

GMG ColorProof

How to Create a Printer Calibration from a Starter Kit

Imprint

© 2012-2015 GMG GmbH & Co. KG

GMG GmbH & Co. KG

Moempelgarder Weg 10

72072 Tuebingen

Germany

This documentation and described products are subject to change without notice. GMG GmbH & Co. KG makes no guaranty as to the accuracy of any and all information and procedures described in this documentation. To the maximum extent permitted by applicable law, in no event shall GMG GmbH & Co. KG or the author be liable for any special, incidental, direct, indirect, or consequential damages whatsoever (including, without limitation, injuries, damages for data loss, loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use of or inability to use the software or this documentation or the provision of or failure to provide Support Services, even if GMG GmbH & Co. KG has been advised of the possibility of such damages.

Reprinting and copying, as well as other duplication including excerpts of this document, are prohibited without the written permission of GMG GmbH & Co. KG. This also applies to electronic copies.

GMG, the GMG Logo, and GMG product names and logos are either registered trademarks or trademarks owned by GMG GmbH & Co. KG.

All brand names and trademarks are the property of the respective owner and are expressly recognized as such. If brand names, trademarks, or other material are used without the permission of the respective owners, we request appropriate notification. We will immediately stop use of said items.

PANTONE® colors displayed in the software application or in the user documentation may not match PANTONE identified standards. Consult current PANTONE color publications for accurate color. PANTONE®, PANTONE® Goe™ and other Pantone, Inc. trademarks are the property of Pantone, Inc., © Pantone, Inc., 2007. Pantone, Inc. is the copyright owner of color data and/or software which are licensed to GMG GmbH & Co. KG to distribute for use only in combination with GMG ProductionSuite, GMG ColorServer, GMG InkOptimizer, GMG OpenColor, GMG ColorProof, GMG DotProof® and GMG FlexoProof. PANTONE color data and/or software shall not be copied onto another medium or hard disk unless as part of the licensed products.

Microsoft and Windows are registered trademarks of Microsoft Corporation in the United States and/or other countries.

X-Rite is a registered trademark of X-Rite, Incorporated. HP, Hewlett-Packard, and Designjet are registered trademarks of Hewlett-Packard Company. Epson, Epson Stylus, and Epson Stylus Pro are registered trademarks of Seiko Epson Corporation. UltraChrome is a trademark of Epson America, Inc. Nexus is a trademark of Esko. Adobe and Photoshop are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries. Canon is a registered trademark of Canon Inc.

Last update of this documentation: 26.11.2015

This documentation refers to the GMG software version No. 5.7.1.

1. About this Tutorial	4
2. Creating a Printer Calibration—Short Version	5
3. Creating a Printer Calibration—Full Version	6
3.1 Adding a Custom Medium	6
3.2 Changing the Print Medium	7
3.3 Ink Test	8
3.4 Creating the Full Gamut File	9
3.4.1 Printing and Measuring a Full Gamut Test Chart	9
3.4.2 Creating the Full Gamut File	9
3.5 Creating Target Values for the Printer Calibration	10
3.5.1 Printing and Measuring a Calibration Test Chart	10
3.5.2 Averaging and Importing the Target Values	11
3.6 Creating the Gamut File	11
3.6.1 Printing and Measuring a Gamut Test Chart	11
3.6.2 Creating the Gamut File	12
3.7 Setting up a New Calibration Set	12
4. Calibrating the Printer	14
4.1 Automated Calibration with GMG AutoCali Wizard	14

1. About this Tutorial

GMG ColorProof comes with pre-installed, tested color profiles for all relevant print standards. For most media supported in GMG ColorProof, printer calibrations are included and ready to use. If you wish to use a proof medium that is **not** supported, you need to create your own printer calibration.

