GMG SpotColor Editor
Quick Start Guide for Spot Color Proofing (EN)

Imprint

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1. Getting Started

1.1 Welcome to GMG SpotColor Editor

Note This documentation refers exclusively to GMG SpotColor Editor integrated in GMG ColorProof / GMG FlexoProof / GMG DotProof.

GMG SpotColor Editor is a profile editor which allows you to edit or create spot color **sets** and spot color **profiles** for the color management of spot colors in GMG ColorProof.

A spot color set contains all information required for the color management of spot colors for a certain set of printer and media types. Each spot color set in GMG ColorProof is linked to a spot color **database** (*.db3). GMG ColorProof provides you with spot color databases for widely used spot colors, for example, from Pantone, DIC, or HKS.

Example: The spot color set **PANTONE® GOE coated - Ex880 GMGsemimatte250** includes all spot colors of the **PANTONE® GOE coated** set for **Epson Stylus Pro x880** printers and GMG ProofPaper semimatte 250.

Each spot color set can be duplicated, edited and enhanced with further spot colors. If you want to simulate not only full tones, but also spot color tints, you can either create a spot color profile with several fulcrums or create a **spot color gradation** (see "Simulating Spot Color Tints" on page 11) and assign the gradation to one or multiple spot colors.

Possible applications

- create custom spot color libraries
- extend your proofing color space with **special ink** spot colors
- more flexibility with paper tint neutral spot colors
- **calibrated** spot color sets for a higher stability of the print output

Setting up a new spot color—Overview

To simulate a spot color on a proof system, you need to define target values. In GMG SpotColor Editor you can either directly enter Lab target values or **measure** them from a reference print. The target values are computed with the color space of the printer-medium-combination (*.csc gamut file) to create CMYK output values for the proof system.

If you need to proof spot colors within tight tolerances, it is recommended to **optimize** the spot color profile by printing and measuring a specific test chart. The measured values are saved as current values and are compared to the target values. If the delta E deviation is too high, the profile is recalculated. The profile can be optimized until the delta E between target values and current values meets your requirements.

Tip Automatic **spot color optimization**: in combination with GMG ProofControl Inline, spot colors can be quickly and automatically optimized in GMG ColorProof when using a proofer with an integrated measuring device. The optimization wizard guides through the process with step-by-step instructions. For more information, please see the separate documentation on GMG ColorProof.

1.2 What's New?

This chapter summarizes all major changes that have been applied to the program since the latest release. It is recommended that experienced GMG SpotColor Editor users read the information provided in this chapter very carefully, so that they can take full advantage of all new software features. Please follow the links for more information.

What's New in GMG SpotColor Editor Included in GMG ColorProof Version 5.2.3?

Advantage	*New Feature*	*See Also*
Extend your proofing color space	Flexo proofing is characterized by far greater substrate and spot color diversity. As some printers can print **special inks** such as White or Metallic Silver, you can now use GMG SpotColor Editor to mix your own **spot colors** with these inks which allows for a wide range of colors, such as gold, copper and bronze. This paves the path for special effects which have not been possible with conventional inkjet printers but are commonly used in today's packaging print process.	"Special Ink Spot Colors" on page 15

What's New in GMG SpotColor Editor Included in GMG ColorProof Version 5.2?

Advantage	*New Feature*	*See Also*
Transparency on the results that can be expected from the target printer-medium combination	The feature already known from GMG ProfileEditor **Estimate Current Values from CMYK**, has now been added to GMG SpotColor Editor. Out-of-gamut colors can now be easily detected by comparing Current Values with Target Values, without the need to measure "real" Current Values. You can select the display option **Automatic Update of Estimated Current Values** to automatically refresh the Current Values each time CMYK values (**Colors**) are changed.	
Compatibility with world-wide standards	Choose the **Color Difference Formula** you want to use for comparing Current Values with Target Values: delta E76, delta E94, delta E2000, or CMC(2:1)	
More **flexible** spot color simulations for the packaging business	You can now subtract the paper tint from spot color profiles to create **paper tint neutral** spot colors.	"Paper Tint Neutral Spot Colors" on page 10
Enhanced user friendliness	Revised **user interface**: A more descriptive terminology is now being used for the spot color options. The options are logically grouped in the window. Changes are only cosmetic. The underlying functionality has **not** been changed.	"Renamed Software Options" on page 7

