

## What is new in CoPrA 10?

### ***Printer Profiling***

- New feature **Channel Settings** for automatic or user defined channel definition
- Improved **Multicolor Generation** for special cases
- **G7 Correction** for ICC profiles
- Create **Multicolor Profile Variant Reports**
- Measurement data are embedded in Multicolor profile variants
- Gamut volume info in **Curves** view

### ***DeviceLink/Printer Profiling***

- Better support for 4CLR profile variants in DeviceLink profiling
- Improved **Black Generation/Mink** setting
- Profile **Format** and profile **Size** are now embedded in the profile

### ***Update Profiling***

- Automatic detection of the required **Viewing Condition** when using spectral data in charts and profiles

### ***DeviceLink Profiling***

- G7 properties can now be applied to DeviceLink profiles
- Improved support for DeviceLink profiles with embedded profiles
- Improved automatic rendering modes

### ***DeviceLink Linearization***

- **G7 evaluation** in **Linearization Profile Report**
- Notification when using inadequate data for G7 gray balance

### ***Profile Manager***

- **Create Multicolor Profile Variants** in **Profile Manager**

## DeviceLink Editing

- Updated information for DeviceLink conversion and editing

## Image Conversion

- New **Zoom function** in **Image Conversion** preview

## Improvements and bug fixes

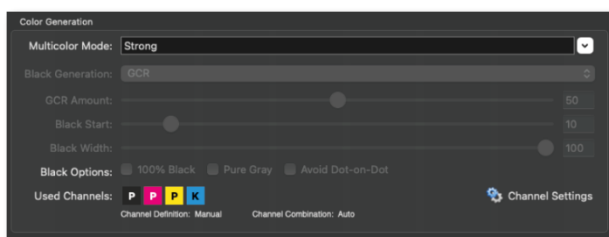
## Printer Profiling

### New Channel Settings for automatic and user defined channel definition

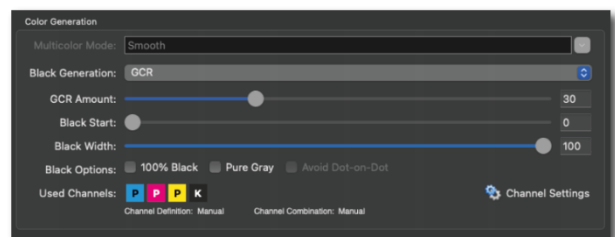
With CoPrA 10, the flexibility in handling color channels has been greatly improved. Now it is possible to process channels that are not defined in the correct order so that they can be used correctly in CoPrA. This can be done both automatically and manually and allows the greatest possible flexibility. This is made possible by the new **Channel Settings** option.

### Used Channels

In CoPrA, the default channel order in the measurement data has always been: Three primary colors (**P**), optional black (**K**) and optional additional (**Other**) colors (**O**). This definition was applied regardless of whether the order could be handled correctly or not.

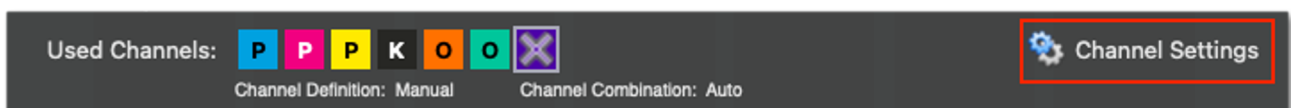


Used Channels with KCMY data



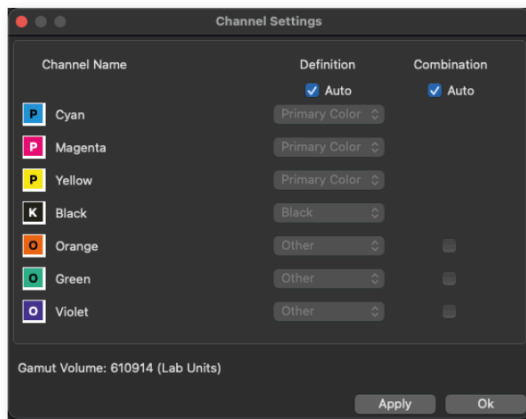
Used Channels with CMYK data

In the **Used Channels** section, the definition of the channels is displayed in addition to the color and whether a channel is used or not. By default, all channels of the profile are enabled, and all **Channel Settings** are set to **Auto**. Excluded channels are grayed out and marked with an X.

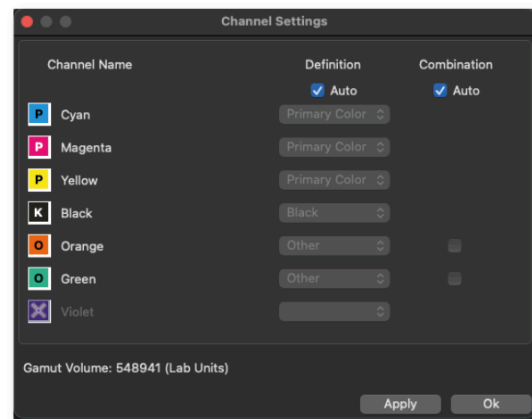


All settings that affect channels, such as channel definition, channel combination, or enabling/disabling channels, can be configured in the **Channel Settings**.

## Channel Settings



Default Channel Settings



Disabled Violet Channel

By default, all channels of the data are enabled. Channels can be enabled or disabled by clicking on the icon of the desired channel. It is possible to exclude multiple channels. Click **Apply** to confirm the changes.

## Definition

The channel **Definition** determines the assignment of the channels, i.e., whether it is a primary color (e.g., CMY), black or another gamut-extending (spot) color. This assignment can be done automatically or manually. By default, the order is set automatically (**Auto**).

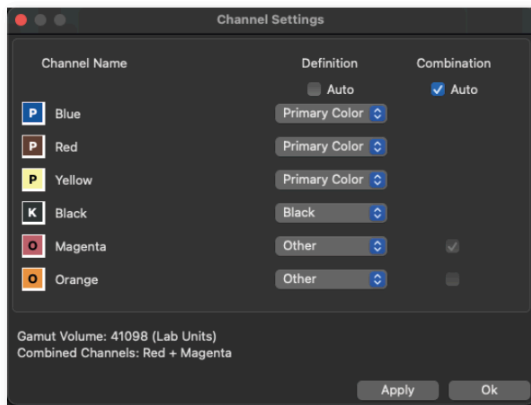
An important element of the channel **Definition** is the inherent flexibility to achieve the maximum gamut volume from the measurement data used.

**Note:** There are several reasons why measurement data do not comply with the required printing sequence.

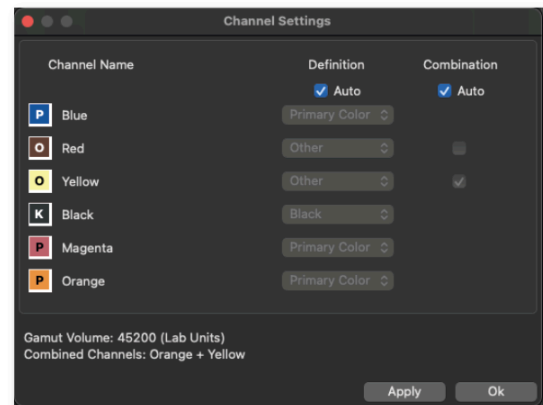
For example, in some applications, a specific color sequence must be adhered to on printing presses, and the RIP assigns a linearization to this sequence. The profiling chart is then defined and printed based on this sequence.

In other applications, such as ceramic printing, standardized CMYK colors are not used, and a specific sequence is not provided.

