Color Management Handbook

Strategies to master color management
in the digital workflow.
Start applying them today.

ver.5

Is that really the correct color?

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

Photographer

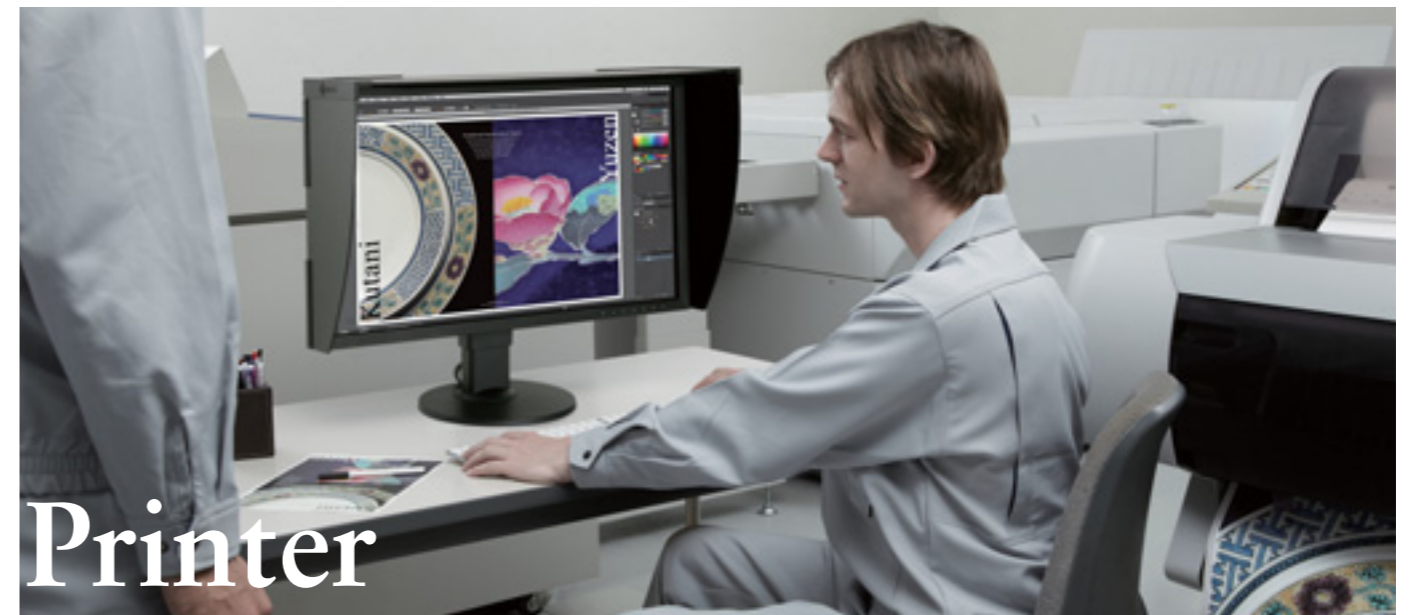Is the image displayed on the monitor really accurate?

Designer

Are the application settings on the monitor correctly adjusted and does the color match the printed image?

Retoucher

Is the photograph edited the way it was intended?

Printer

Do the colors in the design comp and color proof match?

No more color worries. The basics of color management.

We will explain about the key points in each production step.
Keep these in mind to significantly improve your color management.
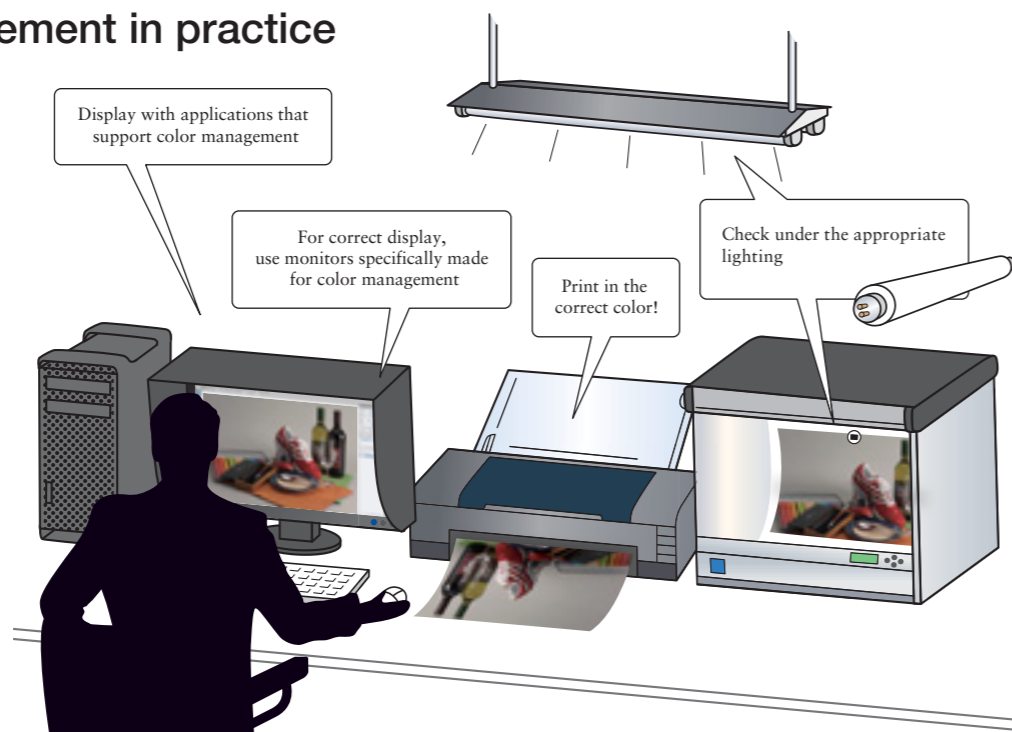
Concerns over color in the digital workflow

A monitor to display the data, a printer to check it on paper…. Issues concerning color are a constant concern in the print production digital workflow. Anyone involved in creating printed materials is bound to have experienced color variations depending on the monitor used for the check, or a difference in color tones between the comp output and printed material.

A designer's work environment → Full of potential problems in the digital workflow

Are the color settings of the application correct?

Is it properly calibrated?

Is my color checking environment appropriate?

Are the monitor's colors accurate?

Is it printed with the right color?

⚠ **WARNING** Poor color management in the digital workflow can lead to significant concerns at the back end of the process.
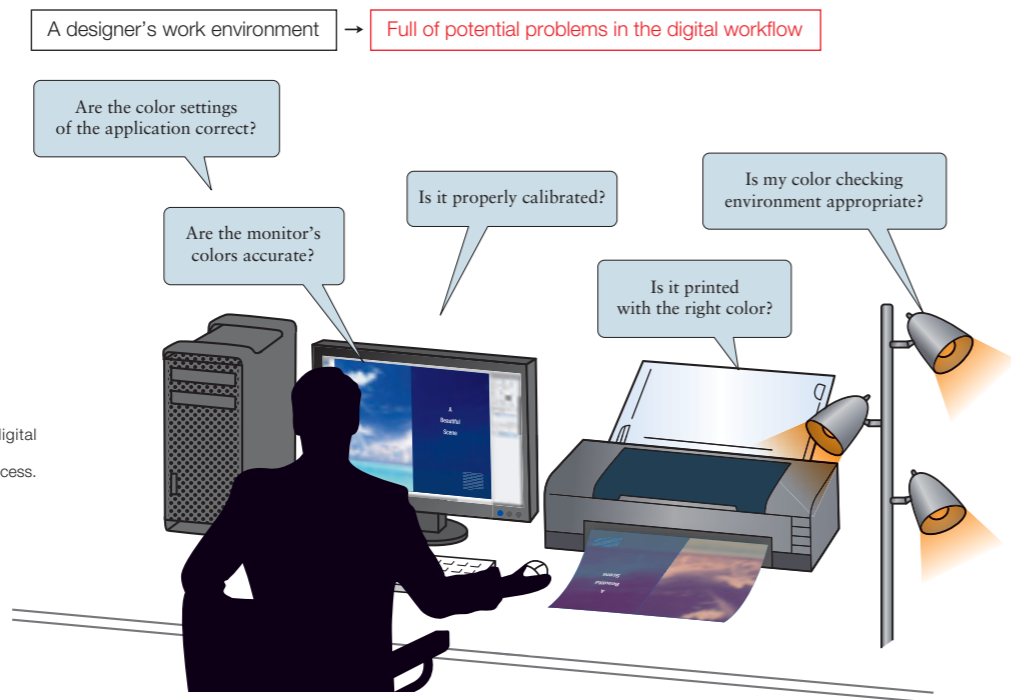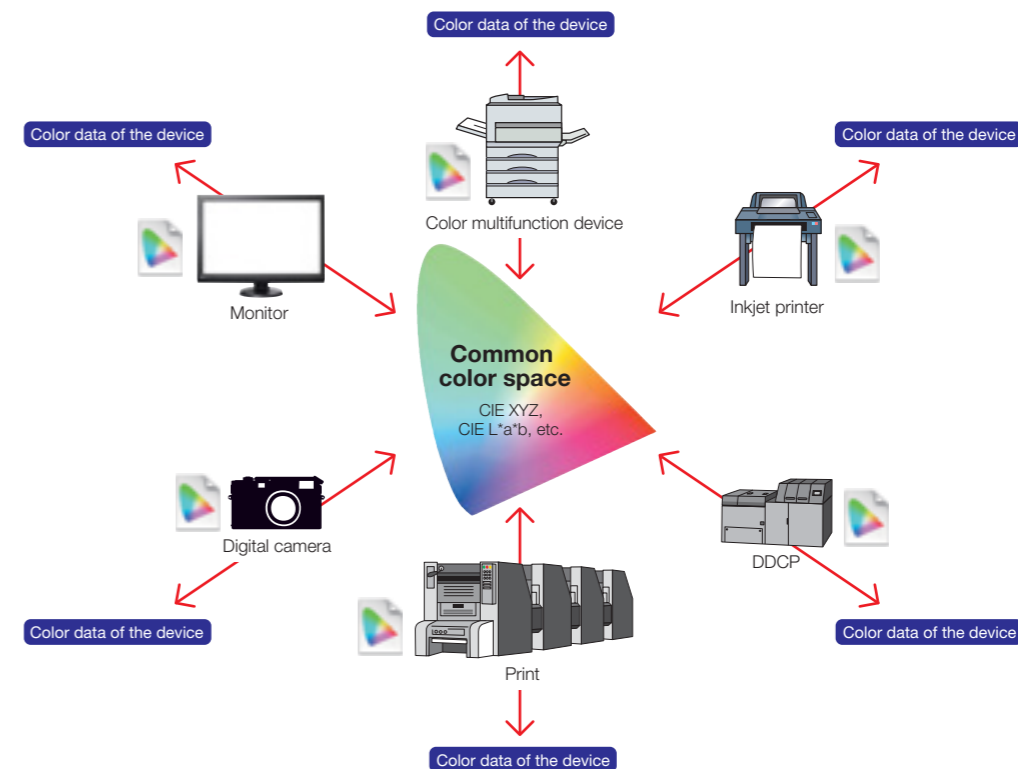
Color management in practice

Color management can be performed by following a set of rules to correctly handle the data. Color management will not only improve the end quality but also bring other major benefits to each work step.

Display with applications that support color management

For correct display, use monitors specifically made for color management

Print in the correct color!

Check under the appropriate lighting

What is color management?

Color management provides a unified environment for handling colors where a common color reference is used at each step of production from photography to design, plate making, and printing. It aims to unify the image throughout the entire production by using the profiles of the various devices to adjust their colors.

Color data of the device

Color multifunction device

Monitor

Inkjet printer

Digital camera

Common color space
CIE XYZ,
CIE L*a*b, etc.

DDCP

Print

Color data of the device

Monitors and printers have their own color idiosyncrasies and it is impossible to make them a perfect match.
However, it is possible to convert the color data of each device via a common color space (a color space independent of any device) so that the various colors can match more closely.
This is the basic principle of color management.

