

The Kodak logo is positioned on the left side of the slide, above a horizontal yellow line. It consists of the word "Kodak" in a bold, red, sans-serif font. The background of the slide features a vibrant, multi-colored wave graphic that flows from the left towards the right, with colors transitioning from red and orange at the bottom to yellow, green, and blue at the top. A thin vertical yellow line runs down the left side of the slide, intersecting the horizontal line.

**Kodak**

# Introduction

Kodak ColorFlow Software Training

# Color – It's what we do

You are in the business of managing printed color.

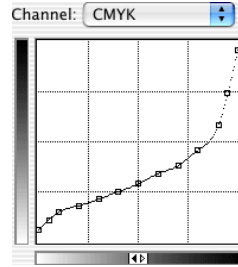
Today, there are many tools, procedures, and processes for setting up color within the production environment.



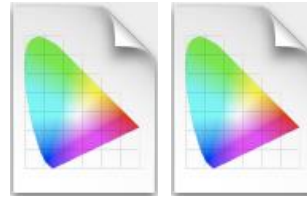
# The Color Challenge



ICC Profiles



Curves



DeviceLink

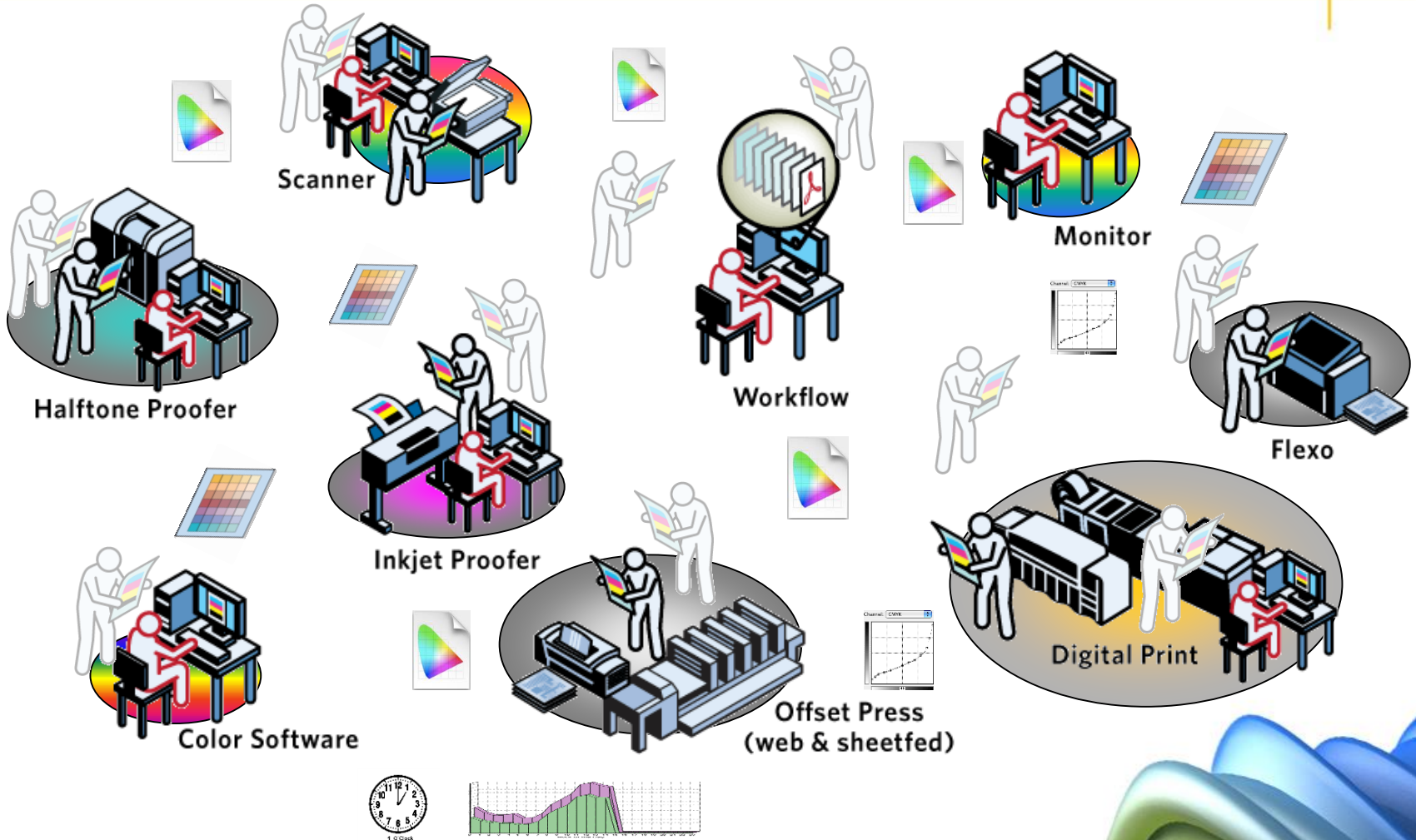


Spot recipes

Many color elements are needed to make "that" look like "this".