1.3 Renamed Software Options

The following options have been renamed and regrouped for GMG SpotColor Editor included in GMG ColorProof Version 5.2. Changes are only cosmetic. The underlying functionality has **not** been changed.

Previous Name	*New Name*
Calibrated Spot Color Set check box selected	**Calibrated Set (Use Gamut Defined by Calibration)** radio button
Calibrated Spot Color Set check box deselected	**Uncalibrated Set (Use Full Gamut of Printer)** radio button
More Parameters group	**Overprinting Behavior** group
With Color Profile check box	**Convert to Color Profile (Use Gamut of Profile/MX4)** check box
IRIS separation mode in drop-down list	**Max Black Generation** separation mode in drop-down list
White Spot Color check box	**Special Inks** separate settings

1.4 File Formats in GMG SpotColor Editor

The following file formats are used in GMG SpotColor Editor.

Spot color database (*.db3)

Each spot color is saved with Lab target values in a spot color database. To reflect different printing conditions, you can set up several spot color sets in a database, which can be selected for proofing in GMG ColorProof in the Manual Job Manager or in a workflow.

Spot color gradation (*.sfg)

As spot colors are generally not subject to the MX4/MX5 color conversion, spot color gradation profiles can be assigned to a spot color in the spot color database or to a job in the general job settings. Since adding fulcrums to a spot color in GMG SpotColor Editor is not sufficient to simulate the dot gain behavior in GMG DotProof and GMG FlexoProof, a gradation can be used to define the dot gain behavior of spot colors . In ContoneProof mode, a spot color gradation is a simple but effective alternative to defining several fulcrums for each spot color. The latter is more accurate, takes differences in the dot gain for individual color channels into account, but also requires a press proof and measurement for each spot color. With a spot color gradation, it is possible to perform a global correction for multiple spot colors showing a similar behavior.

Gamut /Full Gamut file (*.csc)

Colors that can be accurately represented by a certain printer-medium combination. If colors are out-of-gamut, they cannot be adequately represented by the target output device. The gamut file describes the color space the printer can print according to its technical specifications and the selected medium in a calibrated state. Gamut files can also be viewed in the GMG ProfileEditor GamutViewer to display a 3d model of the printer gamut, for example, if you want to check whether a certain (spot) color is inside or outside the gamut.

Full gamut files describe the complete color space of the printer-medium combination **before** calibration. The full gamut file is used for calculating uncalibrated spot color simulations, using the maximum color space of the printer. The gamut (*.csc) and full gamut files (_fullgamut.csc) of all supported printers can be found in the main program subfolder **Calibrations**.

1.5 Best Practices ContoneProof / DotProof

The following table shows you the ideal approach when it comes to simulating certain spot color aspects in ContoneProof or DotProof mode.

Aim	*ContoneProof*	*DotProof*
I need the best possible simulation of the color interplay between process and spot colors	Use a CMYK profile in combination with a db3 spot color database. **Note:** GMG developed a new profiling software GMG OpenColor which addresses the overprint problem of spot colors. GMG OpenColor generates high-quality multicolor profiles with up to 15 ink channels simulating the printing behavior of diverse printing technologies, media types, and screenings.	Use a CMYK profile in combination with a db3 spot color database. **Note:** For Epson Stylus Pro x900 and HP Designjet Zx200 printers, you can purchase a **GMG DotProof XG** (Extended Gamut) license which enables you to make the most of the expanded color gamut of these printers and reproduce more spot colors in halftone proofs.
I want to simulate spot color tints	Add several fulcrums to the profile, for example, in 10% steps. For each fulcrum, print, measure, and **optimize** the profile as described in chapter "Optimizing the Spot Color" on page 13. —OR— Create a spot color profile with only a **100%** fulcrum and link a **Gradation Correction** to the spot color profile as described in chapter "Simulating Spot Color Tints" on page 11.	For spot colors in halftone proofs, only the 100% fulcrum should be defined. The reason for this is that every further fulcrum would just be able to reflect a minimal color part of the simulated dot. Therefore, we recommend to simulate the dot gain with a **Gradation Correction**, as described in chapter "Simulating Spot Color Tints" on page 11.