- ▶ In this tutorial, which is part of a printer-specific Starter Kit, you will learn how to create your own **printer calibration** with GMG ProfileEditor.
- ▶ The calibration is created with the manufacturer driver, therefore you will need to use an **Epson driver print mode** for printing the test charts.
(Reason: The GMG driver cannot be used as it controls the printer series with a special calibration format which cannot be created with GMG ProfileEditor.)
- ▶ The tutorial describes the measuring steps for using an integrated measuring device. If you are using an external measuring device, please use the measuring function in GMG ProfileEditor (**Measure** menu > **All Target Values**) together with the templates from the Starter Kits.

Tip Before starting, make sure the printer is running at its optimal level. For Epson x900 and SC-P printers, we provide a checklist on our website (**Support Area > Downloads > Printer Utilities > Epson x900 check list**).

2. Creating a Printer Calibration—Short Version

The following provides you with a summary showing all steps required for creating a new **printer calibration** for **custom** print media. Please follow the referenced topics or documents in the **See also** column for detailed step-for-step instructions.

Tip All test charts not included in the Starter Kit can be found in the **Testcharts** subfolder of the main program folder (default path: .../Users/Public/GMG/ColorProof/Testcharts).

Step	Short description	See also
Set up your media in GMG ColorProof	GMG ColorProof: Add your print medium to the database and select it in the printer settings.	"Adding a Custom Medium" on page 6 "Changing the Print Medium" on page 7
Make a test print	It is recommended to make a test print with the print mode you want to use to check if the print mode and the print medium are basically compatible (a calibration file cannot compensate everything).	"Ink Test" on page 8
Create the Full Gamut file	GMG ColorProof: Print the full gamut test chart for the measuring device you are using (for example GMG_TC4_random_Epson-emb-MD_17inch.tif) with the linear calibration from the Starter Kit. GMG ProfileEditor: Import the measurement data into the template from the Starter Kit and export it as a full gamut file.	"Creating the Full Gamut File" on page 9
Import target values	GMG ColorProof: Print the calibration test chart for the measuring device you are using (for example GMG_TC3-K_random_Epson-emb-MD_17inch.tif) with the prepared calibration from the starter kit (3 - Target Values: Epson_SCP_Starterkit_V1.mx4). GMG ProfileEditor: Import the measurement data as target values.	"Creating Target Values for the Printer Calibration" on page 10
Create the Gamut file	GMG ColorProof: Print the gamut test chart for the measuring device you are using (for example GMG_ECI2002_random_Epson-emb-MD_17inch.tif) with the calibration from the preceding step. GMG ProfileEditor: Import the measurement data into the template from the Starter Kit and export it as a gamut file.	"Creating the Gamut File " on page 11
Set up a new calibration set	GMG ColorProof: Set up a new calibration set on the Database view and link the created calibration and gamut file into the set (Calibration Set > Measurement > Initial Calibration/Gamut).	"Setting up a New Calibration Set"
Calibrate your printer	GMG ColorProof: Select the calibration on the Output view and start the calibration wizard.	"Automated Calibration with GMG AutoCali Wizard" on page 14

3. Creating a Printer Calibration—Full Version

3.1 Adding a Custom Medium

→ Duplicate an existing media type and use this as a template.

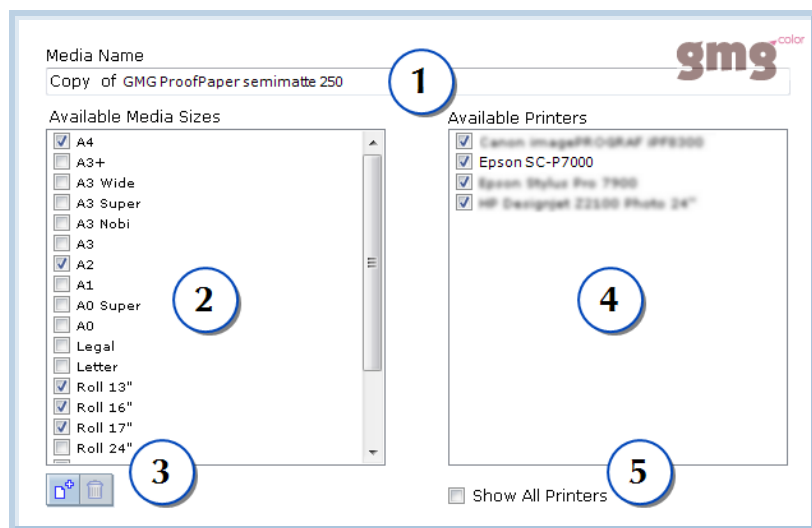


Fig. 1 Adding a custom print medium to the GMG ColorProof database.