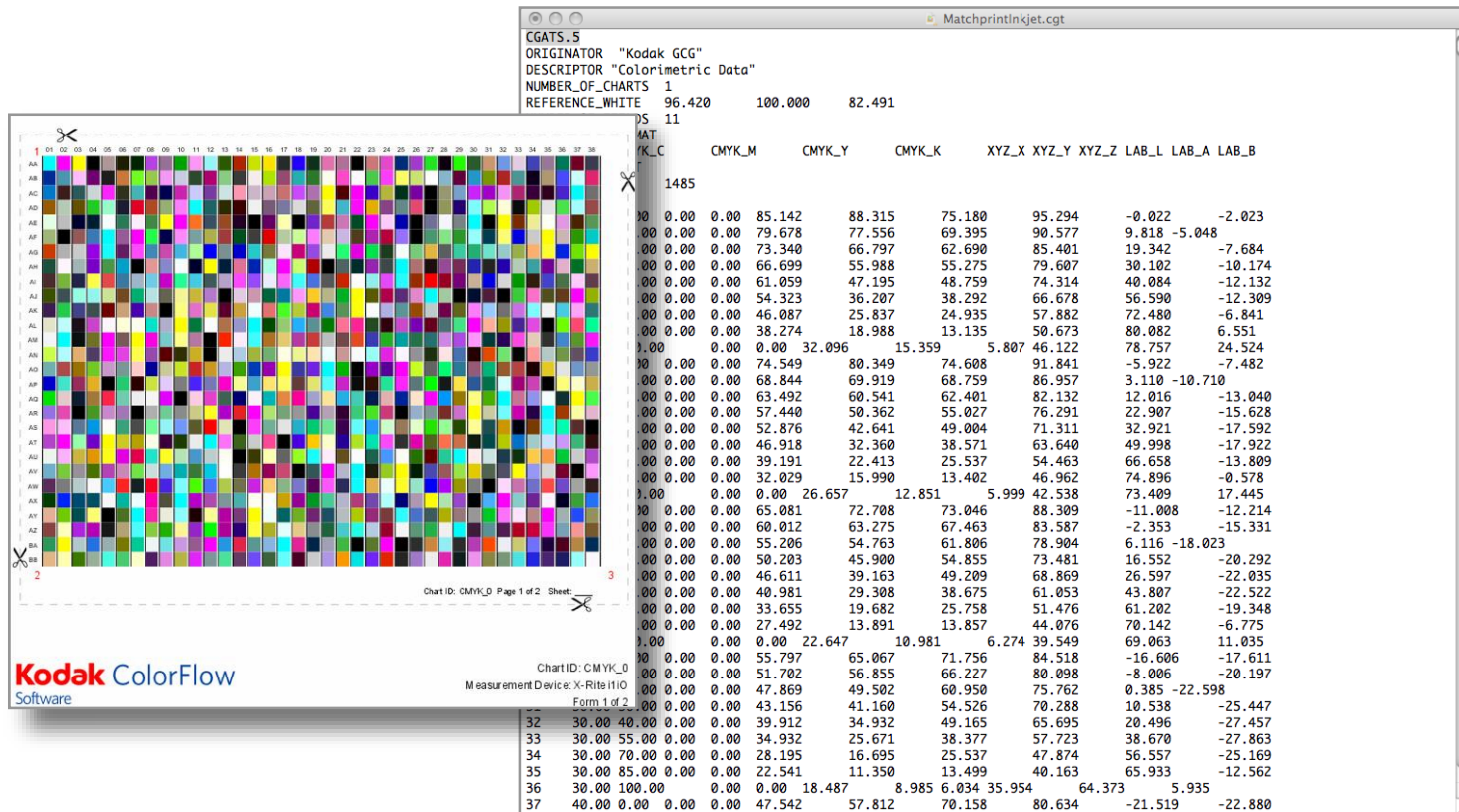
# Independent Color Systems



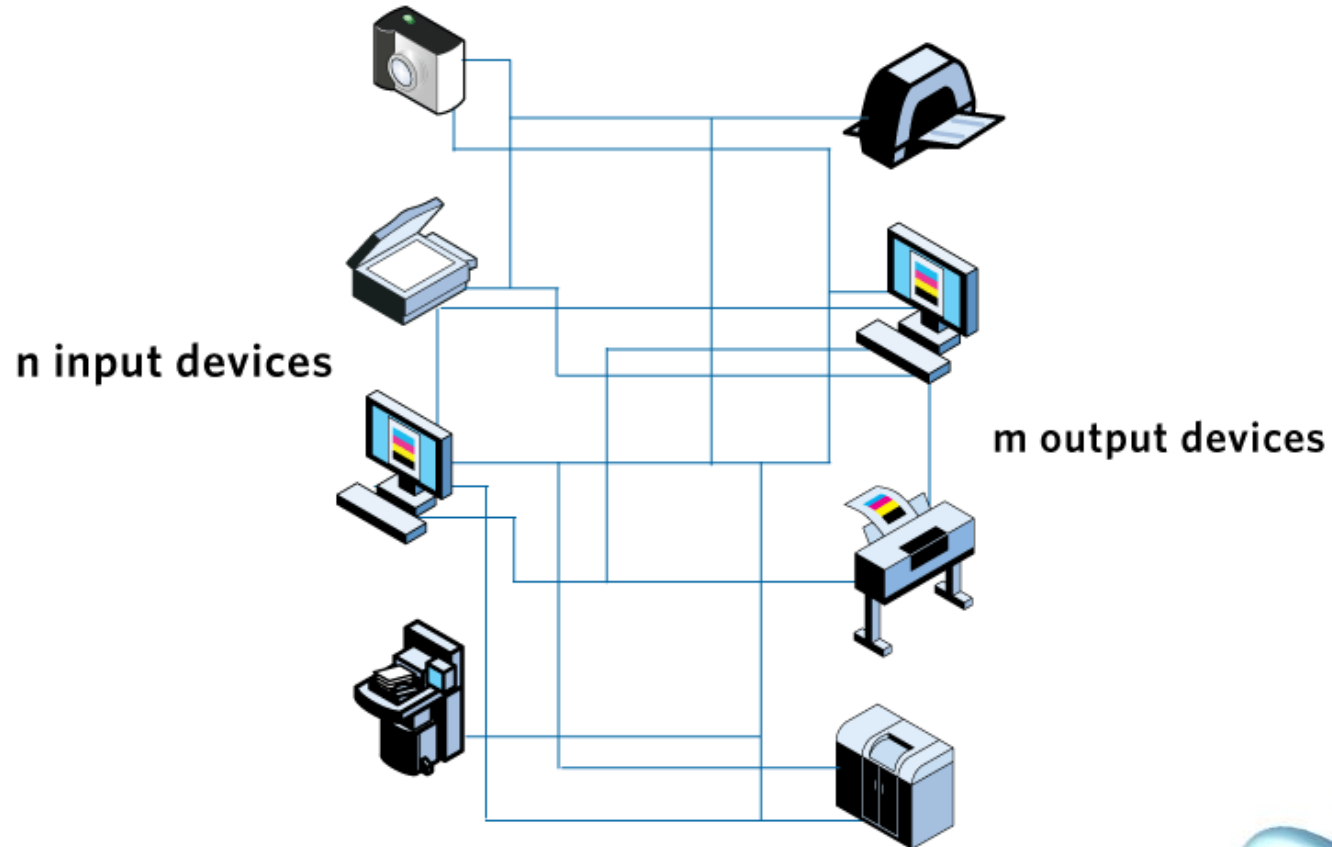
- Color changes when normal production variables occur.
- Resources and time are required.
- There are many color elements across devices.



# Color by the numbers



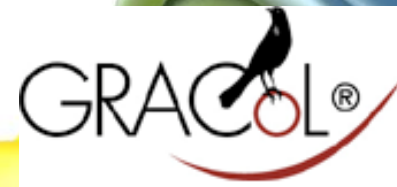
# Complex Conversions



Many input-to-output device conversions

# Why Using ColorFlow?

- Integration with Prinergy Workflow: simplifies production and increases automation
- One application for tonal calibration and color relationship management
- Automatic updates when color adjustments are made
- Do more: evolve from simple tonal calibration to grey-balance calibration (i.e. G7)
- Edit by the numbers using lab dot gain or optional Visual color editing for accurate on-screen color when editing profiles and curves
- Comprehensive print condition reporting tools
- Fully endorses ISO printing system standardization recommendations, and supports international data exchange formats and job control specifications



# Editions of ColorFlow Software

## **ColorFlow software, Workflow edition**

- Generate and edit curves
- Import ICC device profiles and ICC DeviceLinks
- Free with Prinergy Workflow

## **ColorFlow software, Pro Workflow edition**

- Chargeable upgrade for Prinergy Workflow
- All the functionalities of the Workflow edition
- Generate and edit ICC device profiles and ICC DeviceLinks
- Includes ColorMatch on Output for Prinergy
- An optional licensed Ink Optimizing Solution feature





# Ink Optimizing Solution

- A licensed feature to generate DeviceLinks
- Use Gray Component Replacement to reparate images and replace chromatic colors with black
- Improves print stability on press and reduces ink consumption



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# Overview

Kodak ColorFlow Software Training

# Devices and Device Types

A **Device** in ColorFlow Software is any physical device in your environment that captures or produces an image. Devices are identified by:

- A name that you choose (such as Speedmaster 102 or Epson)
- A type (for example, Sheetfed or Inkjet). The type allows ColorFlow Software to associate it with similar devices.

A **Device Type** differentiates devices into categories to allow for easier device management:

- Curved devices include offset press and halftone proofers.
- Non-curved devices include digital presses and inkjet proofers.



# Device Condition

A **Device Condition** is an important concept in ColorFlow Software. It is a combination of:

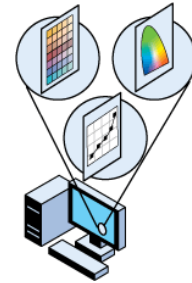
- A device
- The operating conditions in which the device captures or produces an image
- A Device Condition has a measurable color response.
- A device can have multiple Device Conditions, depending on screening, substrate, or other variables that affect the color response.
- Devices of the same device type can share the same Device Condition.



# Color Control Objects

Color is intrinsically controlled by two objects in the graphics workflow: Curves and ICC Profiles

- **Curves** can be separated from Profile to make tonal adjustments
- **Profiles** were implemented to achieve a higher degree of color fidelity, beyond the scope of a set of 1D curves





# Curves

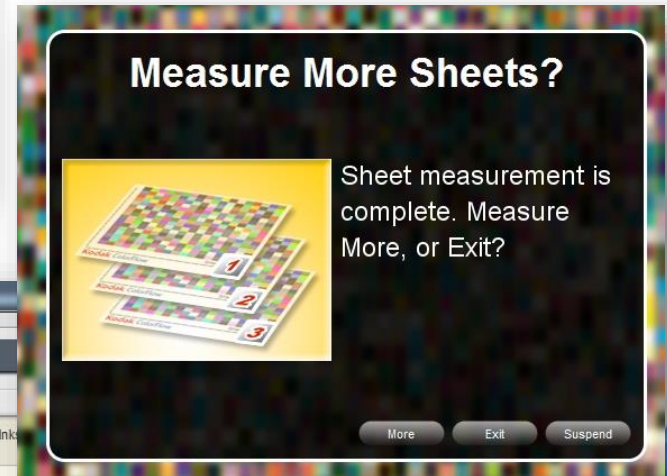
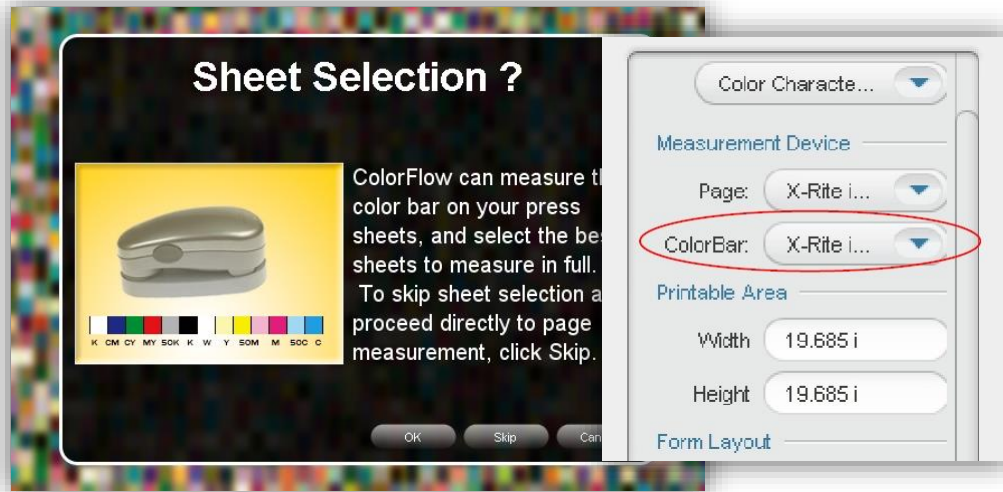
Applying calibration curves is a standard method of controlling color on curve-controlled devices:

- **Plate calibration curves:** create a plate calibration curve to linearize a plate
- **Print calibration curves:** create print calibration curve to make the response of a curve output device condition match the response of a target device condition
- **Print transfer curves:** create print transfer curve to control the response without measuring a response and defining a target



# Measurements

- Can select the best sheets to measure in full and measure multiple sheets to capture the most accurate data



Device Measurements - Offset Press A in [200 L, Type 1 or 2 (coated art) 170 g/m2, Offset Press - Sheetfed, CMYK]

Charts Measurements

Active Measurement

Process Inks Response Origin	Measurement Condition	Process Inks Response T	Sheet Number	Print Curve	Form Number	Date Created	Spot Inks	Spot Inks Response T	Process Inks Mindot
Measured chart: Minimum Full CMY... M2									
		Tonal And C...		Linear ...		Oct 19, 2015 1:24:0...			
			1		1	Oct 19, 2015 1:00:4...			
			2		1	Oct 19, 2015 1:05:2...			
			3		1	Oct 19, 2015 1:23:1...			