2. Creating Custom Spot Colors

2.1 Creating a New Spot Color Database

This chapter outlines the creation of a new spot color set in GMG SpotColor Editor. For each spot color in the set, you need to create a spot color profile (see "Creating a New Spot Color" on page 11). The spot color sets created in GMG SpotColor Editor can then be imported and used in GMG ColorProof.

Note When creating a gamut / full gamut file for a **white** spot color, test charts should be printed with **Undercoat** of 100% **Intensity**. For further information, please see the GMG ColorProof documentation.

How to add a spot color set

1. On the **Tools** menu of GMG ColorProof, click **SpotColor Editor**.
   GMG SpotColor Editor is started.
2. On the **File** menu, click **Open Spot Color Database** to create a new spot color database (*.db3 file). (If you want to add a spot color to an already existing spot color database, click **Open External Database**. Please note that when modifying a GMG spot color database, these modifications may be overwritten when updating the software.)
3. On the tree view on the left, right-click on the **SpotColor.db3** named **Old_DB** and **Rename** the db3 file.
4. **Save** the (db3) database file under a meaningful name.
5. On the **Edit** menu, click **Add New Spot Color Set**.
6. Click the set name (default name: Set_1) and **rename** the spot color set.
   It might be useful to mention the supported print medium in the name.
7. On the **Edit** menu, click **Add New Spot Color**.
   A new spot color is added (default name: Color_1).
8. Optional: If you want to use the advantages of a printer calibration for this spot color set, select the spot color set again and select the option **Calibrated Set (Use Gamut defined by Calibration)**. This option can only be selected for the whole spot color set and not for single spot colors.

2.1.1 Calibrated Spot Colors

Calibrated vs. not calibrated spot colors

Generally, spot colors should not be subject to an MX4/MX5 color transformation, as this color transformation simulates the limited color space of the target output device. Spot colors are used for extending this color space and are printed “as is” on the output device. Thus, it does not make sense to simulate a limitation that does not really exist. As a consequence, spot colors are **not** converted by the **MX4/MX5** as default. However, you can overrun this default by selecting the option **Convert to Color Profile (Use Gamut of Profile/MX4)** in GMG SpotColor Editor. This option cannot be defined for the complete set, but has to be selected for **each** spot color separately.

The **printer calibration** of the proof printer can be considered for the color management to avoid differences in the output due to normal printer deviations. On the other hand, the printable color space of the printer will be reduced (that is, the gamut is used instead of the full gamut) to achieve a very stable output. Thus, using a printer calibration together with a spot color set is a trade-off between the stability of the print output and the size of the color space.

The iterative process for determining correct target values for each spot color in GMG SpotColor Editor is recommended for achieving results that match the original colors as closely as possible. The printer calibration then assures that this result is stable and not subject to deviations in the printer performance or environmental parameters.

The option **Calibrated Set (Use Gamut defined by Calibration)** is defined for the **complete** spot color set and cannot be defined for each spot color separately.

How to enable an MX3 printer calibration for spot colors

Note If you change the option **Calibrated Set (Use Gamut defined by Calibration)** for an already **existing** spot color set, you need to replace the **gamut** / **full gamut** file linked to the spot color and create **new spot color profiles** for **each** spot color separately, including an **iterative optimization** of each spot color profile.