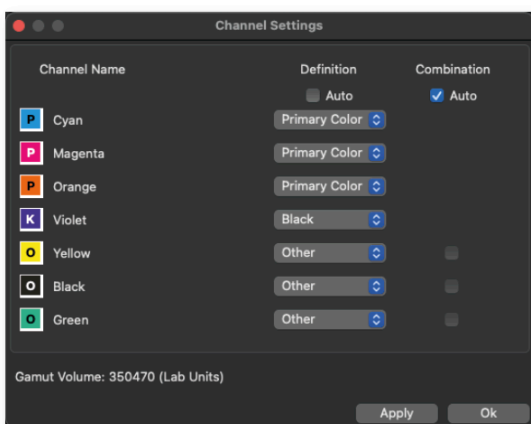
In addition, different densities of the colors used can result in colors being swapped to obtain a larger color space (e.g., **Magenta** and **Red**).



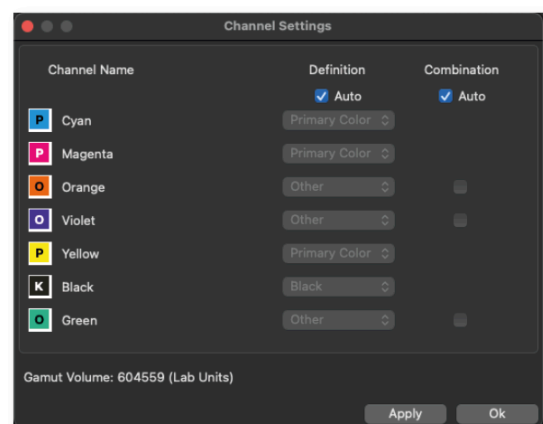
Previous Standard (first three primaries, black + others)



New Default Definition with increased Gamut Volume



Previous Standard (first three primaries, black + others)



New Default Definition with increased Gamut Volume

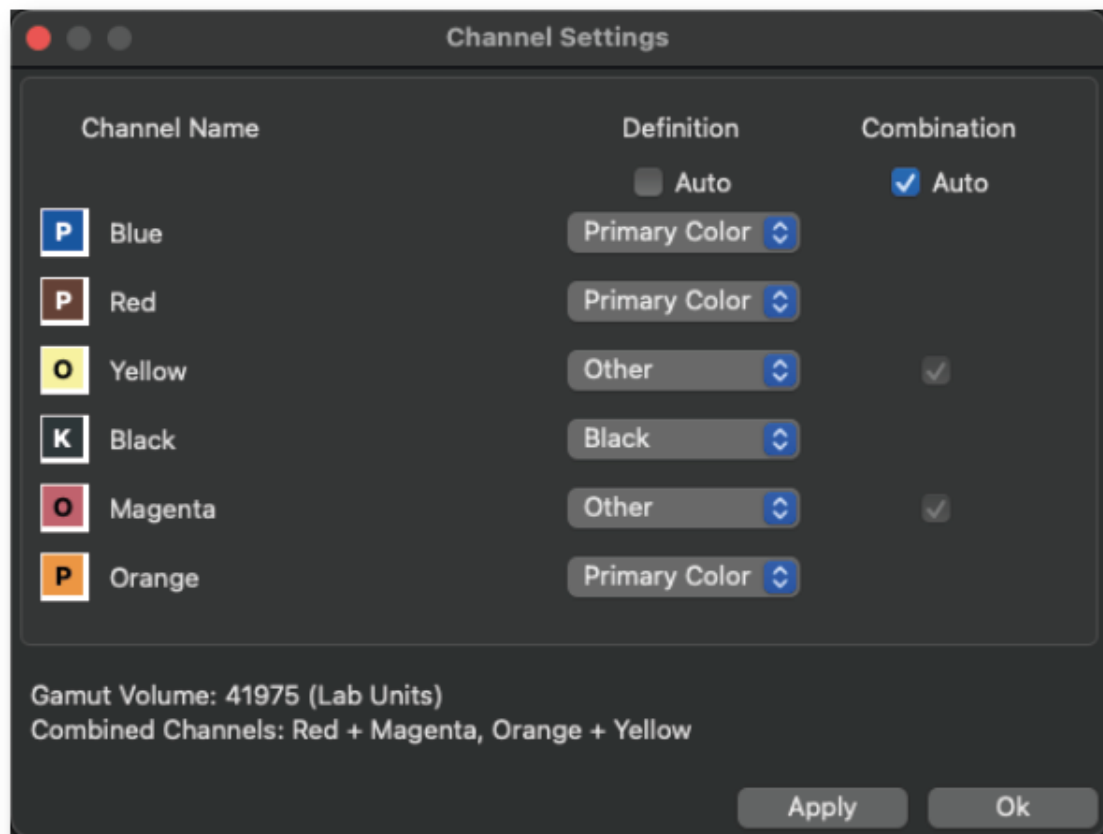
If **Auto** is enabled, CoPrA automatically calculates and selects the ink definitions and the combinations with the largest gamut. The size of the **Gamut Volume** and the combined channels are displayed.

If necessary, the channels can be assigned their own definition manually. There are three options per channel available.

**Primary:** The data must contain three primary colors.

**Black:** One channel can be defined as black.

**Other:** Additional colors get the status **Other**.



Manual Definition with user defined primaries, black + others

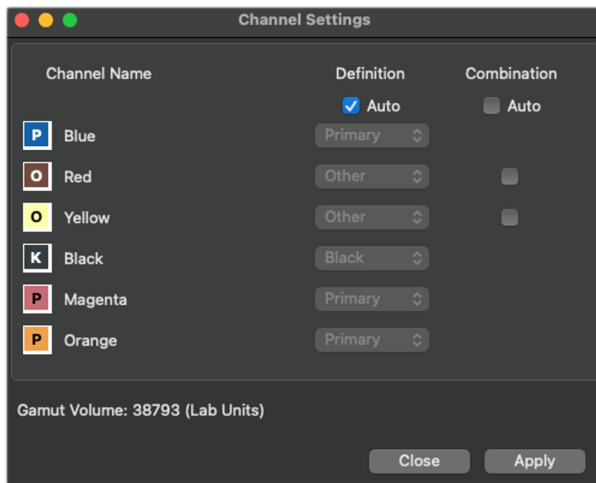
After defining the channels and confirming the settings with **Apply** the **Gamut Volume** is calculated and displayed. By clicking **OK** the changes are applied and the window is closed.

### **Combination**

The channel **Combination** specifies the Multicolor channels which are to be combined to expand the color gamut. This can be assigned automatically (which is the default for measurement data  $\geq 4\text{CLR}$ ) or manually.

**Auto:** This checkbox is enabled by default for all Multicolor presets. When enabled, CoPrA automatically calculates and selects the ink combinations with the largest gamut and indicates the combined channels. The combined channels are displayed in the **Channel Settings** window and also below the **Curves** and **Gamut** previews. In both previews CoPrA shows the impact of the combined colors by the **Gamut Volume** number.

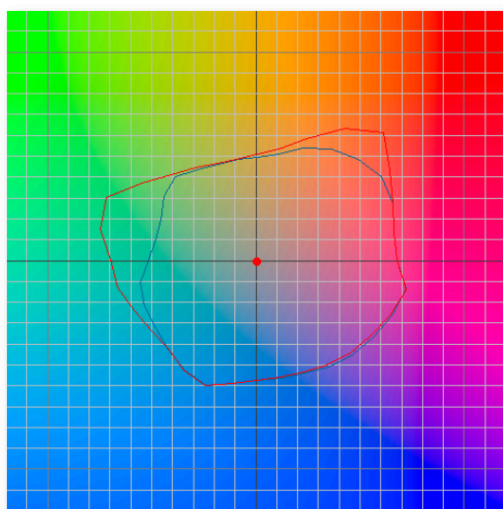
If the **Auto** checkbox is disabled, the channels can be defined manually by clicking the checkboxes of the desired combinable channels. If the additional inks are not to be combined with the four standard inks, the channels of the additional inks can be disabled.



