove the effect of the device curve. Displayed if the **Effective Dot Area View** icon is selected. Type a value to see the corresponding **Tint in**.

TVI

Tone value increase as measured on a press sheet, and then adjusted to remove the effect of the device curve. Displayed if **Tone Value Increase View** icon is selected. Type a value to see the corresponding **Tint in**.

(graph of response)

Click the graph of the selected channel, and then drag the point and read in the text boxes the corresponding **Tint in** and vertical axis values.

See also:

Device Curves Adjustment dialog box on page 233

Simulation Definition (PCO to target) dialog box

Use this dialog box to select a target, and control how a PCO simulates the target. This dialog box is available from the **Simulation** icon that appears in the outside frame of the PCO. If a simulation is already defined, in the Simulation Adjustment dialog box, click **Redefine**.

ColorFlow can perform the simulation using tonal curves or DeviceLinks or a combination.

Target

Select the color response whose colors the PCO will attempt to simulate. Often this will be an industry reference.

Curves Method

For curved devices only (i.e., offset presses, some digital presses, and halftone proofers), select how you want to generate and use tonal curves.

Manual Adjustments Only

Tonal curves are applied to data in the digital file. However, these curves are linear—they have no effect—until you make some adjustments.

Tonal Match

Tonal curves are applied to data in the digital file. The curves are calculated so that the Tonal Value Increase (TVI) for a particular tone and ink color on the printed sheet (or other device output) is the same as the TVI for the target response. Tonal match requires spectral data from a Tonal or Color Characterization chart, or EDA values from a Tint Ramp chart (see Charts).

Gray Balance

Tonal curves are applied to data in the digital file. The curves for cyan, magenta, and yellow are calculated so that the neutral (gray) tone throughout its range of lightness on the printed sheet is the same as the neutral tones for the target response. The curve for black is calculated so that the relative lightness for a particular tone on the printed sheet (or other device output) is the same as the relative lightness for the target response. Perceptual mapping of neutral ramps is performed for black and CMY curves. The gray balance method requires spectral or CIELAB values from a color characterization chart.

DeviceLink Method

Select how you want to generate and use DeviceLinks. For some types of devices, not all selections are available. Because the DeviceLink is used in the context of a simulation, the DeviceLink source is the color space selected in **Target**; the destination is the device condition inside the PCO.

Ink Optimizing Solution

This check box is available if your license includes the Ink Optimizing Solution feature. Select the check box to apply gray component replacement (GCR) to optimize ink usage by replacing chromatic inks with black.

Allow Color Space Simulation or Allow Color Space Conversion

The name of this option depends on whether you are in the PCO or SCO. For curve-controlled devices, use this option to achieve ink savings, and to achieve a closer color match to your source color space. When this option is selected, gamut mapping may occur between two different color spaces.

Full Reseparation

Completely reseparated. Solid colors in the original file may not remain solid. The black generation parameters that you specify are used, which may result in using less chromatic ink and more black ink.

CMYK Integrity

All color builds can be adjusted. The relative amount of black vs CMY will be preserved in content processed through the DeviceLink

Black Purity Only

Any colors other than black channel (solid K, K-grays) may be adjusted.

Color and Black Purity

Same as **Fully Constrained** but solid colors may be reduced to a tint.

Fully Constrained

A DeviceLink is used to change data in the digital file. However, it is constrained, so that any color made with only one or two inks will not have other inks added. Solid (100% tints) primaries and secondaries are not affected and remain solid.

Imported

Import an existing DeviceLink. Click **Import** to browse to a DeviceLink.

Rendering Intent

Perceptual, **Relative Colometric**, **Saturation**, or **Absolute Colometric**

Total Ink Limit

200 to 400%

Black Start

0 to 60%

Max Black

70 to 100%

Black Strength

Use the slider or text box to select a value between 5 and 100%.

See also:

Simulating an industry specification on page 91
Generating a DeviceLink on page 128

Simulation Adjustment (PCO to target) dialog box: DeviceLink tab

Use the **Adjust DeviceLink** tab to make changes in the overall color response of the PCO. If a simulation has been defined, this dialog box is

available from the **Simulation** icon that appears in the outside frame of the PCO.

(adjustment mode)

There are three adjustment modes. Options in this area depend on the adjustment mode and are described separately.

- **White Point** is available only if **Rendering Intent** is **Absolute Colorimetric**.
- **Input Tonality**, individual channels or CMY, is available only when editing the DeviceLink source.
- **Output Tonality**, individual channels or CMY, is available only when editing the DeviceLink destination.

Preview

Enables you to see the effects of the simulation on an image before you click **Apply**. You will see a before-and-after preview of all edits. The before-and-after view can be customized to show edits for any particular area of the image.

Redefine

Discards adjustments and defines the simulation again.

See also:

Adjusting a simulation DeviceLink on page 93
About adjusting DeviceLinks on page 133
DeviceLink White Point options on page 254
DeviceLink Input Tonality options on page 255
DeviceLink Output Tonality options on page 256

Simulation Adjustment (PCO to target) dialog box: Curves tab

Use the **Curves** tab to make changes in the overall color response of the PCO. If a simulation has been defined, this dialog box is available from the **Simulation** icon that appears in the outside frame of the PCO.

(Curves Adjustments tool)

Use the graph and controls in this area to make tonal difference adjustments. Adjustments you make here affect the curves that change the color response of the device condition to simulate the selected target.

Expected Tonality

Displays the Expected Tonality dialog box which contains a graph of the expected overall tonal response of the primary color output, including the effect of the simulation curves.

Calibration Curves

Displays the Calibration Curves dialog box where you can view and change the curves directly.

Preview

Enables you to see the effects of the simulation on an image before you click **Apply**. You will see a before-and-after preview of all edits. The before-and-after view can be customized to show edits for any particular area of the image.

Redefine

Displays the Simulation Definition dialog box where you can change the simulation target and methods for matching it.

See also:

Adjusting simulation curves on page 93
About previewing images on page 149
Simulation Definition (PCO to target) dialog box on page 236
Calibration Curves dialog box on page 240
Expected Tonality dialog box on page 242
Curve Adjustments tool on page 263

Calibration Curves dialog box

Use this dialog box to view and directly adjust calibration curves to use with the device in the PCO or an SCO. This dialog box is available in the Simulation or Conversion Adjustment dialog box, from the **Curves** tab, **Calibration Curves** command.

(title bar)

If these are calibration curves for a simulation, the title bar displays, "Calibration Curves [<*PCO device condition name*>] as [<*target name*>]."

If these are calibration curves for a SCO conversion, the title bar displays, "Calibration Curves [<*SCO device condition name*>] as [[<*PCO device condition name*>] as [<*target name*>]]."

Device

If the device condition has more than one device (pooled), select a device here. Calibration curves include a device curve that ColorFlow may have adjusted to make the devices match.

(Curve View-Edit tool)

Use the graph and controls in this area to view calibration curves and directly adjust them.