You can set up custom media types under any name (1). You can then define available media sizes as a global property of this media type, for all printers (2). You can also define new custom media sizes (3) or delete sizes (for all printers).

The media type (with all sizes) needs to be assigned to printer types (4). In our example, the print medium is assigned to all available printer types.

Select **Show All Printers** (5) to update the list with **all** printers supported in GMG ColorProof.

How to add custom media

1. On the navigation panel on the left of the main program window, click **Database**.
2. On the **Proofing Conditions** tab, right-click an existing media type in the list and select **Duplicate**.
—OR—
Create a new media type from scratch by clicking **Database** menu > **Media** > **New**.
3. Enter a **Media Name**.
4. In the **Available Media Sizes** list, select the media sizes that you want to support with this print medium.
5. In the **Available Printers** list, select all printers you want to use with this medium.
6. Click **OK** to confirm the settings.
The new media type is added to the database. In the next step, you need to define the **Advanced Media Settings**.

How to define the Advanced Media Settings


- In the **Database** view, right-click the new print medium in the **Media** list and select **Advanced** from the context menu.
- Define parameters such as the media thickness. If you are unsure, keep the default settings and change the settings only if you experience any problems.

3.2 Changing the Print Medium

Note Some printers with a **bidirectional** connection can send information about the currently loaded print medium to GMG ColorProof. If the media synchronization is activated, the software will be automatically updated after a media change in the printer.

When setting up a new printer, you need to define a print medium which you are going to use with the printer. If you change the print medium in your printer, it is very important to also change the medium in GMG ColorProof to make sure you are using the correct profiles for printing.

How to change the print medium

1. Click the **Output** button on the navigation panel on the left of the main window.
2. Select the printer that you want to change the printer medium for from the **Available Printers** list.
3. Click the **Change Media** button  on the right side of the printer.
4. Select the currently loaded **Media Type** and the appropriate **Media Size** from the list. If a sheet type **Media Size** is selected, you need to define the **Orientation** of the sheet in the printer as well.
5. Optional: Customize the **Media Specific Printer Settings** for the selected printer (e.g. the drying time).

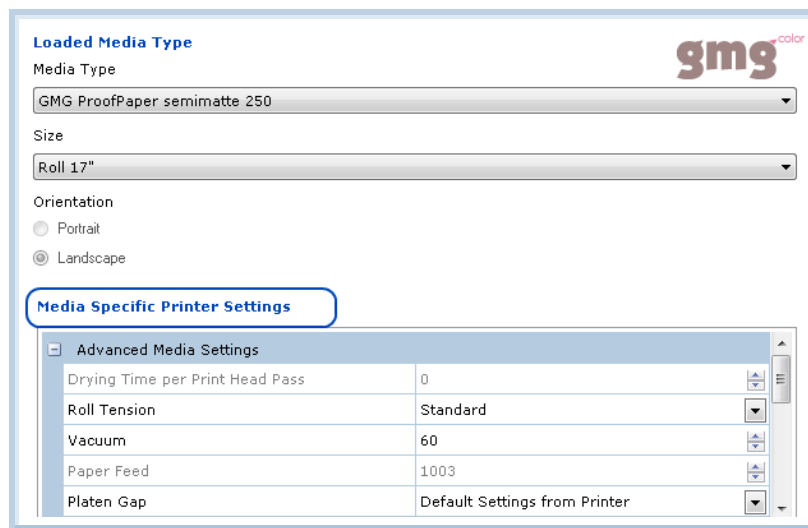
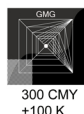


Fig. 2 Changing the print medium in the Output view.