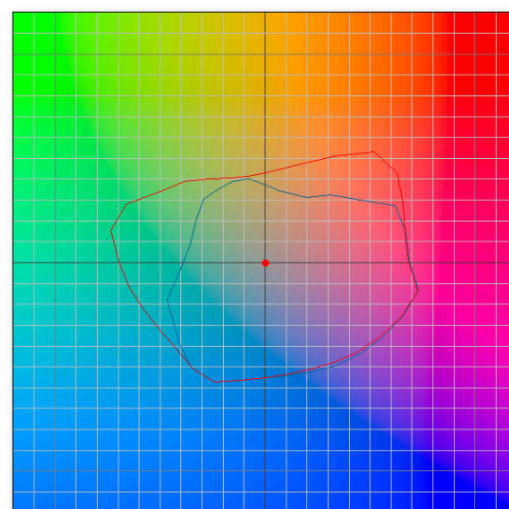
All profile settings, including those from the **Channel Settings** window, are embedded in the profile, and can be imported and used to reproduce settings by dragging an ICC profile onto the **Setting** drop-down menu. The name of imported profiles is given the suffix (**imported**).

## Improved Multicolor Generation for special cases

The multicolor generation has been improved compared to CoPrA 9. In some special cases this can mean an extension of the color gamut by up to 20%.



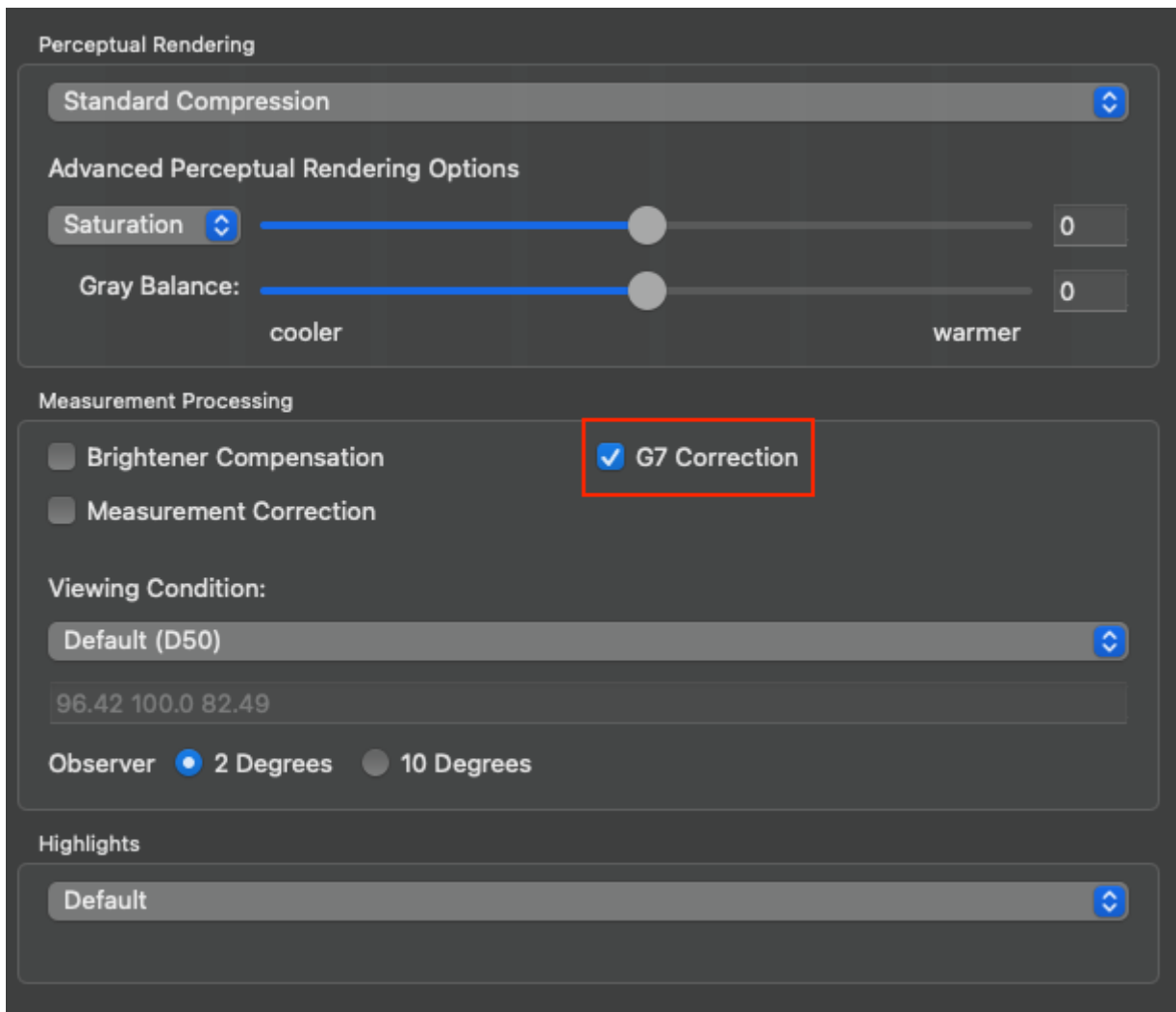
2D view at L\* 50  
Example 1: Red - CoPrA 10 / Blue - CoPrA 9.0.2



2D view at L\* 50  
Example 2: Red - CoPrA 10 / Blue - CoPrA 9.0.2

## G7® Correction in ICC profile

The new **G7 Correction** in the **Measurement Processing** section of the **General** tab corrects the tonal value curves of the measurement data to correspond to the gray balance conditions of the G7® method and includes these adjustments in the resulting ICC profile.

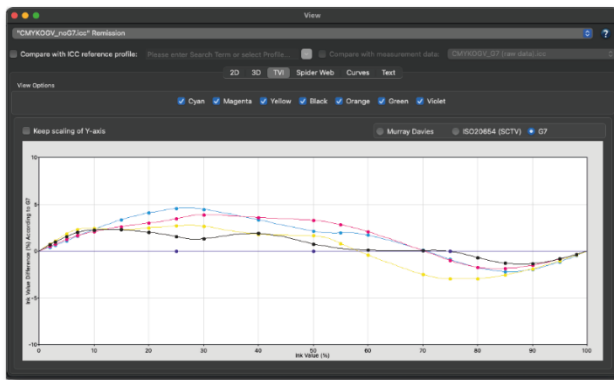


The screenshot displays the CoPrA software interface with the following settings:

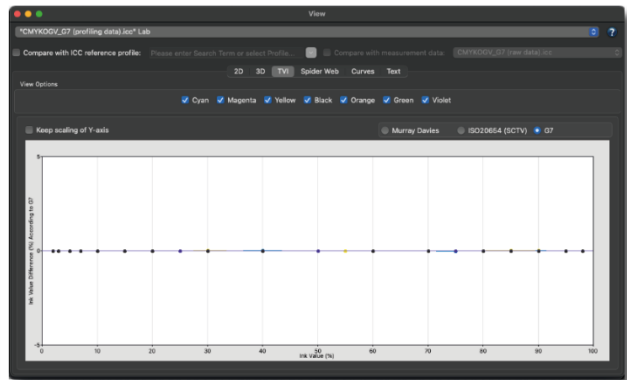
- Perceptual Rendering**
  - Standard Compression: [Dropdown]
  - Advanced Perceptual Rendering Options
    - Saturation: [Slider] 0
    - Gray Balance: [Slider] cooler to warmer 0
- Measurement Processing**
  - Brightener Compensation: ☐
  - G7 Correction: ☒** (highlighted with a red box)
  - Measurement Correction: ☐
  - Viewing Condition:
    - Default (D50): [Dropdown]
    - 96.42 100.0 82.49
    - Observer: ☒ 2 Degrees ☐ 10 Degrees
- Highlights**
  - Default: [Dropdown]

With the G7® method, the CMY curves are adjusted to produce the most neutral gray hue possible with defined lightness across the entire gray balance.

