



# GMG SmartProfiler User Manual

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## **Imprint**

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## 1. About the Help and User Manual

The help integrated into the software and the user manual contain all important information about GMG SmartProfiler to help you learn about and use its basic features.

It is assumed that you already have a basic understanding of computer and software terms, but no special skills are required to read this document.

The GMG SmartProfiler Help provides a fast and convenient way to look for information. Compared to the printed manual, it gives you the advantage of scrolling through the text in a non-linear fashion, picking up all the information you need.

When you press the F1 key in GMG SmartProfiler, a Help topic corresponding to the currently active dialog box will be displayed, so that you will quickly find the information you need. You will find more detailed information and application examples when browsing through the Help.

The GMG SmartProfiler software is part of an ongoing developmental process. Please understand that the provided documentation is not always up to date. The latest information can usually be found in the Help.

### 1.1 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 SmartProfiler 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.

#### 1.1.1 What's New in Version 1.5.1?

<i>Advantage</i>	<i>New feature</i>	<i>See also</i>
Automatic ink reduction and stabilized gray balance	New separation mode <b>Eco Save Mode</b> for LFP and Inkjet printers. Create profiles in <b>Eco Save Mode</b> to save 10-25% ink without quality loss.	"Separation Settings" on page 57
Compensate color shifts caused by OBAs	<b>Profile Calculation Settings:</b> New option <b>Optical Brightener Compensation</b> . Many print media come with varying amounts of optical brightening agents (OBAs) in their coating that may cause color shifts. If you are using media with optical brighteners, this option will help you to produce profiles that compensate the negative impact of OBAs while maintaining the whiteness levels und image contrast.	"Optical Brightener Compensation (OBC)" on page 57

#### 1.1.2 What's New in Version 1.5?

This version comes up with many self-configuration capabilities which enable an increase in efficiency and ability while at the same time simplifying and reducing user interaction. The possibility to install client and server components allows for a partitioning of tasks and workloads and a centralized management of all files. Reflecting the latest advances in computer hardware, we now support 64-bit computing, providing you with both 32- and 64-bit software.

#### New Features Summary

<i>Advantage</i>	<i>New feature</i>	<i>See also</i>
Remote access—working from multiple locations	Support of <b>remote scenario</b> with client and server architecture. GMG SmartProfiler can now be installed on a different computer than GMG ColorServer (for example on the computer used for the frontend). Multiple and simultaneous client connections possible. The remote operation eliminates the need of having a measuring device connected to the computer GMG ColorServer is running on.	"Client/Server Environment" on page 24 "Network Settings on the Client" on page 25

<i>Advantage</i>	<i>New feature</i>	<i>See also</i>
Enhanced functionality	The <b>Create Calibration</b> mode has been redesigned into a <b>Create Printer-Medium Combination</b> mode enabling you to conveniently set up <b>new PDF hotfolders</b> in GMG ColorServer. The hotfolder settings are predefined for certain printing machine types using <b>presets</b> which are part of the installation volume.	"Creating a Printer Calibration File" on page 35  "Creating a Hotfolder" on page 28
Get the system going!	GMG SmartProfiler now offers <b>device specific</b> profiling parameters tested by GMG ColorExperts for various printing systems. Furthermore, this documentation includes helpful tips how to make a quick pre-check of the printing system before you start with the profiling.	"Creating a Hotfolder" on page 28  "Pre-check of the Printing System" on page 16
Faster installation, improved ease of use	<b>Combined installer</b> for GMG SmartProfiler, GMG ColorServer and GMG Connect featuring a complete or custom setup. The custom setup allows you to choose which individual components will be installed and where they will be installed.	"Installing GMG ColorServer" on page 12
Choose a version matching your bit system	With the upcoming trend to integrate 64-bit capabilities into the main processor lines, you are now able to install a <b>64-bit version</b> of GMG SmartProfiler. Please note that this concerns the ability of an application to run on a 64-bit system, GMG SmartProfiler as such remains unchanged.	
Improved hotfolder handling, more security	<b>Hotfolder Filter</b> to determine which hotfolders are shown in GMG SmartProfiler and which are not. All hotfolders are listed with meta information such as the used printer, medium, ink, normalizing space and print mode. The <b>Hotfolder Filter</b> can be individually configured for each remote GMG SmartProfiler instance.	"Hotfolder Filter" on page 25
Perfect transitions from one color to another, visual optimization	<b>Optimized Gamut Mapping</b> ensuring higher quality and visual color matching.  Improved <b>smoothing</b> algorithms to create optimized profiles and calibrations for Laser, Inkjet or LFP printers. <b>Improved interpolation</b> algorithms, automatic removal of measurement outliers in measurement data resulting in less color bumps or breaks.  <b>Dithering</b> is automatically used to avoid a banded or blocky appearance in non-textured areas of images in PDFs with 8 bits per channel. Especially useful for images with large areas of smooth gradations.	"Rendering Intents" on page 55
Even more fail-proof procedure	<b>Visualization</b> of the <b>Linearization Curve</b> and automatic <b>linearization check</b> : If the slope of the linearization curve created by GMG SmartProfiler shows an extreme behavior, a warning message will be displayed, asking you to use the linearization from the frontend RIP. This helps to avoid visible steps when printing.	"Ink Limit and Linearization" on page 37
Saving time and ink while keeping the quality	Automatic <b>validation of test charts</b> avoiding the use of incorrect test charts. New and <b>optimized</b> test charts allowing faster processing and reducing the costs.	
Enhanced user friendliness	When using an X-Rite <b>Eye-One iO</b> , the software automatically switches to <b>Single Patch</b> mode if a row cannot be measured after three attempts.	

## 1.2 Welcome to GMG SmartProfiler

The demand for high color accuracy and repeatability is increasingly filtering into the world of large format making more and more LFP companies run their machines to commercial standards. The competitive edge for most companies is a solution enabling automatic color conversions, easy profiling and quality control.

Our answer is GMG ColorServer, a centrally controllable color management, in conjunction with GMG SmartProfiler—a user-friendly add-on application for creating GMG ColorServer profiles and printer calibrations.

GMG SmartProfiler has a wizard-like structure enabling any user to easily calibrate, recalibrate and profile digital and large format printing systems without requiring any in-depth knowledge of color management.

**Note** GMG SmartProfiler supports only the creation of **ColorServer** profiles. Proof profiles and printer calibration files for use with GMG ColorProof, GMG DotProof, and GMG FlexoProof cannot be created with GMG SmartProfiler.

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### Possible applications

The GMG SmartProfiler and GMG ColorServer solution is extremely beneficial for:

- ▶ Large format printing (LFP)
- ▶ Flexo and packaging business: Mock-up production
- ▶ Fine art printing
- ▶ Photographic printing
- ▶ Textile printing
- ▶ Printing on special print media, for example, glass or metal

### Optimize the color space of your printer or digital press

Get more out of your printer by using automated color management:

- ▶ **Reproducible** colors: **Standardize** your print production, within tolerances defined for standard color spaces such as Fogra39.
- ▶ **Color consistency** between different devices: Achieve **color matching** results across a diversity of substrates, ink types, printing technology, and industry standards.
- ▶ **Flexibility and load balancing**: Choose the output device according to your **production requirements**. Don't worry about color results.
- ▶ Especially useful for **mixed production environments**

### Automated workflows with production printers and digital presses

A flexible hotfolder technology allows you to use GMG ColorServer output folders as input folders for **any** output device supporting an automated print workflow. This way, you can set up integrated and completely automated color management workflows, independent of the output device type and driver.

A **single** color management solution for **all** devices eliminates the need for an individual configuration and synchronization of different frontends, RIPs, printers, and so on. This helps streamlining your workflows and minimizes maintenance activities.

### Process control and production stability

You can use GMG SmartProfiler to easily **calibrate** digital presses on a regular basis. Regular calibrations counterbalance undesired printer deviations caused by varying environment conditions such as temperature and humidity.

### Flexibility and efficiency in the production process

All input files can be **normalized** to the same color space or print standard in GMG ColorServer. By using color profiles optimized for a specific output device and print medium, the print result does not depend on the selected printer. You can flexibly print documents on **any** calibrated printer in your printer pool. By efficiently distributing your jobs (**load balancing**), you can significantly speed up the production and increase your production capacity.

This aspect is of special interest for **hybrid** offset and digital printing workflows. GMG ColorServer makes it easy to print colors matching as closely as possible, independent of the printing technology.

**Extend the capabilities of your toner-based system to produce validation prints**

The close integration of high-performance digital presses from several providers, high-quality print media, and GMG ColorServer software allows you to create validation prints matching the expected print result on a conventional printing press as closely as possible, similar to a printed proof.

The ISO 12647-7 standard specifies requirements for systems that are used to produce hard-copy digital proof prints intended to simulate a printing condition defined by a set of characterization data. For **toner-based** systems, FOGRA has modified these criteria and has defined a **validation print** scheme. Validation print systems based on GMG ColorServer and HP Indigo digital printers have been **certified** by official organizations such as FOGRA and GRACoL. Please see our website for more information.

Supported print standards are: Offset (PSO), Newspaper, PSR, GRACoL, SWOP, 3DAP, JMPA, JPC, PPA, and more. You can **import** characterization data in various file formats to support any print standard you might need. (Please see the separate documentation on GMG ColorServer for further information).

### 1.3 Setting up Your Workflow Configuration—Check List

As GMG SmartProfiler uses **DeviceLink** MX color profiles, all files you will be creating are **only** valid for a specific **printer–medium configuration**.

Thus you will need to set up a **separate** hotfolder with a calibration file and color management profiles for **each** printer–medium combination you want to use.

If you are starting from scratch and have no hotfolders set up or imported, you can conveniently create new hotfolders with GMG SmartProfiler, taking advantage of various presets which are part of the installation volume.

If you already have set up or imported hotfolders, you can select each in the **Overview** view in GMG ColorServer and create a printer calibration and/or color profile optimized for a specific printer–medium combination in GMG SmartProfiler.

The following check list is provided to give you an overview on all required steps. Please follow the "See also" links for further details.

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**Tip** See also the **GMG SetCards** providing check lists with respect to the purpose and hardware configuration. You can find them in the **CheckLists** subfolder of the **Documentation** folder (default path: C:\Program Files\GMG\SmartProfiler\AppData\Documentation\English\CheckLists\)

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**Tip** Print this page and checkmark all finished steps in the **OK** column in order to keep track of the progress.

<b>OK</b>	<b>Required steps</b>	<b>Program</b>	<b>See also</b>
	Perform <b>printer maintenance</b> activities.	printer	"Printer Maintenance" on page 16
	Make a <b>pre-check</b> of the <b>printing system</b> to confirm that it is supported by GMG SmartProfiler and that it is in a good condition.	external frontend	"Pre-check of the Printing System" on page 16
	<b>Deactivate</b> any <b>external</b> color management modules, for example, in a workflow system, RIP, or printer frontend.	external frontend	
	For <b>each</b> printer–medium combination, <b>create</b> a new <b>hotfolder</b> .	GMG SmartProfiler	"Creating a Printer Calibration File" on page 35
	Connect the <b>Output Folder</b> of the hotfolder to the <b>printer frontend</b> .	GMG SmartProfiler, external frontend	"Printing Documents" on page 37
	For each hotfolder, create a <b>printer calibration</b> file and a <b>color profile</b> .	GMG SmartProfiler	"Creating a Printer Calibration File" on page 35
	<b>Calibrate</b> the hotfolder on a regular basis.	GMG SmartProfiler	"About "Recalibrate"" on page 62



## 2. Program Installation

### 2.1 Installation Overview

GMG ColorServer Suite comes with several components you can select in the feature list of the installation wizard. The following table will provide you with information on the different components followed by a description of the possible client/server structures.

<i>Feature/Component</i>	<i>Description</i>
ColorServer	Main color management application.
ConnectManager	GMG ConnectManager is a utility program that monitors all GMG Connect components.
ConnectServer	Part of the GMG Connect system that links GMG applications such as GMG ColorServer and GMG SmartProfiler or GMG WebConnect across different computers. Central data management of the Connect system, needs to be run in the background.
Ink Saving Report Tool	Tool that analyzes your output and calculates the ink savings you could realize with GMG InkOptimizer.
SmartProfiler	Calibration and profiling wizard. GMG SmartProfiler can also be installed as a client component on a different computer for information exchange with GMG ColorServer via your local network.
WebConnect Server	Web server for remote data management that allows to set up users for remote use of GMG ColorServer hotfolders.