3.3 Ink Test

It is recommended to make a test print with the selected print mode to evaluate the physical limitations on ink uptake of the printer–medium combination. Start with a print mode you think is likely to support the medium that you want to use and print the small test image shown below.

The test image shows white lines set against a dark background using the highest level of ink application (CMY and K) possible. The test image will be printed without any color management (linear color profile and printer calibration). A visual check of the printed test page allows deciding whether the selected print mode is suitable for the printer–medium combination.



The test image is printed with the highest possible TAC (100 C, 100 M, 100 Y, 100 K).

How to create a job for the test image

1. Create a new job in GMG ColorProof and add the image **InkCoverage.tif** from the **Ink Test** folder of the Starter Kit. When creating the job, ignore the settings in the **New Job** dialog box. You will configure the job and image settings in the **Manual Job Manager**.
2. **Job > Printer Settings > Printer:** From the **Printer** list, select the printer you are using.
3. **Job > Printer Settings > Printer:** From the **Medium** list, select the loaded medium.
4. **Job > Printer Settings > Printer:** Under **Calibration Set**, select **Custom**.
5. **Job > Printer Settings > Printer:** Under **Printer Calibration**, select the calibration file from the starter kit (1 - Ink Test: Linear_Calibration.mx4).
6. **Job > Printer Settings > Advanced:** Make sure the printer settings are correct, for example the **print mode**.
7. **Image > Color Management > Proof Output:** From the **Proof Standard** list, select **Custom**. Under **Profile (MX/ICC)**, select the linear profile from the Starter Kit (CP_Linear Proof Profile.mx4).
8. Click **OK** to print the job.

How to evaluate the result

→ Visually check the printed ink coverage test form.

If the printed image shows no overinking and gives a good print result, you can use the selected media type and proceed with creating the full gamut file.

If the test fails, you need to evaluate a different print mode for your medium.

3.4 Creating the Full Gamut File

In this step, the **full gamut** file for the selected printer–medium combination will be created by printing and measuring a test chart. The full gamut is used for calculating new color values in the printer calibration file when **calibrating** a printer. It defines the output values that need to be sent to the printer to achieve a target Lab value. Thus the full gamut file describes the color space the printer is able to print according to the print medium and print mode in a "neutral" state, **before** being calibrated.

Required test chart type: **TC4**

3.4.1 Printing and Measuring a Full Gamut Test Chart

Note It is important to add the test chart directly from the original file path to the job (default path: `.../Users/Public/GMG/ColorProof/Testcharts`). Otherwise, GMG ColorProof will not recognize the test chart and will not start the measurement.

How to create and print the job

1. Create a new job in GMG ColorProof and add the appropriate **full gamut** test chart for the printer, for example, `GMG_TC4_random_Epson-emb-MD_17inch.tif` to the job.
2. Ignore the other options in the New Job dialog and click **Open** to configure the job in the **Manual Job Manager**.
3. **Job > Printer Settings > Printer:** From the **Printer** list, select your printer, for example, Epson SC-P7000.
4. **Job > Printer Settings > Printer:** From the **Medium** list, select the loaded medium.
5. **Job > Printer Settings > Printer:** Under **Calibration Set**, select **Custom**.
6. Under **Printer Calibration**, select the linear calibration from the Starter Kit (2 - Full Gamut: Linear Calibration.mx4).
7. **Job > Printer Settings > Advanced:** Make sure the print mode uses the correct driver, for example Epson Driver - 720 x 1440.
8. **Image > File:** Select the option **Measure Test Chart Automatically** when using an integrated measuring device.
If this option is not selected, the test chart will be printed, but not measured by the printer.
9. **Image > Color Management > Proof Output:** From the **Proof Standard** list, select **Custom**. Under **Profile (MX/ICC)**, select the linear profile from the Starter Kit (CP_Linear Proof Profile.mx4).
10. Click **Print** to print the job.