— Adobe® RGB
— sRGB
— ISO coated v2
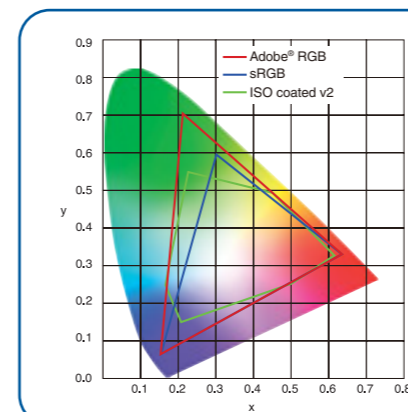
If we compare the color space widely used in digital cameras, Adobe® RGB, with the printing color standard of ISO coated v2, we can tell that there is a difference in the color gamuts that can be reproduced. These two gamuts cannot be made to coincide, but color management can make them approximate one another. Maintaining an awareness of the final printed color in the finished product in the photographic, design, and plate making stages, and making it the shared standard, makes it possible to handle data smoothly.

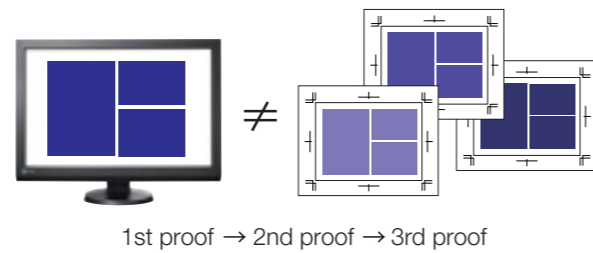## 🎨 The Benefits of Color Management in Practice

Preparing an environment for color management involves installing the appropriate machinery,
adjusting settings, and deciding and sharing rules for color management with work staff to remain consistent.
While it may be a challenge, we will show the benefits of using a color management system in the creative workflow.

Benefit 1 Communication between front-end and back-end of the process is smooth
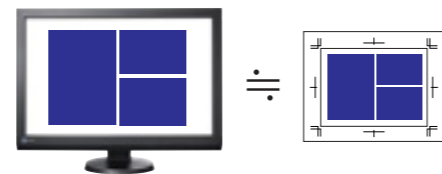
Unified image

1 Photographer / Retoucher Illustrator

Ai

2 Design company

3 Plate making company

4 Printing company

Benefit 2 Reduce cost and time associated with reprints and multiple proofs

1st proof → 2nd proof → 3rd proof

≠

Apply color management

Good 1st color proof or monitor-based proof!
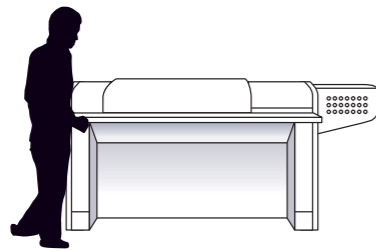
Benefit 3 Gives you peace of mind as you work

Peace of mind

Proof   Deliverable

Accurate display
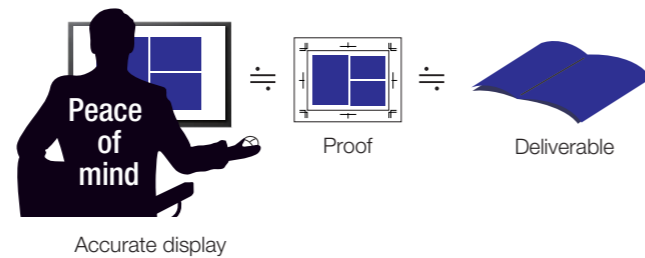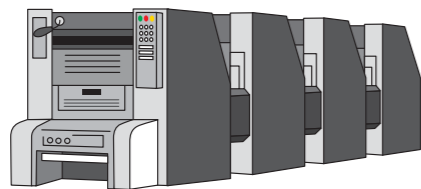
You can increase the quality of the final product with these benefits.

The key points in production steps.

What should we be careful about to ensure that data is handled correctly in each process leading up to the finished product? We will deal with each production step separately. By referring to these steps, you can greatly increase your color management accuracy.

Photographer ———— 8
Photograph under a 5000 K light source with printing in mind

Retoucher ———— 9
Embed the profile while working in a correctly lit environment

Designer ———— 12
Design with the colors as they are on the monitor
Output a comp and PDF based on the printer profile

Printer ———— 21
Convert images to CMYK while looking at the monitor
Output a color proof via DDCP or an inkjet printer

Summary ———— 24
The perfect monitor for every workflow

Extras ———— 26
Define the color space underpinning the work process
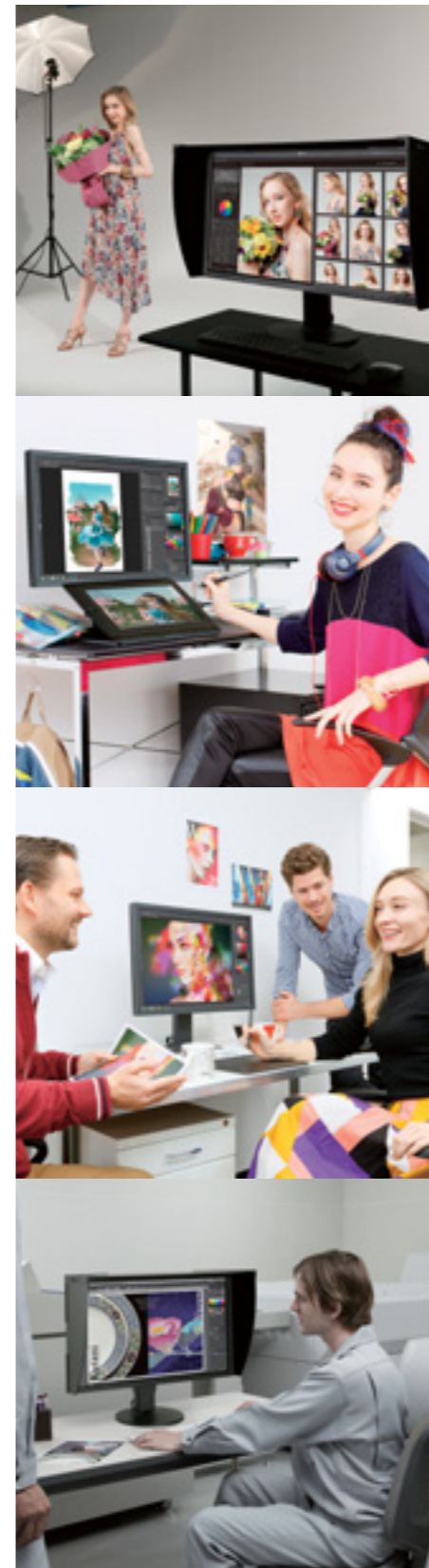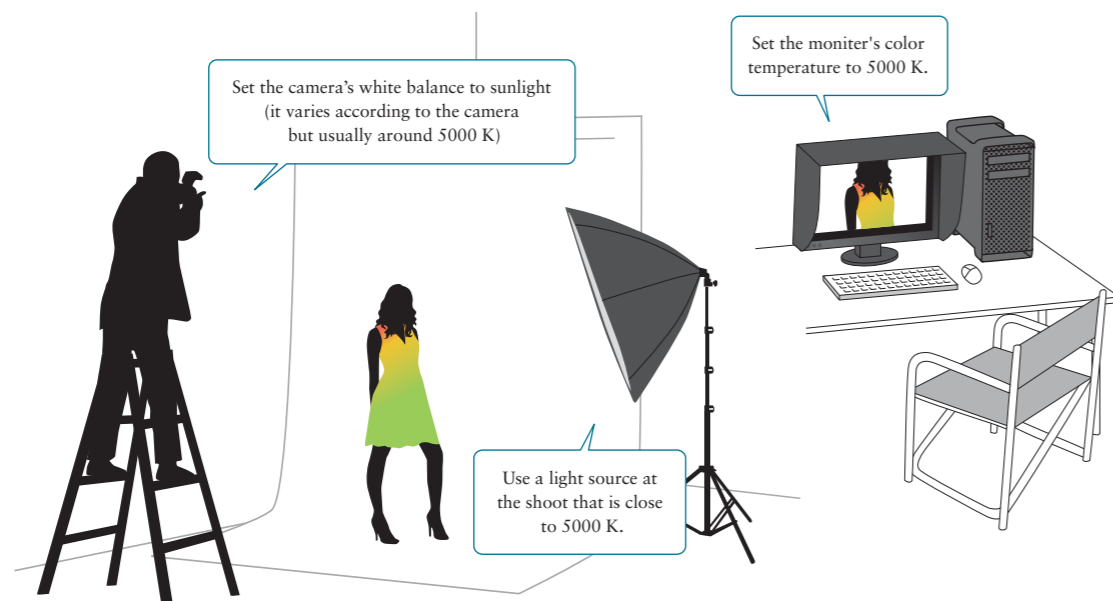
Photographer

Photography

### Photograph under a 5000 K light source with printing in mind

In ISO international standards "D50" is adopted as the light source for evaluating the color tones in printed materials. This value, determined by sampling based on the human sense of color, is a color temperature of 5000 K. For proper color management it is vital to keep this 5000 K in mind right from the photography stage.

It is possible to maintain color consistency from the photography stage to printing by making the color temperature of the light source during the shoot as close to 5000 K as possible, and by using 5000 K as a yardstick in the white balance settings of the camera and in the RAW development.

Set the moniter's color temperature to 5000 K.

Set the camera's white balance to sunlight (it varies according to the camera but usually around 5000 K)

Use a light source at the shoot that is close to 5000 K.

Key points when comparing the subject at the shoot and how it looks on the monitor

Use a light designed for color appraisal when you compare the subject and its image on the monitor at a shoot. The color temperature of the light is important, but you must pay just as much attention to the color rendering index (Ra). Accurate color reproduction requires Ra90 or above. The colors of the monitor and the subject will match when viewed in fluorescent light with high color rendering properties.
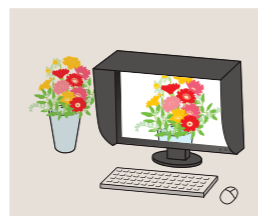
Modeling lamps with a low color temperature are usually used in studios.
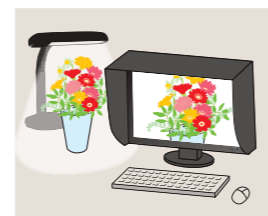
If you illuminate the subject with a desk lamp designed for color appraisal, the colors will match those on the monitor.
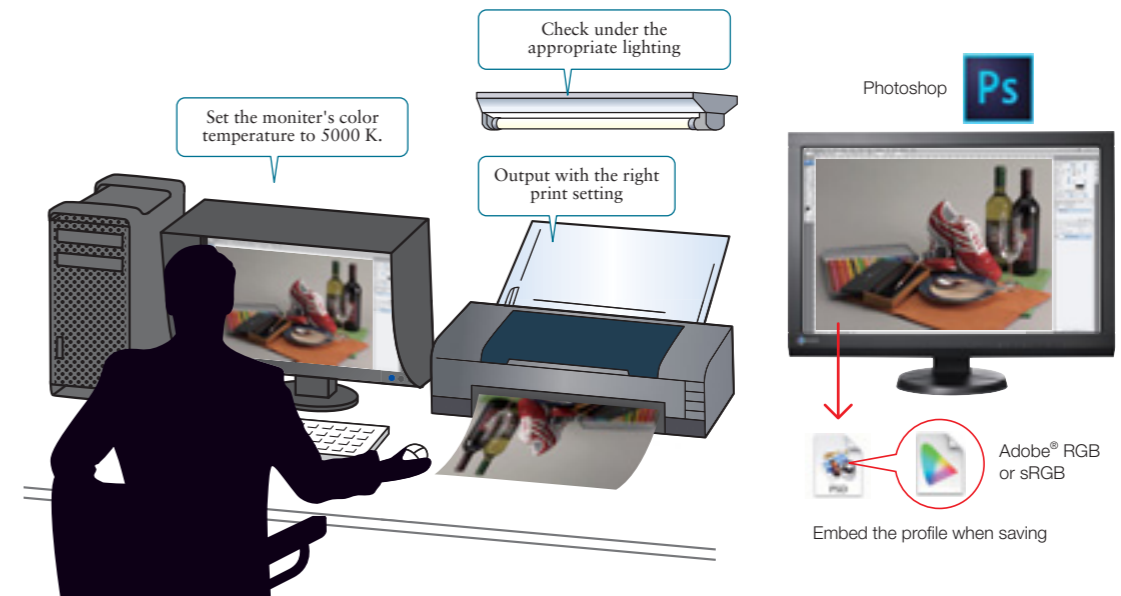

Retoucher

Retouching

### Embed the profile while working in a correctly lit environment

The document profile (source profile) used in the digital printing workflow is Adobe® RGB or sRGB. The white point in these profiles is set as D65 and, based on this, some people hold that the color temperature of the monitor should be 6500 K. However, as was stated earlier, ISO printing standards stipulate viewing under D50 light source and in Photoshop, the white point is also processed at 5000 K. When retouching photographs, it is essential to prepare a 5000 K work environment that accords with these standards. In addition, always embed the profile when saving a file so that the colors of the image can be accurately conveyed to the back-end of the process.