Exclude Device Curves

Do not select this option if the intent is to edit the entire calibration curve.

Preview

Enables you to see the effects of the calibration curve on an image before you click **Apply**. You will see a before-and-after preview of all edits. The before-and-after view can be customized to show edits for any particular area of the image.

See also:

Curves on page 107
Simulation Curves dialog box on page 241
Conversion Curves dialog box on page 247
Curve View-Edit tool on page 266

Simulation Curves dialog box

Use this dialog box to view and directly adjust simulation curves to use with the device in the PCO. This dialog box is available from the Calibration Curves dialog box when **Exclude Device Curves** is selected.

(title bar)

The title bar displays "Simulation Curves [<*PCO device condition name*>] as [<*target name*>]"

Device

This option, to choose a device among pooled devices, has no effect because a simulation curve is the same for either device.

Exclude Device Curves

Clear this option to view or edit the entire calibration curve. The title bar changes accordingly.

(Curve View-Edit tool)

Use the graph and controls in this area to view simulation curves and directly adjust them.

Preview

Enables you to see the effects of the simulation curve before you click **Apply**. You will see a before-and-after preview of all

edits. The before-and-after view can be customized to show edits for any particular area of the image.

See also:

Curves on page 107
Calibration Curves dialog box on page 240
Curve View-Edit tool on page 266

Expected Tonality dialog box

Use this dialog box to view the predicted tonal response of the device condition, including its simulation (or conversion) curves. This dialog box is available in the Simulation (or Calibration) Adjustment dialog box, on the **Adjust Curves** tab, from the **Expected Tonality** command.

(title bar)

Displays the device condition name and target.

C, M, Y, K

Select the channel to view.

(Effective Dot Area View, Tone Value Increase View)

Select the type of table and graph you prefer—**Effective Dot Area** view or **Tone Value Increase** view. The displayed tonality is the same; only the presentation is different.

Tint in

Tint values at the level of the PCO (or SCO) before applying simulation (or conversion) and device curves. Type a value to see the corresponding value for that channel in the other column.

EDA

Effective dot area predicted to occur on a press sheet. Appears if the **Effective Dot Area View** icon is selected. Type a value to see the corresponding **Tint in**.

TVI

Tone Value Increase predicted to occur on a press sheet. Appears if the **Tone Value Increase View** icon is selected. Type a value to see the corresponding **Tint in**.

(graph of response)

Click the graph of the selected channel, and then drag the point and read in the text boxes the corresponding **Tint in** and vertical axis values.

See also:

Simulation Adjustment (PCO to target) dialog box: Curves tab on page 239
Conversion Adjustment (PCO to SCO) dialog box: Curves tab on page 246

Conversion Definition (PCO to SCO) dialog box

Use this dialog box to control how a SCO emulates the PCO. This dialog box is available from the **Conversion** icon that appears in the link connecting a SCO to the PCO. If a conversion is already defined, in the Conversion Adjustment dialog box, click **Redefine**.

ColorFlow can perform the conversion using tonal curves or DeviceLinks or a combination of each.

Curves

Select how you want to use tonal curves.

Manual Adjustments Only

Tonal curves are applied to data in the digital file. However, these curves are linear—they have no effect—until you make some adjustments.

Tonal Match

Tonal curves are applied to data in the digital file. The curves are calculated so that the Tone Value Increase (TVI) for a particular tone and ink color on the printed sheet (or other device output) is the same as the TVI for the PCO device.

Gray Balance

Tonal curves are applied to data in the digital file. The curves for cyan, magenta, and yellow are calculated so that the neutral (gray) tone throughout its range of lightness on the printed sheet is the same as the neutral tones for the target response. The curves for black and other process inks are calculated so that the TVI for a particular tone and ink color on the printed sheet (or other device output) is the same as the TVI for the PCO device.

DeviceLink

Select how you want to use DeviceLinks. For some types of devices, not all options are available. Because the DeviceLink is used in the context of a conversion, the DeviceLink source is the PCO; the destination is the device condition of the SCO.

In the following descriptions, the numbers in brackets (n) are provided to aid the descriptions.

None

A DeviceLink is not used to change data in the digital file.

Imported

Import an existing DeviceLink. Click **Import** to browse to a DeviceLink.

Fully Constrained

A DeviceLink is used to change data in the digital file. However, it is constrained, so that any color made with only one or two inks will not have other inks added. Solid (100% tints) primaries and secondaries are not affected and remain solid.

Color and Black Purity

Same as **Fully Constrained** but solid colors may be reduced to a tint.

Black Purity Only

Any colors other than black channel (solid K, K-grays) may be adjusted.

CMYK Integrity

All color builds can be adjusted. The relative amount of black vs CMY will be preserved in content processed through the DeviceLink.

Full Reseparation

Completely reseparated. Solid colors in the original file may not remain solid. The black generation parameters that you specify are used, which may result in using less chromatic ink and more black ink.

Ink Optimizing Solution

This DeviceLink Method is available if your license includes the Ink Optimizing Solution feature. Select **Ink Optimizing Solution** to apply gray component

replacement (GCR) to optimize ink usage by replacing chromatic colors with black.

Target Simulation or Color Space Conversion

The name of this option depends on whether you are in the PCO or SCO.

For curve-controlled devices, use this option to achieve ink savings and to achieve a closer color match to your source color space. When this option is selected, gamut mapping may occur between two different color spaces.

Rendering Intent

Perceptual, **Relative Colometric**, **Saturation**, or **Absolute Colometric**

Total Ink Limit

200 to 400%

Black Start

0 to 60%

Max Black

70 to 100%

Black Strength

Use the slider or text box to select a value between 5 and 100%.

See also:

Generating a DeviceLink on page 128

Conversion Adjustment (PCO to SCO) dialog box: DeviceLink tab

Use this dialog box to control how an SCO emulates the PCO. If a conversion has been defined, this dialog box is available from the **Conversion** icon that appears in the link connecting a SCO to the PCO.

(adjustment mode)

There are three adjustment modes. Options in this area depend on the adjustment mode and are described separately.

- **White Point** is available only if **Rendering Intent** is **Absolute Colorimetric**.
- **Input Tonality**, individual channels or CMY, is available only when editing the DeviceLink source.

- **Output Tonality**, individual channels or CMY, is available only when editing the DeviceLink destination.
- **Dark Point**, Allows you to adjust the color look-up table (CLUT) of the DeviceLink profile at one of four selectable dark points: Solid K, Solid CMY, Solid CMYK, or the darkest pixel of a Preview image.
- **Gray Balance**, Allows you to adjust the source at a selected point on one of two selectable gray ramps: K only and CMY only. For example of adjusting the Gray Balance is when you want to make a localized correction to an inaccurate color on the neutral axis of a device profile.
- **Selected Color**, Allows you to adjust the central color look-up table (CLUT) of the DeviceLink profile at a selected input tint. The profile input coordinates to be adjusted may be entered directly, or sampled from the active colorimeter of the Preview image. Three range sliders select the range of influence of the adjustment.