Buttons: Import... View... Estimate... Import Multiple... Promote Device... Report... Export...

Inactive Measurements

# Gray Balance Curves

- Gray balance curves using unique algorithms for a balanced color match: better color, faster

Simulation Definition

Output Version: Primary Color Output

Simulation Name: 200 L, Type 1 or 2 (coated art) 170 g/m2, CMYK

Show curves in Prinerary

Default Name

**Process Inks** | **Spot Inks**

Target: GRACoL 2006 Coated 1

**Curves Method:** Gray Balance

Generated Curves:

- Align the CMY neutral response of the Primary Color Output to that of the Target
- Match tonality for other color channels

DeviceLink Method: None

A DeviceLink is not used

Calibration Curves - Primary Color Output - Offset Press A

Print Curve Name: Type 1 or 2 (coated art) 170 g/m2, CMYK - Primary Color Output - Offset Press A

Show Simulation Curves only

Include Device Curves

Device: Offset Press A

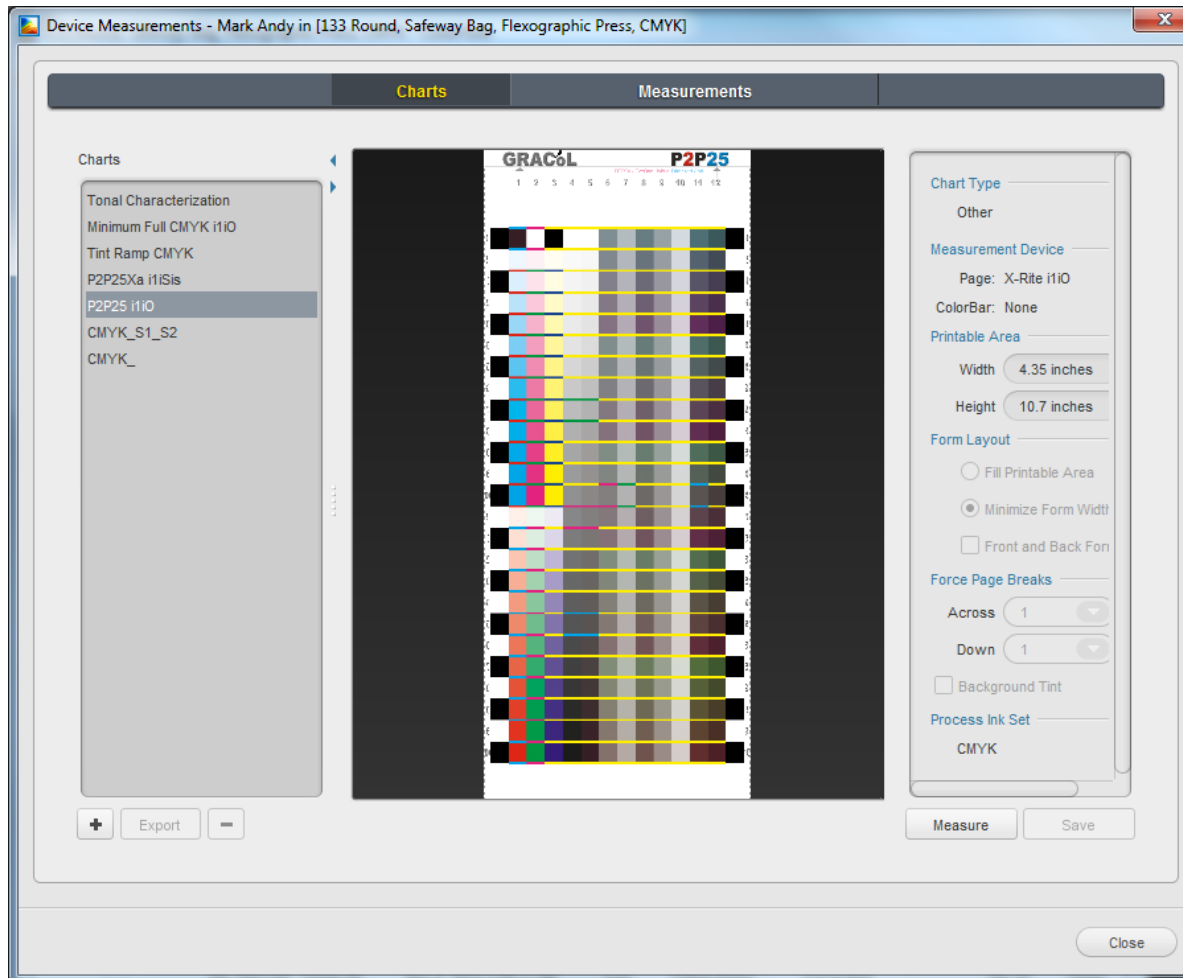
Enable Editing

Tint In	Tint Out
0.0	0.0
5.0	3.6
10.0	7.6
15.0	11.7
20.0	15.8
25.0	20.2
30.0	24.9
35.0	29.9
40.0	34.7
45.0	39.3
50.0	43.7
55.0	48.4
60.0	53.3
65.0	58.4
70.0	63.8
75.0	69.5
80.0	75.5
85.0	81.7
90.0	88.0
95.0	94.2
100.0	100.0

Preview... Apply Close

# G7 Gray Balance Calibration

- Native support for P2P25 chart (G7 methodology)



# Flexographic Support

- Flexographic press device type
- Mindot Bump / Cutoff curve support

The screenshot displays the 'Device Curves Definition - flexo' software interface. The 'Mindot Bump / Cutoff' section is active, showing settings for 'Process Inks (CMYK)'. The 'Tint In' is set to 0.39, and the 'Minimum Tint Out' is set to 7.0. The 'Highlight Contrast' is set to 70%. A 'Snap Tint In to 8-bit values' checkbox is checked. The 'Device Curve Selection for Prinergy' section has the 'Use Current State for Approved Snapshot' checkbox checked.

The 'Device Curves - [flexo] in [200L, Plastic, Flexographic Press, CMYK]' window is open, showing a 'Tint In' vs 'Tint Out' graph. The graph shows a linear relationship between Tint In and Tint Out, with a slight bump at the beginning. The 'Curve Values' table is as follows:

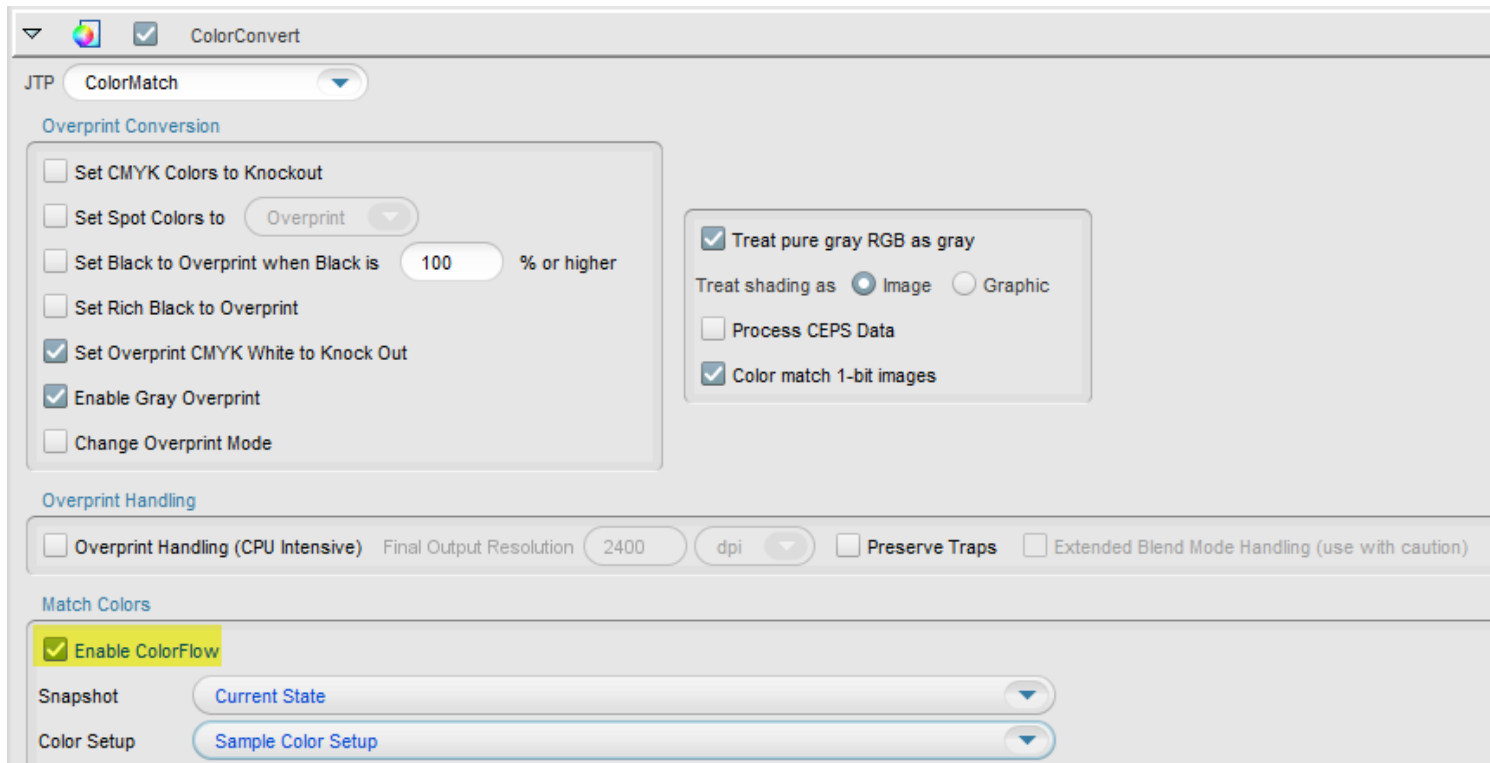
Tint In	Tint Out
0.0	0.0
0.39	7.00
5.0	10.3
10.0	14.0
15.0	18.0
20.0	22.0
25.0	26.3
30.0	30.7
35.0	35.3
40.0	40.1
45.0	45.0
50.0	50.0
55.0	55.0
60.0	60.0
65.0	65.0
70.0	70.0
75.0	75.0
80.0	80.0
85.0	85.0
90.0	90.0
95.0	95.0
100.0	100.0

The graph shows a linear relationship between Tint In and Tint Out, with a slight bump at the beginning. The 'Tint In' and 'Tint Out' axes range from 0 to 100. The 'Tint In' axis is labeled 'Tint In' and the 'Tint Out' axis is labeled 'Tint Out'. The 'Enable Editing' checkbox is checked.



# Using Prinergy with ColorFlow

- Can simply turn ColorFlow on or off in Process Templates



# Using Prinergy with ColorFlow (Continued)

- Tonal Calibration can be separated from Color Relationship Management

The image displays two screenshots of the Prinergy software interface, illustrating the separation of Tonal Calibration from Color Relationship Management.

**Left Screenshot:** Shows the 'Calibration & Screening' section. The 'Curve Source' is set to 'ColorFlow Current State'. A red box highlights the 'ColorFlow value' dropdown for 'Print Curve' and 'Plate Curve', with a red arrow pointing to the right screenshot. A red circle with the number '1' is next to the text 'Previously ColorSetup controlled CF curves'.

**Right Screenshot:** Shows the same 'Calibration & Screening' section. The 'Curve Source' is now set to 'ColorFlow Approved Snapshot'. The 'Print Curve' is set to 'HD SM102 - Gracol C1' and the 'Plate Curve' is set to 'Kodak Electra Excel, 150 Round, Offset Press - Sheetfed, BS Harmony'. A red box highlights these dropdowns, with a red circle containing the number '2' and the text 'Now freely choose Calibration Curve Source'.

# ColorFlow Feature Comparison with Harmony

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Features	Harmony	ColorFlow 7.5 Workflow Edition
Plate Curves	Y	Y
Tonal Match Calibration Curves	Y	Y
Spot Color Curves	Y	Y
Gray Balance Curves	N	Y
Flexographic Print Support: Mindot Bump/Cutoff Curves	N	Y
Visual color editing allows accurate on-screen color	N	Y
Comprehensive print condition reporting tools	N	Y
Color Relationship Management	N	Y
Tonal Control Adjustment - ability to make on-the-fly tonal adjustments	N	Y
Averaging - ability to measure multiple sheets for most accurate results	N	Y
Measurements - Best sheets selection	N	Y
History - view curves adjustments made and being made to the element	N	Y



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# Demo

Kodak ColorFlow Software Training

# Create a Plate Calibration Curve

- Enter the measured Dot Area values for each Tint In value
- View curve graphs in Tint out or Tint change view

**Plate Curves**

Calibration Curves

Show all  
 Show Device Type: Offset Press - Sheetfed

Sho...	Name	Date Modified	Device Type	Plate Type	Screening	Plate Line
<input checked="" type="checkbox"/>	Kodak Electra Excel, 20 Staccato, ...	Oct 17, 2015 5...	Offset Press - Sheetfed	Kodak Electra Excel	20 Staccato	- 5

**Color Setup**

Plate Curve Name: Default Name  
Kodak Electra Excel, 20 Staccato, Offset Press - Sheetfed

Use Current State for Approved Snapshot  
 Show curve in Prinegy

Plate Setup Properties

Device Type: Offset Press - Sheetfed  
Plate Type: Kodak Electra Excel  
Screening: 20 Staccato

Measured Plate Response

Plate Line: - 5

Tint In	Dot Area
5.0	
10.0	
20.0	
30.0	
40.0	
50.0	55.0
60.0	
70.0	
80.0	
90.0	
95.0	

**Curve Values**

Tint In	Tint Out
0.0	0.0
5.0	4.3
10.0	8.7
15.0	13.1
20.0	17.5
25.0	21.9
30.0	26.4
35.0	31.0
40.0	35.6
45.0	40.3
50.0	45.1
55.0	50.0
60.0	55.1
65.0	60.3
70.0	65.7
75.0	71.2
80.0	76.7
85.0	82.5
90.0	88.3
95.0	94.1
100.0	100.0

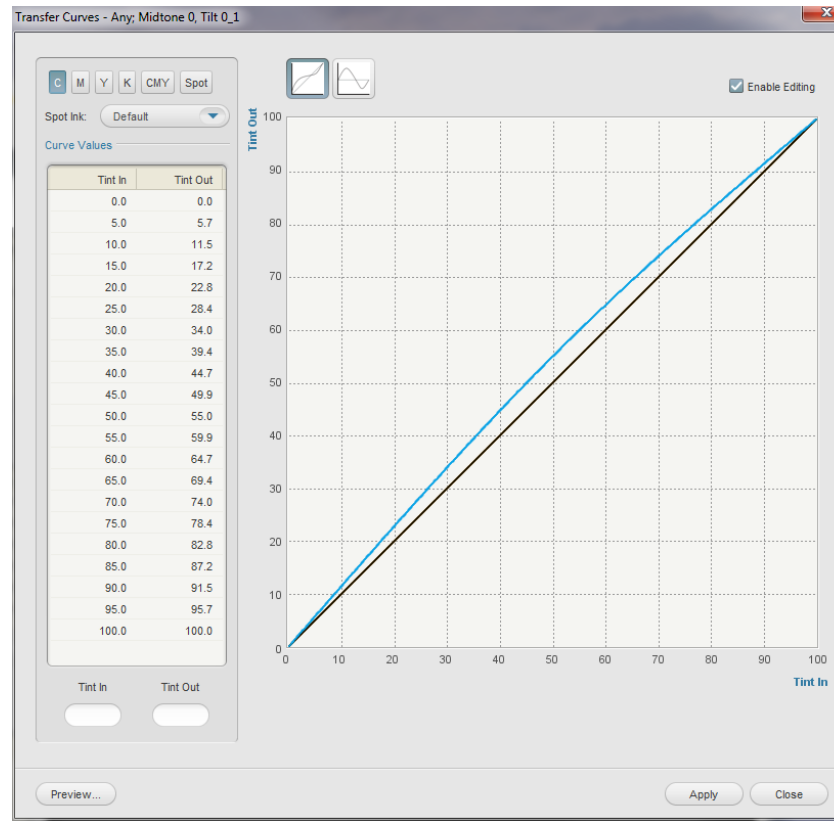
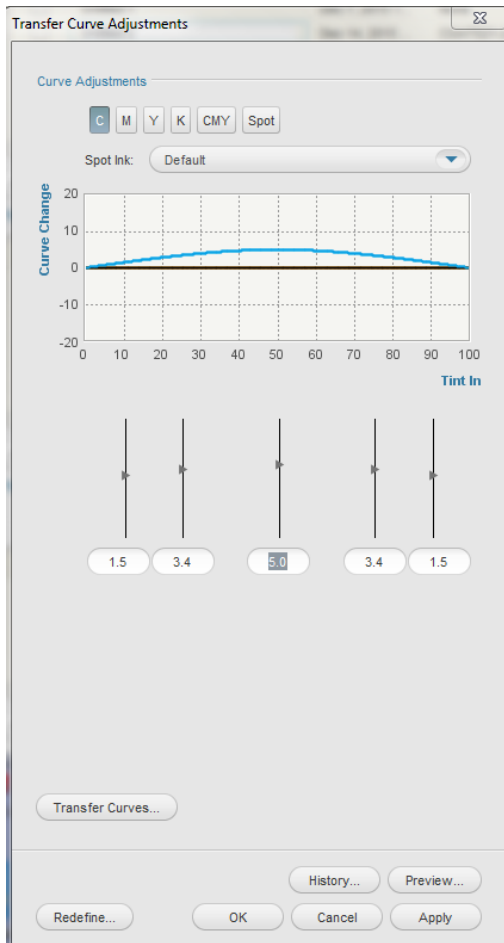
**Table of Measured Plate Response**