The **G7 Correction** is defined to work with CMYK only. However, it is possible to apply the G7® method to the CMYK parts of a Multicolor measurement file and the additional (Multicolor) channels will be corrected according to **ISO 20654** (also known as **SCTV**, Spot Color Tone Value).



ColorAnt - **TVI View** according to G7 of CMYKOGV.icc without **G7 Correction** in CoPrA



ColorAnt - **TVI View** according to G7 of CMYKOGV.icc with **G7 Correction** in CoPrA

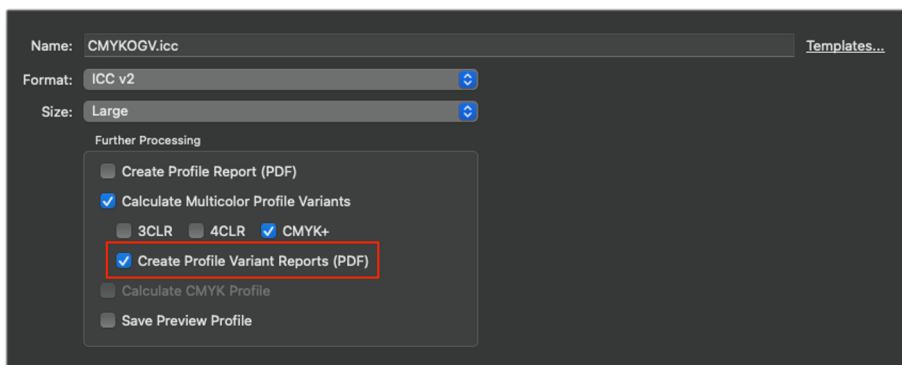
The **G7 correction** option is also included in the Profile Report.

## Create Multicolor Profile Variant Reports

Based on the selection of the calculated **Multicolor Profile Variants** the dedicated **Profile Variant Reports** will be created and stored in the dedicated **Documents** folder.

Mac: /Users/USERNAME/Documents/CoPrA/Reports/

Win: C:\Users\USERNAME\Documents\CoPrA\Reports



## Measurement data are embedded in Multicolor profile variants

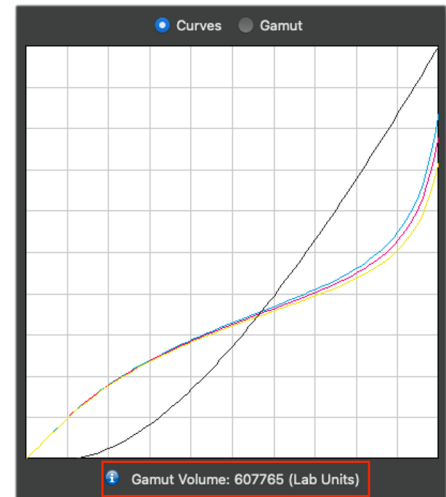
The extracted and used measurement data for the **Multicolor Profile Variants** are embedded in the respective profiles. The measurement data is identical to that of ColorAnt if you manually deactivate the channels in the **Edit Primaries** tool.



## Gamut Volume info in Curves view

The **Gamut Volume** information is now available in the **Curves** view, too.

The **Gamut Volume** is calculated and expressed in Lab units using the absolute colorimetric rendering intent which allows finding the settings that produce the largest gamut (highest number) easily.

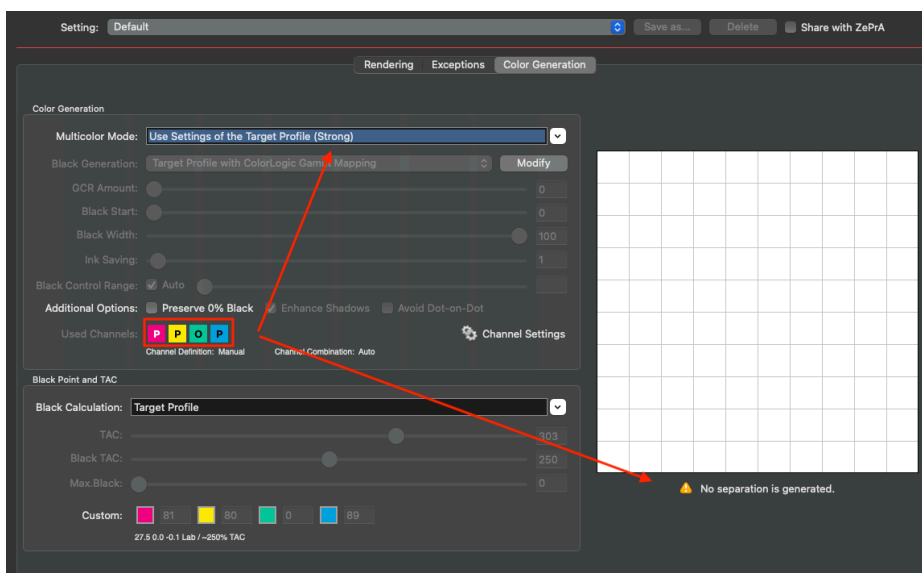


## DeviceLink/Printer Profiling

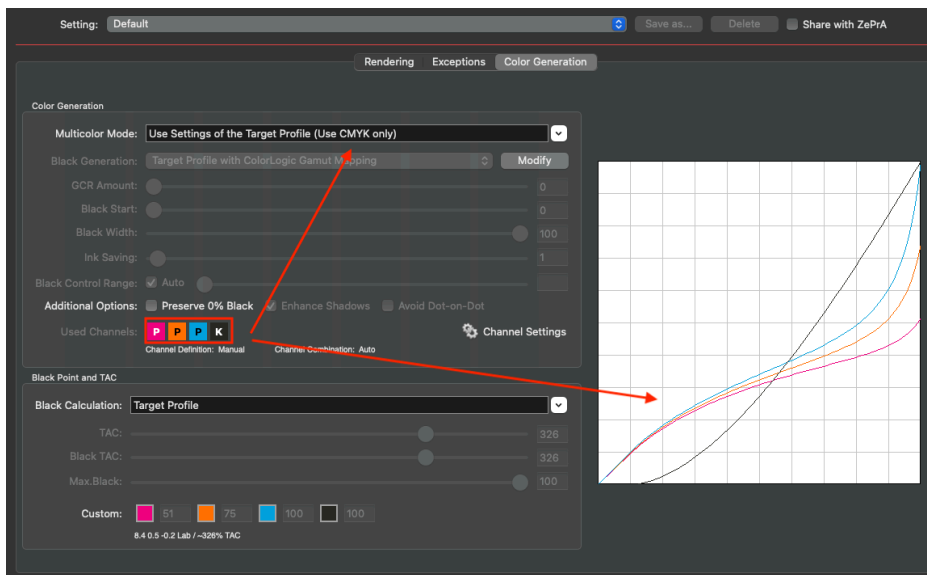
### Better support for 4CLR profile variants in DeviceLink profiling

For the respective 4CLR color space, the profile variants are automatically created with the correct **Multicolor Mode**:

Profiles without a black channel are created with the **Multicolor Mode Strong**, since no black separation is generated.



Profiles that contain a black channel are created with the method **Use CMYK only** and generate a black separation.