How to repeat the test chart printing for averaging measured data

It is recommended to print the test chart **twice** and average the results to achieve a reliable result.

→ In the GMG ColorProof **History** view, select the printed job and print the test chart again.

3.4.2 Creating the Full Gamut File

To average and export the measured data as a full gamut file, a template is used as a container.

Tip The data measured by the integrated measuring device is automatically saved to the **ProofControl** folder (default path: `.../Users/Public/GMG/ColorProof/ProofControl`).

How to average and export the measurement data

1. Rename the measurement files to `xx_fullgamut_1.txt` and `xx_fullgamut_2.txt` in Windows Explorer.
2. In GMG ProfileEditor, on the **File** menu, click **Open**.
3. Browse your folders and select the **Template** from the Starter Kit to import the measurement data.

-
4. On the **Import/Export** menu, click **Import Target Values**.
 5. Browse your folders and select the `xx_fullgamut_1.txt` and `xx_fullgamut_2.txt` files while holding down the SHIFT key (multi-select).
The measured data from all selected files is automatically **averaged** and loaded into the MX4 as **Target Values**.
 6. If an error message is displayed, confirm it with **OK**.
 7. On the **Import/Export** menu, point to **Export Target Values**, and click **Gamut File**.
 8. Save the file under an appropriate file name.

The resulting file is the full gamut file and will be linked within the final printer calibration file in a following step.

3.5 Creating Target Values for the Printer Calibration

A calibration test chart is printed with the calibration file from the starter kit. The calibration file defines the output values, that is, the values that the printer should print for each color patch in the test chart in order to achieve the correct color value in the print and to avoid overinking.

The print result of this test chart will serve as the reference for all further prints with this printer–medium combination. The full gamut file will be linked to the printer calibration file in GMG ProfileEditor so that it can be used by GMG CaliWizard or AutoCali Wizard.

Required test chart type: **TC3-K**

3.5.1 Printing and Measuring a Calibration Test Chart

Note It is important to add the test chart directly from the original file path to the job (default path: `.../Users/Public/GMG/ColorProof/Testcharts`). Otherwise, GMG ColorProof will not recognize the test chart and will not start the measurement.

How to create and print the job

1. Create a new job in GMG ColorProof and add the appropriate **calibration** test chart for the printer, for example, `GMG_TC3-K_random_Epson-emb-MD_17inch.tif` to the job.
2. Ignore the other options in the New Job dialog and click **Open** to configure the job in the **Manual Job Manager**.
3. **Job > Printer Settings > Printer:** From the **Printer** list, select your printer, for example, Epson SC-P7000.
4. **Job > Printer Settings > Printer:** From the **Medium** list, select the loaded medium.
5. **Job > Printer Settings > Printer:** Under **Calibration Set**, select **Custom**.
6. Under **Printer Calibration**, select the calibration file from the Starter Kit (3 - Target Values: `Epson_SCP_Starterkit_V1.mx4`).
7. **Job > Printer Settings > Advanced:** Make sure the print mode uses the correct driver, for example Epson Driver - 720 x 1440.
8. **Image > File:** Select the option **Measure Test Chart Automatically** when using an integrated measuring device.
If this option is not selected, the test chart will be printed, but not measured by the printer.
9. **Image > Color Management > Proof Output:** From the **Proof Standard** list, select **Custom**. Under **Profile (MX/ICC)**, select the linear profile from the Starter Kit (`CP_Linear Proof Profile.mx4`).
10. Click **Print** to print the job.

3.5.2 Averaging and Importing the Target Values

It is recommended to use several test chart prints from the target machine (at least two) and measure and average the results to get more precise target values.

Tip The data measured by the integrated measuring device is automatically saved to the **ProofControl** folder (default path: `.../Users/Public/GMG/ColorProof/ProofControl`).