Check under the appropriate lighting

Set the moniter's color temperature to 5000 K.

Output with the right print setting

Photoshop

Adobe® RGB or sRGB

Embed the profile when saving

Settings for color sample comp output

When outputting a color sample comp to send to the back-end printing process, ❶ choose "Photoshop Manages Colors" for Color Handling and ❷ specify the printer profile compatible with the paper. ❸ Click on Print Settings and select ❹ "Off (No Color Adjustment)" under Mode.
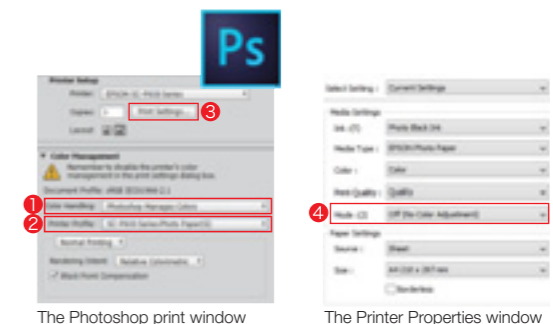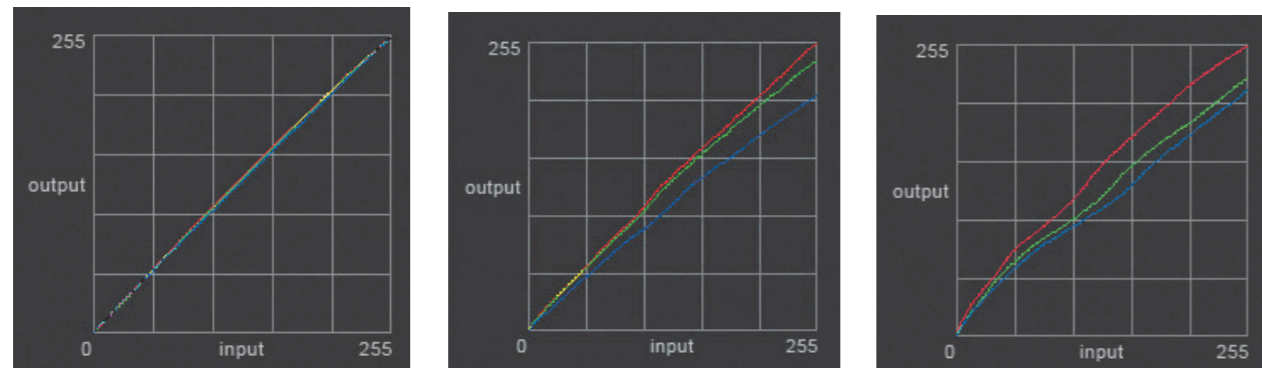
The Photoshop print window   The Printer Properties window

Use a monitor specifically for color management.
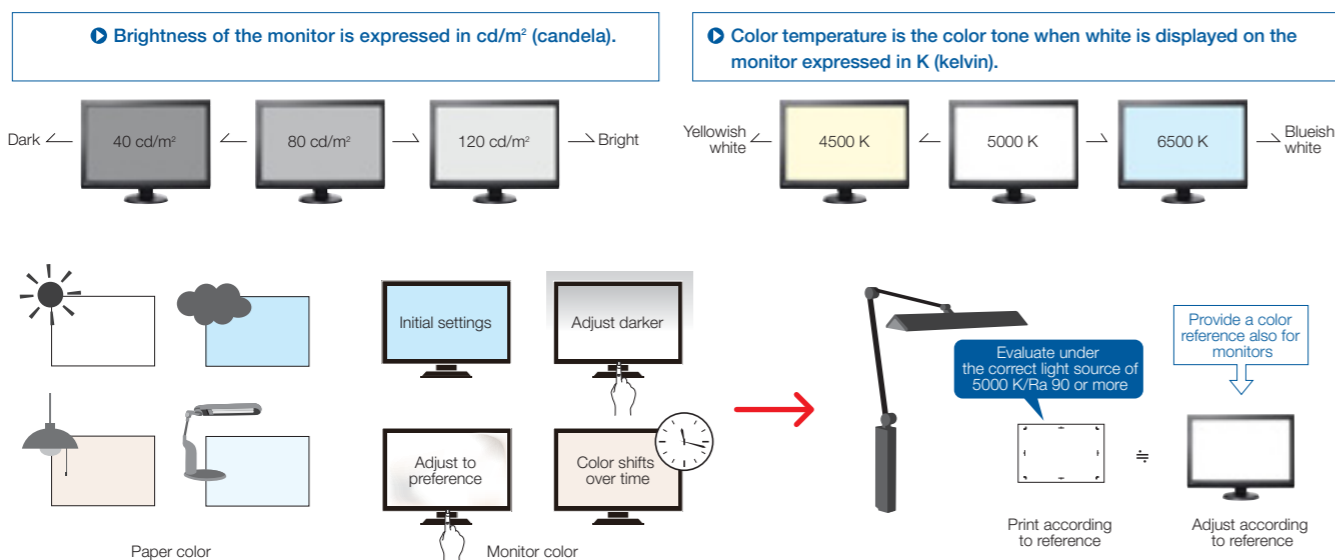
Why is a color management monitor necessary?

❶ ColorEdge high-end graphics monitors

❷ Other graphics monitors

❸ Other low-end monitors

There are many different types of LCD monitors, from inexpensive ones to high-performance models. However, the display properties of the monitor are very important for accurate display and proper color handling. The ColorEdge series shown in ❶ has clear gradations for each RGB color, but the monitors shown in ❷ and ❸ have uneven

and fluctuating gradations. This not only means that they cannot display images correctly, but there is also the danger of corrupting high-quality data. It is essential to employ a monitor specifically for color management in the digital workflow.

What is monitor color?

Of the many adjustable color settings, "brightness" and "color temperature" are especially important.

▶ Brightness of the monitor is expressed in cd/m² (candela).

▶ Color temperature is the color tone when white is displayed on the monitor expressed in K (kelvin).

Dark ⟵ 40 cd/m² ⟵ 80 cd/m² ⟵ 120 cd/m² ⟶ Bright

Yellowish white ⟵ 4500 K ⟵ 5000 K ⟶ 6500 K ⟶ Blueish white

Paper color

Initial settings

Adjust darker

Adjust to preference

Color shifts over time

Monitor color

Evaluate under the correct light source of 5000 K/Ra 90 or more

Print according to reference

Adjust according to reference

Provide a color reference also for monitors

Just like the color of paper can look different depending on the lighting conditions, different monitors will display different colors. Correct use of color is possible by adjusting the monitor to the reference.

The ideal monitor

Point 1 — Individual adjustment at the factory

Every ColorEdge monitor is individually adjusted at the factory for displaying the entire RGB color space, giving each one a smooth, consistent display.

### Point 2 — Dedicated circuit for display correction

Sometimes LCD monitors may display uneven levels of brightness and color across the screen. Monitors with a dedicated circuit to rectify this enables work efficiency with a uniform display.

Point 3 — Easy 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 6, dedicated calibration software for ColorEdge, facilitates accurate and quick monitor adjustments to the target color temperature and brightness.

5000 K/Ra 90 or more

Evaluation under a 5000 K light source ≒ Adjusted to 5000 K

ColorNavigator™ 6
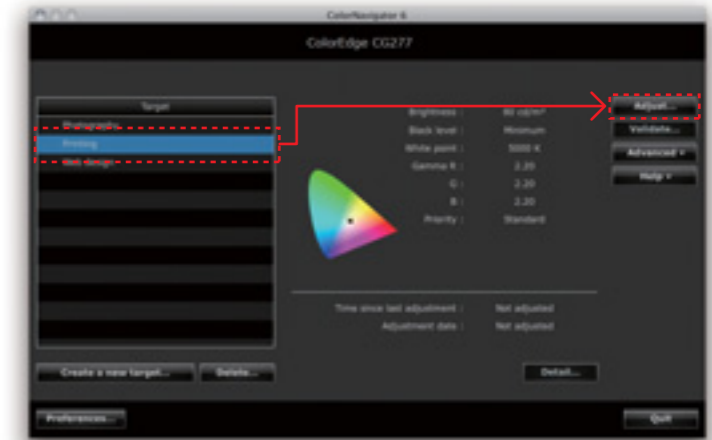
High-precision calibration can be performed in just a few minutes by simply choosing the default 5000 K and 80 cd/m² target values for printing.

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.

Automatically generate and store monitor profiles

5000 K
Profile
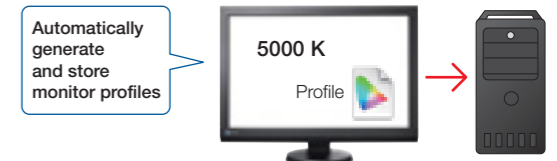
Point 4 — Color management with an automatic internal sensor


ColorEdge® CG Series
built-in calibration sensor

A monitor's display of color changes over time with use so regular readjustments are important. The ColorEdge CG Series comes with a built-in sensor that automatically adjusts the monitor at user-determined intervals. This gives the user a consistent display that is easy to setup and maintain.

Hardware calibration that doesn't sacrifice gradation expression is possible with ColorEdge.

ColorEdge uses ColorNavigator 6, its dedicated calibration software, in combination with the monitor's built-in sensor or a commercially available external sensor, so the monitor's internal settings and its color display are adjusted directly. This is known as hardware calibration.
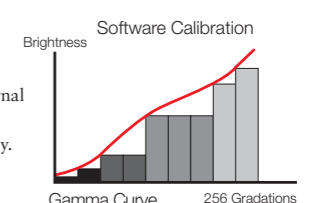
Unlike software calibration, where computer output is adjusted in a general purpose LCD monitor by a combination of a commercially available calibration sensor and software, hardware calibration performs more accurate monitor adjustment with no gradation loss or color shift.
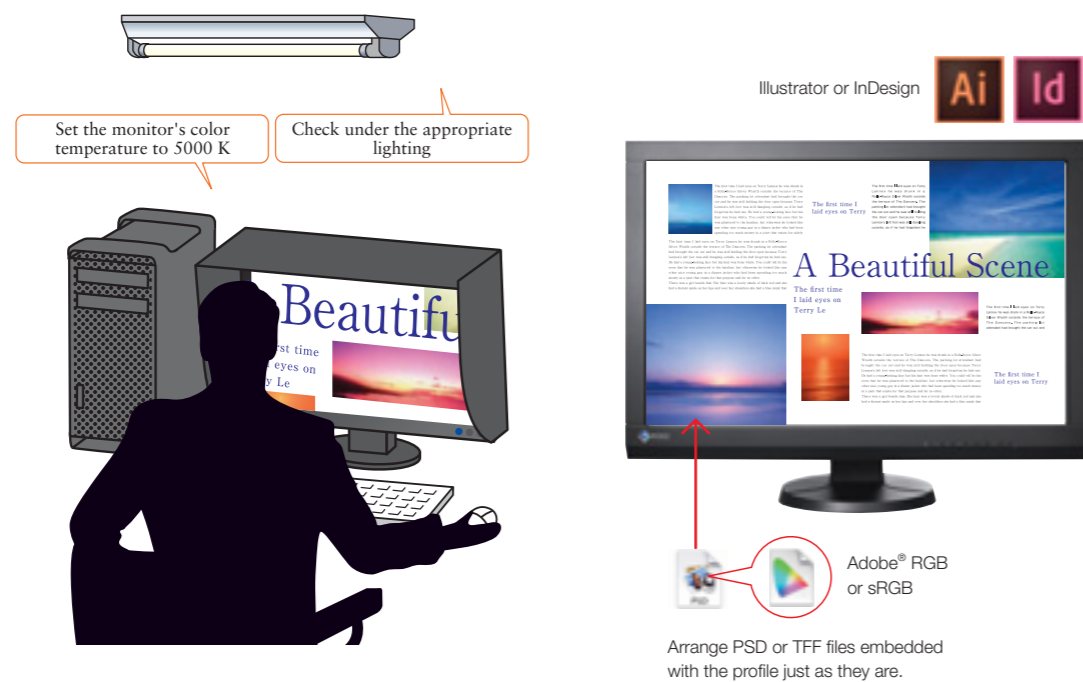
Software Calibration
Brightness
Gamma Curve   256 Gradations