ID	Medium	Resolution	Ruling	D	
XL Euclidean 150 DERIVED, ...	0035	XL	2400	150	Ei
XL Euclidean 150 TRANSFE...	0055	XL	2400	150	Ei
XL Euclidean 175 DERIVED, ...	0036	XL	2400	175	Ei
XL Euclidean 175 TRANSFE...	0054	XL	2400	175	Ei



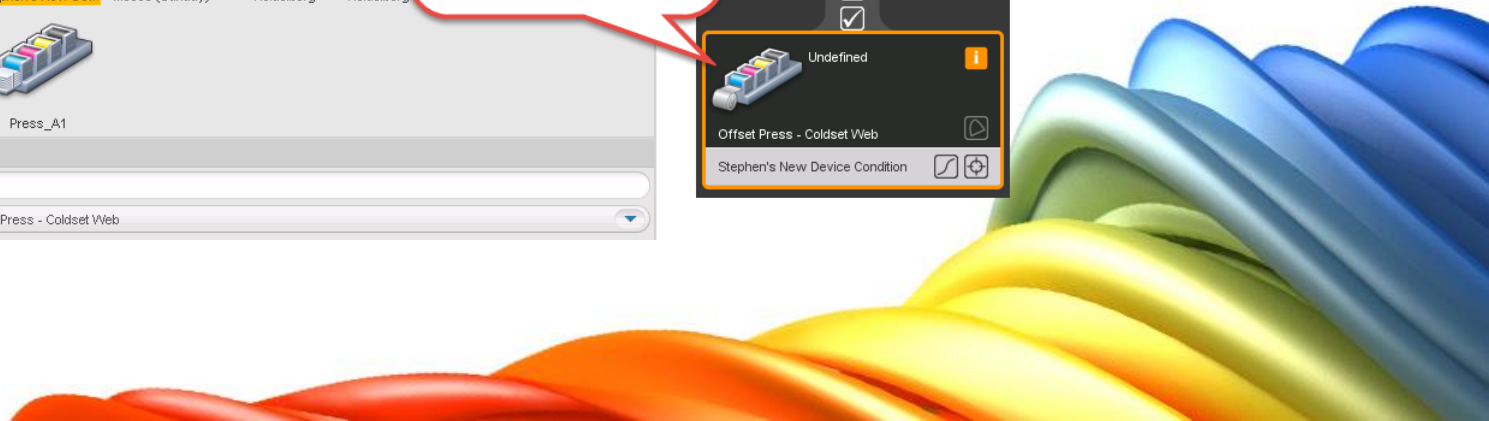
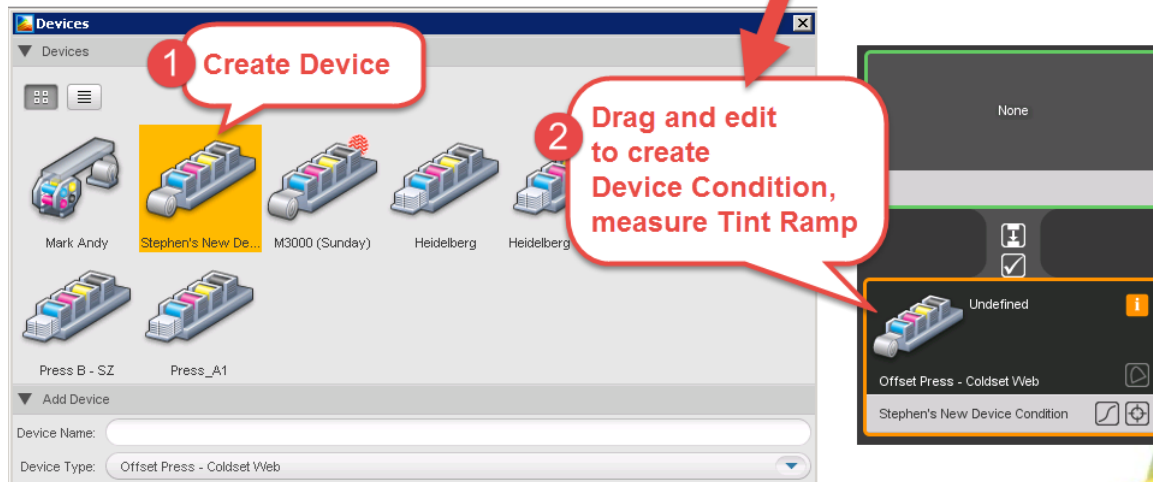
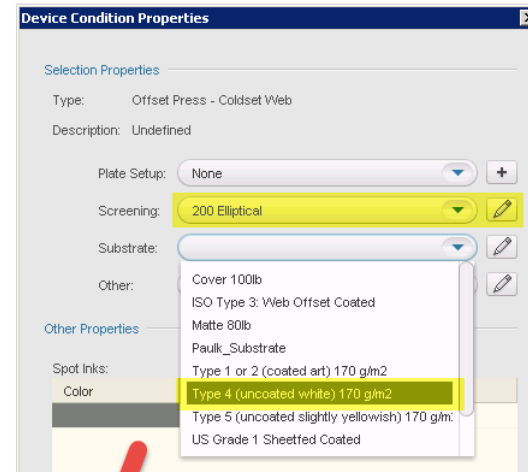
# Create a Print Transfer Curve

- Create a linear transfer curve as the start point
- Edit the transfer curve to get the desired output



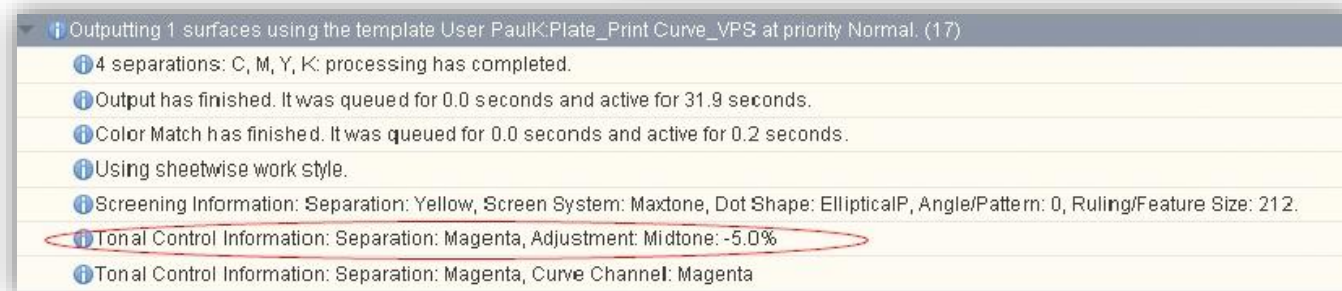
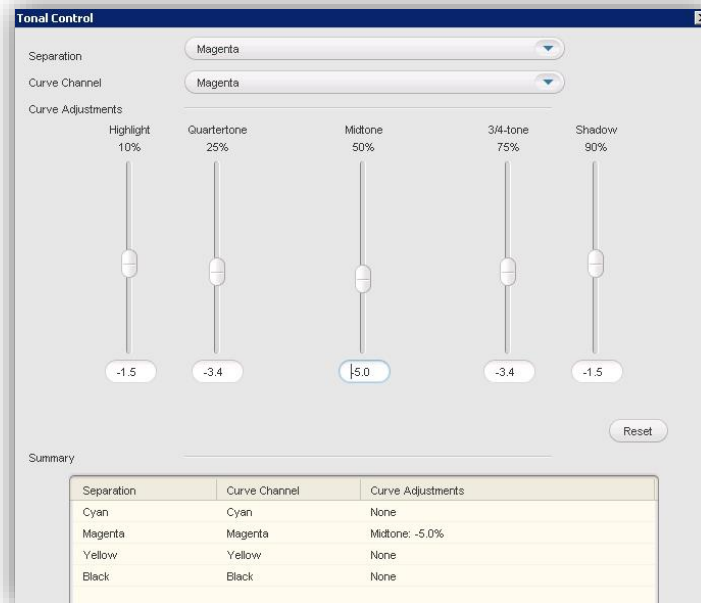
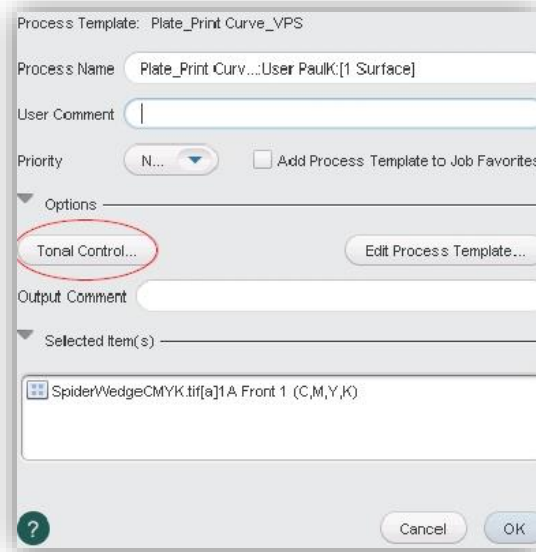
# Create a Print Calibration Curve

- Create a **Device Condition** based on a measured response (printed Tint Ramp)
- Define **Target** response based on an industry standard and choose **Curve Method**
  - **Tonal Match** or **Grey Balance**



# Make on-the-fly Tonal Adjustments

- Make an on-the-fly Tonal Match tonal adjustments in Prinergy, and track edit history made in the Tonal Control



# Add a Spot Ink to the Print Curve

- Add a custom spot ink that uses a unique curve to control its tonality

The screenshot shows a software interface with four main tabs: Plate Curves, Print Curves (selected), Device Conditions, and Color Setups. The Print Curves tab contains a list of curves and an 'Other Properties' dialog box.