Preview

Enables you to see the effects of the conversion before you click **Apply**. You will see a before-and-after preview of all edits. The before-and-after view can be customized to show edits for any particular area of the image.

Redefine

Discards adjustments and defines the simulation again.

See also:

Adjusting an SCO DeviceLink on page 97
About adjusting DeviceLinks on page 133
DeviceLink White Point options on page 254
DeviceLink Input Tonality options on page 255
DeviceLink Output Tonality options on page 256

Conversion Adjustment (PCO to SCO) dialog box: Curves tab

Use the **Adjust Curves** tab to change the color response of the SCO. If a conversion has been defined, this dialog box is available from the **Conversion** icon that appears in the link between an SCO and the PCO.

(Curve Adjustments tool)

Use the graph and controls in this area to make curve adjustments. Adjustments you make here affect the curves that

change the color response of the device condition to simulate the PCO.

Expected Tonality

Displays the Expected Tonality dialog box which contains a graph of the expected tonal response of this SCO, including the effects of the conversion curves.

Calibration Curves

Displays the Calibration Curves dialog box where you can view and change the curves directly.

Preview

Enables you to see the effects of the conversion before you click **Apply**. You will see a before-and-after preview of all edits. The before-and-after view can be customized to show edits for any particular area of the image.

Redefine

Displays the Conversion Definition dialog box where you can change the methods used to match the PCO.

See also:

Adjusting SCO conversion curves on page 96
About previewing images on page 149
Calibration Curves dialog box on page 240
Expected Tonality dialog box on page 242
Conversion Definition (PCO to SCO) dialog box on page 243
Conversion Curves dialog box on page 247
Curve Adjustments tool on page 263

Conversion Curves dialog box

Use this dialog box to view and directly adjust conversion curves to use with the device in an SCO. This dialog box is available from the Calibration Curves dialog box, when **Exclude Device Curves** is selected.

(title bar)

The title bar displays "Conversion Curves [<*SCO device condition name*>] as [[<*PCO device condition name*>] as [<*target name*>]]"

Device

This option, to choose a device among pooled devices, has no effect because a conversion curve is the same for either device.

Exclude Device Curves

Clear this option to view or edit the entire calibration curve. The title bar changes accordingly.

(Curve View-Edit tool)

Use the graph and controls in this area to view conversion curves and directly adjust them.

Preview

Enables you to see the effects of the conversion curve before you click **Apply**. You will see a before-and-after preview of all edits. The before-and-after view can be customized to show edits for any particular area of the image.

See also:

Curves on page 107
Calibration Curves dialog box on page 240
Curve View-Edit tool on page 266

Input Conversion Definition (Color Input to PCO) dialog box

Use this dialog box to control how data in the color space of the color is converted to the color space of the PCO. This dialog box is available from the **Conversion** icon that appears in the link connecting a color input to the PCO. You can select this from either the **RGB Reference** or **CMYK Reference** color input device.

You can select between **Profile Pair** or **DeviceLinks** for the conversion method. There are different options available depending on the conversion method you select.

RGB Reference

Profile Pair

Image (tab)

Workflow handles Image content (pictures or raster) differently from graphic content (text and linework). You can make different settings for each.

Rendering Intent

The rendering intent influences the conversion from device independent color spaces to a target color space. Includes the following options:

- **Perceptual**
- **Relative Colorimetric**

Profile Pair

- **Saturation**
- **Absolute Colorimetric**

Graphic (tab)

Graphic Conversion same as Image Conversion

Select to use the same settings for graphic content as for image content.

RGB Reference

DeviceLink

Image (tab)

Workflow handles Image content (pictures or raster) differently from graphic content (text and linework). You can make different settings for each.

DeviceLink Method

Select how you want to use DeviceLinks. For some types of devices, not all options are available. Because the DeviceLink is used in the context of a conversion, the DeviceLink source is the color input; the destination is the PCO.

In the following descriptions the numbers in brackets (n) are provided to aid the descriptions.

Imported

Import an existing DeviceLInk. Use **Import** to browse to a suitable DeviceLink.

ColorFlow Generated

Allows you to select a rendering intent and adjust the black generation controls and default values. Includes the following options:

Rendering Intent

The rendering intent influences the conversion from device independent color spaces to a target color space. Includes the following options:

DeviceLink

- **Perceptual**
- **Relative Colorimetric**
- **Saturation**
- **Absolute Colorimetric**

Total Ink Limit

200 to 400%

Black Start

0 to 60%

Max Black

70 to 100%

Black Strength

Use the slider or text box to select a value between 5 and 100%.

Black Point Compensation

Applies to **Relative Colorimetric** rendering intent only. Performs **Perceptual-**like gamut mapping of near-neutral colors.

Graphic (tab)

Graphic Conversion same as Image Conversion

Select to use the same settings for graphic content as for image content.

CMYK Reference

Profile Pair

Image (tab)

Workflow handles Image content (pictures or raster) differently from graphic content (text and linework). You can make different settings for each.

Rendering Intent

The rendering intent influences the conversion from device independent color spaces to a target color space. Includes the following options:

- **Perceptual**
- **Relative Colorimetric**

Profile Pair

- **Saturation**
- **Absolute Colorimetric**

Graphic (tab)

Graphic Conversion same as Image Conversion

Select to use the same settings for graphic content as for image content.

CMYK Reference

DeviceLink

Image (tab)

Workflow handles Image content (pictures or raster) differently from graphic content (text and linework). You can make different settings for each.

DeviceLink Method

Select from the following options:

- **Ink Optimizing Solution**: This is only available if your license includes the Ink Optimizing Solution feature. Select this to apply gray component replace (GCR) to optimize ink usage by replacing chromatic colors with black.
- **Full Reseparation**: Completely reseparated. Solid colors in the original file may not remain solid. The black generation parameters that you specify are used, which may result in using less chromatic ink and more black ink.
- **CMYK Integrity**: All color builds can be adjusted. The relative amount of black vs CMY will be preserved in content processed through the DeviceLink.
- **Black Purity Only**: Any colors other than the black channel (solid K, K-grays) may be adjusted.
- **Color and Black Purity**: A DeviceLink is used to change the data in the digital file. However, it is constrained, so that any color made with only one or two inks will not have other inks added. Solid (100% tints) primaries and secondaries may be reduced.
- **Fully Constrained**: A DeviceLink is used to change the data in the digital file. However, it is constrained,

DeviceLink

so that any color made with only one or two inks will not have other inks added. Solid (100% tints) primaries and secondaries are not affected, and remain solid.

- **Imported**: Import an existing DeviceLink. Use **Import** to browse to a DeviceLink.

Depending on your selection, you can select a rendering intent and adjust the black generation controls and default values. Includes the following options:

Rendering Intent

The rendering intent influences the conversion from device independent color spaces to a target color space. Includes the following options:

- **Perceptual**
- **Relative Colorimetric**
- **Saturation**
- **Absolute Colorimetric**

Total Ink Limit

200 to 400%

Black Start

0 to 60%

Max Black

70 to 100%

Black Strength

Use the slider or text box to select a value between 5 and 100%.