#### 2.1.1 Client/Server configuration possibilities

All components of GMG ColorServer Suite can either be installed on one system and used just locally or distributed across several computers, allowing for a networked, but centrally controllable cross-platform color management. For example, you can install GMG SmartProfiler on several computers within your network and create hotfolders with color management files in GMG ColorServer via remote access. WebConnect also follows the client/server model, but as the client only needs a web browser to access GMG ColorServer hotfolders, there is no installation required from the client side.

- ▼ Client-server configuration: Installation on **two** separate computers (**server**, **client**), as shown in the table below.

<i>Workstation</i>	<i>Installation</i>
Server	GMG ColorServer, GMG ConnectServer, GMG WebConnect
Client	GMG SmartProfiler

**Note** The number of client programs you can install on different computers depends on the purchased license. All client computers must have access to the server with **Full Control** permissions.

**Note** GMG SmartProfiler licenses are managed by GMG ConnectServer. You need to install GMG ConnectServer on the **same** computer as GMG ColorServer. Otherwise, it will not be possible to run the client software.

### 2.2 Before You Install

To ensure a safe installation, please check the following list before starting the process.

- Check the **system requirements** for the software you want to install.
- Make sure a valid **license** required for the software version you want to install is available on the target computer.
- Unplug all **measuring devices** connected to the computer (if any). Otherwise, device drivers will not be properly installed.
- Make sure you are logged on as a user with **full administrator rights**.

- Make sure **no** Microsoft system updates are running in the background. This could lead to an installation failure.

### 2.3 Additional Requirements under Windows 7 and Windows Vista

When using **Windows 7** or **Windows Vista**, it is required to deactivate the **User Account Control** before installing GMG ColorServer. Otherwise, software modules will not be recognized correctly (you can check this under **Help > Info** in GMG ColorServer) and GMG ColorServer will not operate properly.

#### How to deactivate the User Account Control on Windows 7

1. Open the **Control Panel**, click **User Accounts**.
2. Click **Change User Account Control settings**.
3. Move the slider to the **Never notify** position, and then click OK.
4. Restart the computer before installing GMG ColorServer.

#### How to deactivate the User Account Control on Windows Vista

1. Open the **Control Panel**, click **User Accounts**.
2. Click **Turn User Account Control on or off**.
3. Deselect the **User Account Control (UAC)**.
4. Restart the computer before installing GMG ColorServer.

### 2.4 Server Installation

GMG ColorServer is the central color management module of GMG ColorServer Suite. Install the module on a central server that can be accessed from all clients in the network.

GMG ColorServer requires a USB dongle with a license key.

For maximum performance, we recommend the hardware drive configuration as described in the following chapters.

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**Note** The folder configuration used by the software is defined when creating a new printer–medium combination in GMG SmartProfiler.

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See also:

- "Recommended Hardware Configuration" on page 11

#### 2.4.1 Setting Up the Computer

We recommend the program to be run on a computer meeting the following requirements to ensure the maximum performance from GMG ColorServer.

**System requirements:** Intel® Core™ 2 Quad, Q6600 or similar, 2.4 GHz, 2 x 4 MB Level 2 (L2) cache, 4 GB RAM, 750 GB - 10.000 U/min hard disk drive with at least 15 GB free disk space

**Hardware components:** Video card (DVI, supporting DirectX 9c), enabled Direct 3D acceleration, updated driver (**not** Windows default driver), for example, NVIDIA® GeForce 8600 GT; minimum screen resolution 1024 x 768 px, 32 bit color depth

#### Operating system:

- ▶ Windows 7 (32-bit/64-bit version)
- ▶ Windows Vista Service Pack 1 or later (32-bit/64-bit version)
- ▶ Windows XP Professional Service Pack 3 or later
- ▶ Windows Server 2008
- ▶ Windows Server 2003 Service Pack 2 or later

**NTFS** file system only (FAT32 is **not** supported)

**Note** The spectral color chart reader iCColor (X-Rite) is **not** supported in the **64-bit** version of GMG SmartProfiler.

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**Software components:**

- Microsoft Internet Explorer 6.0 or higher
- Direct X 9c or higher (required for the GMG GamutViewer feature in GMG ProfileEditor)

**User rights: Power User**, under Windows **Vista: Administrator** (**Full administrator rights** are always required for installation.)

### 2.4.2 Graphics Card Configuration for Gamut Viewer

For using the gamut viewer included in GMG ProfileEditor, you need to use a graphics card that supports the required drivers and software components. The following instructions were optimized for Windows Vista. The procedure might differ slightly according to the used operating system.

**System requirements**

**Hardware components:** Graphics card supporting DirectX 10, with activated Direct3D acceleration, with up-to-date driver (not Windows default driver)

**Software components:** DirectX 10 or higher

**How to check the DirectX settings**

- ➔ Open the **Windows Control Panel** and check that the video card driver provided by the manufacturer of the video card is used. Check also that the driver is up to date.
- ➔ Install **DirectX 10** or higher.
- ➔ In the **Start/Run** box of the Windows operating system, type in "**dxdiag**" and press Enter. The **DirectX Diagnostic Tool** dialog box is displayed.
- ➔ Click the **Display 1** tabbed page.
- ➔ Check that the following DirectX features are enabled: **DirectDraw Acceleration**, **Direct3D Acceleration**, and **AGP Texture Acceleration**. Enable them if this is not the case. If it is not possible to activate these features, the graphics card might not support them and you might need to use a different card.

**How to check the hardware acceleration settings**

1. Open the **Display Settings** of the Windows operating system.
2. Click **Advanced Settings**.
3. Click **Troubleshoot**.
4. Click **Change Settings**.
5. Set **Hardware Acceleration** to **Full**.

### 2.4.3 Recommended Hardware Configuration

For maximum processing performance, we recommend the following hardware configuration with three **separate** disk drives on the same computer, as described in the following.

**Note** A noticeable performance increase can be achieved only with separate physical disk drives, **not** with separate partitions on the **same** disk drive.

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- Disk drive with the GMG ColorServer installation
- Disk drive for input data (**Input Folders**)
- Disk drive for output data (**Output Folders**)

See also:

### 2.4.4 Installing GMG ColorServer

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**Note** The GMG ColorServer Suite installer offers an **update** functionality. If you have already installed GMG ColorServer**4.7 or later**, you do **not** need to uninstall an existing version before installing the new version. If you have installed an **earlier** version, you will need to **uninstall** an existing version before installing the new version.

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#### How to uninstall the previous version

Existing hotfolder configurations or application data from the user are **not** changed by the installer. Still, it is recommended to make an **environment backup** to save all workflows and settings before uninstalling the software to avoid any potential data loss.

1. Start your currently installed version of GMG ColorServer.
2. On the **Options** menu, point to **Environment Backup**, and click **Create**.
3. After the **Environment Backup** has been successfully created, close all GMG applications.
4. Uninstall GMG ColorServer from the Windows Control Panel (**Start > Control Panel > Programs and Features**). Do **not** delete the main program folder (default folder for version 4.6 or lower: c:\C-colorproof\1) manually before the new installation as the folder contains all printer calibrations, profiles, and other system files and application data related to the software.
5. After the uninstall operation is complete, restart the computer.

#### How to install the new version

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**Note** Even if the installer appears to be **unresponsive**, it is still working in the background. Do **not** cancel the installation, end the process, or restart the computer until the installation is **finished**.

---

1. For a successful installation of device drivers, unplug all spectrophotometers connected to the computer.
2. You can install the program directly from the purchased DVD.
3. If you downloaded the program from the GMG website, copy the **GMG-ColorServerSuite\_4.7.x.x.\_32bit.zip** file, "4.7.x.x" being a placeholder for the current build number, (or the 64-bit version) into a local directory on the computer you want to install the program on.
4. Extract all compressed files and double-click the **GMG-ColorServerSuite\_4.7.x.x.\_32bit.exe** file (or the 64-bit version) to start the installation.
5. Follow the instructions of the installation assistant. (If upgrading from an earlier version than 4.7, please install the program to a different folder than the one you installed the previous version to.)
6. Under **Setup Type**, you can select the **Custom** option if you want to install only the main components required for a specific program.
7. Deselect the features you do not want to install on the computer.
8. If you want to run GMG SmartProfiler on a remote client and not on the same computer as GMG ColorServer, select only the **Server** features (i. e. GMG ColorServer, GMG ColorServer Connector, and GMG ConnectServer) for the installation on the server computer and select only the **Client** features (i. e. GMG SmartProfiler) for the installation on the client computer.
9. Please wait while the installer is running.  
The installer needs to extract the installation package, install the program, and copy all application data to the hard disk. These actions may take a while. The installer might appear **unresponsive** during the installation. This is considered to be normal behavior and does not impair the installation success.

10. Restart the computer when you are prompted to do so.  
The installation procedure will be automatically resumed after the restart.
11. The installation assistant will inform you when the installation is complete. Click the **Finish** button to exit the wizard.

### 2.4.5 Software License

#### License Information

Features available in the software bundle are controlled by the license information on the connected USB dongle. Please make sure that you have all licenses required for the actions you want to perform with the software.

For example, trial or temporary program versions can be limited either by the **number of actions** the user can perform or by an **expiration time**.

Licenses can be updated via the software. For more information on available license packages, please contact your local dealer.

Please keep the license information and serial number at hand when contacting the support.

#### How to check the currently available licenses

1. Start the main GMG ColorServer application.
2. On the **Help** menu, click **License Update**.  
A list with all licenses installed on the connected USB dongle is displayed.

## 2.5 Client Installation

GMG ColorServer can be accessed by multiple clients (GMG SmartProfiler installations) in the network.

### 2.5.1 Setting Up the Computer

We recommend the program to be run on a computer meeting the following requirements to ensure the maximum performance from GMG ColorServer.

**System requirements:** Intel® Core™ 2 Quad, Q6600 or similar, 2.4 GHz, 2 x 4 MB Level 2 (L2) cache, 4 GB RAM, 750 GB - 10.000 U/min hard disk drive with at least 15 GB free disk space

**Hardware components:** Video card (DVI, supporting DirectX 9c), enabled Direct 3D acceleration, updated driver (**not** Windows default driver), for example, NVIDIA® GeForce 8600 GT; minimum screen resolution 1024 x 768 px, 32 bit color depth

#### Operating system:

- ▼ Windows 7 (32-bit/64-bit version)
- ▼ Windows Vista Service Pack 1 or later (32-bit/64-bit version)
- ▼ Windows XP Professional Service Pack 3 or later
- ▼ Windows Server 2008
- ▼ Windows Server 2003 Service Pack 2 or later

**NTFS** file system only (FAT32 is **not** supported)

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**Note** The spectral color chart reader iColor (X-Rite) is **not** supported in the **64**-bit version of GMG SmartProfiler.

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#### Software components:

- ▼ Microsoft Internet Explorer 6.0 or higher
- ▼ Direct X 9c or higher (required for the GMG GamutViewer feature in GMG ProfileEditor)

**User rights:** **Power User**, under Windows **Vista: Administrator** (**Full administrator rights** are always required for installation.)

### 2.5.2 Installing GMG SmartProfiler

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**Note** The GMG ColorServer Suite installer offers an **update** functionality. If you have already installed GMG SmartProfiler **1.5 or later**, you do **not** need to uninstall an existing version before installing the new version. If you have installed an **earlier** version, you will need to **uninstall** an existing version before installing the new version.

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#### How to install the new version

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**Note** The system component GMG ColorServer Connector is required for proper operation of GMG SmartProfiler and must be installed on the **same** computer where GMG ColorServer is installed.

---

**Note** Even if the installer appears to be **unresponsive**, it is still working in the background. Do **not** cancel the installation, end the process, or restart the computer until the installation is **finished**.