**Print Curves List:**

Show in Prinerigy Print Curves	Name	ID	Medium	Resolution	Ruling	Dot Shape
<input checked="" type="checkbox"/>	PLATE XL Euclidean 150 TRANSFER, X...	0055	XL	2400	150	Euclidean
<input checked="" type="checkbox"/>	PLATE XL Euclidean 175 TRANSFER, X...	0054	XL	2400	175	Euclidean
<input type="checkbox"/>	PRINT Press A CS1 SWOP 175L, Coate...	0048	Coated Stock C1	2400	175	Round
<input checked="" type="checkbox"/>	PRINT Press B CS1 SWOP 175L, Coate...	0048	Coated Stock C1	2400	175	Round
<input checked="" type="checkbox"/>	PRINT SPOT Curve Pantone 123, C1 Pa...	0050	C1	2400	175	Round

**Other Properties Dialog:**

Spot Inks:

Color	Name ▲	Curve
	Default	Black
Yellow	Pantone 123	Custom

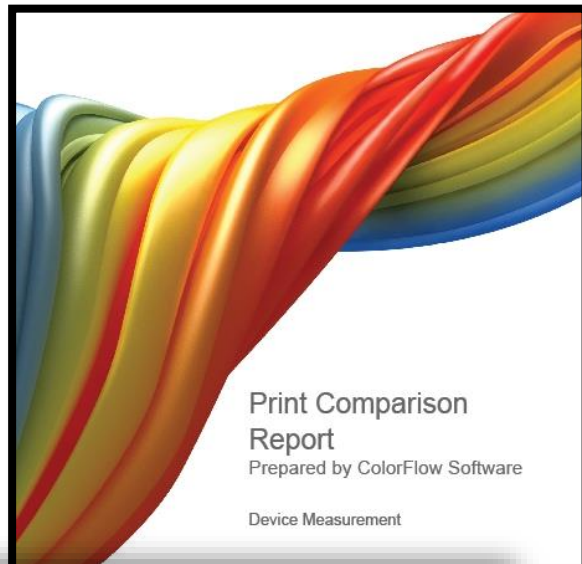
**Color Setups Panel:**

PRINT SPOT Curve  
Pantone 123, C1  
Pantone 123 Round...  
Harmony Curves



# Create ColorFlow Reports

- Reports are generated from the **Measurements** tab in PDF format



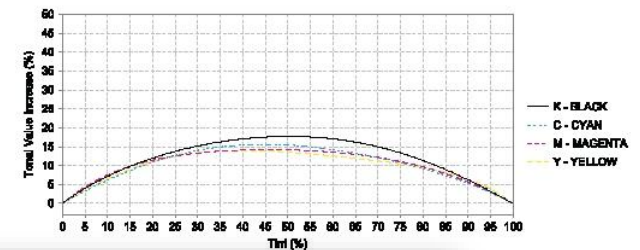
Print Comparison Report  
Prepared by ColorFlow Software  
Device Measurement

## 2.2 Measured Solid and Overprint Colors

The following table contains the CIELAB values of primaries (process KCMY), secondaries (two-color overprints) and selected color builds contained in the measurement chart.

Figure 2.2.1 Measured CIELAB colors of solid ink and traps

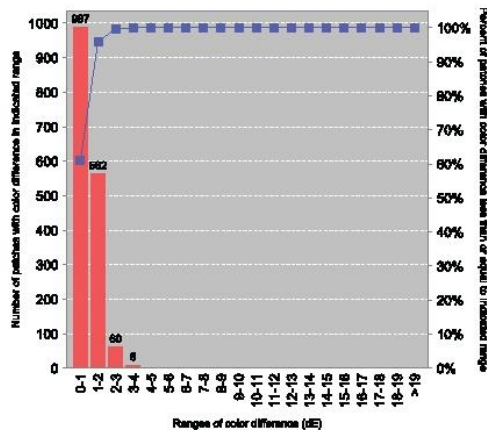
	dE	dH	Target		Measured			C	
			L*	a*	b*	L*	a*		b*
	0.6	0.2	95.0	0.0	-2.0	95.4	-0.2	-1.5	0
	0.8	0.2	55.0	-37.1	-50.0	55.1	-37.8	-50.4	100
	0.4	0.1	47.9	74.1	-3.0	48.1	74.4	-2.9	0
	0.7	0.2	88.9	-5.0	93.2	89.2	-5.2	92.6	0
	0.6	0.5	14.9	0.2	-0.1	14.9	-0.2	-0.7	0
	0.5	0.4	47.4	68.3	48.8	47.5	68.3	49.2	0
	1.0	0.8	50.1	-68.4	25.0	49.7	-67.8	25.5	100
	0.7	0.1	24.1	17.2	-46.1	23.7	17.4	-46.6	100



## 2.3 Color Difference Distribution and Cumulative Frequency

The following table contains the CIELAB values of primaries (process KCMY), secondaries (two-color overprints) and selected color builds contained in the measurement chart.

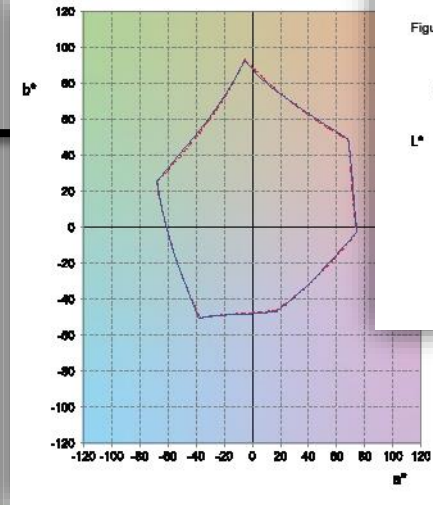
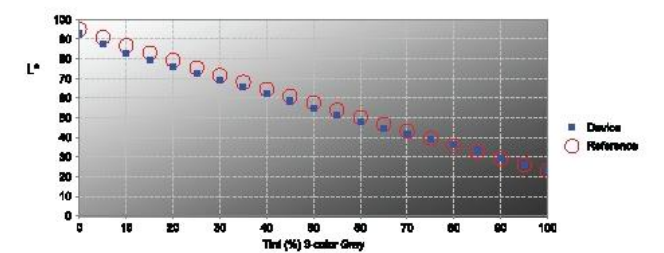
Figure 2.3.1 Color Difference (dE) distribution and cumulative frequency



## 4.5 Gray Balance, Complete tonal range

CIELAB values charted individually as a function of file tint values for three-color grays. Device L\* values higher than the Reference values indicate that neutrals are lighter than desired. Device a\* values higher than the Reference values indicate a magenta cast in the neutrals. Device b\* values higher than the Reference values indicate a yellow cast. Figure 4.5.4 provides CMYK tint values for the 3-color gray ramp.

Figure 4.5.1 Lightness through the tonal range







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# Curve Editing

Kodak ColorFlow Software Training



# Tonal Adjustment Tool

Kodak

## Key points:

- Simple curve tonal adjustments – works well for small “tweaks”
- Edits expressed in % change difference values
- Must use sliders or data entry
- Edits must be between -20% and +20% difference values
- Make midtone adjustments first, then other tone scale edits
- Individual curve and 3-color gray balance adjustment



# Tonal Adjustment Tool – Example

Print Curve – adjust offset press back to characterization state.