Hardware Calibration
Brightness
Gamma Curve   256 Gradations
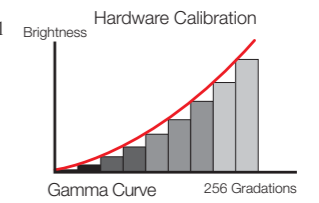
Designer

Design

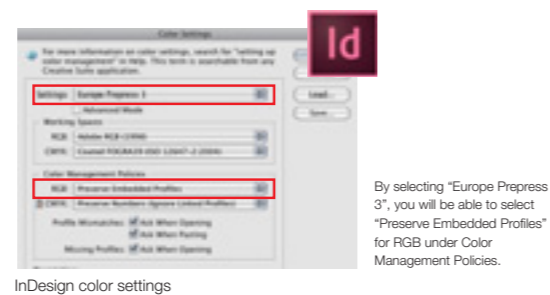### Design with the colors as they are shown on the monitor

Color management has seen revolutionary changes in both the input (photography, scanning etc.) and output (printing) processes. However, in the design process, which lies directly between them, the traditional method of determining colors by CMYK values is still going strong, while there are many cases where people who use monitors with a low level of accuracy are swayed by their visible perception of the colors. However, by using a monitor with excellent tone and color reproducibility, and introducing color management, it becomes possible to simulate the print finish on the monitor. Both creativity and productivity are boosted when design work is shown accurately on the monitor.

Set the monitor's color temperature to 5000 K

Check under the appropriate lighting

Illustrator or InDesign Ai Id

A Beautiful Scene

Adobe® RGB or sRGB

Arrange PSD or TFF files embedded with the profile just as they are.

Use the same profile embedded in the image in the design process.

Sometimes the profile embedded in the photographic data is deliberately removed by the designer. This is probably due to an incomplete understanding of systemic color management. Removing an image's profile puts the colors in an undetermined state and can cause problems in the back-end process. It is important for the designer to use the photographic data as is, without removing the profile. The safest way to do it is to select "Europe Prepress 3" in the InDesign or Illustrator color settings.

By selecting "Europe Prepress 3", you will be able to select "Preserve Embedded Profiles" for RGB under Color Management Policies.

InDesign color settings

Adjust the monitor to match printed material.

case 1

Color matching between prints and monitor

Color matching between the printed material and the monitor (evaluating side-by-side) can be done by:

❶ Calibrating the monitor using target values that have been standardized under a 5000 K light source, to create and set the monitor profile

❷ Adjusting the monitor so the white of both the paper and monitor match (Paper White Measurement*)

Even with the color temperature of the monitor set to 5000 K, its white may still not match that of the paper. In this case, fine tuning the monitor's white to match the paper will improve color accuracy.

Example) 5000 K/Ra.99

5000 K ≠

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

Influencers
- Base-color of the paper
- Reflection of the wall color
- Multiple light sources

White Paper Measurement with ColorNavigator 6

You can measure the white of the paper by using an external sensor and adjusting the values of the monitor to approximate them.

Measure the paper with the sensor.

White of the paper

White on the monitor
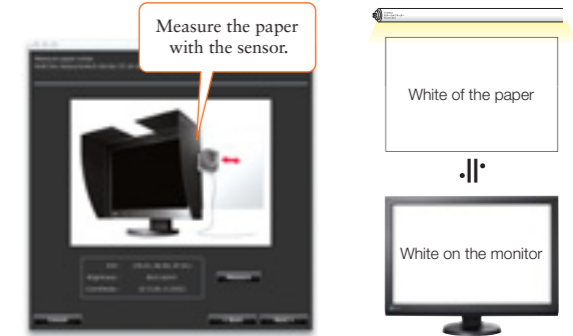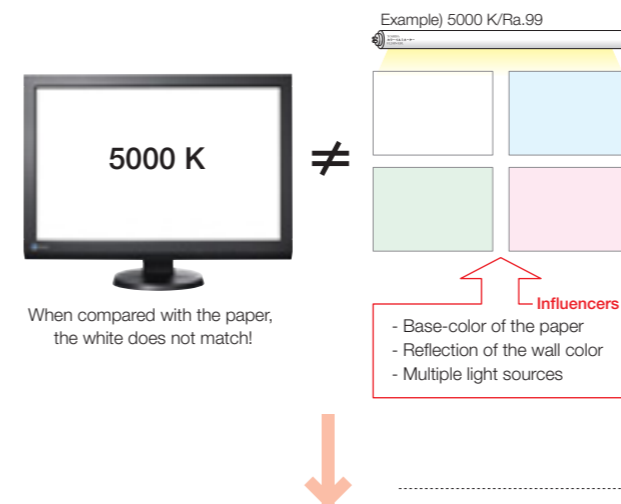
* The ColorEdge internal sensors cannot perform paper white measurement. To use this method of measurement, it is necessary to prepare a separate external calibration sensor.

ColorNavigator 6's manual adjustment function makes fine tuning white color very easy!
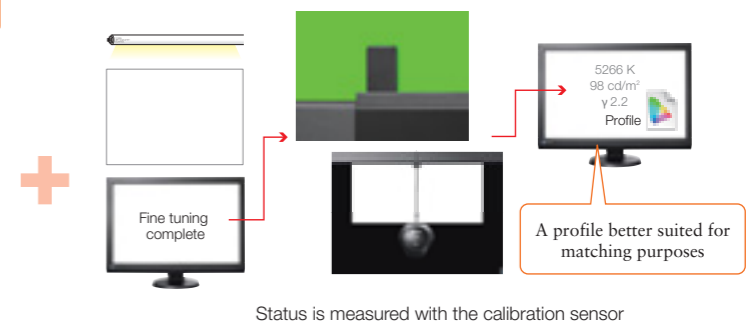
With ColorEdge, fine tuning the display is possible even after calibration. By visually reselecting the white color, it is possible to derive a calibration target value that is better suited for the matching application.

An intuitive user-friendly interface

5000 K

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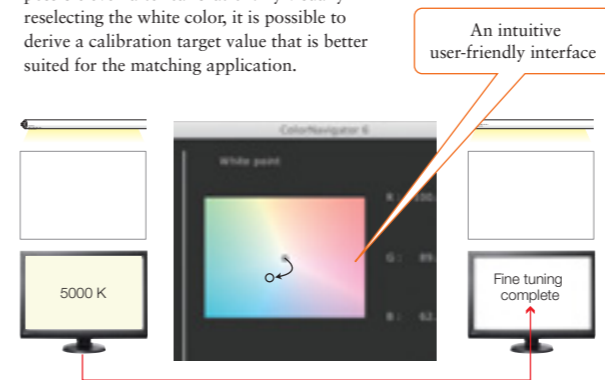
Just move the pointer towards the desired color. The white color is adjusted accordingly!

It is possible to regenerate profiles to match the objective.

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

Fine tuning complete

5266 K
98 cd/m²
γ 2.2
Profile

A profile better suited for matching purposes

Status is measured with the calibration sensor

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 also two methods by which the color of monitors may be matched.

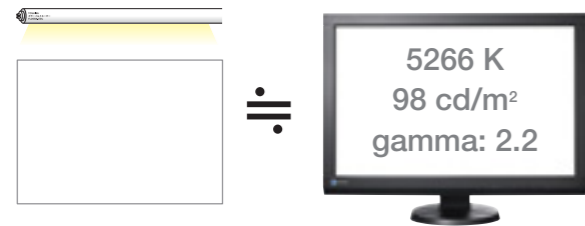**case 2** Matching them to the printed output

case 3 Matching them to an industry reference value

By using each of these methods, color accuracy can be improved.

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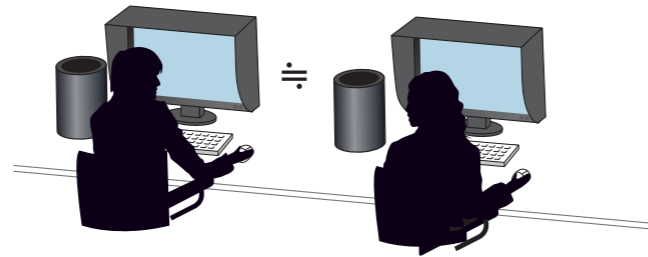
case 2

🎨 Matching them to the printed output

Very convenient for in-house color consistency but not compatible outside the company or studio.

≒

| 5266 K 98 cd/m² gamma: 2.2 |

By taking the adjustment value to match the white of the printer paper obtained in **case 1** and applying it to all monitors in the company or studio, theoretically, the display color of all monitors will match.

Settings may be slightly different between each monitor due to model differences.

5266 K 98 cd/m² gamma: 2.2

5266 K 98 cd/m² gamma: 2.2 | 5266 K 98 cd/m² gamma: 2.2 | 5266 K 98 cd/m² gamma: 2.2

ColorNavigator 6, makes it easy to share target values between different ColorEdge monitors using its target adjustment value import/export function.

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case 3

🎨 Matching them to an industry reference value

Provides a high level of compatibility but may not match print output.

| 5000 K 80 cd/m² gamma: 2.2 | 6500 K 80 cd/m² gamma: 2.2 |
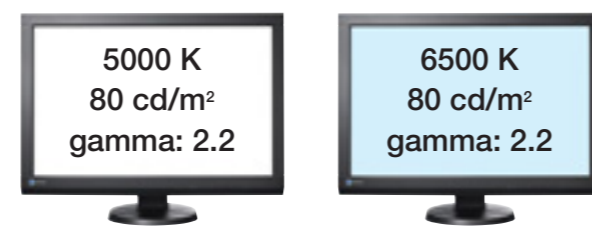
By adjusting all in-house monitors to an industry standard, you can establish a basic color management environment. This may not meet necessary requirements in terms of matching with actual print output.

5000 K 80 cd/m² or above gamma: 2.2 [ISO 12646]	6500 K 80 cd/m² gamma: 2.2 sRGB standard
[ISO12646] is a core standard for "soft proofing", the practice of performing print color proofing on a monitor.	An international standard on color gamut 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.