1. On the **Tools** menu in GMG ColorProof, click **SpotColor Editor**.
   The **SpotColor Editor** opens.
2. On the **File** menu, click **Open External Database** to open the desired spot color database (default path: *<GMG ColorProof installation path>\SpotColors*).
3. In the treeview pane on the left, select the desired spot color set.
4. A selected spot color set is highlighted with a different background color.
5. Select the option **Calibrated Set (Use Gamut Defined by Calibration)**.
6. Click the **Save** button on the SpotColor Editor toolbar. The printer calibration file (from the calibration set linked to each spot color set in the GMG ColorProof database) is now used for all jobs that use spot colors from this spot color set.

See also:

- "Creating a New Spot Color Database" on page 9

2.1.2 Paper Tint Neutral Spot Colors

Often, spots are highly saturated colors and are used as a solid color (100%). In this case, the paper tint does not really affect spot colors (provided that the paper tint is rather light in color).

However, if you are using spot colors that are not highly saturated and/or if you are using different shades of a spot, the paper tint will affect the color in the same way as for process colors. You probably want to simulate the paper tint effect of the final output paper in the printed proof. If you simulate multiple print standards, you probably want to create spot color profiles that can be used together with all print standards.

How is it possible to simulate different paper tints with the same spot color profile?

In GMG SpotColor Editor, you can define the paper tint of your sample and **subtract** it from the spot color profile, thus storing the spot color as such, with a "Neutral Paper Tint".

The **printed** paper tint is **always** taken from the MX color profile of the Proof Standard. (This behavior is independent from the **Convert to Color Profile (Use Gamut of Profile/MX4)** option.) This way, paper tint neutral spots can be combined with **any** proof standard in GMG ColorProof, allowing you to simulate different print standards and paper tints with the same spot color profile.

The following illustration shows the behavior of a normal spot color (dotted line) and the same spot color after subtraction of the paper tint (solid line).

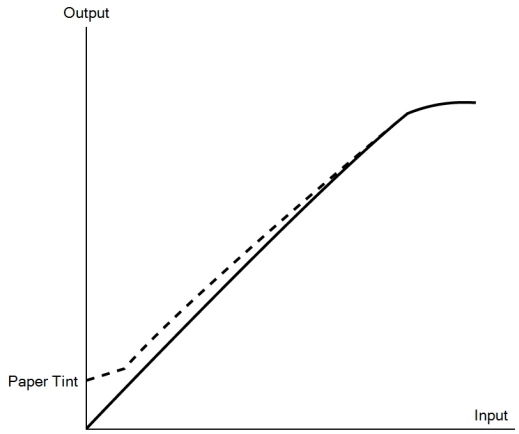

Fig. 1 Comparison of a "normal" and a paper tint neutral spot color.

2.2 Creating a New Spot Color

For **each** spot color in a spot color set, you need to calculate a spot color **profile**.

Note The option **Convert to Color Profile (Use Gamut of Profile/MX4)** color converts the spot color and is a special case option generally **not** used to create spot color profiles.

Note To create paper tint neutral spot colors with the **Subtract Paper Tint** option, you do **not** need to apply a special gamut, but only the usual printer gamut.

How to create a spot color profile in GMG SpotColor Editor

1. Enter the characterization data (provided by the spot color manufacturer or measured from a print sample) as **Target Values** for all required fulcrums. A single fulcrum at 100 is sufficient for most use cases.
2. Delete all unused fulcrums (**Edit** menu > **Delete Fulcrum**).
3. It is recommended to set up a **Calibrated** spot color set. Link the **gamut** file to each spot color in the set.
4. Select the required **Separation** mode, depending on the printer driver and printer type. (**Inkjet** for standard CMYK printers).
5. To create a **paper tint neutral** spot color, which can be used with **multiple** proof standards, you can either measure the paper tint at 0%, or manually enter the paper tint values into the spot color profile (**Edit** menu > **Define Paper Tint**).
6. Calculate the CMYK **output** values in the **Colors** column (**Measure** menu > **Calculate with Target Values**).
7. If you defined paper tint values, activate the option **Subtract Paper Tint** to filter out the 'real' spot color without paper tint.
   (In GMG ColorProof, paper tint neutral spot colors are printed with the paper tint values from the selected MX profile.)
8. Optional: Optimize the profile in an iterative process.
9. **Save** the (db3) database file.