Black Point Compensation

Applies to **Relative Colorimetric** rendering intent only. Performs **Perceptual-**like gamut mapping of near-neutral colors.

Graphic (tab)

DeviceLink

Graphic Conversion same as Image Conversion

Select to use the same settings for graphic content as for image content.

See also:

Adjusting a CI conversion on page 103

Conversion Adjustment (Color Input to PCO) dialog box

Use this dialog box to control how the color space of the color input is converted to that of the PCO.

If a conversion has been defined, this dialog box is available from the **Conversion** icon that appears in the link connecting a color input to the PCO.

(adjustment mode)

There are three adjustment modes. Options in this area depend on the adjustment mode and are described separately.

- **White Point** is available only if **Rendering Intent** is **Absolute Colorimetric**.
- **Input Tonality**, individual channels or CMY, is available only when editing the DeviceLink source.
- **Output Tonality**, individual channels or CMY, is available only when editing the DeviceLink destination.

Preview

Enables you to see the effects of the conversion before you click **Apply**. You will see a before-and-after preview of all edits. The before-and-after view can be customized to show edits for any particular area of the image.

Redefine

Discards adjustments and defines the simulation again.

See also:

Adjusting a CI conversion on page 103
About adjusting DeviceLinks on page 133
DeviceLink White Point options on page 254
DeviceLink Input Tonality options on page 255
DeviceLink Output Tonality options on page 256

DeviceLink White Point options

These options are available on the **DeviceLink Adjust** tab of the Simulation or Conversion dialog box when the adjustment mode is **White Point**.

This adjustment mode edits the central color lookup table of the DeviceLink at the white point—input coordinates (0, 0, 0, 0).

(color adjuster)

Use the lightness (L*) slider together with the cast (a*b*) selector to adjust the white point. Your movement in the color selector may be constrained. When **Adjust Displayed Colors** is selected, you can use these color adjuster controls to move the displayed color patches to a new color.

Before, After

The displayed color patches demonstrate the effect of all the adjustments specified in this dialog box. The color produced by the curves or profile before your adjustment is shown on the left (**Before**). The color produced by the curves or profile after your adjustment is shown on the right (**After**). Click the patches to display them in a larger view.

Adjust Displayed Colors

Enables you to adjust the displayed color of the **Before, After** or **Current, Corrected** patches on your viewing monitor, if the neutral gray that is displayed in the color patch does not visually align with the neutral gray on your proof or press sheet. Select the **Adjust Displayed Colors** check box and use the color adjuster controls. The feature enables you to change the color of the patches *only* as they are displayed onscreen; it does not directly affect curve editing. Clear the check box after using the feature.

Reset

Available only when **Adjust Displayed Colors** is selected. Resets the displayed color.

In

Input is the file white point (0, 0, 0, 0).

Out

White point after transformation by the DeviceLink. You can change it with the color adjuster controls, or by directly entering C M Y K.

Change

Displays the expected change in L*, a*, b*, C* and H* at the white point. You can enter the desired change directly in L*, a*, b*.

See also:

About adjusting DeviceLinks on page 133
Simulation Adjustment (PCO to target) dialog box: DeviceLink tab on page 238
Conversion Adjustment (PCO to SCO) dialog box: DeviceLink tab on page 245
Conversion Adjustment (Color Input to PCO) dialog box on page 253

DeviceLink Input Tonality options

These options are available on the **Adjust DeviceLink** tab of the Simulation (or Conversion) Adjustment dialog box when the adjustment mode is **Input Tonality**.

This adjustment mode provides adjustment of the transfer curve at the input (source) of the DeviceLink for a single process channel, or coordinated adjustment of CMY input curves at four fixed tonal values. This does not adjust the curves that appear on the **Adjust Curves** tab of the Simulation (or Conversion) Adjustment dialog boxes.

(Curve Adjustments tool)

Use the graph and controls in this area to make curve adjustments.

Input Curves

Opens the Profile Input Curves window where you can adjust the curves directly.

See also:

About adjusting DeviceLinks on page 133
Simulation Adjustment (PCO to target) dialog box: DeviceLink tab on page 238
Conversion Adjustment (PCO to SCO) dialog box: DeviceLink tab on page 245
Conversion Adjustment (Color Input to PCO) dialog box on page 253
Curve Adjustments tool on page 263

DeviceLink Output Tonality options

These options are available on the **Adjust DeviceLink** tab of the Simulation (or Conversion) Adjustment dialog box when the adjustment mode is **Output Tonality**.

This adjustment mode provides adjustment of the transfer curve at the output (destination) of the DeviceLink for a single process channel, or coordinated adjustment of CMY output curves at fixed tonal values. This does not adjust the curves that appear on the **Adjust Curves** tab of the Simulation (or Conversion) Adjustment dialog boxes.

(Curve Adjustments tool)

Use the graph and controls in this area to make curve adjustments.

Output Curves

Opens the Profile Output Curves window where you can adjust the curves directly.

See also:

About adjusting DeviceLinks on page 133
Simulation Adjustment (PCO to target) dialog box: DeviceLink tab on page 238
Conversion Adjustment (PCO to SCO) dialog box: DeviceLink tab on page 245
Conversion Adjustment (Color Input to PCO) dialog box on page 253
Curve Adjustments tool on page 263

Image Preview window

Use this window to view a selected image in detail. You can see and measure the changes caused by adjustments. This window is available from the **Preview** command in all Adjustment dialog boxes.

(title bar)

Displays the device condition name and other relevant identifiers, such as the name of the device, the name of the simulation target, and so on), depending on the element being adjusted.

(navigation pane)

A rectangle indicates the portion of the image that appears in the preview pane. The rectangle is shaded to indicate the *before* side (black) and the *now* side (white).

To zoom, drag a marquee.

To make a point the new center of the preview pane, simply click it.

(zoom slider)

To zoom, move the slider, or select the slider and nudge it with the arrow keys.

(zoom % list)

To zoom, type a value or choose a value from the list. A magnification of 100% indicates the image is displayed using one screen pixel for each image file pixel. Similarly, 500% indicates five screen pixels for each image pixel. The top item on the list represents the zoom value that fits the image in the current preview panel, the same zoom value as full-left on the zoom slider.

(preview pane)

Use the split-screen to compare the image with all adjustments including the most recent (the *now* side) and the image without any adjustments (the *before* side). The image is updated to show the effect of adjustments as you make them.

To zoom, click in the image, and then use your scroll-wheel, or Command-drag a marquee.

To pan the viewed area, drag in the pane. Or to make a point the new center, simply click the point, taking care not to move the mouse as you do.

(input-output divider)

A movable divider lets you position the split at the exact point where you wish to examine the effect of the changes. You can drag the divider across the top of the image, and around corners, even onto the lower edge so that *before* and *now* switch sides.