[ISO 12646:2008] Characteristics of a proofing monitor and observation conditions

With ColorEdge, it is possible to store monitor adjustment settings for each application and easily switch between them depending on the job.
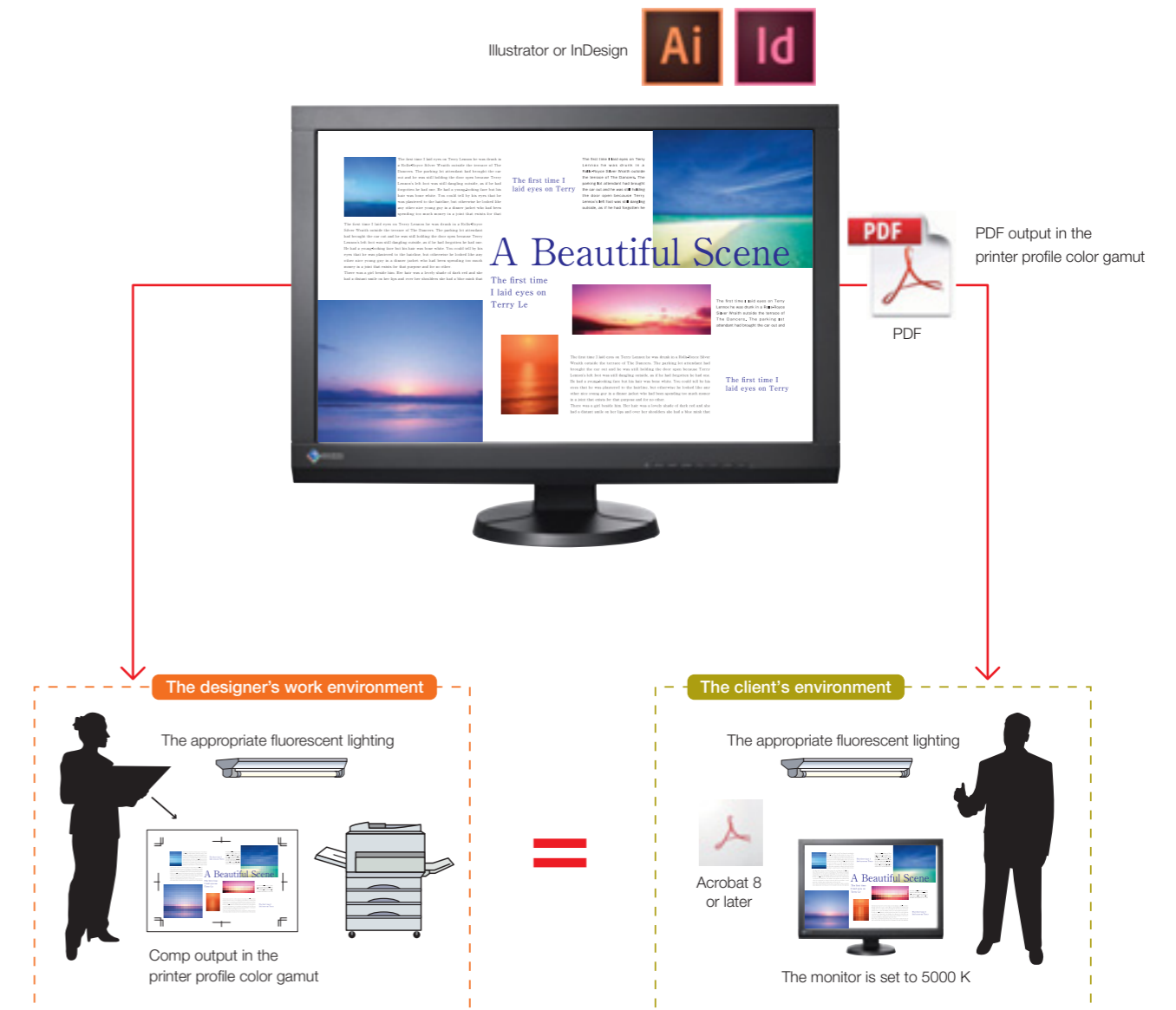
🔘 5000 K 80 cd/m² gamma: 2.2   🔘 Communicating with design company A
🔘 6500 K 80 cd/m² gamma: 2.2   🔘 Data submission to printing company B
🔘 In-house matching   🔘 For sRGB workflow
⋮ etc.

▎Comp and PDF

Output a comp and PDF based on the printer profile

Once the design is finished, the comp is output using a laser printer or inkjet printer. This is a very important stage where the designer and the client both look at the printed output and do a comprehensive check of the composition, color coordination and so on. This cannot be done efficiently if the color tones on the monitor and in the comp output are different. Recently it's becoming more common to export a PDF file and send it to the client. This is a very convenient way of doing things if the printing colors can be simulated at the PDF stage. Outputting a comp and PDF based on the printer profile makes it possible to share the finished image with the client.

Illustrator or InDesign

PDF output in the printer profile color gamut

PDF

The designer's work environment

The appropriate fluorescent lighting

Comp output in the printer profile color gamut

=

The client's environment

The appropriate fluorescent lighting

Acrobat 8 or later

The monitor is set to 5000 K

Display using applications that support color management.

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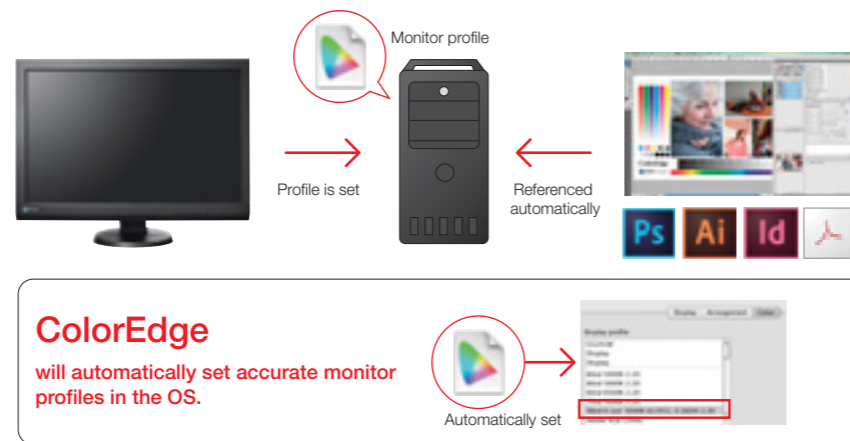To correctly view an image in accordance with color management rules, the application must load each of the profiles for the monitor and the image, and perform accurate color conversion.

Monitor profile

Image profile

Color conversion

LCD Monitor

Image data

Applications supporting color management

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.

Monitor profile

Profile is set

Referenced automatically

ColorEdge

will automatically set accurate monitor profiles in the OS.

Automatically set

First, check the application's color settings

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

You can adjust the color settings in any software individually, but with Adobe® Bridge you can save settings across all Adobe® programs at once. Bridge is useable with CS2 and above.
Open Creative Suite and select "Creative Suite Color Settings" under Edit. A window for selecting settings for all applications will appear.
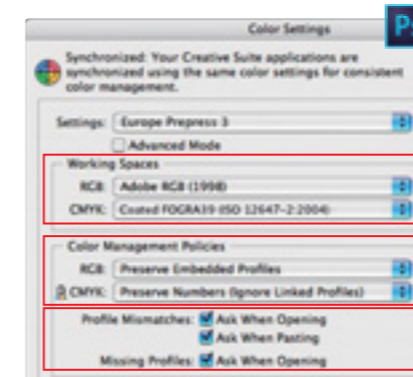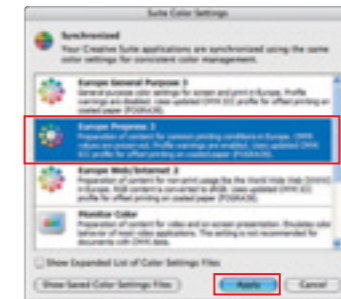
Select the appropriate color setting and click "Apply".
For the USA: North America Prepress 2
For Japan: Japan Prepress 2
For other countries: Europe Prepress 3

The color settings you choose in Bridge will stay consistent with every Adobe® application so your selection will also carry over.

< Recommended Photoshop color settings >
Select "Color settings" under "Edit".

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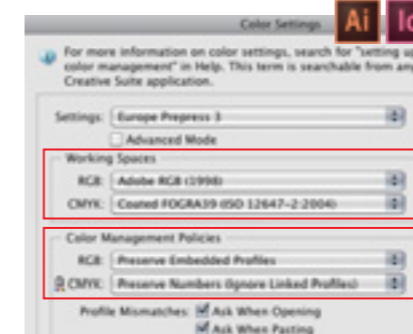It is convenient to have the profile for your normal digital workflow set up in advance.
RGB: Typically, "sRGB" or "Adobe® RGB".
CMYK: Select according to the color standard used in the workflow. When re-embedding the image profile, make selections based on the back-end workflow and the type of end deliverable.

Color Management Policies
For both RGB: and CMYK:, select "Preserve Embedded Profiles."

Select all check boxes so it is possible to make positive identification either when files that have embedded profiles do not match the "Working Spaces", or when files without an embedded profile are being opened. (Recommended)

< Recommended Illustrator/InDesign color settings >
Select "Color settings" under "Edit".

Working Spaces
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 Policies
For RGB: select "Preserve Embedded Profiles."
For CMYK: select "Preserve Numbers (Ignore Linked Profiles)."

- CMYK differs from RGB in that it does not define color spaces, but prioritizes percentage values.

Open the image file

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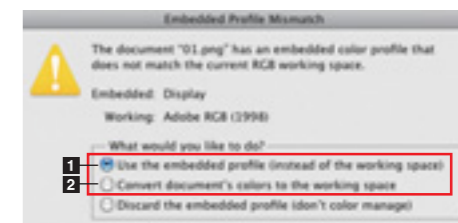**1** Use the profile embedded in the image.
2 Use the profile specified in "Color settings".
In normal digital work, the embedded profile should be used by selecting method **1**.

This screen will appear if you attempt to open an image that does not match the Photoshop working space.

1 Use the profile embedded in the image

When opening the file in the application, select "Use the embedded profile (instead of the working 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 working space, checking is not necessary as the file opens automatically.

2 Use the profile specified in "Color Settings"

The image can be viewed in the working space specified in the application's "Color Settings". This is a useful function utilizing data that come from various external organizations or devices, or when it is necessary to switch profiles depending on the back-end process.

Output a comp to a printer with the correct settings.

For precise color management it is necessary to prepare the printer you will be outputting the comp to with the correct settings.
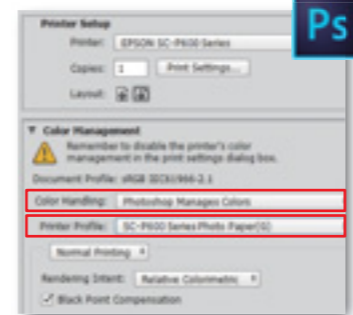
case 1

🖨 Using an inkjet printer

In order to manage colors using your image software, you must specify a printer profile. While referring to the printer profile and the image profile within the software, we can change the colors for output.

Printer profile

Color change

Image profile

Output

Software with color management
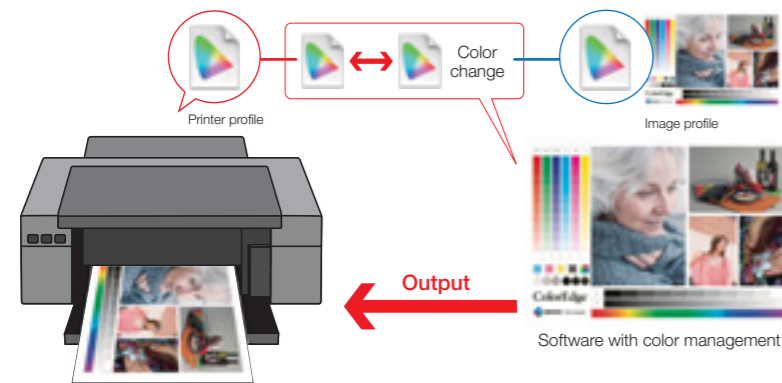
Photoshop print settings

Choose "Photoshop Manages Colors" under Color Handling and the paper profile you will be using under Printer Profile
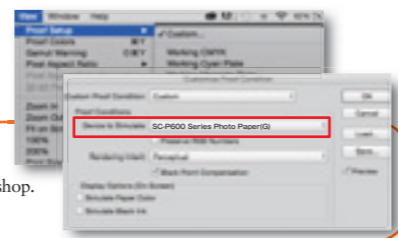
Simulating the final print

To simulate how your photograph will look before you print it, go to View > Proof Setup > Custom in Photoshop. Make sure the "Preview" box is checked and click OK.

case 2

🖨 Using a laser printer

Laser printers are equipped with a RIP (raster image processor). We will apply the output profile directly to the laser printer (DTP full color all in one printer-copier) so there will be no need to manage color settings in your image software.

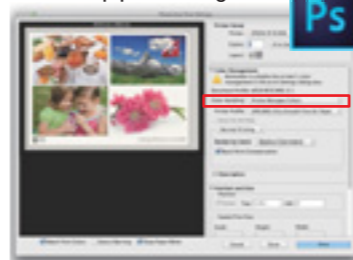-Settings as they would go through a RIP to output.