---

1. For a successful installation of device drivers, unplug all spectrophotometers connected to the computer.
2. You can install the program directly from the purchased DVD.
3. If you downloaded the program from the GMG website, copy the **GMG-ColorServerSuite\_4.7.x.x.\_32bit.zip** file, "4.7.x.x" being a placeholder for the current build number, (or the 64-bit version) into a local directory on the computer you want to install the program on.
4. Extract all compressed files and double-click the **GMG-ColorServerSuite\_4.7.x.x.\_32bit.exe** file (or the 64-bit version) to start the installation.
5. Follow the instructions of the installation assistant. (If upgrading from an earlier version than 4.7, please install the program to a different folder than the one you installed the previous version to.)
6. Deselect all **Server** features. Make sure all **Client** features are selected. Click **Next**.
7. Please wait while the installer is running.  
The installer needs to extract the installation package, install the program, and copy all application data to the hard disk. These actions may take a while. The installer might appear **unresponsive** during the installation. This is considered to be normal behavior and does not impair the installation success.
8. Restart the computer when you are prompted to do so.  
The installation procedure will be automatically resumed after the restart.
9. The installation assistant will inform you when the installation is complete. Click the **Finish** button to exit the wizard.

### 2.5.3 Network Settings on the Client

GMG SmartProfiler and GMG ColorServer talk to each other via a central server running in the background. This server is installed by default on the same computer as GMG ColorServer.

If you want to run GMG SmartProfiler as a **client**, remote controlling GMG ColorServer via the network, you need to enter the IP address of the computer on which GMG ColorServer is installed.

If you want to run GMG SmartProfiler on the **same** computer as GMG ColorServer, enter "localhost" instead of an IP address.

#### How to connect GMG SmartProfiler to the server

1. On the **Options** menu, click **Network Settings**.

2. Enter the IP address of the computer on which GMG ColorServer is installed as the **Server Address** and enter the **Server Port**.
3. Click the **Test Connection** button to check whether the connection can be established.

### 3. Connecting the Printer

GMG SmartProfiler and GMG ColorServer are a perfect color management solution for all kind of production printers and digital presses. In this documentation, the term "printer" will be used as a general term for all output devices.

As GMG ColorServer processes PDF and image files and does not need to control or directly interact with a printer, the software does not depend on the printer driver, frontend RIP, or workflow system you might use. GMG SmartProfiler and GMG ColorServer will perfectly integrate with your custom software and hardware configuration.

---

Key message: After a hotfolder has been created in GMG ColorServer Suite, you need to connect it to your printer frontend. For the connection, you will need access to the **output folders** defined in the hotfolder settings (via the network if you are working in a server-client environment). Once the connection has been established, you can proceed with profiling by printing test charts and measuring color values.

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See also:

- "Defining the Output Folder" on page 30

#### 3.1 Frontend Requirements

The printer frontend you want to create printer calibrations or profiles for must meet the following requirements to be compatible with GMG SmartProfiler.

**Automated print workflow:** Our hotfolder technology allows supporting **all** kind of printers and digital presses **independent** of the used printer driver, frontend RIP, and so on. For an automated printing of test chart pages created by GMG SmartProfiler, however, the frontend needs to support an automatic printing from **input folders**. Of course, you can also manually print the test chart pages.

**PDF support:** If you want to calibrate or profile PDF hotfolders, the frontend needs to support PDF version **1.3**.

#### 3.2 Printer Maintenance

High quality profiles can only be created for a printer in a good and stable condition. Ideally, environmental conditions such as ambient temperature and humidity should also be standardized. A printer calibration is able to counterbalance normal deviations, but if you observe strong fluctuations, it is recommended to find and fix the cause for the unwanted behavior.

Please take in mind that print quality always reflects the quality of the used resources. Even though GMG SmartProfiler and GMG ColorServer will play an important part in your quality control, the quality of all parts in the chain should be taken into consideration.

Therefore, it is strongly recommended to perform all printer maintenance activities as instructed by the printer's manufacturer before starting to work with GMG SmartProfiler. Make a test print and make sure the general behavior of the printer and of the loaded medium is ok. See the user manual provided by the printer's manufacturer for further information.

#### 3.3 Pre-check of the Printing System

The main reason for using GMG ColorServer Suite in a digital or large format production environment is to achieve a reliable and consistent color reproduction, as described in detail in the "Welcome to GMG SmartProfiler" on page 6 chapter.

"Consistent" does not mean a better quality, does it?

Yes—and No. Of course, if you want to achieve consistent colors on different printing systems, the quality is somehow limited by the weakest system you might have.



However, you will experience that GMG ColorServer Suite can dramatically increase your print quality by flattening and normalizing documents and by applying high-quality color management. To get you an idea of what we are talking about, here is a short summary of what is possible.

- Avoid overinking
- Perfectly smooth gradients
- Print deep, dark color tones to bring out detail in the shadows
- Print bright and colorful images
- Avoid unintended tints or color drifts

However, there are technical limitations you should be aware of before starting to work with GMG ColorServer Suite. For example, if the ink is running from the print medium, if a "gradient" prints as a full tone, or if you observe very strong print artifacts, there is not much you can do about it by profiling alone. To save valuable time and resources, we therefore highly recommend a pre-check of the printing system before starting the profiling process.

The pre-check described in this chapter has the following goal.

- Confirmation that the **printing system** is in general **supported** by GMG SmartProfiler.
- Confirmation that the printing system is in **good shape** and that it will be possible to achieve a good printing quality on the system.
- Confirmation that the settings of the **frontend RIP** are **compatible** with GMG SmartProfiler.

Test charts specifically designed for a pre-check of digital and large format printers have been developed by GMG ColorExperts. They are provided together with the software and are described in detail in separate chapters.

- If the pre-check results fulfill the **minimum** quality criteria, you can **proceed** with the profiling.
- If the results are **not** acceptable, you will need a **technical service** before you can proceed with the profiling.
- If the results are **far** away from acceptance or if the technical service does **not** solve the problems, you can consider the printer as **not supported** by GMG SmartProfiler.

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**Note** Do **not** proceed with the profiling before you have solved all issues and performed a successful pre-check.

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### How to perform the pre-check

1. Make sure the frontend and the printing system is in the status you currently use for production.
2. Print the appropriate test charts directly on the printer-medium combination you want to profile, without using GMG SmartProfiler and GMG ColorServer.
3. Visually assess the print quality.

See also:

- "Visual Evaluation of the Print Quality" on page 59
- "Digital Printers" on page 19
- "Large Format Printers" on page 20

#### 3.3.1 Visual Evaluation of the Print Quality

You can print a test chart to visually check the print quality.

We recommend this check for two purposes:

- ▶ **Before** profiling:
  - ▶ Printer and frontend RIP: Use your standard print and RIP settings.
  - ▶ Printer only: Deactivate the color management and linearization of the frontend RIP. This will be the basis for the profiling process with GMG SmartProfiler.
- ▶ **After** profiling: As a final approval of the profile and to document the profile quality for later reference.

### Where to find the test chart

`<installation path>AppData/Charts/Visual_Profile_Check\GMG_TestForm_visual_<version No.><printer type><orientation>.pdf`

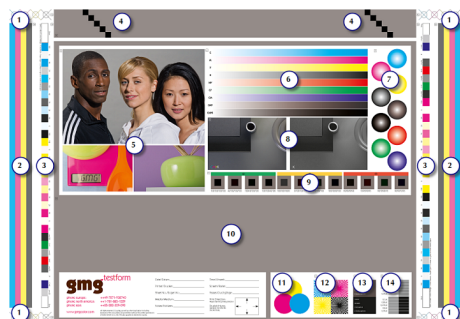


Fig. 1 Visual test chart.

All test objects are numbered on the chart. You will find a detailed explanation for all objects in the following table.

No.	Object	Description	
1	Register marks	There are four register marks in each corner of the test chart to control the color register. The color register determines the overlay of the different printing colors in the printing process. If the color register is not correctly adjusted, the register marks will appear blurred or slightly shifted. By arranging the register marks in groups of four, the test chart enables you to determine whether the color register is prone to variations across the sheet.	
2	Color density bars	Solid bars in the primary colors to determine whether a stable color tone is printed across the sheet.	
3	GMG Unified Control Wedge	Measure the control strips (ISO Coated v2 (39L) from FOGRA on the left side, GRACoL on the right side) to determine whether the measured color values are within the tolerances as defined by ISO standards.	
4	Memory bars	The memory bars have to be assessed with an eye to the gray 4c background.  If you can see shadow images of the bars on the background, this could mean that the print heads need to be cleaned. If this is the case, the printer status might not be suitable for profiling. Please perform any necessary printer maintenance actions, reset GMG SmartProfiler, and restart the profiling process.	"Printer Maintenance" on page 16
5	Test images	Test images with a lot of detail and mixed colors are used to visually assess the profile quality.	
6–7	Gradients	The gradients reflect the smallest printable dot. Furthermore, you can check the linearity of your printing system. If the gradients show any breaks, the printer linearization might not be sufficient.  The gradients will also reveal gradation breaks or solarizations that might be caused by the profile.  The gray gradation strips can be used to evaluate the neutral gray.	"Ink Limit and Linearization" on page 37
8	Grayscale images	Grayscale images reflect the selected separation settings. You can use the images to check the gray balance.	"Separation Settings" on page 57
9	Overinking	For evaluating the ink limit and overinking.	"Evaluating

No. Object	Description	
		the Ink Limit" on page 40
10 CMYK background	The gray 4c background serves to evaluate the homogeneity of the print. Attention should be paid to an overall smoothness of the background. There should be no color shifts or banding.  If you can see shadow images of the GMG Unified Control Wedge control strips on the background, this could mean that the print heads need to be cleaned. If this is the case, the printer status might not be suitable for profiling.	"Printer Maintenance" on page 16
11 Overprinting CMYK, RGB	(PDF only) If the object shows a clear overprinting of the primary colors, the overprinting parameter in the printer frontend is set correctly.	"Connecting the Printer" on page 16
12 Siemens stars	(PDF only) Siemens stars are a very useful pattern to check the resolution of a printer. The pie-shaped bright spokes of the stars on a dark background become narrower towards the center of the star. The higher the resolution of the printer, the closer to the center of the star they will appear to merge. Comparing the test chart to recent reference prints can help to detect any printer deviations. Artifacts at the border of the stars are an indication of a frontend optimization. Such an optimization has a detrimental effect when it comes to printing characterization charts and might negatively affect the profile quality.	"Connecting the Printer" on page 16
13 Type	(PDF only) Type reveals any font or color replacement in the printer frontend. It also reveals whether the printer frontend applies anti-aliasing or not. Anti-aliasing might negatively affect the profile quality. Test charts should be printed without anti-aliasing.	"Connecting the Printer" on page 16
14 Strokes	(PDF only) Strokes with different weights are used to check the print resolution. Comparing the test chart to recent reference prints can help to detect any printer deviations. If strokes with the same weight appear to be different with respect to the dark or light background they are printed on, this might be caused by frontend parameters. This might falsify measurement results and thus negatively affect the profile quality.	"Connecting the Printer" on page 16

### 3.3.2 Digital Printers

The pre-check described in the following applies to inkjet and laser/toner digital printers.

During this test, you will print a 5-page test chart for a visual evaluation of the print quality.

- 4 c gray area (C40 M40 Y40 K40) with fulltone patches (C100 M100 Y100 K100)
- 1 c gray area (C0 M0 Y0 K40) with fulltone patches (C0 M0 Y0 K100)
- 1 c Cyan area (C40 M0 Y0 K0) with fulltone patches (C100 M0 Y0 K0)
- 1 c Magenta area (C0 M40 Y0 K0) with fulltone patches (C0 M40 Y0 K0)
- 1 c Yellow area (C0 M0 Y40 K0) with fulltone patches (C0 M40 Y0 K0)

#### Where to find the test chart

<installation path>AppData/Charts/Visual\_Lin-Inkcut\_Check\GMG\_DP\_Test\_Form\_technical\_<version No.>.pdf

#### Expected results

- The area should show a homogenous print result.
- The fulltone patches should have a sharp border.

#### What to look for

- Color shifts or inhomogeneities
- Massive overinking (slight overinking can be come by with profiling)
- Hair lines
- Printer streaks
- Streaks or artifacts in a regular pattern, especially when printing on flexible foils

- Ghosting (a double image, which can be a positive or negative image of the fulltone patches)
- Blushing (lighter or darker color) around the fulltone patches

The 1 c test charts might help you to narrow down the problems you might find. For example, you can see whether the problem is a general system failure and occurs with all inks or whether the problem can be narrowed down to a particular ink.

#### 3.3.3 Large Format Printers

The pre-check described in the following applies to inkjet or solvent-based large format printers.

During this test, you will print a 1-page test chart for a visual evaluation of the print quality. If the printable area of your printer does not support the full size of the chart, you can use the dotted lines on the chart to tile the page.