 **(add colorimeter)**

Creates floating colorimeters in the preview pane. As you drag a colorimeter to any point in the image, the numbers below the preview pane reveal the tint change of that color, before and after adjustments.

 **(delete colorimeter)**

Deletes the selected colorimeter. If colorimeters with a higher number exist, they are renumbered.

Input

Tint value for each ink (and the total of inks) at the location of the selected colorimeter before applying the transformation.

Output

Tint value for each ink (and the total of inks) at the location of the selected colorimeter after applying the transformation, both before and after the adjustment. The transformation revealed here depends on where you were making adjustments when you invoked the Image Preview window.

Hide Colorimeters

Hides all colorimeters but does not delete them. Their locations still appear in the navigation pane.

(colorimeter pane)

Displays color data for all colorimeters.

See also:

Image preview on page 149

New Plate Setup dialog box

Use this dialog box to create a plate setup. The dialog box is available by clicking the **add** button + in the **Plate Setup** area of the Plate Setups dialog box.

Device type

Displays the type of offset device (sheetfed offset, coldset web offset, or heatset web offset) for this plate setup. The plate setup that you create can be used only with this device type. If this dialog box was invoked from the Device Condition Properties dialog box, this item is already known, and cannot be changed.

Plate type

Displays the physical plate for this plate setup. A plate can appear in many plate setups and plate lines. However, note that when you add a plate type, it is specific to the device type that the plate will be used with.

Screening

Displays the screening for this plate setup. The list contains the same values as the screening property for the device type. Use the **edit** button to change the screening values in the list. Values added here will be available everywhere that the screening property for this device type appears.

OK

Creates the new plate setup. Its name is formed from the combined values of its plate type and screening.

See also:

Plate setups on page 157
Creating a plate setup on page 158

Plate Setups dialog box

Use this dialog box to create and edit plate curves. These curves can make your platesetter output linear. The dialog box is available from **View** > **Plate Setups**.

Device type

Select an offset device type. Only the plate setups for this device type are displayed in **Plate setups**. If this dialog box was invoked from the Device Condition Properties dialog box, this item is already selected.

Plate setups

A list of all the plate setups that can be used with the selected **Device type**. Because each plate setup must have a unique combination of the Plate and Screening properties, its name is simply their combined values. You cannot change the name.

(add)

Opens the New Plate Setup dialog box where you can create a plate setup.

(export)

Exports the selected plate setup in Harmony format.

(delete)

Deletes the selected plate setup.

Plate lines

A plate line refers to a particular combination of plate, screening, platesetter, and chemistry. The plate lines displayed are for the selected plate setup only. If you want to use the same physical plate line with a second plate setup, you must create another plate line in the second plate setup. Several plate lines can use the same combination of platesetter and chemistry.

Name

You can assign your own plate line names.

Date modified

The date you created the plate line or modified a tint.

(add)

Creates a new plate line for this plate setup only.

(delete)

Deletes the selected plate line from this plate setup.

Tint values

The tint values imposed on the plate for measurement. The tint value table is specific to the selected plate line.

Input tint

Tint values that are input to the platesetter. The values are the same as on the Kodak plate control strip.

Measured tint (uncalibrated)

The measured densities on plate for each of the input tints.

Close

Closes the dialog box. Additions and changes were saved as you made them.

See also:

Plate setups on page 157

Preferences dialog box

Use this dialog box to configure your default settings in several categories. The dialog box is available from the **File** menu.

User Interface tab

Language

Selects the language of the ColorFlow user interface. After the language is changed, a restart is required.

ICC Profiles tab

Profile Version

Selects whether generated ICC device profiles and ICC DeviceLink profiles are version 2 or version 4 profiles. The default is version 4. After it is changed, a restart is required. Existing profiles are not affected.

Measurement tab

Density Standard

Enables you to select the standard that your measuring device will use when measuring densities on a press sheet.

ISO Status T, ANSI T: Wide band color reflection densitometer response, used mainly in the US and United Kingdom.

ISO Status E, DIN: Wide band color reflection densitometer response, used mainly in Europe. Yellow values tend to be higher than Status T.

ISO Status I / SPI, DIN NB: Narrow band densitometer responses.

See also:

Measuring the chart on page 75
About device profiles on page 121

History window

Use this window to view adjustments made and being made to the element in the currently selected adjustment dialog box. This window is available from the **View** menu. Here you can view the entire history of curves and profiles, including definition, regeneration, adjustments, and snapshot capture events.

A separate history log is kept for each adjustable element in each color setup, and each device condition. Consequently, changes to a device curve and simulation curve even in the same PCO do not appear in the same window.

Adjustments to

Although individual adjustments are shown under this heading, you cannot undo them individually. However, from the **Edit** menu you can undo or redo the collected adjustments made in each preceding apply.

Uncommitted

Shows the adjustments you have made since you opened that dialog box, or last clicked **Apply**. These adjustments can be undone individually from the **Edit** menu.

See also:

History and undo on page 201

Licensing dialog box

Use this dialog box to obtain or view the status of the license for your edition and options. The Standalone edition is not available in version 1.0 of the software.

Workflow Edition

When a Workflow edition first runs, it presents the ColorFlow Licensing dialog box where you can connect to a Prinergy server.

Prinergy Primary Server

Select a server and its IP address from the list to view its licensed ColorFlow edition and licensed options. To add more servers that are not on the local network, use the **add** button + and type the exact server name. To remove a server from the list, use the **delete** button −.

ColorFlow License

Licensed editions available on this server.

Optional Features

Additional features available on this server.

OK

ColorFlow connects to the selected server and the features that are licensed by the server become available. If you used this procedure to change an existing license, or connect to a different server, ColorFlow exits and you must restart it.

Standalone Edition

When the Standalone edition first runs, it presents the ColorFlow Licensing dialog box where you can connect with the Kodak licensing server.

Your Unique Computer ID

A unique string that identifies your computer. Use it to obtain your standalone license key.

Get License

Opens a Web browser to contact Kodak and obtain the license key.

License Key

Enter the license key provided.

Optional Features

Displays any optional features that are available with your license.

OK

If you changed an existing license, ColorFlow exits and you must restart it.

See also:

Licenses on page 20

Curve Adjustments tool

This collection of items appears in several curve-adjustment dialog boxes: device curves, simulation/conversion curves, and device profile and DeviceLink input/output tonality. Together the items comprise a powerful global adjustment tool.

As you adjust the controls in this group, you are changing the underlying curves. The height of the graph and values in text boxes represent the exact change in the underlying curves.

(graph of tonal change)

For CMYK devices, the horizontal axis represents CMYK and Spot (if applicable) tint values 0% (lightest) to 100% (darkest). The vertical axis represents your requested curve change, +20% to - 20%.

Expected Tonality (simulation/conversion curve adjustments)

Device Tonality (device curve adjustments)

View the tonal response of the PCO/SCO or device, and the effect of your curve changes.