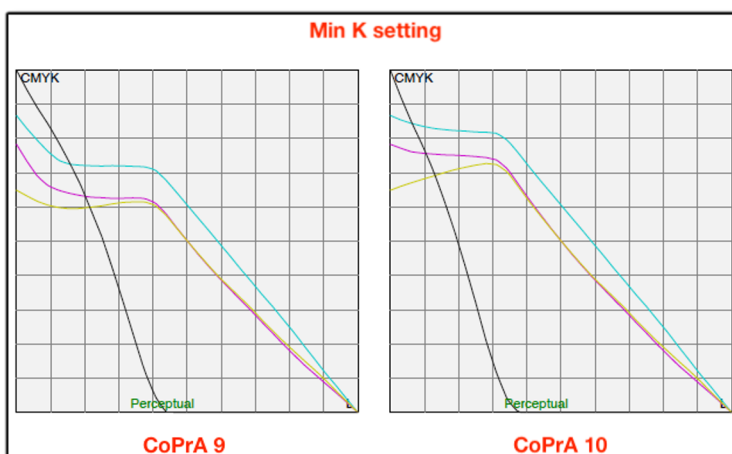


In addition, the presets **Default** and **Proofing** for 4CLR target profiles in the DeviceLink profiling now use the Multicolor mode **Use Settings from Target Profile** in order to automatically use the correct **Multicolor Mode** which is embedded in the 4CLR profile variants.

This new procedure simplifies and speeds up the correct use of 4CLR profiles in DeviceLink profiling.

## Improved Black Generation/MinK setting

The use of black when using the **Black Generation - MinK** setting has been further reduced so that even less black and more CMY is used in the separation.



## Profile *Format* and profile *Size* are now embedded in the profile

The profile ***Format*** and profile ***Size*** options are now embedded in the profile. They can be imported and used to reproduce settings by dragging the ICC profile onto the ***Setting*** drop-down menu. The name of imported profiles is suffix with ***(imported)***.

## Update Profiling

### Automatic detection of the required *Viewing Condition* when using spectral data in charts and profiles

***Update Profile*** is an extremely practical tool for digital printing, e.g., for textile printing, to compensate for drifts and color shifts using a small printed test chart.

With CoPrA 10, the ***Viewing Condition*** is now taken into account when updating printer profiles. In textile printing, the ***Viewing Condition*** D65 and 10 degrees ***Observer*** is the default rather than D50 and 2 degrees as in graphic arts.

If both the profile to be updated and the update test chart use spectral data, the required ***Viewing Condition*** is now automatically detected. The spectral data is then converted according to this ***Viewing Condition***.

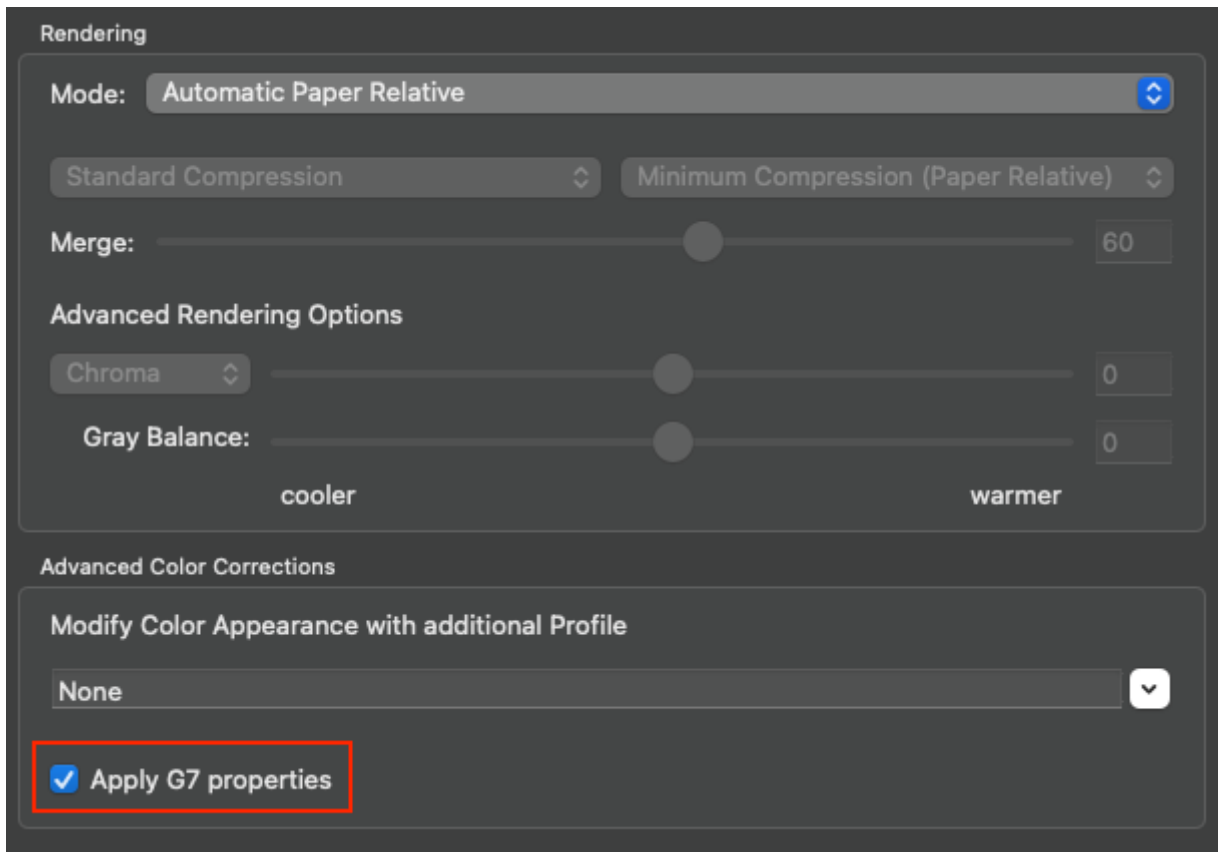
Previously, a workaround had to be applied using the ***CIE Conversion*** tool in ColorAnt to achieve what can now be done quickly and easily by CoPrA 10.

## DeviceLink Profiling

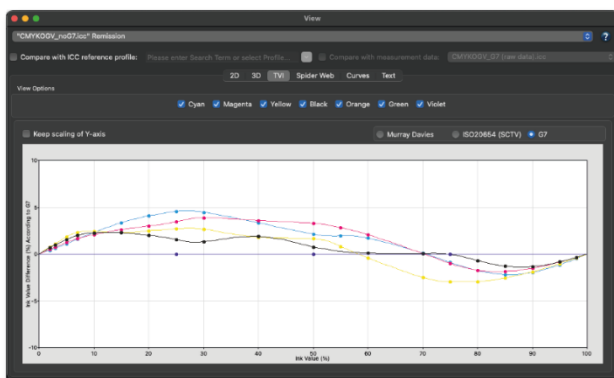
### G7<sup>®</sup> properties can now be applied to DeviceLink profiles

When using a source profile that complies with a certain standard (e.g., the G7<sup>®</sup> method), this property may be lost or changed when converting to a target profile.

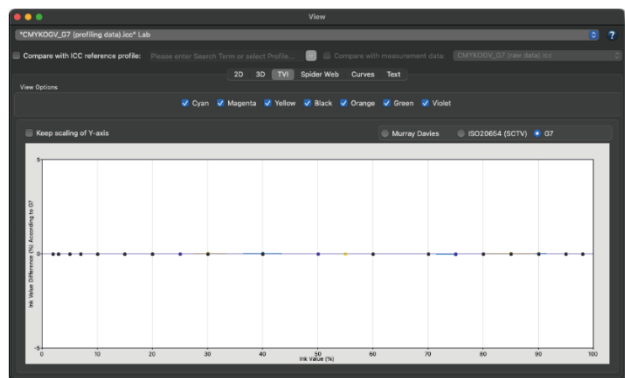
The new option ***Apply G7 properties*** will add a correction so that the DeviceLink conversion complies to the G7<sup>®</sup> method.