Printer profile

Color change

Image profile

Output
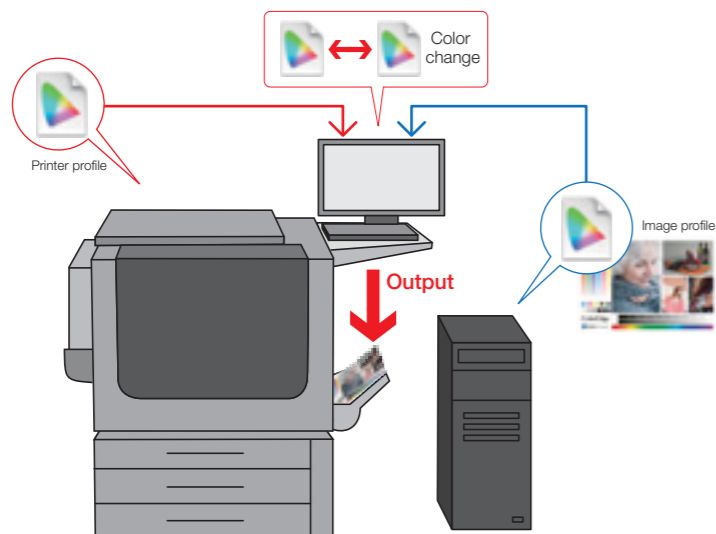
Illustrator print settings
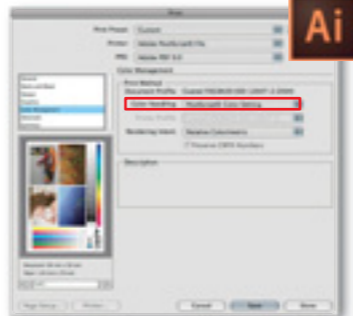
Select "PostScript color settings" for Color Handling
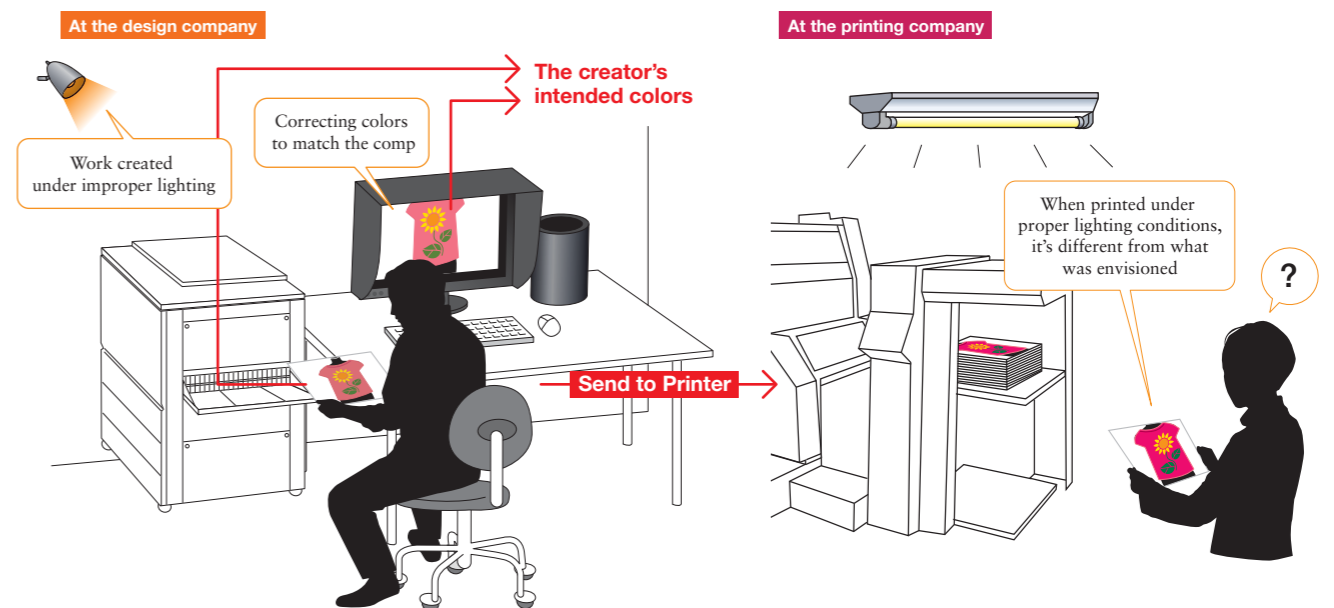
Photoshop print settings

Select "Printer manages colors" for Color Handling

Check the color under the correct light source.

🖨 Why the light source must be controlled

The printed material reflects the light from the light source so colors look different depending on the environmental light (ambient light).

☀ Natural light (sunny)   ☁ Natural light (cloudy)

Incandescent light   Cool fluorescent light

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

Reference color in the publishing/ printing industry   Color tone of regular LCD monitors   Color tone of regular televisions

5000 K   6500 K   9300 K

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

At the design company

Work created under improper lighting

Correcting colors to match the comp

The creator's intended colors

Send to Printer

At the printing company

When printed under proper lighting conditions, it's different from what was envisioned

?

🎨 Controlling environmental light

Solution! (1) Lighting with a high color rendering index and appropriate color temperature.
(2) Block outside light and view solely under the appropriate lighting as much as possible.

Example) 5000 K/Ra.99

Under proper lighting, color evaluation can be performed with confidence

High Color Rendering Fluorescent Lights*

Toshiba Lighting & Technology

Type	Size	Name	Color Temp.	Ra
High Color Rendering Fluorescent Lamp	20"	FL20SN-EDL	5000 K	99
	40"	FL40SN-EDL		
	40"	FLR40SN-EDL/M		
	40"	FLR40SN-EDL/M.NU		

Panasonic

Type	Size	Name	Color Temp.	Ra
High Color Rendering Fluorescent Lights	20"	FL20SN-EDL	5000 K	99
	40"	FL40SN-EDL		
	40"	FLR40SN-EDL/M		

*Availability outside of Japan may vary.

The colors match!

In the printing digital workflow, confirm your prints using a light with the following specs:
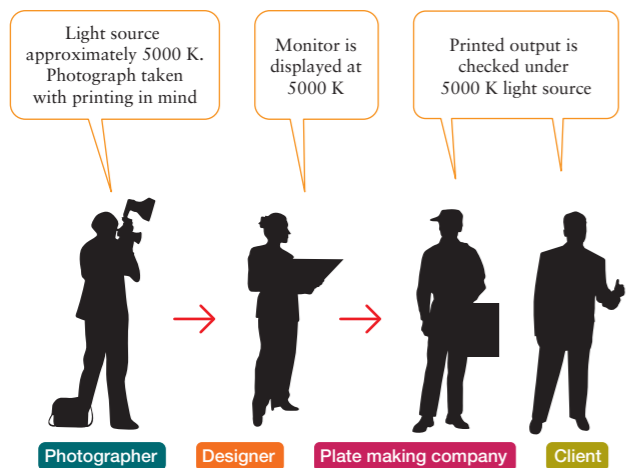
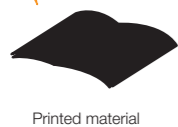**Color Temp: 5000 K** **CRI (RA): 99**
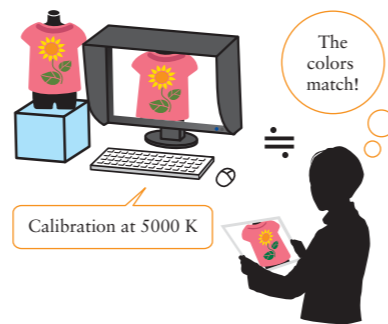
Calibration at 5000 K
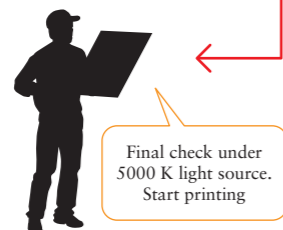
🎨 High quality comes from sharing the same image!

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

Light source approximately 5000 K. Photograph taken with printing in mind

Monitor is displayed at 5000 K

Printed output is checked under 5000 K light source

Photographer → Designer → Plate making company → Client

Correct color under 5000 K light source

Final check under 5000 K light source. Start printing

Printed material

Printing company

🎨 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 a more optimal environment.

Desktop color viewing light box
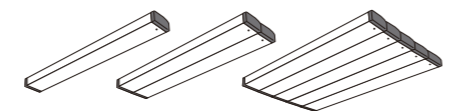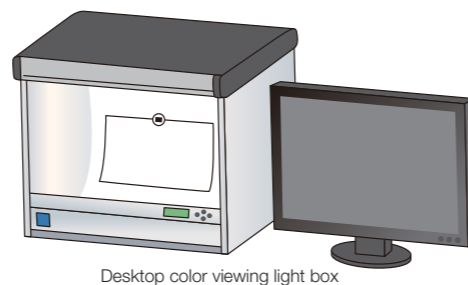
Hanging fluorescent light module for color proofing designed to reduce unevenness in color and illumination

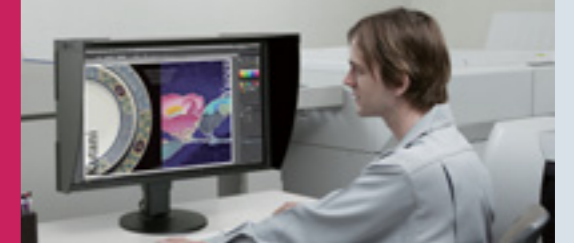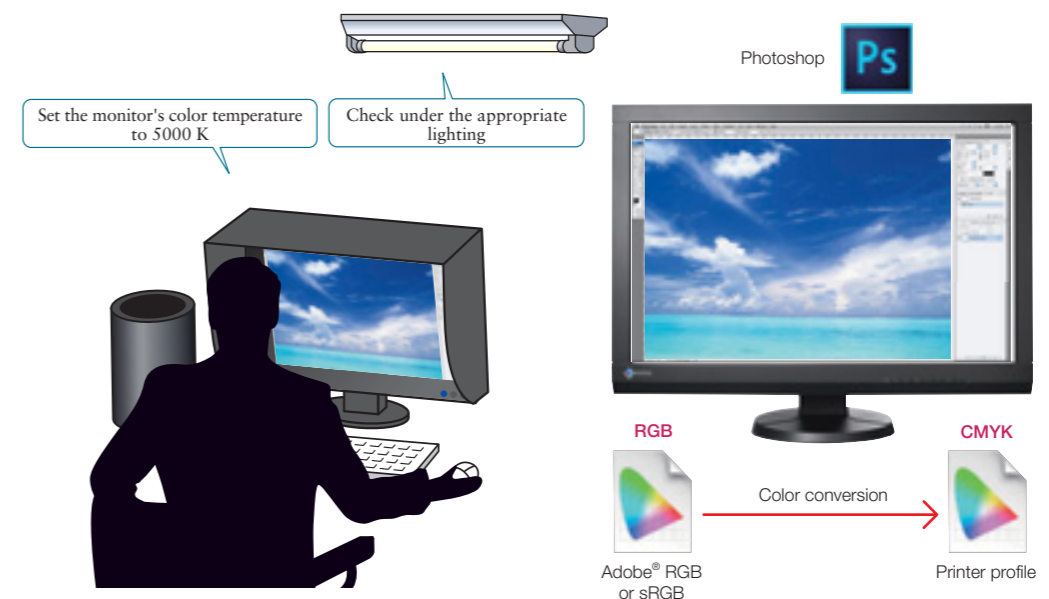Color viewing system

---
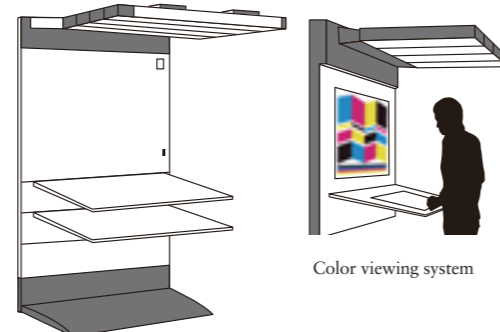
Printer

| Plate making

### Convert images to CMYK while looking at the monitor

In today's digital printing workflow, it is the norm to submit RGB data. Dedicated conversion software is sometimes used to convert RGB to CMYK, but it's more common to do the conversion in Photoshop. Generally speaking, the profile embedded in the image data in commercial printing is Adobe®

RGB, however sRGB data is sometimes submitted. Whichever kind of data it is, as long as you have color conversion software that supports color management, such as Photoshop, and a monitor calibrated to D50 (5000 K), you can do your work with a fairly good idea of how the final print will look.