Calibration Curves (simulation/conversion curve adjustments)

Device Curves (device curve adjustments)

Input Curves (device profile or DeviceLink input tonality adjustments)

Output Curves (device profile or DeviceLink output tonality adjustments)

Device or Calibration Curve views can be used to view and edit the actual curves that you are adjusting with the Curve Adjustments tool. Alternately, you can change curves in both windows, and see the result in both.

(channels)

Select for adjustment an individual channel **C**, **M**, **Y**, or **K**, combined channels **CMY** for a coordinated neutral tonal or cast or lightness adjustment, or **Spot** for spot color adjustment.

Spot ink

If **C**, **M**, **Y**, or **Spot** is selected, the dialog box contains adjustment sliders in five ranges. As you move a slider or type in a text box, the underlying curve changes by the amount indicated on the graph. Five sliders affect tints in the following ranges:

- Slider at 10% (Highlight): affects 0 to 25%
- Slider at 25% (Quartertone): affects 0 to 50%
- Slider at 50% (Midtone): affects entire tonal range
- Slider at 75% (3/4-tone): affects 50 to 100%
- Slider at 90% (Shadow): affects 75 to 100%

If **CMY** is selected, the dialog box contains the following options:

(range buttons)

Select the range of input tints that you want to affect: **Highlight**, **Quartertone**, **Midtone**, **3/4-tone**. The ranges refer to lightness (L*), not the tint of cyan or any other channel. For this reason, the greatest curve change resulting from your *Midtone* adjustment may not occur at 50% **C**, **M**, or **Y**.

(CMY Gray Adjustment controls)

Use the lightness (L*) slider together with the cast (a*b*) selector to adjust the color in the selected range. Your movement in the color selector may be

constrained. When **Adjust Displayed Colors** is selected, the color adjuster controls only shift the displayed color patches for visualization of the current color change; they do not change any curves.

Before, After (simulation/conversion curve and profile input/output tonality adjustments)

The displayed color patches demonstrate the effect of all the adjustments specified in this dialog box. The color produced by the curves or profile before your adjustment is shown on the left (**Before**). The color produced by the curves or profile after your adjustment is shown on the right (**After**). Click the patches to display them in a larger view.

When **Commit All Adjustments** is selected in the **Edit** menu, the After patch is updated to be the same as the Before patch, even though the adjustments are retained. This facilitates visualization of further incremental adjustments with the **Before, After** patches.

Current, Corrected (device curve adjustments)

The displayed color patches demonstrate the effect of all the adjustments specified in this dialog box. The color that is currently being produced is shown on the left (**Current**), and can be adjusted to reflect any changes in the device color output that require correction. The desired color output is shown on the right (**Corrected**) and remains constant, as a reference to the expected color output after correction. Click the patches to display them in a larger view.

Adjust Displayed Colors

Enables you to adjust the displayed color of the **Before, After** or **Current, Corrected** patches on your viewing monitor, if the neutral gray that is displayed in the color patch does not visually align with the neutral gray on your proof or press sheet. Select the **Adjust Displayed Colors** check box and use the color adjuster controls. The feature enables you to change the color of the patches *only* as they are displayed onscreen; it does not directly affect curve editing. Clear the check box after using the feature.

Reset

Available only when **Adjust Displayed Colors** is selected. Resets the displayed color.

Color Change

Displays the expected change in L*, a*, b*, C*, and H* at a point in the range that you are working on. You can enter the desired change at the center of the selected range, directly in L*, a*, b*.

See also:

About adjusting curves on page 111
Curve View-Edit tool on page 266

Curve View-Edit tool

This collection of items appears in several curve-adjustment dialog boxes, including device curves, calibration curves, and DeviceLink input/output tonality. Together the items comprise a powerful curve adjustment tool.

Enable Editing

Select to allow editing of the curves in this dialog box. The descriptions of the remaining items assumes that **Enable Editing** is selected. (If the check box is not selected, you can only drag a point along the selected single curve, and read its values in Tint In and Tint Out.) Adjustments you make, both before and after you click **Apply**, can be undone from the **Edit** menu.

(graph of transfer curves)

For CMYK devices, the horizontal axis represents CMYK tint-in values 0% (lightest) to 100% (darkest). The vertical axis represents the corresponding tint-out values.

Apply

After you make the changes you want, click **Apply** to save your changes.

(channels)

Select for adjustment an individual channel **C**, **M**, **Y**, or **K**, combined channels **CMY** for a coordinated neutral cast or lightness adjustment, or **Spot** for spot color adjustment.

If a **Spot** or single channel **C**, **M**, **Y**, or **K** is selected, you can adjust the curves as follows:

On the selected curve (channel), click to make handles. To change the shape of the curve, drag a handle up or down. The

handles on either side act as anchors, restricting the change to a smaller range. Press Delete to remove the selected handle.

Tint In

The displayed value is the tint-in value of the selected point. Enter a value and the selected point on that curve (or if none exist, a new point) moves to that tint-in value on the curve; the curve does not change.

Tint Out

The displayed value is the tint-out value of the selected point. Enter a value and the curve changes so the curve at the existing tint-in value moves to the new tint-out value.

If **CMY** is selected, you cannot adjust the curves by dragging them. Instead, the dialog box contains the following controls:

Gray Range

Select the center and range of lightness (L*) that you want to affect. The center must be between 5 and 75. Notice that the range sliders refer to lightness (L*), not the tint of cyan or any other channel. For this reason, the curve change on the Tint-in Tint-out graph will not "line up" with the slider positions you set.

CMY Gray Adjustment

Use the lightness (L*) slider together with the cast (a*b*) selector to adjust the color in the selected range. Your movement in the color selector may be constrained. When **Adjust Displayed Colors** is selected, the color adjuster controls only shift the displayed color patches to a new example color; they do not change any curves.

Before, After (simulation/conversion curve and profile input/output tonality adjustments)

The displayed color patches demonstrate the effect of all the adjustments specified in this dialog box. The color produced by the curves or profile before your adjustment is shown on the left (**Before**). The color produced by the curves or profile after your adjustment is shown on the right (**After**). Click the patches to display them in a larger view.

When **Commit All Adjustments** is selected in the **Edit** menu, the After patch is updated to be the same as the Before patch, even though the adjustments are retained.

This facilitates visualization of further incremental adjustments with the **Before, After** patches.

Adjust Displayed Colors

Enables you to adjust the displayed color of the **Before, After** or **Current, Corrected** patches on your viewing monitor, if the neutral gray that is displayed in the color patch does not visually align with the neutral gray on your proof or press sheet. Select the **Adjust Displayed Colors** check box and use the color adjuster controls. The feature enables you to change the color of the patches *only* as they are displayed onscreen; it does not directly affect curve editing. Clear the check box after using the feature.

Reset

Available only when **Adjust Displayed Colors** is selected. Resets the displayed color.

Color Change

Displays the expected change in L*, a*, b*, C* and H* at the selected tint-in (center slider). You can enter values in L*, a*, b*.

Curve Values

Displays the tint-in and tint-out values of each curve at the L* corresponding to the center slider.