2.3 Simulating Spot Color Tints

For most spot color applications, it is only required to print the spot color as full-tone (100%) color. If you, however, want to print spot color tints, there are two possibilities to reflect the **dot gain** of the spot color:

- **Fulcrums** in the profile (only recommended for **ContoneProof**): Add several fulcrums to the profile, for example, in 10% steps. For each fulcrum you need to print, measure, and optimize the profile by comparing the proof to a print sample of the corresponding tone value, as described in "Optimizing the Spot Color" on page 13. Defining the dot gain via fulcrums, which need to be measured and optimized, is a very accurate, but on the other hand also time-consuming method.
- **Gradation Correction** linked to the profile: Create a spot color profile with only a **100%** fulcrum and link a gradation correction to the spot color profile. This method has the advantage that you only need one print sample per spot color and only need to optimize the profile **once**. If several spot colors show a similar dot gain behavior, you can conveniently assign the same gradation correction to multiple spot colors.

See also:

- "Best Practices ContoneProof / DotProof" on page 7

2.3.1 Creating A Gradation Correction

Gradation corrections serve different aims in ContoneProof and DotProof mode. If you want to use spots with a gradation file for **both** proofing modes, you might experience undesired proof results. We therefore recommend to create gradation files separately for ContoneProof and for DotProof, as explained in this chapter.

A gradation correction file can be created in GMG SpotColor Editor (**File** menu > **New Gradation**) and is saved as an sfg file. To simulate the specific dot gain of the printing and the proof system, you can either manually enter dot gain values or modify the displayed curve by selecting and dragging individual fulcrums with the mouse. To add or delete fulcrums, use the corresponding commands in the **Edit** menu.

Tip When **saving** the gradation correction file, it might be useful to include the proofing mode in the name, so it is easier for you to keep an overview and to load the correct gradation file in GMG ColorProof.

Gradation corrections for ContoneProof

A gradation correction used in ContoneProof mode affects the CMYK output values of the spot color, thus defining the color output values at different fulcrums.

Gradation corrections for DotProof

A gradation correction used in DotProof mode directly affects the dot size, but has no impact on the color as such. To change the color, you need to edit the CMYK output values in the spot color **profile**, not the gradation file.

For a best possible dot gain simulation, we recommend not only to take the dot gain of the print system into account, but also the dot gain of the proof system. Use a densitometer to determine the dot gain of both systems and calculate a correction curve from both curves. Transfer this curve by entering the computed values into the gradation file and save the file to a folder GMG ColorProof can access.

Depending on the resolution of the input file and the screen ruling there is an effective range of the dot gain which is rooted in technical limitations. For example, it is technically not possible to increase a 1% dot to 40%, especially if you have a small raster cell. The following paragraph gives you some guidelines on how to modify the dot gain when printing spots in DotProof mode.
(missing or bad snippet)

2.3.2 Applying a Gradation Correction

Gradation correction files can be applied to a spot color in two ways, as described in the following:

- Link the sfg file to one or multiple **spot colors** directly in the db3 spot color database as described in the following.
- Link the sfg file to a **spot color set** in GMG ColorProof if you prefer flexibility, applying one gradation correction per GMG SpotColor Editor **workflow**.

How to link a gradation correction to a spot color in the spot color database

1. On the **Tools** menu in GMG ColorProof, click **SpotColor Editor**.
   The **SpotColor Editor** opens.
2. On the **File** menu, click **Open External Database** to open the desired spot color database (default path: *C:\Program Files\GMG\ColorProof05\SpotColors*).
3. In the **Color** tree view pane on the left, select the desired spot color. You can also multiselect multiple spot colors, if you want to link them to the same spot color gradation file.
4. A selected spot color set is highlighted with a different background color.
5. Next to the **Gradation** box, click the browse button and select the sfg file.
6. Click the **Save** button on the toolbar.
   The gradation file is now used for all jobs using the spot colors of this spot color set.