Photoshop

Set the monitor's color temperature to 5000 K

Check under the appropriate lighting

RGB **CMYK**

Color conversion

Adobe® RGB or sRGB

Printer profile

Printed color simulation using Photoshop's "Proof Colors" command

Converting RGB data to CMYK means revising the image from the wide RGB color gamut to the narrower CMYK one. The image quality deteriorates if this is done repeatedly. Rather than first converting the image to CMYK to perform retouching during the plate making process, you can get better results if you finish the retouching while it is still in RGB form and then convert it to CMYK and make any minute adjustments required. If you select "Working CMYK" in the Photoshop "Proof Setup", and use "Proof Colors" to switch between them as you work, you can run simulations of the print colors while still in RGB, which makes for more efficient retouching.

The Photoshop proof settings
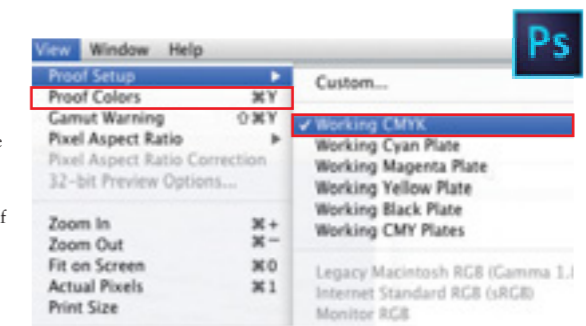
Color proof

Output a color proof via DDCP or an inkjet printer

Before sending material to be printed, you should check the color proof. Even in an environment appropriately prepared for color management and color properly checked on the monitor, the texture and whiteness of the printer paper, and the reproducibility of the ink used can cause different results. Thus, it is necessary to output a color proof on paper. Here we introduce various kinds of color proofs and their characteristics.

Color proof trends

A flat-bed proof, press proof, DDCP (Direct Digital Color Proofing), or inkjet can be used for printing color proofs to match purpose, cost, and speed. Recently, high-end DDCP is capable of reproducing each dot and is the most popular while inkjet is lower cost by comparison. The main types of proofs are detailed in the chart below.

Characteristics of DDCP

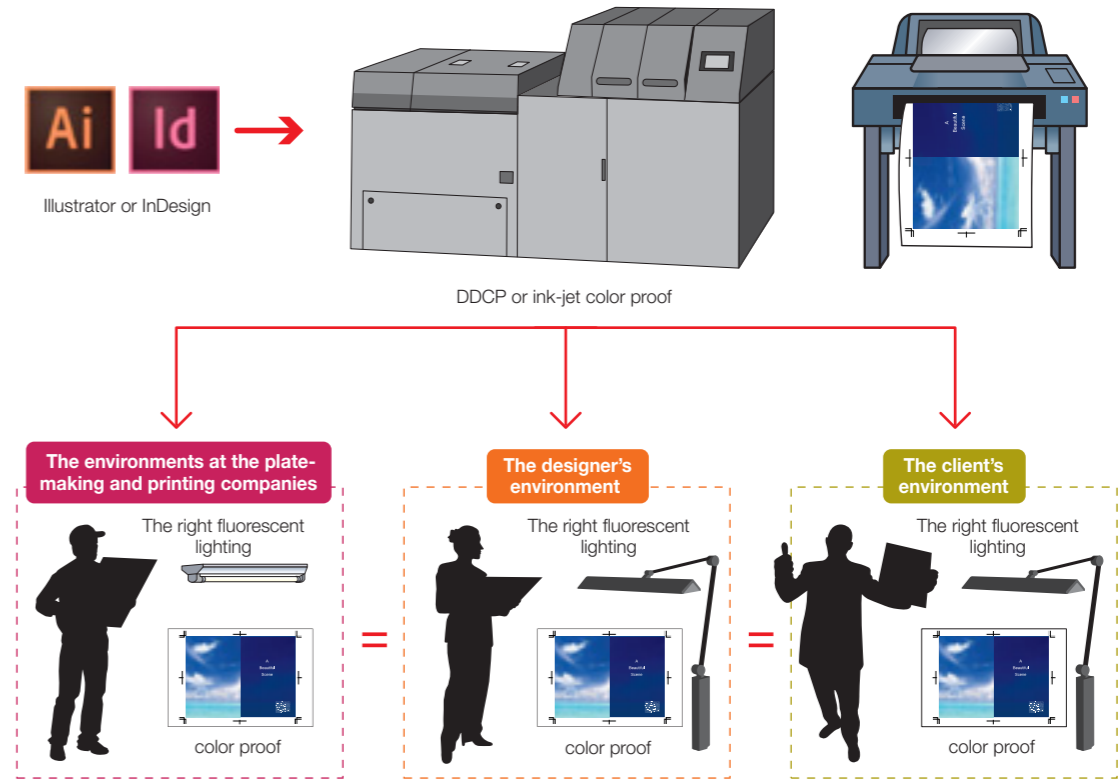|	DDCP	
	High-end DDCP	Inkjet
Dot reproducibility	Same as the printer	Differs from the printer
Paper	Dedicated paper type (fewer types)	Dedicated paper type (including newspaper coating)
Color space	Slightly narrower than general offset printing	Wider than general offset printing
Spot color	None	PANTONE, DIC Color Guide, etc. (Difficulty with metallic and fluorescent colors)
Color stability over time	Good reproducibility Good matching with printer when printing in standard 4-color.	Good reproducibility Good matching with printer when printing in standard 4-color.
Cost	Cost increases with mass production	Lower cost (Takes more time for mass production)

What is DDCP?

DDCP printing includes hardware such as laser, thermal, and inkjet. Traditionally in terms of color proofs, DDCP refers to a system required to satisfy the need for high precision output. However, recently it has come to also refer to digital output.
Depending on the type, DDCP can be affected by ambient lighting. In order to accurately evaluate a color proof, it is important to maintain a properly lit environment.

Check that the color proof is at 5000K

Install a suitable light source
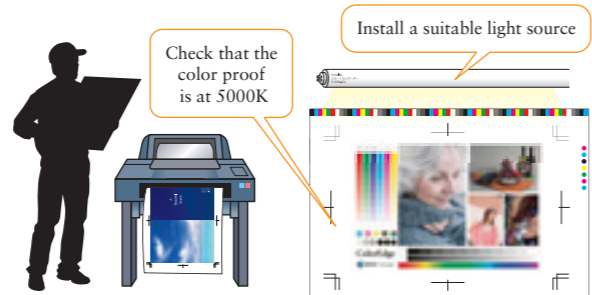
Lighting in the designer's and client's environment is important

The environmental light of the designer and the client is very important when checking printed color proofs. As was explained in pages 19-20, the colors will look the same when the environmental lighting in their respective locations is controlled. The efficient creation of high-quality printed materials is possible when communication about color goes smoothly.

Illustrator or InDesign

DDCP or ink-jet color proof

The environments at the plate-making and printing companies

The right fluorescent lighting

color proof

The designer's environment

The right fluorescent lighting

color proof

The client's environment

The right fluorescent lighting

color proof

Color proofs: from flat-bed proof presses to DDCP, and now ink-jet is mainstream

The need for inkjet output of color proofs is gradually increasing, but paper type is limited and they cannot reproduce moire patterns. When compared to printed color proofs, there are still limitations to its reproducibility. Soft proofing, where proofs are done on a display monitor, may be a way to resolve these technical challenges.

A large Epson printer equipped with many colored inks

Summary

Color Management Setup

The perfect monitor for every workflow

So far we have followed each workflow from start to finish, covering correct use of data and putting color management into practice. Here we will introduce some of the features of EIZO's ColorEdge lineup that are ideal for each workflow.

Recommended Monitors

For Professionals

ColorEdge CG Series

Get the best in both color and convenience for the optimal creative workflow.

For Hobbyists and Prosumers

ColorEdge CS Series

Create, edit, and enjoy photography, illustration, and more.

Photographer **Retoucher**

Take photographs under a 5000 K light source with printing in mind

Use a display monitor specifically for color management to perform reliable calibration

Create an appropriately lit environment and embed the profile

Ideal Features!

❶ Vivid Colors Reproduced to Industry Standards

The wide color gamut of ColorEdge monitors reproduces almost the entire Adobe ® RGB color so images shot in Adobe® RGB will be displayed correctly. This ensures photos of vibrant blue skies and lush green forests are reproduced faithfully.

❷ Stable Color in Just 3 Minutes

Many CG Series monitors take a mere 3 minutes for the brightness, chromaticity, and tone characteristics to stabilize. Whether you are working in a studio or taking the monitor with you on location, you get reliable color display soon after turning the monitor on.

❸ Consistent Color Throughout the Workflow

Using ColorEdge throughout the photography workflow ensures the same color information is shared at each step of the process. You can adjust the monitors to display the same colors using ColorNavigator 6 software bundled with every ColorEdge monitor.

Designer

Display using applications that support color management

Work with the embedded image profile retained

Comp output based on the printer profile

Check under correct lighting conditions

Beautiful

A Beautiful Scene

Ideal Features!

❶ Easy Recalibration to Maintain Color Consistency

The calibration sensor that comes built-in to the ColorEdge CG Series saves your calibration settings and will readjust your monitor automatically at user-defined intervals for peace of mind.

❷ Save Multiple Adjustment Values with ColorNavigator 6

List and create several project goals such as printed materials, web contents, and comp output using ColorNavigator 6. With one button, you can easily create materials for smooth color communication throughout the workflow.

❸ Design Freely with Ample Screen Space

ColorEdge 24.1"models display two A4 pages plus tool palettes for flexible use of space. The 27" models give you even more room with their spacious screens.
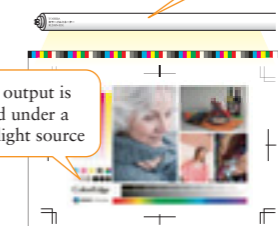
Printer

ISO12646:
5000 K, 80 cd/m², gamma 2.2
Construct a viewing environment that conforms to industry standards

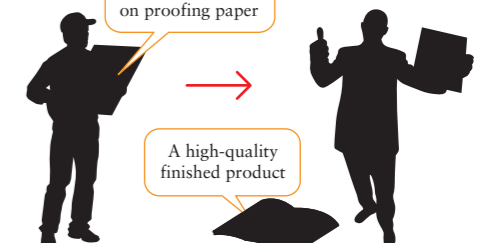Convert to the printer profile on a monitor capable of accurate display

Check the color under the correct light source

Print accurately on proofing paper

Beautiful

Printed output is checked under a 5000 K light source

A high-quality finished product

Client

Ideal Features!

❶ Complete Matching Between Screen and Prints

The wide color gamut of ColorEdge monitors ensures reproduction of almost the entire ISO-coated and US web-coated CMYK color spaces so you can ensure the prints match the image on screen.

❷ Stable, Uniform Display

ColorEdge monitors use EIZO's patented digital uniformity equalizer (DUE) technology to ensure stable image display and counterbalance the influences that a fluctuating temperature may have on color temperature and brightness.