See also:

About adjusting curves on page 111
Licensing dialog box on page 262

Simulation targets and methods

A simulation target for the primary color output may contain only tonal data, only colorimetric data, or both tonal and colorimetric data.

The availability of a particular simulation method depends on the type of data that is included in the simulation target.

The following table lists the simulation methods that are available for various industry specifications and ColorFlow device conditons.

Specification or Reference	Curves: Tonal Match	Curves: Gray Balance	DeviceLink
FOGRA 28 - Web Offset PT 3 Coated		×	×

Specification or Reference	Curves: Tonal Match	Curves: Gray Balance	DeviceLink
FOGRA 29 - Web Offset PT 4 Uncoated		×	×
FOGRA 30 - Web Offset PT 5 Uncoated		×	×
FOGRA 31 - Continuous Forms PT 2 Matte Coated		×	×
FOGRA 32 - Continuous Forms PT 4 Uncoated		×	×
FOGRA 39 - Sheetfed Offset PT 1 & 2 Coated		×	×
FOGRA 40 - Web Offset Super Calandered		×	×
FOGRA 41 - Web Offset MFC (machine finished coated)		×	×
FOGRA 42 - Web Offset SNP (standard newsprint)		×	×
IFRA 26 Newspaper Printing TVI 26%		×	×
IFRA 30 - Newspaper Printing TVI 30%		×	×
GRACoL 2006 C1	x	x	x
SWOP C3 and C5	x	x	x
FOGRA 45 - Web Lightweight Coated, Improved		x	x
FOGRA 46 - Web Lightweight Coated, Standard		x	x
FOGRA 47 - Offset PT4 Uncoated, White		x	x
ISO TVI Curve A	×		
ISO TVI Curve A and B	×		
ISO TVI Curve B	×		
ISO TVI Curve B and C	×		
ISO TVI Curve C	×		
ISO TVI Curve C and D	×		
ISO TVI Curve D	×		
ISO TVI Curve D and E	×		
ISO TVI Curve E	×		
ISO TVI Curve E and F	×		
ISO TVI Curve F	×		
ISO TVI Curve F and G	×		
ISO TVI Curve G	×		
ISO TVI Curve G and H	×		
ISO TVI Curve H	×		
PSR Gravure Publication HWC (Improved LWC)		×	×
PSR Gravure Publication LWC (Light Wt Coated)		×	×

Specification or Reference	Curves: Tonal Match	Curves: Gray Balance	DeviceLink
PSR Gravure Publication MF (Machine Finished)		×	×
PSR Gravure Publication SC (Super Calandered)		×	×
SWOP 2006 Coated 3	x	×	×
SWOP 2006 Coated 5	x	×	×
ColorFlow data set, generated by measuring a Color Characterization chart	×	×	×
ColorFlow data set, generated by measuring a Tonal Characterization chart	×		
ColorFlow data set, generated by importing CIELAB colorimetric data		×	×
ColorFlow data set, generated by importing spetral colormetric data	x	x	x

× indicates that a method is available.

23 Glossary

Glossary

black generation strategy

A method of determining how much black ink—versus a combination of cyan, magenta, and yellow—is used to generate a particular color.

black strength

A value that specifies the black quantity in the replacement zones.

calibration

The act of setting equipment or software to produce desired results. The purpose of color calibration is to achieve a consistent level of color quality.

calibration curve

A curve that the workflow system applies to job image data en route to a halftone output device. The calibration curve is created by combining a device curve and a simulation or conversion curve.

See also:

device curve on page 274
simulation curve on page 278

characterize

To measure the color patches on a printed characterization chart with a spectrophotometer, to determine the average color reproduction of a device condition. Characterizing a device condition establishes a relationship between the output colors and the input values of a digital file.

See also:

color response on page 273

chart form

A portion of a ColorFlow-created characterization chart. It is a page in a Adobe PostScript file that will be printed on one surface (front or back) of a printing device. If the printable area of the print device is too small to contain the complete characterization chart, then the chart contains

multiple forms which must be printed in separate print runs. ColorFlow can generate charts for measuring the response of double-sided printing devices. In this case, front and back forms are generated, with the color patches on back forms being the mirror image of those on the front forms.

CMYK

A color representation scheme (or color space) in which cyan, magenta, yellow, and black are combined to create full-color images.

color cast

The predominance of a particular color that affects the whole image in the original, proof, or reproduction. A color cast is due to an excess of a color pigment or light. It is most obvious in gray and near-gray areas.

color characterization chart

A file that is created by ColorFlow that contains all color patches that are required to determine the color response of a printing device. It includes all necessary identification and branding information. A complete characterization chart may require more than one chart form.

See also:

characterize on page 271
chart form on page 271

color control element

A digital file that affects color reproduction in a prepress workflow system. Color control elements include plate linearization curves and print calibration curves, ICC device profiles, and ICC DeviceLink profiles.

color gamut

The range of possible colors that can be represented in a given circumstance, such as within a given color space or by a certain output device.

color input

The device condition in the color setup that describes the color space of the input files.

See also:

color setup on page 273
conversion method on page 273
device condition on page 274
primary color output (PCO) on page 277

color management

A process that aims to control the representation of colors across a variety of output devices so that the colors that are generated appear consistent. Color management is based on the coordination of three processes: device calibration, device characterization, and conversion from one color space to another.

color response

The relationship between the input values of a digital file and the actual color produced on an output device, for example, the color on a press. It could be the observed behavior of a real output device, or part of an industry printing specification such as GRACoL C1.

See also:

device condition on page 274

color setup

A collection of several device conditions and the color control elements (curves, device profiles, DeviceLink profiles) that are required to align to a common target on all the reproduction devices.

See also:

device condition on page 274
primary color output (PCO) on page 277
secondary color output (SCO) on page 278
simulation target on page 279

conversion method

The way in which input color content is converted from an input device condition to the PCO, or output color content is converted from the PCO to a SCO device condition. Methods include tone value increase and gray balance curve methods (for SCOs only), and full color management DeviceLinks.

curve

A graphical representation of a set of numbered pairs. Types of curves include device curves, simulation curves, conversion curves, calibration curves, and plate setup curves.

density

A measurement of the ability of light to be absorbed by an ink and paper combination. A darker tone has a higher density than a lighter tone.

device

An individual occurrence of a physical device that reproduces an image. Devices have a type and a customer-specified name. Because the declaration of a device does not include its operating conditions—such as ink selection, type of screening, and paper—you cannot measure the color response of a device on its own. (In ICC terminology, the declaration of a device does include its operating conditions.)

See also:

device condition on page 274
device type on page 275

device condition

A combination of a device and the operating conditions in which the device captures or produces an image. A device condition has a known color response. Device conditions can be divided into groups such as print conditions (press and proofer devices), capture conditions (scanner and camera devices), and reference print conditions (industry specifications). A device condition can include more than one device, provided that all the devices are of the same device type, use the same consumables and operational settings, and can be calibrated to yield the same color response.