## Prior to Edit

## Post Edit

3-color gray bar at  
time of Characterization

3-color gray bar  
(3 months later)

3-color gray bar after  
device curve edit



*Original 3-color gray  
balance*

*Current Color  
Assessment: Press is too  
cyan and darker*

*Goal is to adjust  
device curves  
“Before” view to bring  
3-color gray back to  
original state.*

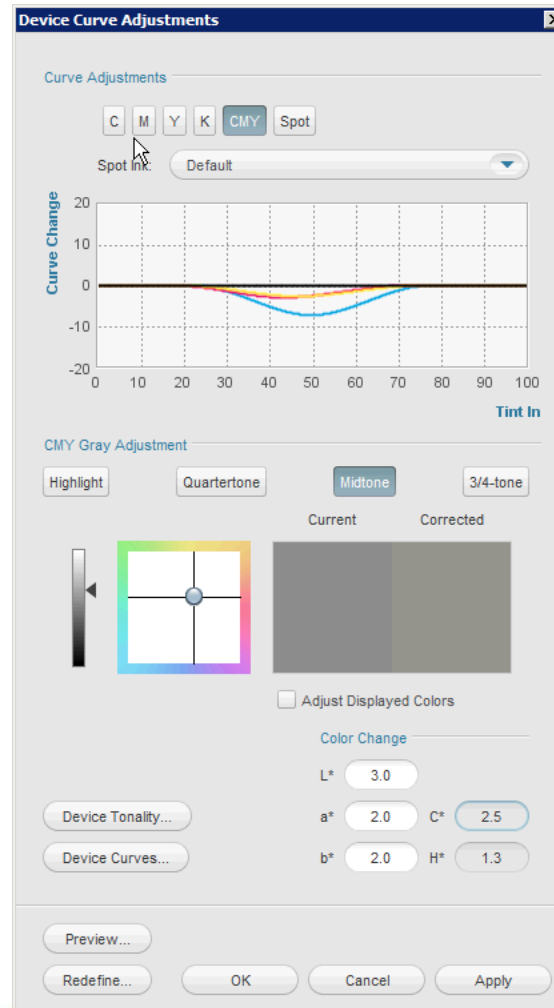
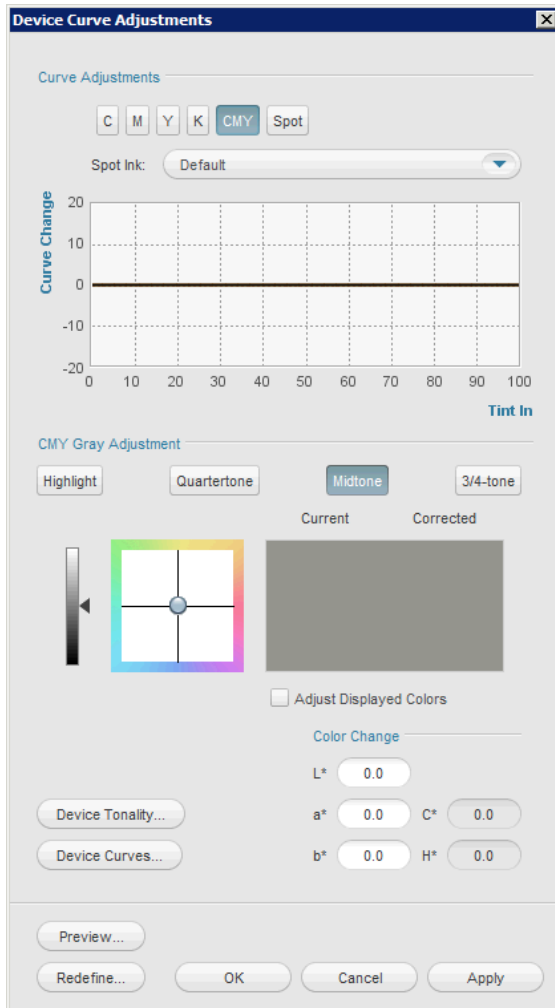


# Tonal Adjustment Tool – 3-color gray

Adjust “Before” view to match current color of press.

**Before:** 0% CMY change

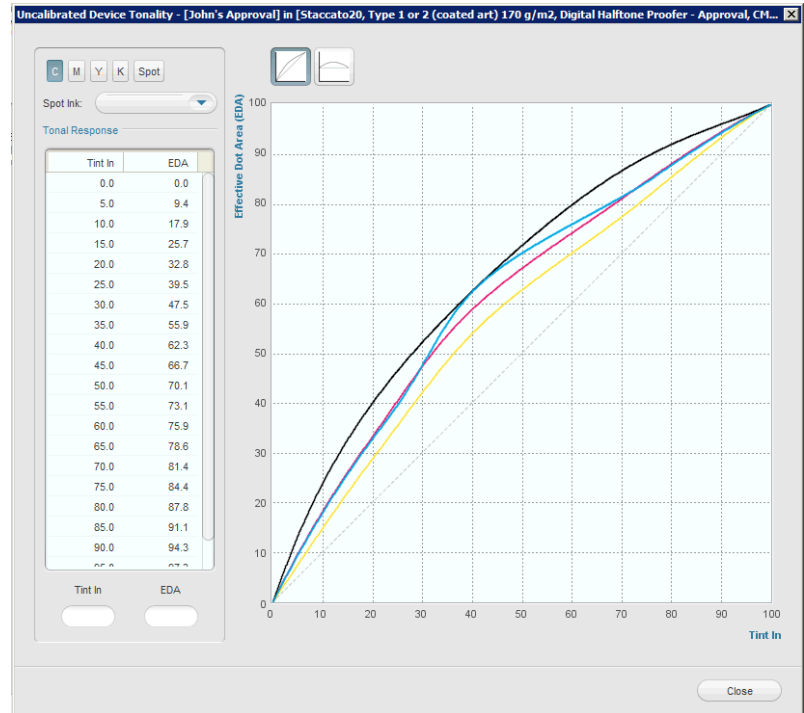
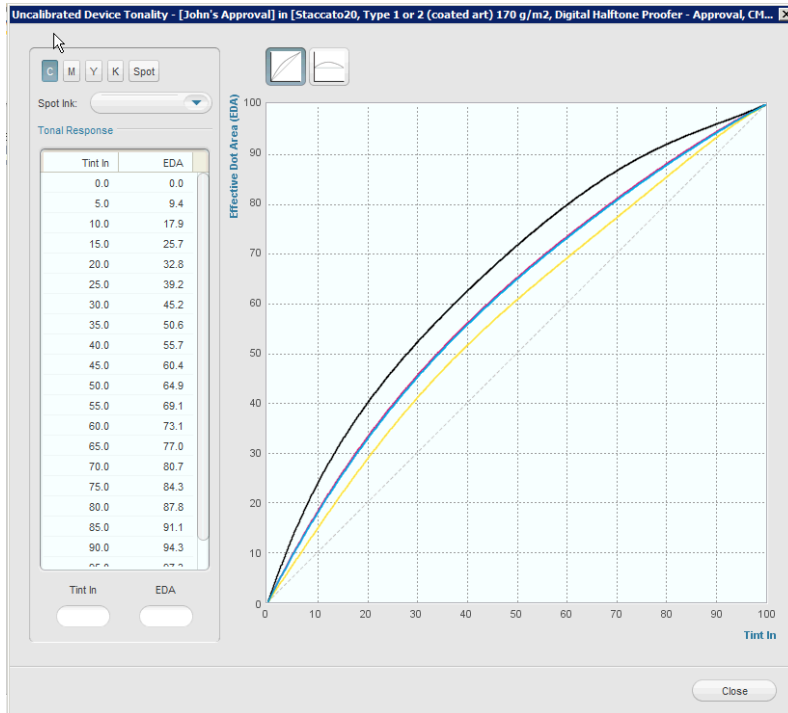
**After:**  $a^*+2$ ,  $b^*+2$ ,  $L^*+3$  @ midtone