2.4 Optimizing the Spot Color

You can optimize a spot color profile in an **iterative** cycle (printing and measuring a test chart, recalculating the profile). The aim of the optimization is to match the target values as closely as possible. Following each iteration cycle, GMG SpotColor Editor computes new CMYK output values based on the deviation between the Lab target values and the measured current values. The new output values are used in the next printing step. Thus, the current values become closer to the tolerances with each iteration.

To be able to print a test chart with the created spot color in GMG ColorProof, you first need to **add** a new spot color set in GMG ColorProof and import the created db3 file (**System** menu > **Spot Color Sets** > **New**). For more detailed information on adding a new spot color set to the GMG ColorProof database, please see the documentation of GMG ColorProof.

How to optimize the profile with an external measuring device

Note When optimizing a paper tint neutral spot color, please deactivate the option **Subtract Paper Tint** every time you recalculate the values (**Calculate with Target and Current Values**) and activate the option again before you save the file.

1. In GMG ColorProof, create a job and print the spot color test chart **GMG_SpotColor_<measuring device>.tif** from the **Testcharts** subfolder with the new spot color (**Color Management** > **Channels** > **Choose Spot Color**). Select the calibration set and print mode you want to use with the spot color set.
2. In GMG SpotColor Editor, measure the test chart with an external measuring device: On the **Measure** menu, click **All Current Values**. (You can also measure individual patches by pressing the M key.)
3. If **Delta E** values are too high, recalculate the profile: (Deactivate the option **Subtract Paper Tint** before recalculating.) On the **Measure** menu, click **Calculate with Target and Current Values**.
   The measured values will be compared to the target values. Output values will be adjusted accordingly. The target values will be computed with the gamut file to produce the output values of the profile.
4. Repeat steps 1 to 3 until the deviation (delta E) between **Target Values** and **Current Values** meets your requirements.
5. Activate the option **Subtract Paper Tint** again, if creating a paper tint neutral spot color.
6. **Save** the (db3) database file.

How to optimize the profile with an integrated measuring device

1. In the **Database** view > **Spot Color Sets** tab, right-click a (custom) spot color set and select **Optimize** from the context menu.
   The Spot Color Optimization wizard is started.
2. Select the printer and print settings you want to use for printing the patches.
3. Click **Next**.

4. Select a proof standard or load an MX profile.
   The proof standard or profile contains the paper tint values required to simulate the paper type you plan to use. This is important because different media generate different color results.
5. Click **Next**.
6. Select the **Proof Mode** and a test chart template.
   You can choose between templates for **full tone** and **gradient** spot colors.
7. Select the spot colors you want to print and measure.
8. Click **Next**.
9. Define the tolerance range for the acceptable deviation of output and target values (delta E).
10. Select an optimization mode (automatic or manual).
    Clicking the **Next** button, GMG ColorProof prints the selected spots, one patch for each fulcrum, using the paper tint value of the selected MX profile.
11. Run optimization cycles until you are satisfied with the results.
    (Click the **Details** button for more detailed information on the measured values.)
    When finishing the optimization, the spot color database is updated with the calculated output values. The measured values and color names are printed next to the color patches.

3. Special Ink Spot Colors

Printing an image with special inks such as White, Silver or Silver Blended requires a spot color channel for each special ink you want to use. You can mix your own spot colors with **Metallic Silver** or **White** ink using special ink settings which can be defined separately for each spot color in a set.

You can define the **Area Coverage** for the special ink (in our example, we added 50% Silver) by clicking the **Settings** button on the bottom of the main dialog. The **Area Coverage** defines the ink coverage at an **Index** of **100%**. Between an index of 0% and 100%, the spot color shows a **linear** behavior. You can, however, use a gradation correction to tweak the linear behavior.