**Note:** The new option is not limited to G7® based source profiles and will add the correction to any DeviceLink conversion when enabled.



ColorAnt - **TVI View** according to G7 of CMYKOGV.icc  
without **G7 Correction** in CoPrA



ColorAnt - **TVI View** according to G7 of CMYKOGV.icc  
with **G7 Correction** in CoPrA

The **Apply G7 properties** option is also included in the **Profile Report**.

With the addition of this new option, the section has been renamed into **Advanced Color Corrections** including the well-known **Modify Color Appearance with additional Profile** option.

## Improved support for DeviceLink profiles with embedded profiles

When a DeviceLink profile is selected in which source and target profiles are embedded (including SaveInk profiles), CoPrA can use these profiles directly from the DeviceLink.

This eliminates the need to install the profiles on the system before the DeviceLink profile is used.

## Improved Automatic Rendering Modes

So far, when using the **Automatic Paper Absolute** or **Automatic Paper Relative** rendering modes to convert from the source to the target profile, it may have happened that a negative lightness value was calculated in certain circumstances. This caused the DeviceLink profile to produce slightly darker images when applied.

This has now been corrected and a negative lightness value is no longer calculated automatically.

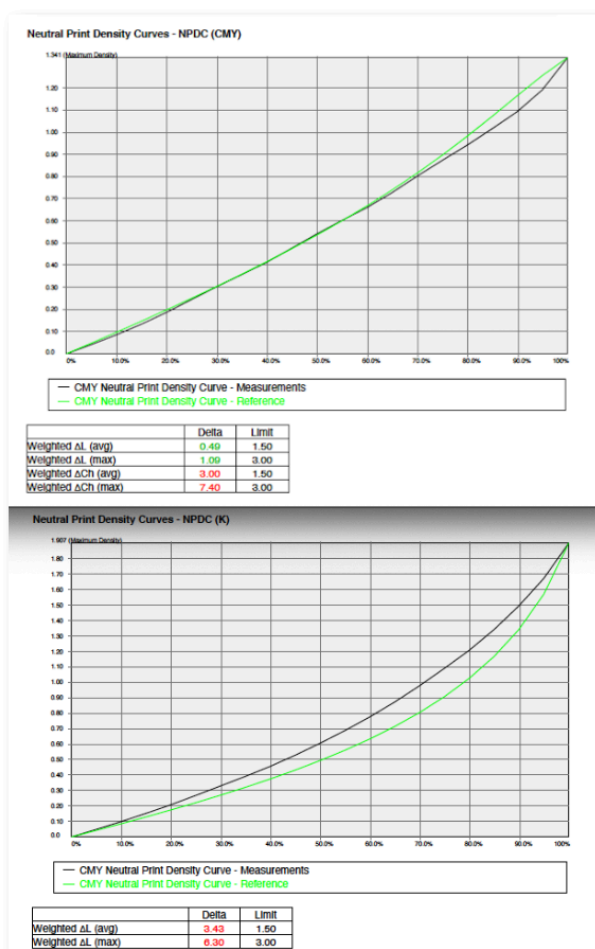
If the lightness still needs to be adjusted, switch to the **Custom** rendering mode and adjust the **Lightness** value accordingly under the **Advanced Rendering Options**.

## DeviceLink Linearization

### G7® evaluation in Linearization Profile Report

When using the linearization calculation mode **Linearization according to G7 (CMYK only)** or **G7 (CMYK) and ISO20654 (spot colors)**, the linearization profile report now also contains the G7 evaluation based on the measurement and calculation data in addition to the **Tonality / Gray balance according to G7®** and the **NPDC (CMY)** and **NPDC (K)** curves.

Using various categories, it is easy to see whether a limit has been exceeded (**red values**) or not (**green values**).



Linearization Profile Report – Measurement data



Linearization Profile Report – Calculated data with G7 calculation mode

## Notification when using inadequate data for G7® gray balance

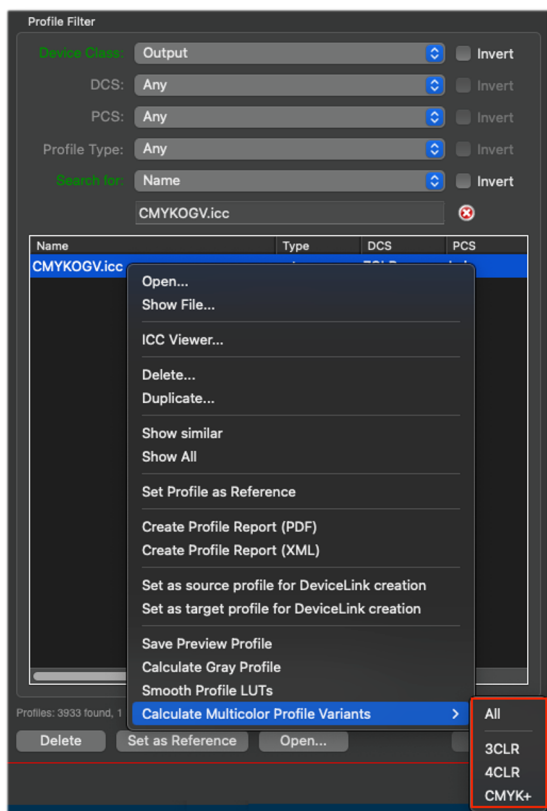
When using the linearization calculation mode **Linearization according to G7 (CMYK only)** or **G7 (CMYK) and ISO20654 (spot colors)**, the number of composite gray patches in the linearization chart is checked. If there are not enough composite gray patches, a notification message will be displayed.

 It is recommended to use a data set with more composite gray patches to improve the accuracy of the gray balance curves.

