A lesson on color management with ColorEdge®
Is that really the correct color?

“Is this color good to go?” — A hesitation we often have before making prints in the digital workflow.

**Concerns over color in the digital workflow**

In the print production digital workflow, where data and paper output are intertwined at each step, issues concerning color are a constant concern. This all originates from the lack of a dependable color reference that can be trusted as the correct color.

**Typical concerns in the digital workflow:**
- Is the photograph edited the way the photographer intended?
- What is a work space? What is a profile?
- Is it alright for each member, including our in-house designers and illustrators, to be working in different color environments?
- Will the final print match the color of the design comp produced on an inkjet printer?
- Image of the final product is always different between the production company, the client, and the printing company.
- The difference in color between the design comp and the color proof is shocking. We are always nervous.
- Color of the photograph is different from the real thing. Is it alright to print with this color?

**What is color management?**

Color management is the practice of processing data along a common color reference at each step of the digital workflow, including material production, design, plate making, and printing. If the color of the final deliverable can be expressed at each step of the process by adjusting the color of each device, the image of the completed product can be unified throughout the workflow. This enables more accurate and efficient data handling while also improving the quality of the final deliverable.

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A designer’s worries and headaches

- What are the color settings of the application?
- Are the monitor’s colors accurate?
- Is it properly calibrated?
- Is it printed with the right color?
- What environment should I check the color under?

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**WARNING**

Poor color management in the digital workflow can lead to big problems at the back end of the process.
No more color worries. The Basics of color management.

Four key points. Keep these in mind to significantly improve your color management.

1. Prepare a profile and print in the correct color.
   - Prepare a profile that provides the color characteristics unique to each device.

2. Check the color under the correct light source.
   - Maintain a light source specifically for color evaluation to ensure more accurate color checks.

3. Use a display monitor specifically for color management.
   - Maintain a monitor that can accurately simulate printed colors and color data.

4. Display using applications that support color management.
   - Correctly utilize profiles with applications that support color management.

Color management in practice

There are four key points in practicing color management. (See page 05.) By setting up the work environment along these four points and following a set of rules to correctly handle the data, not only will it improve the end quality but also bring other big benefits to each work step.

The four key points in color management

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Examples of benefits at each step of the process when using color management

- **Benefit 1**: Communication between front-end and back-end of process is smooth
- **Benefit 2**: Reduce cost and time associated with reprints and re-proofs
- **Benefit 3**: Conduct color related tasks with peace of mind

Unified image
Prepare a profile and print in the correct color.

Establishing profiles

Printing companies have image profiles that are used as internal references, and by establishing rules on how such references are applied, they are able to maintain consistent print quality. This may include rules such as fixing the printer to a setting that is known to produce best results, or always using the same proofing paper.

When a workflow is designed around such rules, the keys that determine print quality are the performance of the printing machine, the image profile, and the accuracy of the profile for each printing machine.

How printing companies use profiles

When embedding an in-house profile in an image

Profiles of each company referencing actual print color. For example, companies will create their own profiles using prints made with specific printing machines, paper, and settings as the color reference.

When embedding a JAPAN COLOR profile in an image

The most commonly used color reference in Japan that an increasing number of printing companies are conforming to. Also has the benefit of being able to use general purpose profiles.
Check the color under the correct light source.

Why the light source must be controlled

The color of printed material looks different (impression) to the human eye depending on the lighting environment (surrounding light).

Even with a clear image of the desired color, a change in environment can result in the following:

- In the photo studio
  - Perfect lighting! Photo comes out as envisioned
- Under uncontrolled lighting...
  - ... color evaluation also is uncontrolled.
- At the printing company
  - Color calibration
  - When printed, different from what was envisioned
- At the design company
  - Color tone of regular LCD monitors
  - Color tone of regular televisions

To correctly control color in the digital workflow, it is necessary to evaluate printed material according to set standards with appropriate lighting conditions.
Controlling environmental light

(1) Fluorescent light with high color rendering index and appropriate color temperature.
(2) View solely under fluorescent lighting by shutting out outside light.