See also:

calibration on page 271
color response on page 273
device on page 274
print condition on page 277

device curve

A set of curves, one for each ink color, that is associated with a particular device in a device condition. The device curve corrects either tonal values or gray balance response differences between multiple devices in the device condition. The method applied depends on whether colorimetric or tonal measurement data is used, or gray balance response differences between multiple devices in the device condition such that each has the same apparent dot gain.

See also:

calibration curve on page 271

device-dependent color space

A color space defined by using information about the color capabilities of a specific device.

device-independent color space

A color space based on human perception of color, measured using a colorimeter or spectrophotometer. The color space is independent of the color capabilities of any specific device. An example is CIELAB. A device-independent color space may be used as an intermediate color space when converting from one color space to another, for example, from CMYK to RGB.

DeviceLink profile

A type of ICC profile that represents a one-way link or connection between devices. Its input has one channel for each colorant of the source or simulation device; its output has one channel for each colorant of the destination device. It does not represent any device model and cannot be embedded into images.

device profile

A type of ICC profile that represents the relationship between colorant tint values of a device and the resulting color. It has two sets of color mapping tables: one set maps device colorant tint values to the profile color space while the other set maps the profile color space to device colorant tint values.

See also:

rendering intent on page 278

device type

A classification of a device into one of several types that implies a set of capabilities and behavior. The list of device types is fixed.

See also:

device on page 274

dot gain

A printing effect which results in dots being printed larger than they should be. It occurs as a result of ink spreading on the printed page, and if not compensated for, can lead to an image appearing too dark.

effective dot area (EDA)

The area of the halftone dot as perceived by the human eye. It is comprised of the physical dot area and the optical dot area. Effective dot area is measured with a *densitometer*. Also referred to as *tonal value*.

frequency-modulated (FM) screening

A method of creating halftones where the spots are all the same size, but the frequency or number of dots changes in a given area. There are more dots in a dark area and fewer in a light area.

gray balance

The values for yellow, magenta, and cyan that produce a neutral gray with no dominant hue when printed at a normal density.

highlights

The whitest portions of the original or reproduction that have no color cast. The highlight dot is ranged in the reproduction from the smallest printable dot to approximately 25 percent.

See also:

midtones on page 277
shadows on page 278

ICC profile

A color space description that acts as a standard for accurate reproduction of colors across different platforms, devices, and applications.

linearization curve

A curve that achieves a linear response on a printing plate. It adjusts the tint values so that the measured dot area on the imaged plate is the same as the tint specified in the input digital file. That is, a tint patch specified as 50 percent in the digital file will measure a 50 percent dot area on the printing plate.

measurement data set

Data collected from a measurement device that describes the color response of a device that has known operating conditions.

measurement page

The portion of a chart form that can be measured by a measurement device. It contains color patches and a footer. The maximum size is limited by the intended measurement device, and by the uninterrupted printable area on the print device.

midtones

Tones in the range between highlights and shadows.

See also:

highlights on page 276
shadows on page 278

Preucil equation

A method of calculating wet trap. It quantifies how well a printed ink adheres to another ink, compared to how well that ink adheres to paper. This way of expressing apparent wet trap is defined only for the three basic process inks (CMY). The equation is named after Frank Preucil (1905–1996) who pioneered the use of color reflection densitometry to control and evaluate process color printing in lithography.

primary color output (PCO)

The device condition in the color setup that is chosen to be the main color output. The PCO can include curves and/or a DeviceLink to be used with the device condition to make it simulate a selected target.

See also:

color setup on page 273
device condition on page 274
secondary color output (SCO) on page 278
simulation method on page 279
simulation target on page 279

print characteristic

The graphical relationship between the tint values specified in a digital file and the effective dot area or tonal values on a press sheet.

print condition

The operating conditions associated with printed output from a device. For output from a printing press, these usually include (as a minimum) printing process, substrate type, printing ink, and screening. A print condition is one of the several types of device condition.

See also:

device condition on page 274

process colors

A set of ink colors used in overprinted combinations to print graphic design elements. A process color set can be the common CMYK set or an extended color set such as CMYKOG.

profile connection space

The color space used to describe color in an ICC profile. CIELAB is often used because it has reasonable perceptual uniformity.

reference print condition

An industry printing specification such as GRACoL C1 or FOGRA 39 for which characterization data and printing aim points are published. A reference print condition is one of the several types of device condition.

See also:

device condition on page 274

rendering intent

The compression method—a mathematical algorithm—used when mapping and translating colors from one color gamut to another. It allows for compression of out-of-gamut colors into the color capability of the press used.

secondary color output (SCO)

The name given to all other output device conditions in the color setup —other than the one used in the PCO. Each SCO extends its device condition with a method by which it matches the target of the PCO.

See also:

color setup on page 273
conversion method on page 273
device condition on page 274
primary color output (PCO) on page 277

shadows

The darkest part of an image (original and reproduction). A shadow has densities near the maximum. In a reproduction, shadows are printed with dot areas between 80 percent and 100 percent.

sheet selection

The process of choosing the printed sheets from a print run that are deemed to best represent the color response of a print condition.

simulation curve

A set of curves, one for each ink color, that is associated with a color output. The simulation curve modifies the color response of the associated device condition in accordance with the desired simulation.

See also:

calibration curve on page 271

simulation method

The way in which the PCO extends its device condition to achieve a target. Methods include tone value increase, color and gray balance, and full color management DeviceLinks.

See also:

primary color output (PCO) on page 277
simulation target on page 279

simulation target

The color response that you want to achieve in the PCO.

See also:

primary color output (PCO) on page 277
reference print condition on page 278
simulation method on page 279

spot color

A special ink color, not included in the process color set, that is used to specify the color of a graphic design element.

substrate

Any printing surface to which ink will adhere. Also referred to as *stock*.

three-quartertone

Tone area of an image that has density values between the midtone and the dark point. Three-quartertone is typically printed with a dot area near 75 percent.

TIFF

Acronym for Tagged Image File Format. TIFF is a file format used to describe, store, and exchange bitmap images. TIFF is cross-platform, highly flexible, and capable of saving a wide variety of image types, including photographs and illustrations. Most page makeup and image editing software supports TIFF.

tint

The percentage value assigned to a dot.

tone value increase

The difference between the tint specified in the digital file and the tone values on the output. Tone value increase is the total of all increases in tone values that can happen at various stages of the print reproduction process.

total ink limit

An upper limit placed on the sum, at a given point on a printed image, of the tint values of all device colorants. Its purpose is to prevent excessive ink buildup. Typical values range from 260 percent for coldset web printing on newsprint, to 400 percent for ink jet printing devices on high-quality substrates.

Index

A

C

D

E

F

G

H

I

K

L

M

N

O

P

Q

R

S

T

U

V

W

Eastman Kodak Company
343 State Street
Rochester, NY 14650 U.S.A.

To learn more about solutions from Kodak, visit http://graphics.kodak.com.

Subject to technical change without notice.