How to average and import the measurement data

1. Browse for the measurement files (if several) and **rename** them to `xx_targetvalues_1.txt`, `xx_targetvalues_2.txt`, etc.
2. In GMG ProfileEditor, on the **File** menu, click **Open** and select the printer calibration you have used when printing the calibration test chart.
3. Click the **4D Color Space** tab.
4. On the **Import/Export** menu, click **Import Target Values** and select all*.txt files you want to **average** by holding down the Shift key and click **OK**.
The measured data from all selected files is automatically averaged and loaded into the calibration file as **Target Values**.
5. (If an error message is displayed, confirm it with **OK**.)
6. Switch to the **General** tab and under **Gamut** select the option **Selected**.
7. Click the browse button and select the **full gamut** csc file created in an earlier step.
8. Save the file.

The saved file is your printer calibration, which is now linked with the Full Gamut file you created in an earlier step.

3.6 Creating the Gamut File

Note To make sure that the printer is still in the same state, this step should be done **immediately** after creating the full gamut and printer calibration file.

In this step, the **gamut** file for this printer–medium combination will be created. The input values (measured from the color patches) are computed with the printer calibration you created in the previous steps to produce the output values (the color values the software outputs to the printer driver). Thus, the gamut file describes the color space that the printer is able to print according to its technical specifications and according to the print mode and media in a **calibrated** state.

Required test chart type: **ECI2002**

3.6.1 Printing and Measuring a Gamut Test Chart

Note It is important to add the test chart directly from the original file path to the job (default path: `.../Users/Public/GMG/ColorProof/Testcharts`). Otherwise, GMG ColorProof will not recognize the test chart and will not start the measurement.

How to create and print the job

1. Create a new job in GMG ColorProof and add the appropriate **gamut** test chart for the printer, for example, `GMG_ECI2002_random_Epson-emb-MD_17inch.tif` to the job.
2. Ignore the other options in the New Job dialog and click **Open** to configure the job in the **Manual Job Manager**.
3. **Job > Printer Settings > Printer:** From the **Printer** list, select your printer, for example, Epson SC-P7000.
4. **Job > Printer Settings > Printer:** From the **Medium** list, select the loaded medium.

-
5. **Job > Printer Settings > Printer:** Under **Calibration Set**, select **Custom**.
 6. Under **Printer Calibration**, select the printer calibration you created.
 7. **Job > Printer Settings > Advanced:** Make sure the print mode uses the correct driver, for example Epson Driver - 720 x 1440.
 8. **Image > File:** Select the option **Measure Test Chart Automatically** when using an integrated measuring device.
If this option is not selected, the test chart will be printed, but not measured by the printer.
 9. **Image > Color Management > Proof Output:** From the **Proof Standard** list, select **Custom**. Under **Profile (MX/ICC)**, select the linear profile from the Starter Kit (CP_Linear Proof Profile.mx4).
 10. Click **Print** to print the job.

3.6.2 Creating the Gamut File

It is recommended to print the test chart **twice** and average the results to achieve a reliable result.
To average and export the measured data, a new (empty) MX4 profile is used as a container.

Tip The data measured by the integrated measuring device is automatically saved to the **ProofControl** folder (default path: .../Users/Public/GMG/ColorProof/ProofControl).

How to average and export the measurement data

1. Rename the measurement files to *xx_gamut_1.txt* and *xx_gamut_2.txt* in Windows Explorer.
2. In GMG ProfileEditor, on the **File** menu, click **Open**.
3. Browse your folders and select the **Template** from the Starter Kit to import the measurement data.
4. On the **Import/Export** menu, click **Import Target Values**.
5. Browse your folders and select the *xx_gamut_1.txt* and *xx_gamut_2.txt* files while holding down the SHIFT key (multi-select).
The measured data from all selected files is automatically **averaged** and loaded into the MX4 as **Target Values**.
6. If an error message is displayed, confirm it with **OK**.
7. On the **Import/Export** menu, point to **Export Target Values**, and click **Gamut File**.
8. Save the file under an appropriate file name.