# View Response 3-color gray (Uncalibrated Device Tonality)

**Before:** 0% CMY change

**After:**  $a^*+2$ ,  $b^*+2$ ,  $L^*+3$  @ midtone

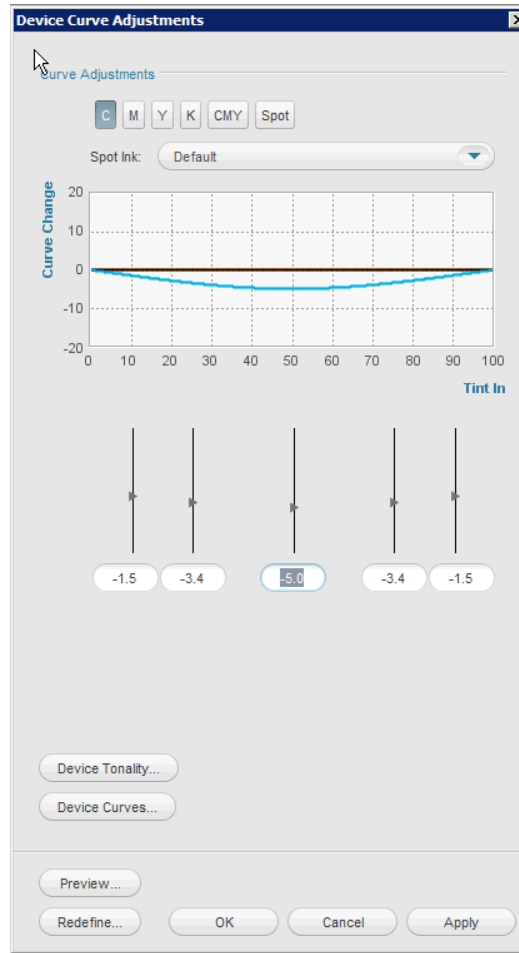
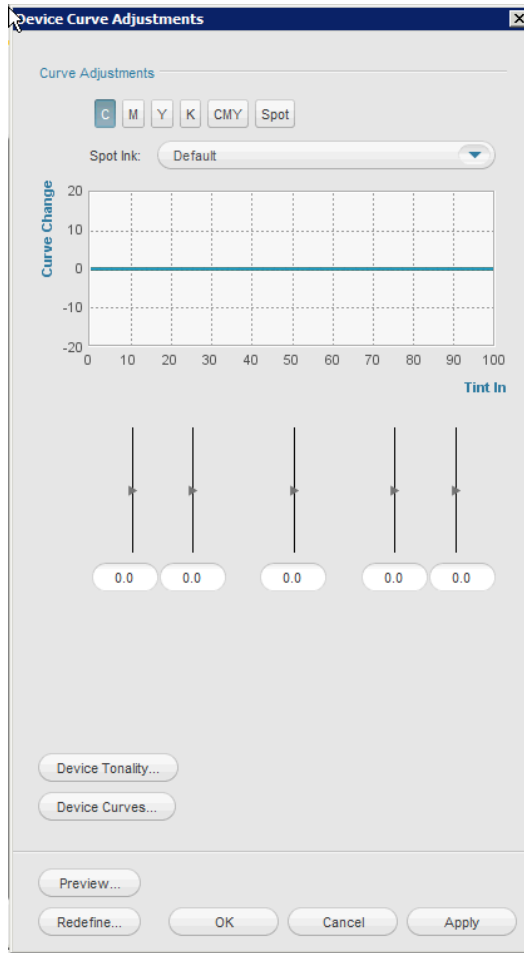




# Tonal Adjustment Tool – single channel

**Before:** 0% Cyan change

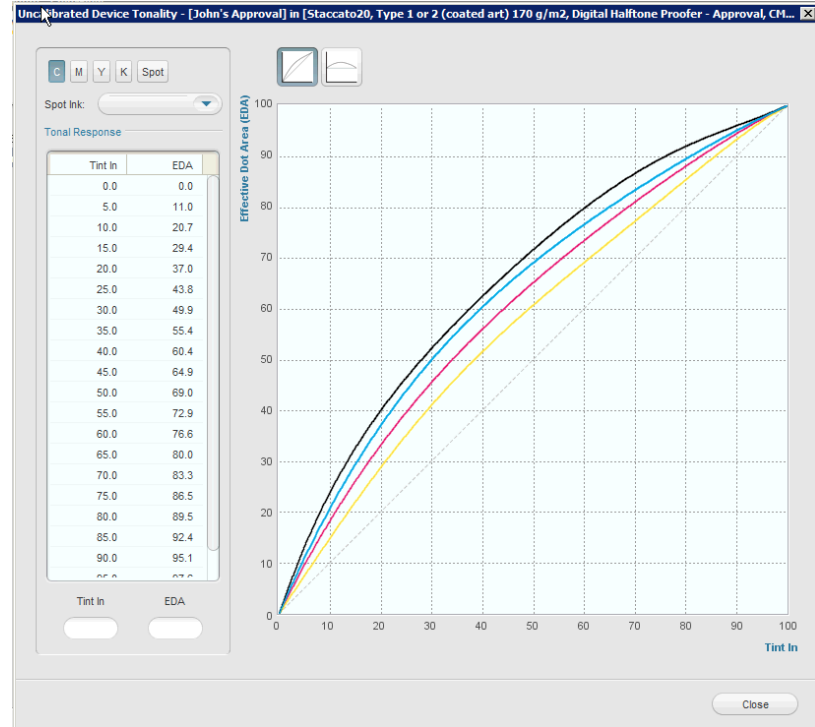
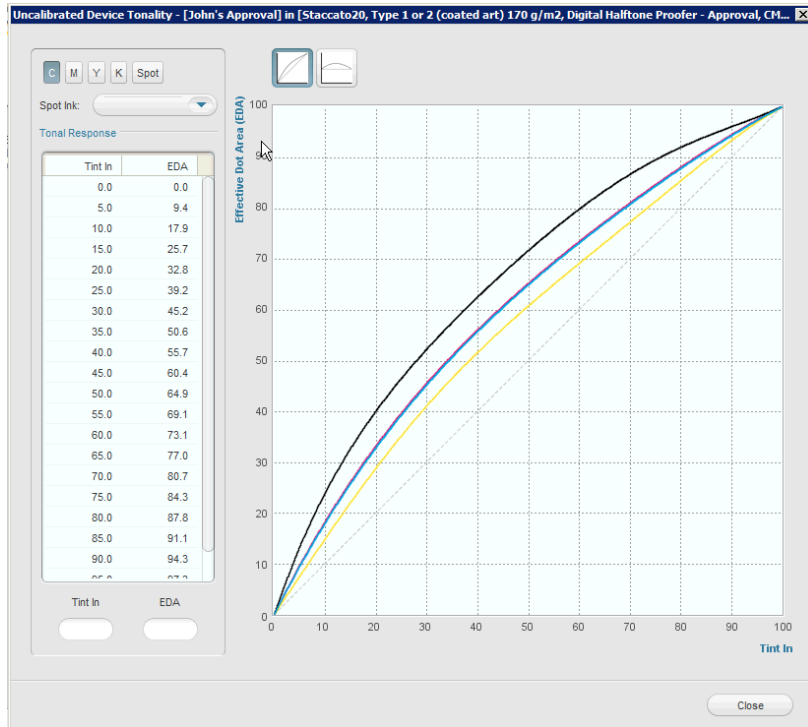
**After:** -5% Cyan @ midtone



# View Response single channel (Uncalibrated Device Tonality)

**Before:**  
0% Cyan change

**After:**  
-5% Cyan @ midtone = +5% Cyan response



# Image Preview – Tiled TIFF Format

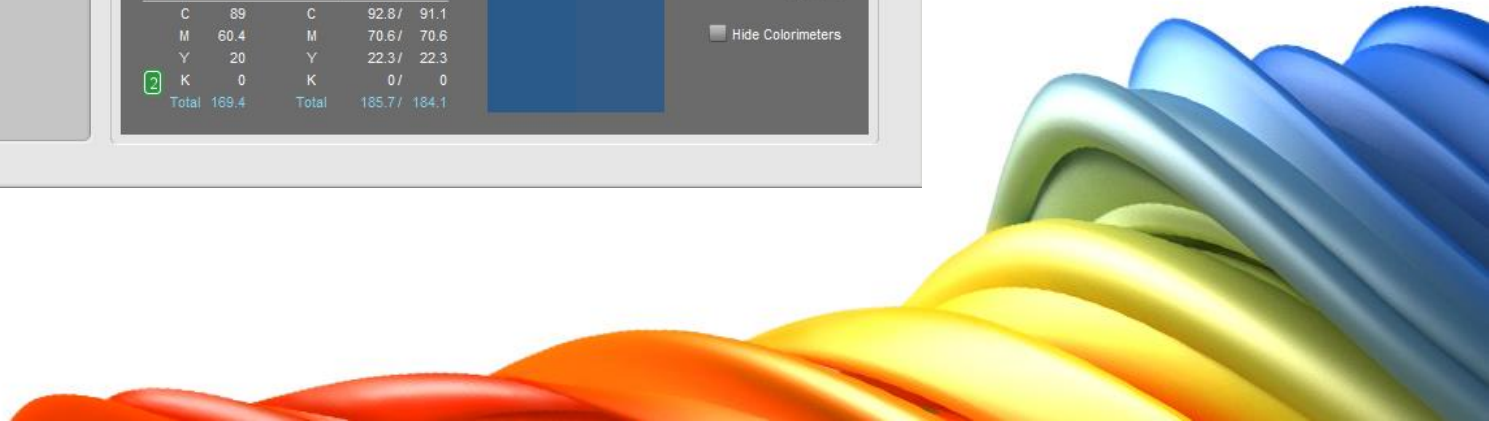
The screenshot shows the 'Image Preview' software window. The main image is a tiled TIFF of three musicians. The interface includes a zoom slider set to 22%, a 'Show Adjustment Range' checkbox, and two colorimetric data tables. The top table shows input and output values for CMYK and Total. The bottom table shows input and output values for CMYK and Total, with a 'Hide Colorimeters' checkbox.

Input	Output Before / After
C 77.6	C 83.9 / 80.8
M 67.8	M 77.8 / 77.8
Y 48.6	Y 57.5 / 57.5
K 20.4	K 17.3 / 17.3
Total 214.5	Total 236.5 / 233.4

Input	Output Before / After
C 89	C 92.8 / 91.1
M 60.4	M 70.6 / 70.6
Y 20	Y 22.3 / 22.3
K 0	K 0 / 0
Total 169.4	Total 185.7 / 184.1

**Best Practice:**  
Choose an image file or graphic design file that has a good cross-section of colors separated the way “live” content is separated.



# Questions...

Kodak





# Color Service Contact

Kodak



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A graphic consisting of a vertical yellow line on the left and a horizontal yellow line extending to the right, intersecting at the top-left corner of the word 'Kodak'.

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