High Color Rendering Fluorescent Lights*

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Name</th>
<th>Color Temp</th>
<th>Ra</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Color Rendering Fluorescent Lamp</td>
<td>20&quot;</td>
<td>FL20SN-EDL</td>
<td>5000 K</td>
<td>99</td>
</tr>
<tr>
<td></td>
<td>40&quot;</td>
<td>FL40SN-EDL</td>
<td>5000 K</td>
<td>99</td>
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<tr>
<td></td>
<td>40&quot;</td>
<td>FL40SN-EDL/M</td>
<td>5000 K</td>
<td>99</td>
</tr>
</tbody>
</table>

*Availability outside of Japan may vary.

In the printing digital workflow confirm your prints using fluorescent light with the following specs:

- Color Temp: 5000 K
- CRI (RA): 99

High quality comes from sharing the same image!

The image profile and evaluation environment of the printed output are the rules that provide a common output image across different steps in the digital workflow.

Use of color evaluation systems can be very effective!

Installing a dedicated color evaluation system will make it possible to perform color checks of printed material in an optimal environment.
Use a display monitor specifically for color management.

What is monitor color?
The display color that can be adjusted from the buttons at the front of the LCD monitor. Of the many adjustable settings, “brightness” and “color temperature” are especially important.

1. Easily setup using dedicated software
When print output is being evaluated in a 5000 K environment, adjusting the monitor to 5000 K enables good color matching and correct use of color.

ColorNavigator, dedicated calibration software for ColorEdge, supports easy, accurate, and quick adjustments.

1. Easy operation requiring just a simple selection of a number
2. Adjustment to target value is completed in a few short minutes
3. Very accurate adjustment

2. Automatically generate accurate profiles
Setting an accurate monitor profile is essential for accurate color matching. With its dedicated calibration software, ColorEdge is able to automatically generate and store an accurate profile.

Even easier for models with a built-in calibration sensor!

3. automatically generate and store monitor profiles

With ColorEdge, it is possible to:
1. Easily setup using dedicated software
2. Automatically generate accurate profiles
3. Fine tune to accurate settings

Key point
03

Case 1

Color matching between prints and monitor
When the objective is to match the color of the printed material and the monitor (evaluate side-by-side) it is necessary to:
1. Adjust the monitor so the white matches on the paper and the monitor.
2. Calibrate the monitor, then create and set the monitor profile.

With ColorEdge, it is possible to:
1. Easily setup using dedicated software
2. Automatically generate accurate profiles
3. Fine tune to accurate settings
3 Fine tune to accurate settings

1. Even with the color temperature of the monitor set to 5000 K, its white may still not match that of the paper.

Even with accurate adjustment of the monitor, utilization of profiles, and a strictly controlled evaluation environment, the monitor’s white may still not match the white of the paper. This is caused by the base-color of the paper, reflection of surrounding objects, and other reasons.

When compared with the paper, the white does not match!

In these cases, fine tuning the monitor’s white to match the paper will improve precision of the match.

- ColorNavigator’s manual adjustment function makes fine tuning of the white color very easy!

With ColorEdge, fine tuning of the display is possible even after calibration. By visually reselecting the white color, it is possible to derive a calibration target value that is better suited for the matching application.

A profile better suited for the matching purpose

Just move the pointer towards the desired color. The white color is adjusted accordingly!

- Possible to regenerate profiles to match the objective.

With ColorEdge, it is possible to regenerate a profile to better match the objective by performing recalibration based on the target values obtained from manual fine tuning.

Repeats status measurement and profile generation upon completion of fine tuning.

Matching the monitor color for all workers

Color quality in the digital workflow can be improved by matching the color of each monitor and having the workers share a common image. There are two standards by which the color of monitors may be matched.

1. Matching them to the printed output.
2. Matching them to an industry reference value.

By using each of these methods appropriately for a given purpose, accuracy in the use of color can be improved.

- Matching them to the printed output

Matching them to the printed output is not compatible outside the company but very convenient for in-house color unification!

By adjusting all in-house monitors along an industry standard can establish a basic color management environment. However, this may not meet necessary requirements in terms of matching with actual print output.

With ColorEdge, ColorNavigator makes it easy to share target values using its target adjustment value import/export function.