3.7 Setting up a New Calibration Set

The next step is to set up a new calibration set in GMG ColorProof for the MX printer calibration you created in the preceding steps.

How to add a custom calibration set

1. On the **Database** menu, point to **Calibration Sets**, and click **New**.
The New Calibration Set dialog is displayed.
2. On the **Properties** page, enter a **Name** for the calibration set.
3. Enter a **version number**.
The version number serves as a unique identifier if you have several versions of the same set. It is advisable to use a naming convention, for example, V1, V2, V3, and so on, but you can enter any string you like.
4. Optional: Select an **ICC Printer Profile** if you want to use an ICC based color management.

How to define the Print Settings

1. Click the **Print Settings** page.
2. On the toolbar, click the **+** button to add new print settings.

3. Select the **Printer** you want to use from the drop-down list on the right side.
The printer type is displayed in the tree view on the left side.
4. In the tree view on the left, click the next node (< undefined >) to bring up the **Medium** drop-down list and select the print medium you want to use.
The default **Print Settings** for the printer-medium combination are displayed as end node.
5. In the tree view, click the **Print Settings** (print mode) node to show the properties of the printer-medium combination on the right side.
6. Adjust the default properties (e.g. the print mode) as required.
7. Optional: Add as many **Print Settings** as you like and choose a **Reference Print Mode** for calibration.
Due to this functionality, you can use the same printer calibration file for multiple color modes or media with similar properties.

How to add printer calibration files to the calibration set

1. Click the **Measurement** page.
2. Click the + button to add a measuring device and the corresponding printer calibration and gamut file.
3. Select the measuring device that you will use for this printer from the list.
4. In the **Initial Calibration** column, click the browse button, browse your folders, and select the printer calibration file.
5. In the **Gamut** column, click the browse button, browse your folders, and select the corresponding gamut (CSC) file. (Do **not** select the full gamut file.)
6. To set up more measuring devices, repeat steps 2 to 5.

How to set up quality criteria for the printer calibration

1. Click the **Quality Criteria** page.
2. Select the quality criteria for this calibration set. If the quality criteria are not met anymore, print jobs using this calibration set will be put on hold until the printer is successfully recalibrated.

4. Calibrating the Printer

4.1 Automated Calibration with GMG AutoCali Wizard

GMG AutoCali Wizard is used to calibrate printers featuring an **integrated** measuring device. With the integrated measuring device, the whole process is fully automated, without user interaction required. You can use the **scheduler** to run the calibration in regular intervals (**Output** view > **Automatic Calibration Scheduler**).

During the printer calibration process, the **last** saved printer calibration file is used as a basis for a recalibration of the printer. During the following iterative cycle, the **output values** in the printer calibration file will be optimized to reach the **target values** within the defined tolerances. The existing printer calibration file will then be **replaced** with the modified file.

The wizard will lead you through all steps required for the calibration. You can use other printers in the meantime. You can also set up jobs for the same printer that currently runs the calibration. They will be printed after the calibration will have been finished.


GMG ColorProof uses multiple **iteration** cycles, similar to a control loop, to optimize the calibration. The steps of a cycle are visualized in the wizard. The currently active step is highlighted by a white background color.

How can I start an automatic calibration?

There are multiple ways to start GMG AutoCali Wizard.

<i>Method</i>	<i>Short description</i>
Time based scheduling	An automatic calibration of one specific calibration set is started in regular intervals.
Calibration set is invalid	The calibration set needs to be recalibrated.
Manual action	You can start GMG AutoCali Wizard manually any time you want.

How to start GMG AutoCali Wizard manually

1. Click the **Output** button on the navigation panel on the left of the main window.
2. Select the printer that you want to calibrate from the **Available Printers** list.
3. Select the calibration set that you want to use from the **Available Printer Calibrations** list.
4. Click the **AutoCali Wizard** button  on the right side of the calibration set.

The GMG AutoCali Wizard is started.

5. Follow the instructions of the wizard.