The test chart has three functional parts:

- 4 c gray area (C40 M40 Y40 K40) with fulltone patches (C100 M100 Y100 K100)
- Gradations with pure colors, plus an additional color
- Gradations with pure colors

#### 4c Gray

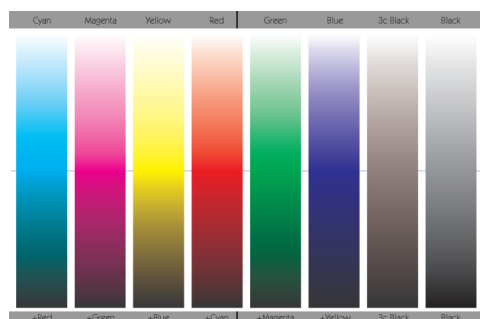
##### Expected results

- The area should show a homogenous print result.
- The 1c gray gradation strip should show a neutral gray without a tint.

##### What to look for

- Color shifts or inhomogeneities
- Massive overinking (slight overinking can be come by with profiling)
- Hair lines
- Printer streaks
- Streaks or artifacts in a regular pattern, especially when printing on flexible foils

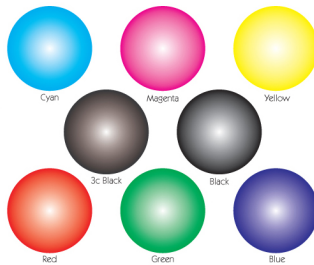
#### Gradations with pure colors, plus an additional color



From top to bottom, the gradations start with pure colors (1c, 2c, or 3c as indicated on the test chart). From bottom to top, an additional color is gradually added, as indicated by the "+" on the test chart.

The color that is furthest down on the chart is a 3c full tone (C100 M100 Y100 K0), which can be used as an indicator for overinking.

The gray gradation strip on the right can be used to evaluate the neutral gray.

**Gradations with pure colors, without an additional color.****Where to find the test chart**

*<installation path>AppData/Charts/Visual\_Lin-Inkcut\_Check\GMG\_LFP\_Test\_Form\_technical\_<version No.>.pdf*

**Expected results**

- ▶ The gradations should be smooth without any visible breaks.

When using a **solvent-based** printer, you might need to optimize the **drying temperature** during the pre-check process.

**What to look for**

- ▶ Massive overinking (slight overinking can be come by with profiling)
- ▶ Massive visible breaks in the gradations (minor breaks can be come by with profiling)
- ▶ Grainy colors
- ▶ Strong artifacts

### 4. Starting GMG SmartProfiler

**Note** The **GMG Connect Service**, which must always run in the background on the computer you installed GMG ColorServer on, might not be compatible with standard firewall programs. Therefore, you might need to **deactivate** your firewall when running GMG SmartProfiler.

You can use GMG SmartProfiler to configure GMG ColorServer. The two separate programs do not need to be installed on the same computer; you can access GMG ColorServer via the network.

GMG SmartProfiler can be started by double-clicking the program icon on the Windows desktop or from the **Start** menu.

If GMG SmartProfiler is installed on the **same** computer as GMG ColorServer (local system), the program can be accessed via the **context menu** of a selected hotfolder in GMG ColorServer. This makes sense, for example, if you want to configure or recalibrate an already existing printer–medium combination.

If you start GMG SmartProfiler from within GMG ColorServer, the first step usually is to create a printer calibration (**Create New Printer–Medium Combination**). If you do not want to use a printer calibration for the hotfolder, select the command **Create Profile** to create a color profile.

#### How to start GMG SmartProfiler from within GMG ColorServer

1. Select the hotfolder you want to create the printer calibration or profile for.
2. Right-click the hotfolder to open the context menu.
3. Click **Create New Printer-Medium Combination** if you want to create a printer calibration.

The hotfolder you have selected in GMG ColorServer is already preselected. All hotfolder settings relevant for the file handling and color management are shown in the **Information** box on the right side.

See also:

- "Using a Printer Calibration" on page 34
- "Creating a Printer Calibration File" on page 35
- "About "Create New Profile"" on page 50

### 4.1 Start Page

GMG SmartProfiler helps you to create printer calibrations and color profiles for GMG ColorServer hotfolders. You can also set up new hotfolders.

- Generally, you will start with **creating a new printer–medium combination**. GMG SmartProfiler will guide you through setting up a hotfolder (you can also use an existing hotfolder) and creating a printer calibration (optional) and profile for this hotfolder. For creating the profile, you will be forwarded to the **Create New Profile** mode.
- After creating a **printer-medium combination**, you can use the **Recalibrate** mode to update the printer calibration on a regular basis.
- **Create New Profile** guides you through the process of creating a **new MX4 color profile** for the selected hotfolder.



Fig. 2 Start page.

Click the button or link of the mode you want to use (1). GMG SmartProfiler will switch to the selected mode, taking you through the process step by step. Click the info buttons for further information (2). If you save an ongoing process as a **CSW** file, you can load the file from the **File** menu and **resume** the process.

Press F1 on the keyboard to show the **Help**.

See also:

- "Setting up Your Workflow Configuration—Check List" on page 8
- "Creating a Printer Calibration File" on page 35
- "About "Create New Profile"" on page 50
- "About "Recalibrate"" on page 62

## 4.2 Program Overview

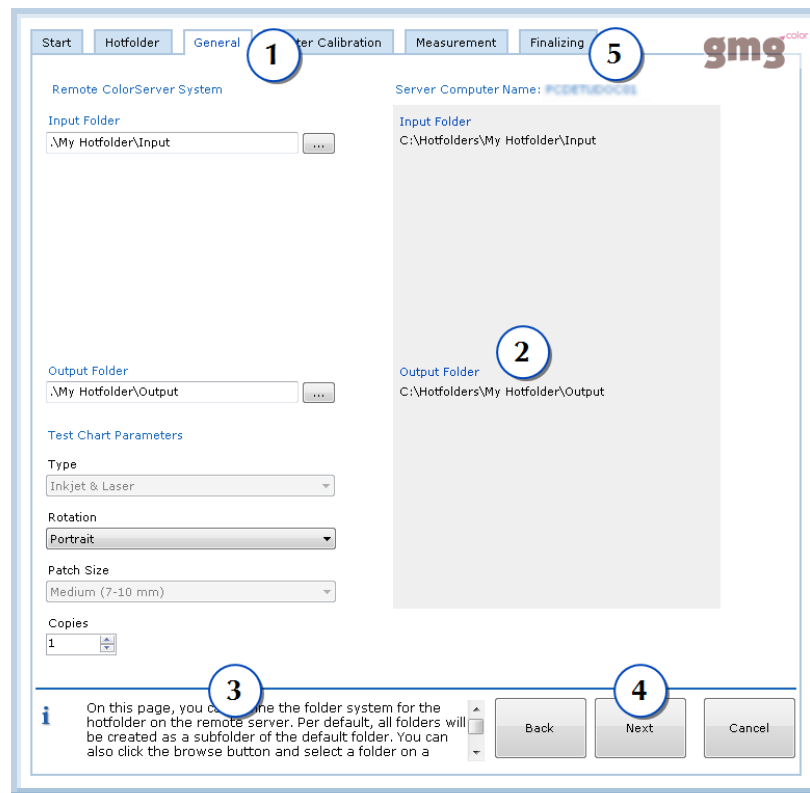


Fig. 3 Main program window.

GMG SmartProfiler has a wizard-like program structure guiding you through the process step-by-step. The navigation panel on the left shows all **major** steps of the process. The number of these steps depend on the parameters you select. For example, you can skip the **Ink Limit and Linearization** step if you want to use the printer linearization from the printer frontend. GMG SmartProfiler guides you through the steps from the top step to the bottom step. The currently active step is highlighted.

Each major step requires a number of **minor** steps, for example, **Printing**, **Measuring**, and **Evaluating** of test charts. Each minor step is visualized by a tabbed page (1). The information pane on the right side provides you with information on the created files or folders (2). Some pages require a user interaction, for example, entering parameters. On most pages, default values are automatically filled in and you generally will not need to change them. You will find a **hint** what you need to do in the **info pane** at the bottom of the window (3). If you require more information, you only need to press **F1** on the keyboard to show the context-sensitive **help**.

GMG SmartProfiler guides you through the minor steps from left to right. You can click the **Next** button to confirm the settings and go to the next step (4). You can also click the **Back** button to reset the last step, change the settings, and repeat the step. It is not possible to switch to another tabbed page by clicking the different tabs.

Each **major** step has a **Finalizing** page (5), on which you will confirm and save the settings of the previous step. After leaving the **Finalize** page by clicking **Next**, you will not be able to go back to a previous step. In an ongoing process, the results of all steps will be saved as **temporary** data. The hotfolder settings and linked application data files such as printer calibration files and profiles will **not** be changed until the very last **Finalizing** step.

## 4.3 Client/Server Environment

You can operate GMG SmartProfiler and GMG ColorServer in a client/server environment, GMG SmartProfiler being the client and GMG ColorServer being the server. This allows you to share your workload and set up multiple simultaneous client connections in a local network.



**Note** GMG SmartProfiler comes with one floating license. With one floating license, any number of users can have the software installed, but only one can use it at a time. To use the software for multiple concurrent users, you have to purchase one floating license for each concurrent user.

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#### 4.3.1 Connecting GMG ColorServer Connector to GMG ConnectServer

GMG ColorServer Connector is the interface between GMG ConnectServer and GMG ColorServer. GMG ColorServer needs to be run on the **same** computer as GMG ColorServer Connector.

GMG ColorServer Connector needs to know the address of GMG ConnectServer. If you have installed GMG ConnectServer on the same computer as GMG ColorServer (recommended), enter "localhost" instead of an IP address.

---

**Note** Make sure the **computer** on which GMG ConnectServer is installed and the Windows service **GMG Connect Service** are **running**.

---

**Note** Changes to the server connection settings will require a restart of the **GMG ColorServer Connector Service**.

---

#### How to connect GMG ColorServer Connector to GMG ConnectServer

1. Start the GMG ColorServer Connector application from the Windows Quick Launch Bar (right mouse click > **Properties**).
2. On the navigation panel on the left, click **System**.
3. Under **Network Settings**, enter the IP address of the computer on which GMG ConnectServer is installed as the **Server Address** and enter the **Server Port**.
4. Click **Apply** to confirm the settings.  
A message box will inform you that **GMG ColorServer Connector Service** will be restarted.

#### 4.3.2 Network Settings on the Client

GMG SmartProfiler and GMG ColorServer talk to each other via a central server running in the background. This server is installed by default on the same computer as GMG ColorServer.

If you want to run GMG SmartProfiler as a **client**, remote controlling GMG ColorServer via the network, you need to enter the IP address of the computer on which GMG ColorServer is installed.

If you want to run GMG SmartProfiler on the **same** computer as GMG ColorServer, enter "localhost" instead of an IP address.

#### How to connect GMG SmartProfiler to the server

1. On the **Options** menu, click **Network Settings**.
2. Enter the IP address of the computer on which GMG ColorServer is installed as the **Server Address** and enter the **Server Port**.
3. Click the **Test Connection** button to check whether the connection can be established.

#### 4.3.3 Hotfolder Filter

Per default, all hotfolders of the remote GMG ColorServer system are available in GMG SmartProfiler. With the **Hotfolder Filter** (**Options** menu > **Hotfolder Filter**) you can determine which hotfolders are visible and can be accessed in GMG SmartProfiler.

---

**Tip** This feature is especially important in a remote scenario. If two GMG SmartProfiler clients access a GMG ColorServer hotfolder at the same time, this can lead to a conflict. With the **Hotfolder Filter**, you can define that GMG SmartProfiler on computer A accesses only a certain subset of hotfolders and GMG SmartProfiler on computer B accesses a different set of hotfolders, thus avoiding potential conflicts.

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The **ColorServer** drop-down list shows the network name of the ColorServer Connector. In case multiple GMG ColorServer systems have been installed in the network, you can select the instance of GMG ColorServer you want to work with.

## 5. Create New Printer-Medium Combination

### 5.1 About "Create New Printer-Medium Combination"

Click the **Create New Printer-Medium Combination** button to **create** a new **hotfolder** with a **printer calibration** (MX3) and a **color profile** (MX4) supporting a specific **printing condition** and **print medium**.

GMG SmartProfiler will switch to **Create New Printer-Medium Combination** mode, taking you through the process step by step. Creating a printer-medium combination includes the following steps.