❸ Easy Recalibration to Maintain Color Consistency

The calibration sensor that comes built-in to the ColorEdge CG Series saves your calibration settings and will readjust your monitor automatically at user-defined intervals for peace of mind.
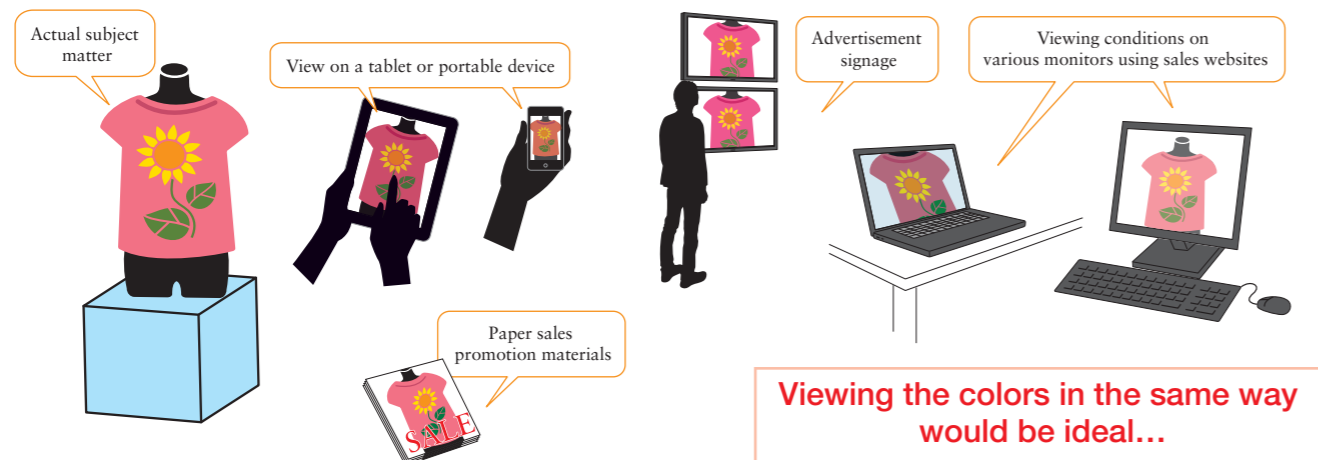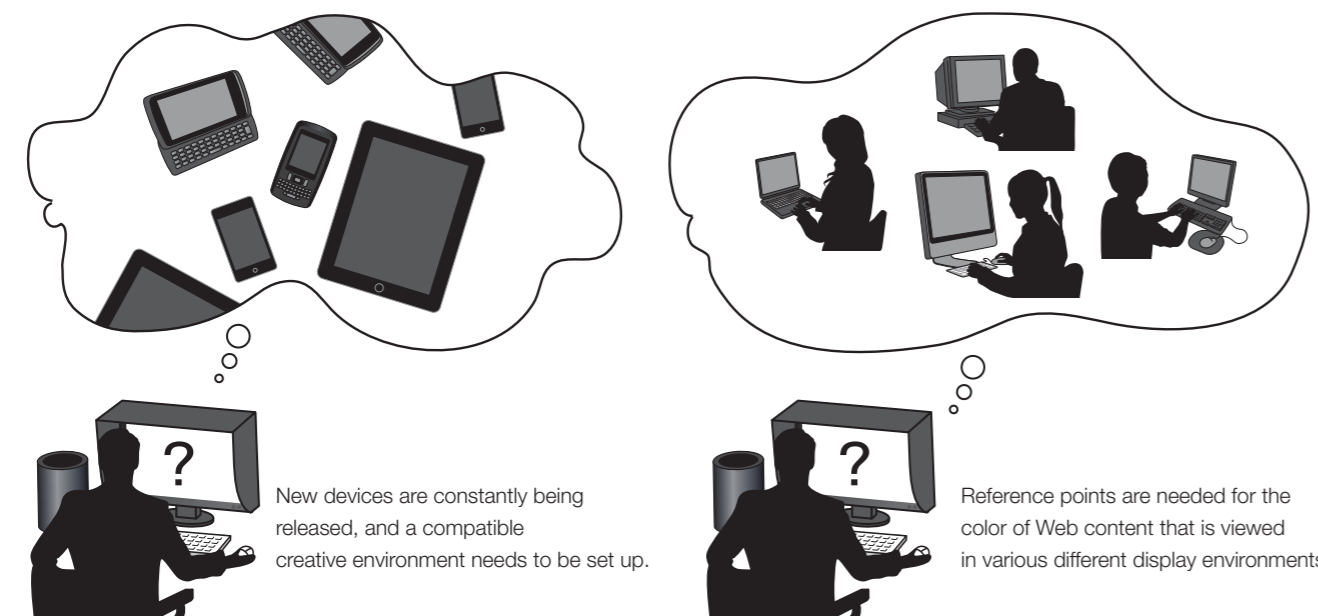
Extras

Creating digital content

Define the color space underpinning the work process

As IT has become more widespread and sophisticated in recent years, printers and designers who used to create content mainly aimed at printed materials are now having more and more opportunities to become involved in the creation of digital content.

Product advertising that uses digital media and e-commerce is expanding in scale and becoming more important with every passing year, and color reproduction in digital content is now a problem that cannot be ignored.

Actual subject matter

View on a tablet or portable device

Advertisement signage

Viewing conditions on various monitors using sales websites

Paper sales promotion materials

Viewing the colors in the same way would be ideal…

Workplace issues in the creation of digital content

New devices are constantly being released, and a compatible creative environment needs to be set up.

Reference points are needed for the color of Web content that is viewed in various different display environments.

Color matching for digital devices

Most of the end-use display devices, such as tablets and digital signage, do not have a color space or profile that can act as a reference when creating content. Nor are they installed with a color management function that would use such benchmarks.

It is therefore necessary to do the creative work on a monitor which can reproduce the tones of the display device in order to produce a design with the intended final color tones.

Reproduce the signage materials

Matching

Emulation display

Creative environment

Delivered in the intended color tones

Digital signage

Reproduce a tablet display

Matching

Emulation display

Creative environment

Digital signage

Tablet

Device emulation

Using ColorNavigator 6, the dedicated calibration software, the ColorEdge CG Series provides an emulation function for the color tones of devices such as tablet computers. Emulation is performed by reading color patches displayed in the web browser of the emulated device, and creating an ICC profile which is adopted for the ColorEdge's internal parameters. This function can be used with a variety of devices such as smartphones, portable game terminals, and CRT monitors as well as tablets.
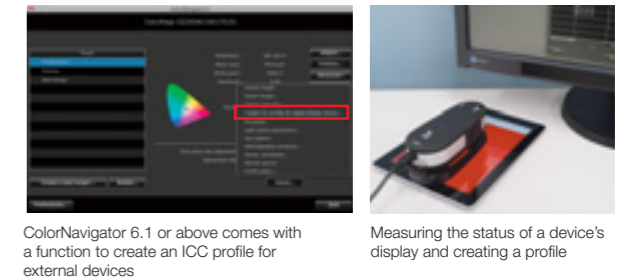
ColorNavigator 6.1 or above comes with a function to create an ICC profile for external devices
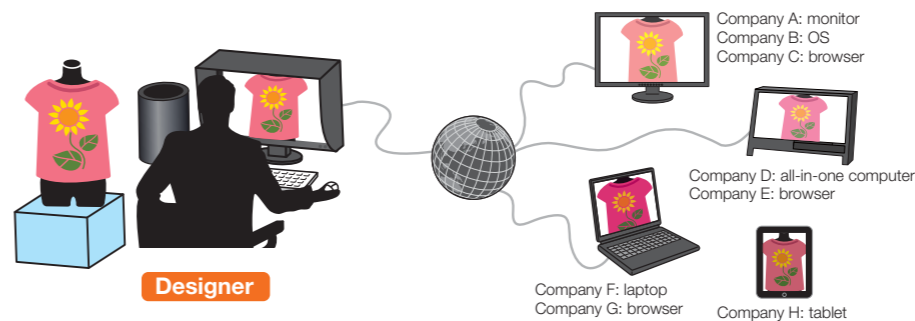
Measuring the status of a device's display and creating a profile

Device emulation requires a supported external sensor (i1Monitor, i1Pro, i1Pro 2, ColorMunki).
ColorNavigator 6 automatic measurement technology used to display on Web browsers is EIZO patented technology.

Color management of web content

There is an increasing need to create web content with accurate color display, particularly for e-commerce sites. However, the color tones on the devices displaying the web content depend on the web display environment of each user. It is thus effectively impossible to have all users view the content in the correct color tones.

Company A: monitor
Company B: OS
Company C: browser

Company D: all-in-one computer
Company E: browser

Company F: laptop
Company G: browser

Company H: tablet

Designer

When creating web content it is necessary to conform to the highly versatile sRGB, designated as the web standard by the World Wide Web Consortium (W3C) and to think about how to enable as many people as possible to see the intended colors.

Compatibility with web browser color management

There is great diversity in the color tones of the devices that display web content so recently more and more browsers are equipped with a color management function. Browsers such as Safari, the Mac standard, and Firefox in the Windows environment are compatible with color management functions, so it is desirable that images for use in web content be embedded with a profile. On the other hand, there are still many environments, such as the long-established Internet Explorer, that are incompatible with color management functions so it is probably safer to create images using the sRGB color gamut.
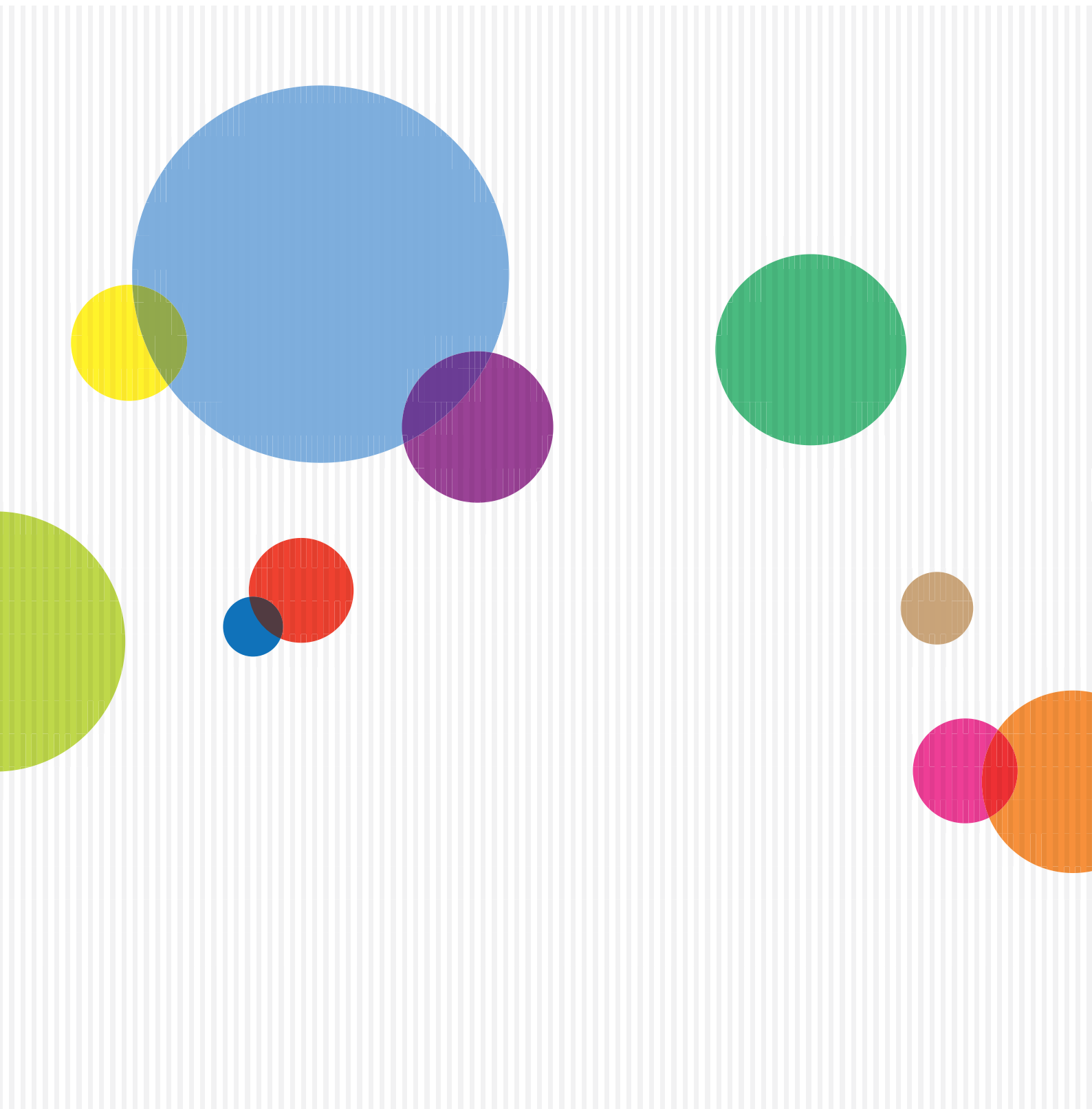
Embed a profile for users of OS or browsers that are compatible with color management

6500 K
80 cd/m²
gamma: 2.2

Check the images with the sRGB gamut, which closely resembles those of many devices

Adjust the monitor used for creative work to versatile sRGB with its large population of users

Deliver in the right colors to as many people as possible