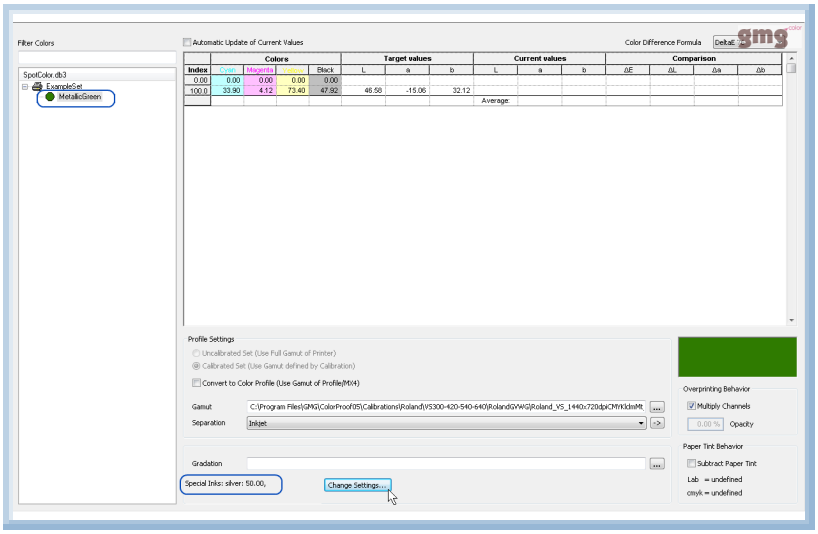

Fig. 2 Creating a new spot color with Metallic ink in GMG SpotColor Editor.

4. Reusing Spot Colors on a Different Printer

When changing the printer, the visual appearance of the spot colors may shift, even though you probably recalculated the spot colors in a colorimetrically correct way. If you want to continue printing your spot colors exactly as before, with the same visual appearance, you need the original target values used when calculating the output values of the spot color. As the target values are often not saved or updated after manual corrections, you need to estimate them as described in the following. After estimating the target values, you copy the database and calculate the new CMYK output values for each spot color, thus setting up new spot color databases for your printer which output the spots in the same way as with the old printer.

How to regain the target values of a spot color

To regain the target values, you need to copy the paper tint value from the MX profile you are using into the spot color profile, estimate the target values and then subtract the paper tint again (because spots are printed with the paper tint of the selected color profile).

Note When iterating a paper tint neutral spot color, please deactivate the option **Subtract Paper Tint** every time you recalculate the values (**Calculate with Target and Current Values**) and activate the option again before you save the file.

Tip If you are using the same print medium for several spot colors, you can **multi-select** these to define and subtract the paper tint value.

1. Open a spot color database and select the spot color you want to reuse.
2. Copy the Lab or CMYK paper tint values from the MX color profile of the printer-medium combination you are using into the spot color profile (**Edit** menu > **Define Paper Tint**).
3. Estimate the target values (**Measure** menu > **Estimate Target Values**).
4. Activate the option **Subtract Paper Tint** to filter out the 'real' spot colors without paper tint.
5. **Save** the database.
6. Right-click the database and select **Copy** from the context menu.
7. Right-click into the tree view on the right side and select **Paste** from the context menu.
8. **Rename** the database.
9. Double-click the spot color you estimated the target values for and select the correct gamut file for your printer-medium combination (**Profile Settings**: **Gamut**).
10. Select the required **Separation** mode, depending on the printer driver and printer type. (**Inkjet** for standard CMYK printers)
11. Redefine the paper tint if required (**Edit** menu > **Define Paper Tint**).
12. Calculate the CMYK **output** values in the **Colors** column (**Measure** menu > **Calculate with Target Values**).
    (Deactivate the option **Subtract Paper Tint** before recalculating.)
13. Optimize the profile in an iterative process.
14. Activate the option **Subtract Paper Tint** again.
15. **Save** the database.