OK	Required steps	See also
	Create a hotfolder.	"Creating a Hotfolder" on page 28
	Create a printer calibration file.	"Creating a Printer Calibration File" on page 35
	Create a color profile.	"About "Create New Profile"" on page 50

The GMG ColorServer technology is based on DeviceLink **MX** profiles.

A **DeviceLink** profile is designed for color transformations from a defined **input** color space to a defined **output** color space.

DeviceLink color transformations generally provide a higher quality and an optimized handling of the black channel.

In contrast, ICC profiles use a device-independent intermediate color space, usually Lab, to link two device-dependent color spaces.

Therefore, you will need to set up a separate **printer-medium combination** in the GMG ColorServer system for **each** printer and medium you want to use.

#### Printer calibration file

A printer calibration file is used for compensating undesired printer deviations caused by varying environment conditions.

A printer calibration file is valid only for the printer-medium combination it has been created for. You will need a different printer calibration file for **each** printer-medium combination you want to use.

**Advanced Info** You could use the same printer calibration file together with multiple print standards. This means, you can recalibrate the printer-medium combination once for all print standards. This requires a manual configuration of the GMG ColorServer system.

#### Color profile

An MX4 Digital Print Production profile is used to transform the print standard color space, for example, ISO Coated v2 (39L), into the printer color space.

You will need a different color profile for **each** printer-medium combination you want to use.

If you want to support multiple print standards, you will need a separate hotfolder with its own color profile for each print standard **and** for each printer-medium combination.

### 5.2 Starting the Process to Create a New Printer-Medium Combination

The first step is to create a **hotfolder** for **each** printer-medium combination you might have.

#### How to start the process

1. Start GMG SmartProfiler from the Windows Start Menu.  
The start screen of the program shows all available processes.
2. Click the button or link corresponding to the **Create New Printer-Medium Combination** mode.



Fig. 4 Starting the Create **New Printer–Medium Combination** mode.

Click the button or link corresponding to the **Create New Printer–Medium Combination** mode. GMG SmartProfiler will switch to the selected mode, taking you through the process step by step.

If you need further information at any point during the process, press F1 on the keyboard to show the **Help**.

See also:

- "Creating a Printer Calibration File" on page 35

## 5.3 Settings

### 5.3.1 Creating a Hotfolder

First, you need to define the basic parameters of the new printer–medium combination, starting with the hotfolder.

The information you enter will be saved within the metadata of the new hotfolder.

By selecting parameters for the new printer–medium combination, you also define the default settings for the separation mode used when creating a profile.

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**Note** The GMG ColorServer feature **Image Hotfolder** is not supported in GMG SmartProfiler. You can only create and update **PDF Hotfolders** in GMG SmartProfiler.

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**Tip** If you want to delete an obsolete hotfolder, you can do so in GMG ColorServer.

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Group	Short description
<b>Hotfolder</b>	Select <b>New Hotfolder</b> from the dropdown list if you want to create a new hotfolder for a specific printer–medium combination and enter a <b>Hotfolder Name</b> .
<b>Normalizing Color Space</b>	Color space defined by the print standard, for example, ISO Coated v2 (Fogra39). Select a color space to normalize all PDF objects in multiple color spaces to a common normalizing color space(as defined by the <b>Output ICC Profile</b> in GMG ColorServer) before the main <b>MX Processing</b> step. Normalizing also includes a flattening of transparent objects.

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Group	Short description
	<p>If you select <b>PDF Input Color Space</b>, all PDF objects will remain unchanged and no normalizing will take place. <b>Flattening</b> will be <b>deactivated</b>.</p> <p><b>Note:</b> It is generally recommended to use normalizing. If normalizing is not used, a consistent color reproduction can be achieved <b>only</b> if all input documents are already in a <b>common</b> color space. Furthermore, if a CMYK document happens to contain some RGB objects, those objects will not be optimized for the printer color space without normalizing.</p>
<b>Printing Method</b>	Select a predefined printer from the list if available or select the <b>Printing Method</b> most closely matching the used <b>printer</b> .
<b>Ink Name</b>	Optional: Enter the <b>Ink Name</b> of the ink the printer is equipped with.
<b>Media Name</b>	Optional: Enter the name of the <b>Print Medium</b> loaded in the printer.
<b>Print Mode Name</b>	Optional: Enter the name of the <b>Print Mode</b> you want to use.

(You can also select an existing hotfolder from the list to overwrite the settings of the printer. If you just want to recalibrate a printer or replace the existing profile, go back to the **Start** page and select one of the other modes.)

### Internal hotfolder parameters

The following features will be automatically activated in the new hotfolder. You can deactivate the features in GMG ColorServer after creating the hotfolder (not recommended).

- **Flattening** (only if a **Normalizing Color Space** has been selected)
- **Normalizing** to the **Normalizing Color Space**
- **Flattening** and **Normalizing** are deactivated if **PDF Input Color Space** is selected.

### 5.3.2 Printing Method

If your printer is not available in the list, you can select one of the following default printing methods matching the used printer.

#### Inkjet

- Commercial digital printing on inkjet-based digital presses
- **High-quality**, offset look and feel and photo quality, fine art, large banner ad design, packaging
- Typical examples: Mimaki, Roland

#### Large Format Printer (LFP)

- Commercial large format digital printing
- All media types
- Medium to large scale productions
- Typical examples: Agfa, HP Scitex, Vutek

#### Laser/Digital Press

- Commercial digital printing on toner-based digital presses
- Paper type 1 and 2 (glossy and matte coated media)
- Medium to large scale productions
- Customized direct mailings
- Typical examples: Canon, HP Indigo, Xerox

### 5.3.3 Defining the Folder Structure on the GMG ColorServer System

On the **General** page, you can define the **Input** and **Output** folder for the hotfolder on the GMG ColorServer system and the **Test Chart Parameters**.

Group	Short description	See also
<b>Input Folder</b>	Files detected in the <b>Input Folder</b> will automatically be processed by the hotfolder.	
<b>Output Folder</b>	Processed files will be sent to the <b>Output Folder</b> .	
<b>Test Chart Parameters</b>	<p>The program automatically selects the required test chart type for each step. You only need to define the <b>Patch Size</b> according to the print quality and the medium. The <b>higher</b> the quality and the <b>finer</b> the medium, the <b>smaller</b> the patch size.</p> <p>Select multiple <b>Copies</b>, if you want to average the measured data to achieve a higher quality.</p>	"Test Chart Parameters" on page 65

You can either use the default relative paths (full paths are shown in the gray info box) or enter custom folder paths **relative** to the GMG ColorServer computer or **UNC** paths. For more information on the default folder structure, please see chapter "Default Folder Structure" on page 31.

Folder path	Syntax	Short description	Example
<b>Relative</b>	.\	Folder on the GMG ColorServer computer, relative to the <b>Hotfolder</b> subfolder of the main GMG ColorServer program folder.	.\MyHotfolder
<b>UNC</b>	\\	Folder anywhere in the network. GMG ColorServer must have full control (read/write access) on the folder. You can use the browse box to pick a folder or you can type in a path.	\\SERVERNAME\ExamplePath\MyHotfolder

#### Defining the Output Folder

Processed PDFs that are ready for printing are saved to the **output folder** of the hotfolder.

You will need to connect the output folder to your printer frontend. This can be done by selecting the **input folder** of the **RIP** as **output folder** for GMG ColorServer.

**Tip** If you do not have configured your RIP yet, you can also create GMG ColorServer hotfolders first and then configure the RIP. However, you will need a working connection to the printer frontend **before** you will be able to print any test charts.

Test charts from GMG SmartProfiler and all documents you send to the input folder of GMG ColorServer later are thus automatically printed on the correct printer.

**Note** GMG ColorServer Suite must have **full** access (read and write permissions) to this folder.

#### If you have already configured the frontend RIP

→ Under **Output Folder**, click the browse button and select the **input folder** of the **RIP**.

#### If you do not have an input folder for the RIP yet

- Under **Output Folder**, enter any folder path accessible to the frontend **RIP**.
- If the frontend RIP has full access to the computer on which GMG ColorServer is installed, you can leave the suggested default path as it is.

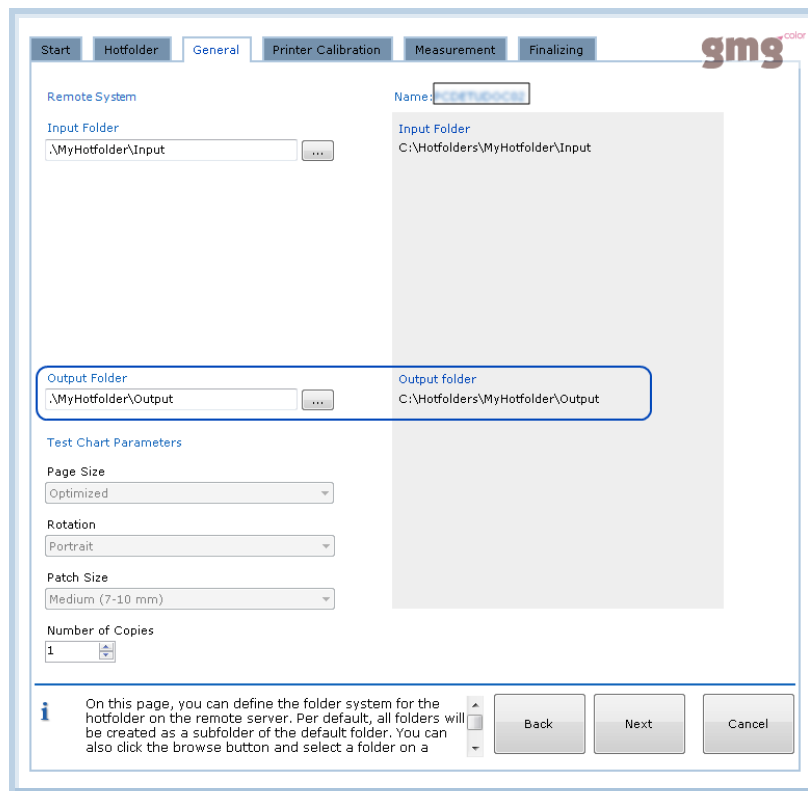


Fig. 5 Creating a hotfolder, defining an output folder.

On the left side, you can modify the predefined folder paths if required. On the right side, you see a "pre-view" of the folder paths on the target GMG ColorServer system. The left side shows only the part of the folder path you can edit. As an alternative, you can also use the browse box to select a shared folder on the network.

See also:

- "Printing Documents" on page 37

### Default Folder Structure

All PDF hotfolders are subfolders of a main **Hotfolders** folder. Each hotfolder has its own input and output folder as subfolders. **Backup** and **Error** folders are common folders used for **all** hotfolders in GMG ColorServer.

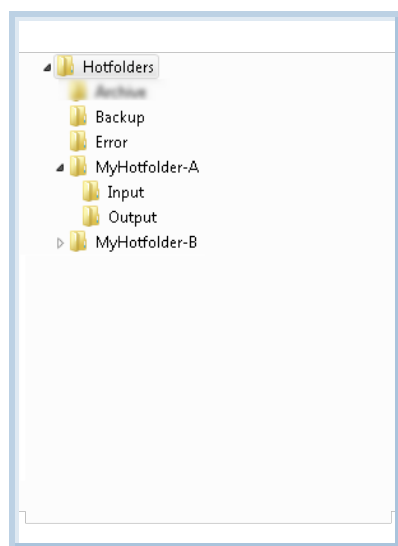


Fig. 6 Folder structure of a hotfolder (shown in Windows Explorer).

### Where are the application files saved to which are used by the hotfolders?

All application files such as calibration files and profiles which you create with GMG SmartProfiler are saved to default folders on the GMG ColorServer system. You can view or modify these folder paths in GMG ColorServer.

### How to modify default folder paths in GMG ColorServer

1. On the **File** menu, click **General Settings**.
2. Click on the **Connect System** tab.
3. Type in the desired path or use the browse button to locate and select a folder.
4. Click **OK** to confirm your changes.

### Test Chart Parameters

#### Type

<i>Option</i>	<i>Description</i>
<b>Inkjet &amp; Laser</b>	Test charts optimized for inkjet and laser printers. Depending on the test chart type and selected <b>Patch Size</b> , the page size might vary. The maximum page size is A3.
<b>LFP</b>	Test charts optimized for large format printers. Depending on the test chart type and selected <b>Patch Size</b> , the page size might vary. These test charts have a gray border as an anti-ghosting area for improved ink homogeneity. Crop the test chart to the dotted line before measuring.