## Profile Manager

### Calculate Multicolor Profile Variants in Profile Manager

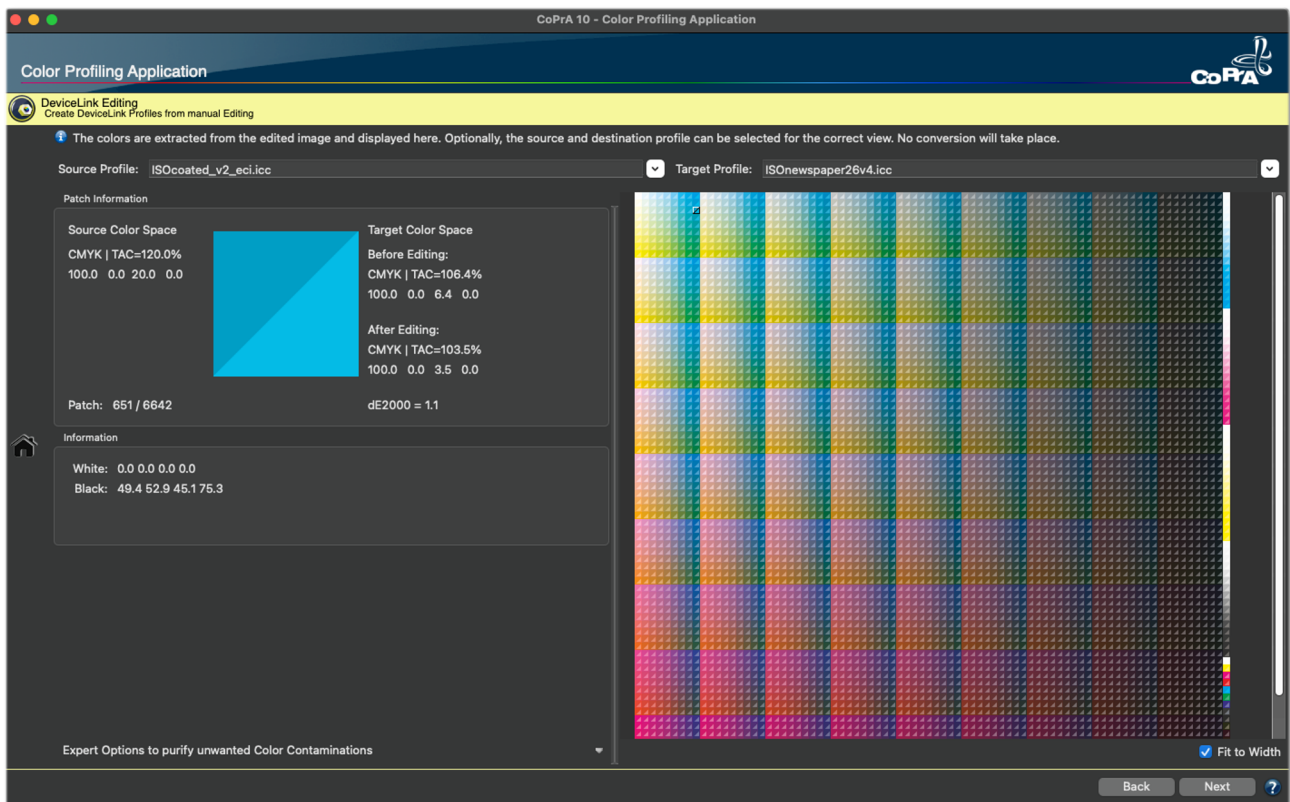
Different profile variants of a Multicolor profile can now also be created in the **Profile Manager**. It is possible either to automatically create different variants such as 3CLR, 4CLR as well as CMYK+ at the same time by selecting the **All** option or by selecting one of them.



## DeviceLink Editing

### Updated information for the DeviceLink conversion and editing

The **DeviceLink Editing** workflows have been improved in the settings window by simplifying the profile selection and adding useful information to the **Patch information** section.



If a profile is embedded in the open **EditTarget**, it is automatically selected as the target color space. If this is not the case, the **Source Profile** and the **Target Profile** are also selected automatically if they could be found on the system or if the profiles were embedded in the DeviceLink profile.

If the profiles cannot be found automatically, the source and the target profile can be assigned manually. Assigning profiles is useful as color patches will then be displayed with true colors in CoPrA as well. A further advantage of edited DeviceLinks with assigned source and target profiles is that these profile information are stored in the PSID tag of the created DeviceLink profile, so it can be used by intelligent workflow solutions like ColorLogic's smart color server ZePrA to automatically create configurations.



**Note:** For the created DeviceLink profile the source and target profiles are of no importance.

### **Patch Information**

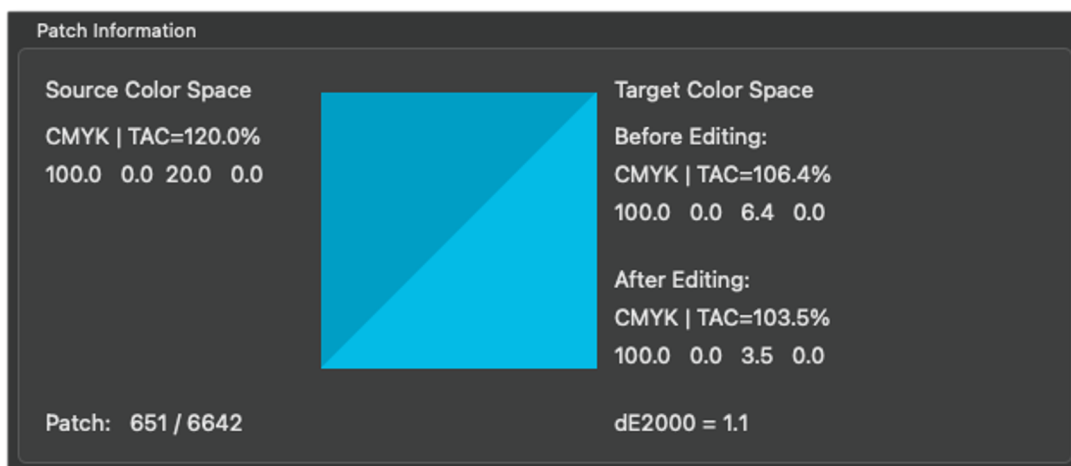
When moving the mouse over the patches on the right you can now assess the modifications for each color patch.

In the **Source Color Space** section, the original unedited **EditTarget** is used as a reference.

In the **Target Color Space** section, two areas are displayed:

- The **Before Editing** section shows the pure conversion to the target profile.
- The **After Editing** section additionally shows the impact of the edits. The difference between the two can be seen in the TAC, the DCS values and as well in the DeltaE2000 value.

The reference value of each color patch is located in the upper left half of the diagonally split color patch, the edited value is in the right lower half. If you move the mouse pointer over the chart, the color patches are displayed along with other color information including a difference display (color space, TAC value and DeltaE2000 differences).

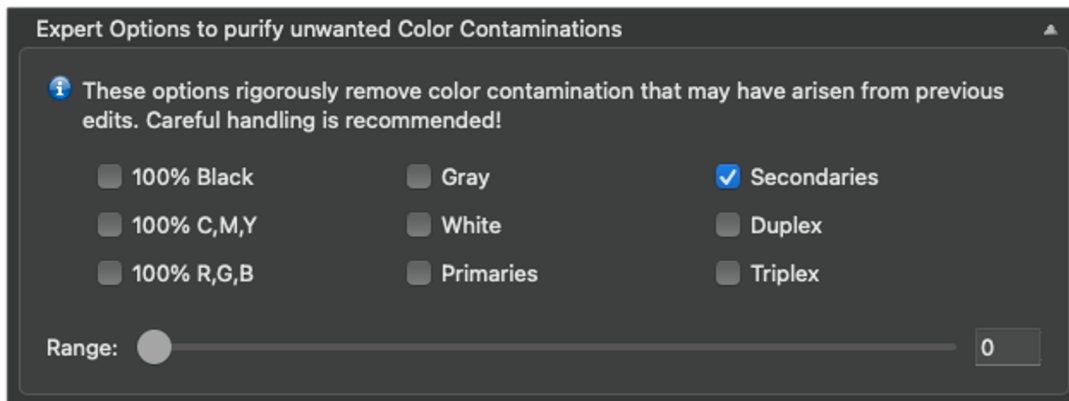


**Example:** Converting the edited image from the source profile ISOcoated\_V2\_eci.icc to the target profile ISOnewspaper26v4.icc had an impact on the yellow channel, which was reduced from 20% to 6.4% (**Before Editing**).

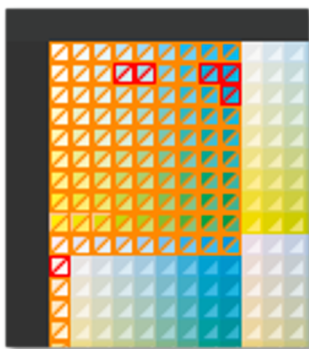
The edits to the image also had an effect on yellow - it was reduced to 3.5%. The difference after conversion and editing has a dE2000 of 1.1 (**After Editing**).

### **Expert options to purify unwanted color contaminations**

In contrast to the exceptions when creating DeviceLink profiles from ICC profiles, the exceptions under **Expert options to purify unwanted color contaminations** in the **Editing** tool ensure that any contamination caused by manual editing of the **EditTargets** is removed. Among other things, these exception rules define how pure colors, secondaries, gray, duplex and triplex colors are structured in the DeviceLink. The selection of these rules considerably determines the quality of your DeviceLink profile.