3. Matching to an industry reference value

A profile better suited for the matching purpose

Matching to an industry reference value provides high level of compatibility, but may not match print output.

Case 1: 5000 K 80 cd/m² γ2.2 (ISO 12646)

With ColorEdge, it is possible to store monitor adjustment settings for each application and easily switch between them depending on the job.

ISO 12646 is a core standard for “soft proofing,” the practice of performing print color proofing on a monitor. The Japanese printing industry also often follows this standard. For various reasons, matching with actual print output is necessary.

An international standard on color gamut. A standard set for CRT monitors, but many manufacturers still conform to this standard. The large installed base provides high compatibility thus making it useful in applications such as web content development.

With ColorEdge, it is possible to store monitor adjustment settings for each application and easily switch between them depending on the job.

- 5000 K 80 cd/m² or above γ2.2
- 5000 K γ2.2
- In-house matching
- Communicating with design company A
- Data submission to printing company B
- For sRGB workflow
- etc.
Displaying images using applications

For accurate color management, it is necessary to check the data and simulate printing on the display using applications that support color management.

To correctly view an image in accordance with color management rules, the application must load each of the profiles for the monitor and the image and perform accurate color conversion.

Loading the monitor profile

Applications that support color management will automatically load the monitor profile set in the OS. NOTE: Some applications may require manual setup.

STEP 1

First, check the application’s color settings

For precise color utilization, first, color settings are adjusted to the requirements of each job.

Work space

It is convenient to have the profile for your normal digital workflow set up in advance. RGB: Typically, “sRGB” or “Adobe® RGB”. CMYK: Select according to the color standard used in the workflow. When re-embedding the image profile, make selections based on the back-end workflow and the type of end deliverable.

Color management policy

For both RGB and CMYK, select "Maintain embedded profile.” Select all check boxes so it is possible to make positive identification either when files that have embedded profiles that do not match the “work space”, or when files without an embedded profile are being opened. (Recommended)

STEP 2

Open the image file

1. Loading the image profile
   To open an image file correctly while referencing a profile, select one of the following two methods.
   1) Use the profile embedded in the image.
   2) Use the profile specified in “Color settings”.
      In normal digital work, the embedded profile should be used by selecting method 1.

2. Use the profile embedded in the image
   When opening the file in the application, select "Use embedded profile instead of work space”. By maintaining the embedded profile, an image can be handled with the same color setting throughout the digital workflow. When a file’s embedded profile matches the work space, checking is not necessary as the file opens automatically.

Use the profile specified in “Color settings”

The image can be viewed in the work space specified in the application’s “Color settings”. When utilizing data that come from various external organizations or devices, or when it is necessary to switch profiles depending on the back-end process, this is a useful function. The image can be viewed in the work space specified in the application’s “Color settings”. When utilizing data that come from various external organizations or devices, or when it is necessary to switch profiles depending on the back-end process, this is a useful function.

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Summary

Many people are involved in the production of printed material. As such, being able to use the correct color among all parties or not having to question the color along the way can result in efficient delivery of high quality prints. To make this a reality, it is important to understand the importance of color management, and to prepare the environment, the peripheral equipment, and the applications for either a dedicated, or an adaptable setup that will enable more accurate utilization of color data and color matching.

ColorEdge 2011
Create an environment for optimal printing and set a profile for an image

01

Prepare an appropriate lighting environment

02

Check application settings and how to use them

03

Calibrating with a color management-ready monitor

04

It is necessary to calibrate devices such as digital cameras, monitors, and printers to their optimal condition, create profiles that record the color characteristics unique to each device, and share these profiles across each of the process steps.

When checking the color of printed material, it is necessary to do so under appropriate lighting conditions. Color temperature and color rendering properties are important in the evaluation of commercial print material; a light source with color temperature 6500K and color rendering index ≥ 99 should be used.

For precise color matching and color management, a monitor capable of generating an accurate monitor profile is essential. For precise and dependable utilization of profiles, we recommend the ColorEdge series — easy to adjust stable displays.

In the digital workflow, it is important to perform data checks and display print simulations on an application that supports color management. A unified output image can be shared across the workflow by using the correct profile.