#### Rotation

For sheet-fed media. Rotate the test chart pages to match the medium loaded in the printer.

**Note** If you are using an **X-Rite Eye-One** or **Eye-One iO** measuring device, the white or black separating lines in-between patches should be oriented **in parallel** (not at a right angle) to the printing direction. Reason: If ghosting should occur, the separating lines would not be clearly visible anymore. This could lead to measurement failures.

### Test chart orientation for LFP printers

**Note** If you are using a **printer** with print heads aligned in an array, you should pay attention to the rows of patches on a test chart **being orientated in a right angle** (not in parallel) to the print head array.

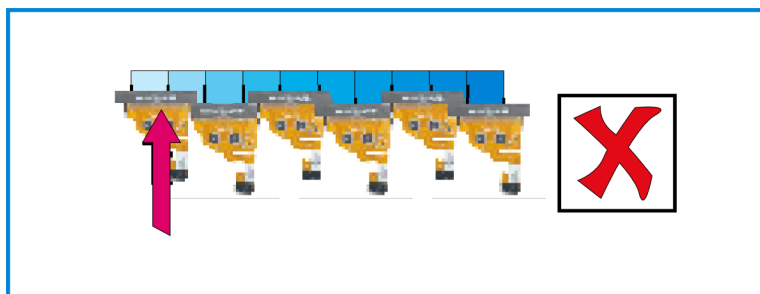


Fig. 7 Printing a test chart with an LFP printer, not recommended orientation.

Patches are printed with different print heads. This could lead to irreproducible color deviations from patch to patch, which can make profiling difficult.





Fig. 8 Printing a test chart with an LFP printer, recommended orientation.  
Patches are printed with the same print head, resulting in more reproducible and homogenous color values.

**Patch size**

Select the **Patch Size** according to the **quality** of the print medium. The **finer** the medium, the **smaller** the patch size. The smaller the patch size, the smaller the test chart, requiring less media.

A **medium** patch size is generally recommended, because the medium patch size compensates variations both of the printer and of the measuring device.

**Small** patches are only recommended for printers showing an exceptionally high level of stability.

**Averaging measured data**

Select multiple **Copies** if you want to average the measured data (advantage: compensation for color shifts from print to print, higher profile quality). You can use a lower number of copies (or none) for printers showing an exceptionally high level of stability.

See also:

- "Measuring Test Charts" on page 38

**5.3.4 Printer Calibration**

On this page, you can determine how many sub steps will be involved in creating the MX3 printer calibration. The information area shows all automatically created metadata stored within the MX3 file.

Group	Short description	See also
Create Printer Calibration	Deselect this option if you want to use <b>only</b> a color profile, without a printer calibration file. If the option is deselected, the creation of a printer calibration is skipped and you can proceed with the <b>Create New Profile</b> step.	"Using a Printer Calibration" on page 34  "When and Why Should I use a Printer Calibration?" on page 34  "Creating a Printer Calibration File" on page 35  "About "Create New Profile"" on page 50
Full Gamut for Calibration	The <b>Full Gamut</b> defines the color space of the <b>printer-medium</b> combination in a <b>not calibrated</b> state. You can import the full gamut from a file, e.g., from an <b>ICC profile</b> provided by the manufacturer of the printer. Advantage: Time saving when creating the calibration file, less steps required. If you have no such file at hand, you will need to <b>measure</b> the full gamut.	"Full Gamut" on page 43

Group	Short description	See also
<b>Gamut Compression</b>	<p>The full gamut can be <b>reduced</b> to calculate the <b>gamut</b> to ensure consistency and accurate color reproducibility under varying printing conditions.</p> <p>If the option <b>Gamut Compression</b> is selected, the recalibration process will become easier and faster. On the other hand, less color can be effected in the output. Also, primary colors can be <b>contaminated</b> by other colors.</p> <p><b>Note:</b> Do <b>not</b> activate this option if you want to keep colors <b>pure</b>. For example, if you want to create a profile with <b>Pure M+Y</b> settings, it is recommended to deactivate the <b>Gamut Compression</b> option. Otherwise, the printer calibration file will introduce contaminations even though the color profile keeps the colors pure.</p> <p>(Info for users of GMG SmartProfiler 1.0: The functionality of the checkbox is identical to the functionality of the previous drop-down list <b>Full Gamut to Gamut Reduction</b>.)</p>	<p>"Gamut" on page 48</p> <p>"Separation Settings" on page 57</p>

### Using a Printer Calibration

For **digital printing**, we recommend calibrating your digital presses on a regular basis. Combined with MX4 color management profiles, a regular printer calibration ensures a consistent representation of colors. Undesired printer deviations caused by varying environment conditions such as temperature and humidity are counterbalanced.

An MX3 printer calibration fine-tunes the CMY channels so that normal printer deviations are **compensated** and print results are **stabilized**.

When using the **Printer Calibration** option (PDF hotfolder: **MX Color Processing > Digital Printing >> Printer Calibration**), you need to create one printer calibration file for each printer-medium combination you are going to use. You can then easily recalibrate your printer on a regular basis.

If you do not want to use an MX3 printer calibration, you can also calibrate the **ColorServer** MX4 profile used in the **MX Color Processing** step.

**Note** InkOptimizer profiles cannot be used to calibrate a printer.

**Note** The MX3 printer calibration must be of the profile type **CMYK Conversion Profile**.

**Note** Information for advanced users: The option **Use Printer Calibration** needs to be selected in the MX4 profile (**Common > Profile Properties**) used together with the MX3 printer calibration. If no printer calibration file is used, the **Printer Gradation** from the MX4 profile (**more Parameters > Printer Gradation**) is used instead. If you are using GMG SmartProfiler, GMG SmartProfiler will make sure that the profile settings are correct.

### When and Why Should I use a Printer Calibration?

We recommend using a printer calibration for **digital printing** applications in general for the following reasons.

- You can use a **single** printer calibration file together with multiple MX4 color profiles. This means, you only need to calibrate your printer-medium combination once and then use it in **multiple** hotfolders. This helps to save valuable time and media.
- As test charts for printer calibrations have fewer patches, they are **smaller** than test charts for color profiles. Thus, you need less time and media to calibrate a printer than to iterate a profile.
- The **gray balance** is already optimized in the printer calibration, leading to a very stable gray axis.

In general, you should **not** use a printer calibration in the following cases.

- For **validation prints** on **toner-based** printers: The color space of the printer-medium combination is larger without a printer calibration.
- For **offset** or **gravure** printing, you might consider to use GMG PrintControl for process control.

## Creating a Printer Calibration File

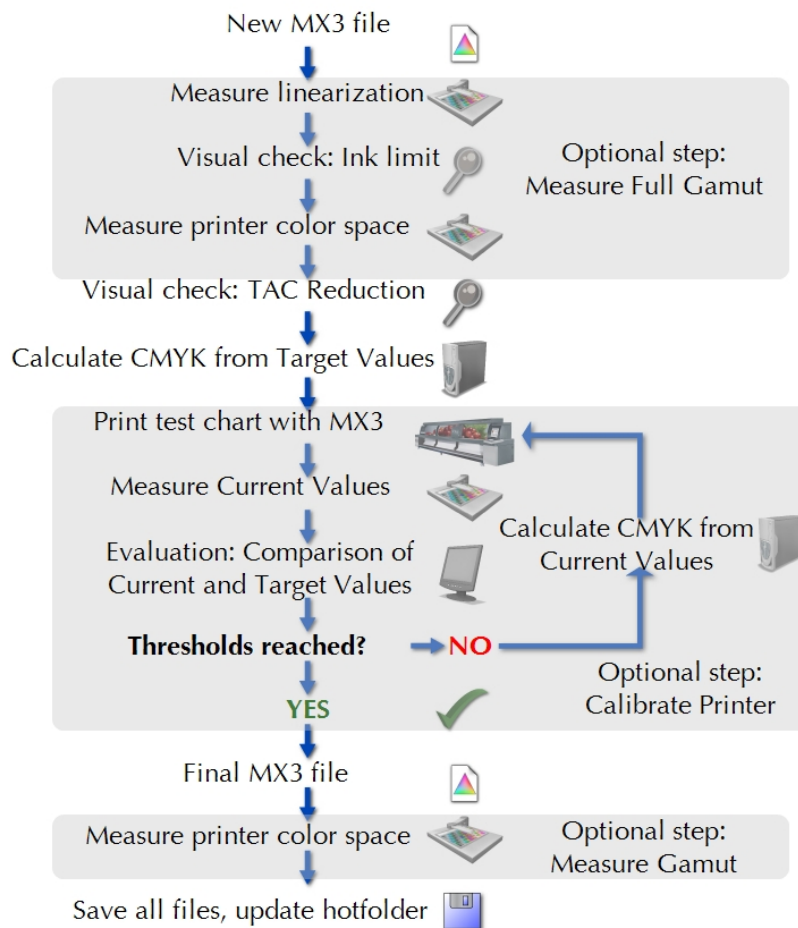


Fig. 9 Creation of an MX3 printer calibration.

The flowchart provides an overview of the steps involved in creating a new MX3 color profile. Optional steps are highlighted by a gray background.

The **full gamut** is used for calculating the new color values in the printer calibration file when **calibrating** a printer. You can import the full gamut from an ICC profile provided by the manufacturer of the printer. If you have selected the option **Measure Full Gamut**, you can measure the full gamut in GMG SmartProfiler. The ink limit and linearization are part of the MX3 printer calibration file. You can create a linearization only if you have selected the option **Measure Full Gamut**.

Iteration cycle: A test chart will be printed with the printer calibration. The **current values** of the print will be measured and **compared** to the **target values**. The printer calibration will be recalculated and the test chart will be printed again with the recalculated profile. These iterative steps (printing, measuring the current values and recalculating) should be repeated until the current and target values meet within the defined Delta E tolerances.

The **gamut** is used as the output intent of the MX4 color profile. The gamut file can be created at the end of the process of creating the printer calibration file.

After **finalizing** the printer calibration file, saving the data to the selected hotfolder, the program activates the **Create Profile** wizard to proceed with creating a new MX4 color profile for the hotfolder.

See also:

- "About "Create New Profile"" on page 50

### 5.3.5 Measurement Settings

After connecting the measuring device to the computer and starting GMG SmartProfiler, the program automatically detects all connected **measuring devices** and you just select the spectrophotometer you want to use for the calibration.

Depending on the used measuring device, some **Measuring Mode** parameters can be changed from within the software, for example, switching from **Scan** mode to **Single Patch** readings.

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**Note** Please check the measuring parameters such as **Standard Observer Angle**, **Illumination Type**, and **Filter** to ensure the software settings in GMG SmartProfiler are correct and match the configuration of the connected measuring device. Otherwise, this will result in wrong measurement values.

---

#### Connection to computer

GMG SmartProfiler looks for measuring devices connected to **USB** ports first. If the program cannot find a USB measuring device, you will be asked whether GMG SmartProfiler should also look for measuring devices connected to a **serial** port, for example, an X-Rite Spectrolino/SpectroScan. This action might take some time.

If the program could not find any measuring device, please check all connections, make sure the measuring device is running, and then click the **Refresh** button on top of the **Measuring Device** list to update the list. The program will then search for a connected measuring device again.

#### Measuring Device Settings when Creating Printer Calibrations

The **printer calibration** file settings can be independent from the **color profile**. This means, you can create a printer calibration file for a **different** measuring device than the one you will use for profile making. Please note that you should create the **profile** with the same measuring parameters that have been used when creating the **gamut**.

This way, you can use a measuring device that suits your needs for calibrating the printer on a regular basis. The achieved calibration status will then be valid for **all** hotfolders based on the **same** printer-medium configuration.

#### Using a UV Cut Filter

UV light affects color measurements made with spectrophotometers. Therefore, spectrophotometers can have integrated UV cut filters that may achieve more reproducible results in the visible color space. The software is capable of working with UV and non-UV measuring devices.

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**Note** The **target values** in an MX4 color profile must be in accordance with the filter settings of the measuring device used for creating the profile. If you use a measuring device with a UV cut filter, please make sure that you import a characterization data file specified for **UV cut**. (For further information, see chapter "Profile" on page 54.)