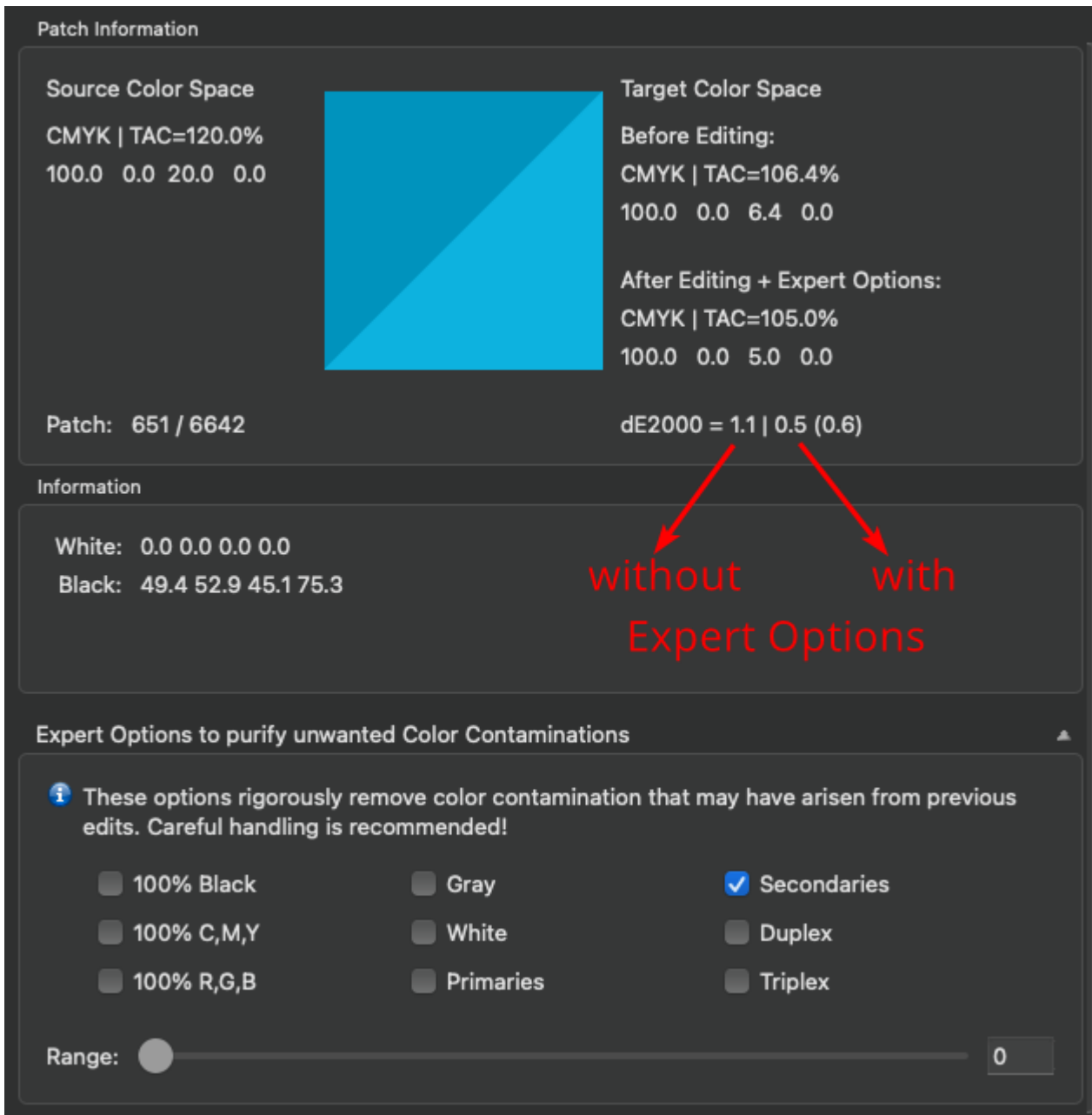
All color patches that are handled by the selected exception are highlighted in the graphical representation by an orange border. Color patches that are affected by the selected exception are highlighted in red.



In addition, under **Patch Information/Target Color Space/After Editing + Expert Options** the color space and TAC value are updated and the DeltaE2000 value with exception (in the middle) or without exception (on the left) is shown.

The calculated DeltaE2000 distance between these two values (**After Editing** and **After Editing + Expert Options**) is the value in brackets. This corresponds to the DeltaE2000 value from CoPrA 8 and 9 and defines the impact of the **Expert Options** to the edits.

Typically, exceptions are not applied as this would change the edit, but sometimes unwanted changes occur during manual edits, which can then be removed using the exceptions.



**Patch Information**

Source Color Space	Target Color Space
CMYK   TAC=120.0%	Before Editing:
100.0 0.0 20.0 0.0	CMYK   TAC=106.4%
	100.0 0.0 6.4 0.0
	After Editing + Expert Options:
	CMYK   TAC=105.0%
	100.0 0.0 5.0 0.0

Patch: 651 / 6642

dE2000 = 1.1 | 0.5 (0.6)

**Information**

White: 0.0 0.0 0.0 0.0  
Black: 49.4 52.9 45.1 75.3

**Expert Options to purify unwanted Color Contaminations**

**i** These options rigorously remove color contamination that may have arisen from previous edits. Careful handling is recommended!

<input type="checkbox"/> 100% Black	<input type="checkbox"/> Gray	<input checked="" type="checkbox"/> Secondaries
<input type="checkbox"/> 100% C,M,Y	<input type="checkbox"/> White	<input type="checkbox"/> Duplex
<input type="checkbox"/> 100% R,G,B	<input type="checkbox"/> Primaries	<input type="checkbox"/> Triplex

Range:  0

without  
Expert Options  
with

**Example:** When the **Secondaries** expert option is applied to the sample workflow, it affects again the Yellow channel. The exception increases the value for yellow from 3.5% to 5% and the dE2000 distance to before editing is now 0.5 (**After Editing + Expert Options**).

The calculated dE2000 distance between these two values (3.5% **After Editing** and 5% **After Editing + Expert Options**) is the value in brackets (0.6).

When moving the mouse pointer over a color patch, it is highlighted by a black or white frame and the source and target color space values are displayed. By pressing the 'Alt' key on the keyboard the color patch is captured allowing to quickly and easily check whether and to what extent it is affected by an exception. Exceptions which are not available are grayed out. This may be the case when a dependency between exceptions exists, or when exceptions are not relevant for a specific color space.

## Image Conversion

### New Zoom function in Image Conversion Preview

The **Image Conversion** has been extended by a zoom function in the image preview. This allows a closer look at image details and thus a better comparison of the complete user-defined color management workflow on the selected image.

There are three ways to adjust the zoom:

1. Via the mouse wheel - mouse wheel up increases, mouse wheel down decreases the zoom factor.
2. Via percentage input in the zoom input field.
3. Using the arrow keys next to the zoom input field.



## Improvements and bug fixes

### General

Includes the latest versions of ColorAnt (9.1) and Measure Tool (6.1).

macOS support for Ventura (13.x).

For creating Multicolor profile variants and profile variant reports, the information on profiling progress (in the bottom bar and the **Batch Overview**) has been improved.

### DeviceLink Editing

The DeviceLink Editing for DeviceLinks from CMYK to Lab color space and vice versa are now supported, when using the workflows **Create new DeviceLink** and **Create DeviceLink from Edited Image**.

### SaveInk

The link to the online help in the **SaveInk/Advanced/Exceptions/Edit** tool has been corrected.