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Some measuring devices are available either with or without UV filters. Other measuring devices support switching the UV cut filter on and off. For more information on the supported hardware settings, please refer to the specification of the spectrophotometer's manufacturer.

If the print medium contains a high amount of **optical brighteners**, it is recommended to use a **UV cut** filter when creating the corresponding profiles. Otherwise, use of a UV cut filter is not required.

The **ISO 12647-7 standard** specifies that **no** UV cut filters should be used for producing hard-copy digital proof prints intended to simulate a printing condition.

#### Backing

As most print media are not 100% opaque, the color of the substrate (for example the measuring table) underneath the test chart also affects the measurement values. Generally, it is recommended to use white backing for single-sided prints.

We also recommend using **white backing** when creating a **validation print** profile. The **ISO 12647-7 standard** specifies that **white backing** should be used for producing hard-copy digital proof prints intended to simulate a printing condition.

**Tip** In case white backing is not available on your measuring device, you can place a highly opaque sheet (or multiple layers if the opacity is not sufficient) of white medium underneath the test chart. Preferably, the medium should have a lightness ( $L^*$ ) value between 92 and 97. The saturation value ( $C^*$ ) should not exceed 2.4.

### 5.3.6 Establishing an Active Hotfolder Connection

GMG SmartProfiler will automatically create the new hotfolder according to your specifications.

Before starting the print production, you first need to profile the hotfolder during the next steps.

- After a connection between GMG ColorServer and the frontend has been established, it is recommended to place a small test document into the Input Folder of the hotfolder to **test the connection**.
- After you have tested the connection, you can proceed with **creating a printer calibration** and/or **color profile** for the hotfolder.

### Printing Documents

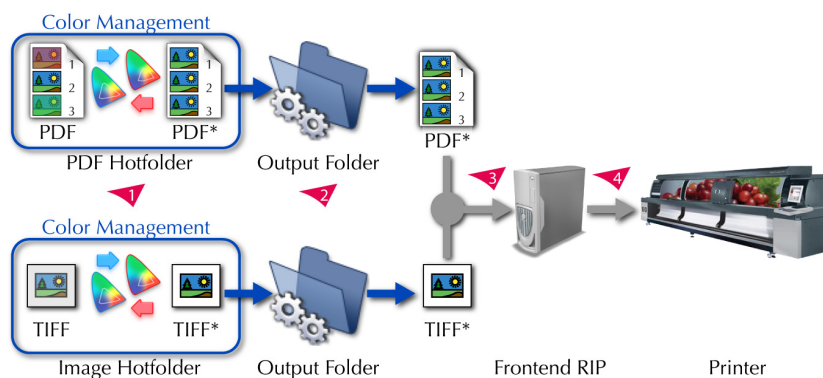


Fig. 10 Automated print workflow with GMG ColorServer.

In GMG ColorServer, separate hotfolders can be used for **image** and for **PDF** processing (1). You can also use PDF hotfolders to **create** PDFs from image data.

All documents undergo an automated **color management** process in GMG ColorServer. No further color management is required.

The **output folders** (2), where the color managed documents are saved, are used as **input folders** for the external **printer frontend**, which is usually either a RIP or a workflow system. The external system will **only** rasterize (RIP) the documents (3) and sent the rasterized documents to the printer (4). Often the frontend also supports nesting and tiling for an optimized paper usage.

You can either use the **printer linearization** from the external system or create a new printer linearization in GMG SmartProfiler.

See also:

- "Defining the Output Folder" on page 30

### 5.4 Ink Limit and Linearization

A printer linearization serves to control a printer in a way that the printed colors behave linearly to the input colors (of the original image file).

This is an optional step, which requires printing and measuring of test charts. You can either use the printer linearization used in the printer frontend or you can create a new linearization in GMG SmartProfiler. If you should observe overinking in one of the following steps, you will need to create a linearization. If you are unsure whether you need a linearization or not, it is recommended to create one; it will not be a problem to have a double linearization in your print workflow.

In this step, a lookup table will be generated describing which color values need to be sent to the printer to achieve a linear relationship between input and output colors and to avoid overinking. The printer linearization is part of an MX3 printer calibration file that will be generated by GMG SmartProfiler in the **Create New Printer-Medium Combination** mode.

If you want to use the printer linearization from the printer frontend, select **None** and click **Next** to proceed to the **Full Gamut** step. Otherwise, select **Create New** and click **Next** to create a new printer linearization.

---

**Tip** If the slope of the linearization curve created by GMG SmartProfiler shows an extreme behavior, a warning message will be displayed, asking you to use the linearization from the frontend RIP. This helps to avoid visible steps when printing.

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See also:

- "Full Gamut" on page 43

### 5.4.1 Printing Test Charts

Test charts with color patches for spectrophotometric measurements are used for the following steps. Each color patch on a test chart represents a fulcrum, that is, data point, in the corresponding data table. By measuring patches, the data table is filled with data points.

Test charts have a different layout and size depending on the part of the printer calibration or profile they are used for and depending on the measuring device. GMG SmartProfiler automatically creates the correct test chart required for each step. For a **PDF** hotfolder, the test charts are created in **PDF 1.3** file format. For an **image** hotfolder, the test charts are created in **TIFF** file format. All test charts will be saved in the **Output Folder** of the corresponding hotfolder, so that you can employ the usual hotfolder-based print workflow to print test charts.

See also:

- "Test Chart Parameters" on page 65
- "Measuring Test Charts" on page 38
- "Evaluating Measurement Results" on page 46
- "Printing Documents" on page 37

### 5.4.2 Measuring Test Charts

Each **color patch** on a test chart represents a **fulcrum** (data point) in the corresponding data table within a printer calibration or profile. By measuring patches, the data table is filled with data points.

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**Note** Before you start measuring a test chart page, check that it is not visibly damaged, for example, by scratches. In case that a page cannot be used for measuring, go back to the **Printing** page and print the page again.

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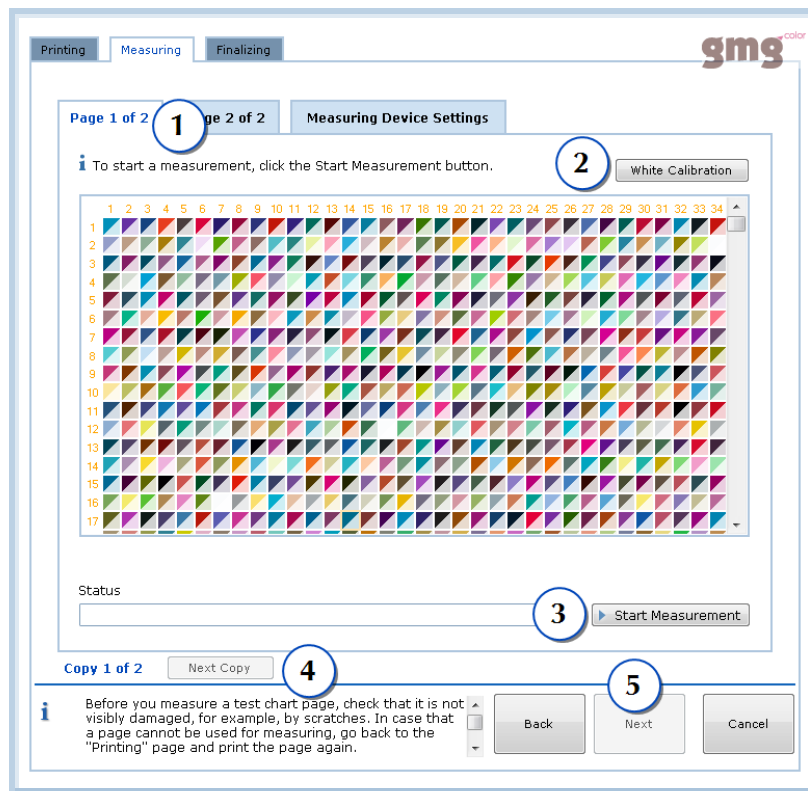


Fig. 11 Measuring page before starting the measurement.

Each test chart page is shown on a **separate** tabbed page (1) in the **Measuring** window.

When using a measuring device that requires a white calibration, it is recommended to do one by clicking the **White Calibration** button (2) before the measurement.

Click **Start Measurement** (3) to start measuring the test chart page shown on the **front** tabbed page (**Page 1 of 2** in the screen shot).

The measuring **progress** of the page is shown in the visualization of the test chart on the tabbed page. You can point to a **color patch** with the mouse to show a popup with more information. You can also measure single patches in this view.

After you have successfully measured **all** test chart pages and copies (4), click **Next** to proceed to the next step (5).

### How to measure test charts with multiple pages

Each test chart page is shown on a **separate** tabbed page in the **Measuring** window.

1. To measure a page, insert it into the measuring device, select the corresponding tabbed page, and click **Start Measurement**.
2. Repeat this procedure for all pages.

If there are too many test charts to fit in the window, you can click the small arrow on the top right side of the tabbed pages to bring hidden test charts or the **Measuring Device Settings** page to the front.

### How to measure multiple copies of test charts

If you have opted for averaging data to achieve a higher quality, the specified number of copies of each test chart will be printed.

You will then need to measure each printed copy. After **all** pages of the first copy have been measured, the program will ask you to measure the second copy of the test chart. Repeat this procedure for all copies.

Printing and measuring multiple copies of a test chart page will result in multiple measurement values for each fulcrum. The program averages multiple values by using a smart algorithm to obtain a very exact data point. Outliers, which can be caused by printing or measurement errors, are automatically removed from the measured data set.

### How to measure a single patch

This can be helpful, for example, if the measuring device cannot automatically scan the test chart.

1. In the test chart image, select a patch with the mouse and right-click it to show the context menu.
2. On the context menu, click the command **Measure Single Patch**.

### Measuring Device Settings

You can click the **Measuring Device Settings** tabbed page to see the currently used measuring device parameters.

Depending on the used measuring device, some measuring parameters can be changed from within the software, for example, switching from **Scan** mode to **Single Patch** readings. Read-only parameters are grayed out and provided only for your information.

When using an X-Rite Eye-One iO, the software automatically switches to **Single Patch** mode if a row cannot be measured after three attempts.

---

**Note** Please check the hardware parameters such as **Standard Observer Angle**, **Illumination Type**, and **Filter** to ensure the software settings are correct and match the hardware configuration of the connected measuring device. Otherwise, this will result in wrong measurement values.

---

See also:

- "Measurement Settings" on page 66
- "Test Chart Parameters" on page 65

### 5.4.3 Evaluating the Ink Limit

You can use this optional step to evaluate the physical limitations on the ink uptake of the printer-medium combination. A visual check of the printed test charts allows confirming or modifying the calculated ink limit.

A test chart is printed based on the **linearization** you have created in the preceding step. GMG Smart-Profiler automatically calculates the ink limit and you can accept the values by clicking the **Next** button. To test the calculated ink limit and perform manual adjustments, click **Print Visual Test** and select the buttons in the button array according to your findings.

### How to test the ink limit

1. Click **Print Visual Test**.  
The visual test charts will be printed.
2. Carefully check the **gradation check** test page. If there should be major issues, reset GMG Smart-Profiler and restart the process from the beginning.
3. Carefully check the **CMYK ink limit** test page.
4. For **Cyan**, **Magenta**, **Yellow**, and **Black**, click the button in the button array corresponding to the test image with the lowest number (closest to **0**) that shows no overinking and gives a good print result. For example, if the test image –2 on test chart 2 provides the best results in the **Cyan** row, click the –2 button in the **Cyan** row in the button array.
5. Click **Recalculate** to update the calculated ink limit according to your evaluation.
6. Click **Print Visual Test** again to verify the new ink limit.  
On test chart 2 and 3, test images **0** should now give the best print results.
7. If you are satisfied with the results, click **Next** to proceed to the next step.



Gradation check

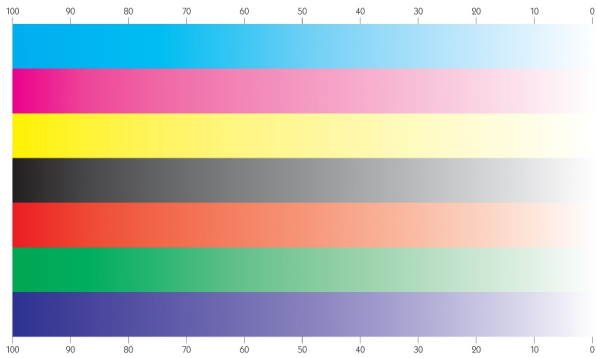


Fig. 12 Gradation check test chart.

The test chart shows color gradations from 100% to 0% density for individual (pure) CMYK inks and for overprinting inks (orange, green, violet).

*Expected results:*

All gradients should show **smooth** and **seamless** transitions, without visible steps or banding.

**UV-based** printers: As inks are cured by UV light in milliseconds and do not need air-drying, they do not show a conventional form of overinking. However, they can show **microbanding**: You will see a regular banding pattern on the print medium. The 3-dimensional structure of the microbanding can also be sensed when brushing your fingers lightly over the print.

*Troubleshooting:*

If there are only minor issues, print test charts 2 and 3 and adjust the ink limit as described in the following. Print test chart 1 again.

Overinking check



Fig. 13 Overinking test images.

<i><b>Test images</b></i>	<i><b>Description</b></i>
Green	All four CMYK channels are printed with high TAC values up to 400%. At this stage, it is considered a <b>normal</b> behavior that overinking occurs. You do not need to take any measures.
Yellow	Different combinations of three channels with TAC values up to 300% are printed. If overinking occurs, it is up to you whether you want to decrease the ink limit or whether the ink limit satisfies your needs.
Red	All four CMYK channels are printed with TAC values up to 330%. If overinking occurs, it might <b>not</b> be possible to measure any test charts. You need to <b>decrease</b> the ink limit and print the overinking test chart again. If in doubt, use a lower ink limit for all channels, that is, move <b>all</b> buttons in the button array one slot nearer to the right and print the overinking test chart again to verify the settings.

See also:

- "Overinking" on page 44

CMYK ink limit evaluation

A test page with multiple test images (white lines set against a dark background) that show different levels of ink application is printed. The test chart decreases the ink limit stepwise for each ink channel.

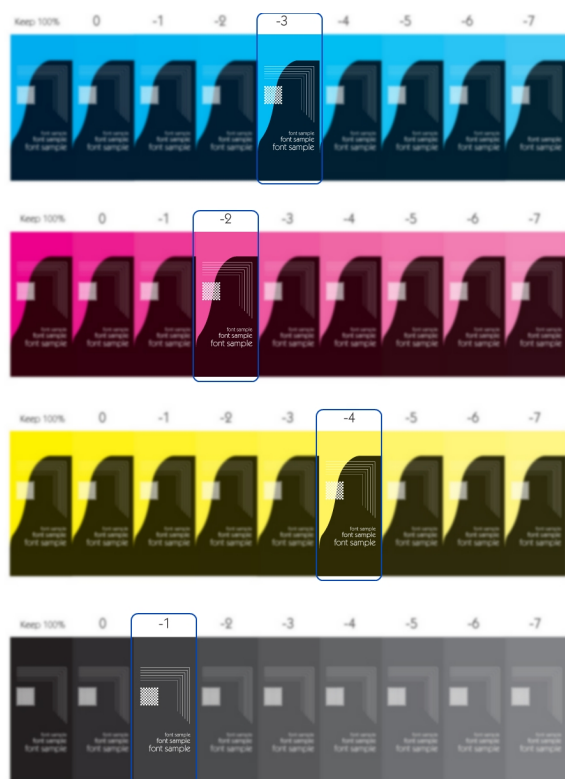
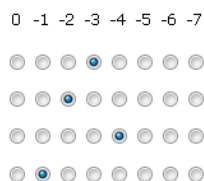


Fig. 14 CMYK ink limit evaluation test chart.

For each ink channel, select the test image with the lowest number (closest to **0**) that shows no overinking and gives a good print result. If all images show similar results, select **0**.

Let us assume the test images highlighted on the test chart (see figure "Fig. 14" above) provided the best results. These findings would result in the following **Ink Limit** settings for CMYK, defined by the position of the buttons in the button array.



*Expected results:*

- ▶ The white lines should appear sharp and crisp, without visible gaps.
- ▶ The type should be clear.
- ▶ **UV-based** printers: Select the test image showing the lowest level of microbanding.

*Troubleshooting:*

If results are still not satisfying after a manual adjustment of the calculated ink limit or if there are major issues such as banding or strong overinking when printing test chart 1 (gradation check), the printer might need **maintenance** and/or the printer **linearization** might not be ok.

In this case, you can try to do the following:

1. Perform printer maintenance activities as instructed by the printer's manufacturer. Make sure the printer is in a good and stable condition.
2. Reset GMG SmartProfiler and restart the process from the beginning. Increase the number of copies (**Settings** > **General** > **Test Chart Parameters** > **Number of Copies**) to achieve a higher quality of the printer linearization.

#### 5.4.4 Ink Limit and Linearization—Finalizing

When clicking **Next**, you will accept the printer linearization and save it within the temporary MX3 printer calibration file (**Create New Printer-Medium Combination** mode) or within the temporary MX4 color profile (**Create New Profile** mode).

---

**Note** This action cannot be undone. After leaving the **Finalizing** page by clicking the **Next** button, you will not be able to go back to a previous step. In such a situation, you can only reset GMG SmartProfiler to cancel the complete process and restart from the beginning.

---

**Advanced Info** **Create New Printer–Medium Combination** mode: When you open the final **MX3** in GMG ProfileEditor, you will find the printer linearization on the **more Parameters** page > **Printer Gradation**.

### 5.5 Full Gamut

The gamut and full gamut file describe the printer gamut (the color space the printer can print according to its technical specifications and the selected medium and print mode) in a "neutral state" **before** calibration (**full** gamut) and in a **calibrated** state (gamut).

Both files describe the relationship between output colors (in CMYK) and resulting color values (in Lab). This relationship is used when **estimating** current values in GMG SmartProfiler or GMG ProfileEditor.

#### 5.5.1 What is a full gamut file used for?

The **full gamut** is used for calculating new color values in the printer calibration file when **calibrating** a printer. The full gamut is used only during the **printer calibration**.

#### 5.5.2 How does a full gamut file work?

When creating a new calibration file during the printer calibration, the full gamut file defines the output values that need to be sent to the printer to achieve a target Lab value. A calibration test chart is printed with the printer calibration and following that, the printer calibration is optimized in an iterative cycle by comparing the measured color values with the target values.

#### 5.5.3 How is a full gamut file created?

The full gamut is the first thing you need when creating a new printer calibration (**Create New Printer-Medium Combination**). You can import the full gamut from an **ICC profile** or from the characterization data (for the printer–medium combination) provided by the manufacturer of the printer. If you have no such file at hand, you can create the full gamut file in GMG SmartProfiler.

The full gamut file is valid only for the specific printer–medium combination and measuring device that were used when creating the full gamut file.

#### 5.5.4 Where can I find an existing full gamut file?

As the full gamut file is required each time you recalibrate the printer, the **link** to the file is saved within the **MX3 printer calibration file**.

See also:

- "Full Gamut—Finalizing" on page 44

#### 5.5.5 Printing and Measuring of Test Charts

For the following steps, you will need to **print** and **measure** test charts with a spectrophotometer. Each color patch on a test chart represents a fulcrum, that is, data point, in the corresponding data table. By measuring patches, the data table is filled with data points.

For further information on the printing and measuring process, please see the following links.

- "Printing Test Charts" on page 59
- "Measuring Test Charts" on page 38

### 5.5.6 Overinking

When creating the **full gamut** file or when creating the **gamut** file **without** using a printer calibration, over-inking can occur when printing CMYK test charts.

In most cases, this can easily be overcome by the **TAC Reduction** settings of the MX4 color profile.

Overinking at this stage can be differentiated into three classes.

- Visible overinking without any impact on measuring. Presents no problem at all.
- Visible "droplets" of wet ink on the test chart. This is not a problem if you leave the test chart to dry **completely** before you start measuring.
- Color patches run into each other and/or the white or black separating lines in-between patches are not pronounced anymore. In this case, measuring will **not** be possible.

If the latter should be the case, there are two possible causes:

- When using the printer linearization from the printer frontend: The **linearization** does not seem to be sufficient. Reset GMG SmartProfiler and restart the process from the beginning. Create a printer calibration with a new **printer linearization**.
- When creating a printer calibration with a new printer linearization: The **ink limit** does not seem to be sufficient. Reset GMG SmartProfiler and restart the process from the beginning. Carefully test the ink limit. If in doubt, use a lower ink limit for all channels, that is, move **all** buttons in the button array one slot nearer to the right and print the overinking test chart again to verify the settings.

See also:

- "Evaluating the Ink Limit" on page 40

### 5.5.7 Full Gamut—Finalizing

By clicking **Next**, you will accept the new full gamut file and save it in the application data folder of the program folder.

---

**Note** This action cannot be undone. After leaving the **Finalizing** page by clicking the **Next** button, you will not be able to go back to a previous step. In such a situation, you can only reset GMG SmartProfiler to cancel the complete process and restart from the beginning.

---

**Create New Printer-Medium Combination:** The full gamut file will be saved under the same name as the MX3 file, extended by "\_fullgamut", in the **Calibrations** subfolder of the program folder. The full gamut **file path** will be saved within the MX3 printer calibration file.

**Advanced Info** When you open the final **MX3** in GMG ProfileEditor, you will find the full gamut file path on the **Common** page > **Gamut**.

**Create New Profile:** The full gamut file will be saved under the same name as the MX4 file, extended by "\_fullgamut", in the **Profiles** subfolder of the program folder.

## 5.6 Creating Calibration

In this step, the **first version** of the MX3 printer calibration file will be completed, but the hotfolder will **not** yet been updated.

In the step following the creation of the calibration file, you will use this file to calibrate the printer-medium combination for the first time.

### 5.6.1 TAC Reduction

The printer calibration file includes a **TAC reduction** to avoid **overinking**.

You can use this optional step to evaluate the physical limitations on ink uptake of the printer-medium combination. A visual check of the printed test charts allows confirming or modifying the calculated **TAC Settings**.

You can accept the calculated values by clicking the **Next** button. To start the test and print the visual test charts, click **Print Visual Test**.

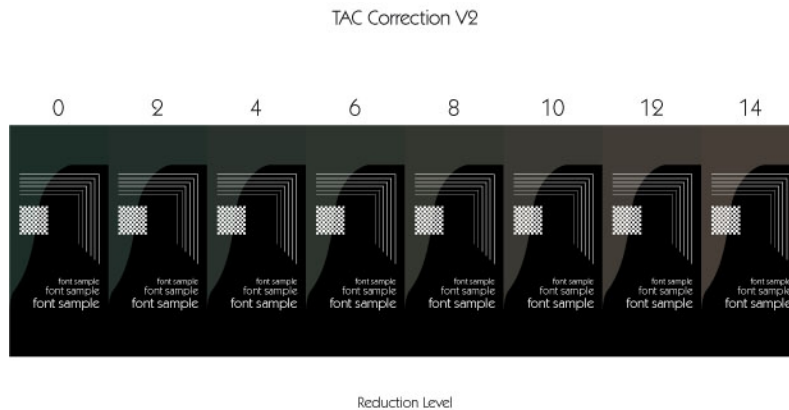


Fig. 15 TAC Reduction test chart.

The test image with the **lowest Reduction Level** that still shows no overinking and gives a good print result specifies the TAC for this printer–medium combination.

Following the **TAC Reduction**, the **Target Values** are created.

#### How to test the TAC Reduction

1. Click **Print Visual Test**.  
The visual test chart will be printed.
2. Carefully check the printed test page.
3. Identify the test image with the lowest number that still shows no overinking and gives a good print result. Enter the number of this image into the **Reduction Level** box.  
For example, if the test image "4" on the test chart provides the best results, enter the number "4".
4. Click **Next** to calculate the **Target Values** for the new calibration file (based on the full gamut you created in an earlier step).  
This may take some time.

#### 5.6.2 Create Calibration—Finalizing

Select the option **Calibrate Printer Now** if you want to calibrate your printer with the newly created calibration file in a following step.

When clicking **Next**, the wizard will take you either to the **Calibrate Printer** step (see "Initial Calibration of the Printer" on page 45), or, if you decided to calibrate your printer later, to the **Finalizing** step.

In the **Finalizing** step, you will complete the process and save the **target values** within a temporary MX3 printer calibration file. The info pane shows all automatically created metadata that will be stored within the MX3 file. The name of the MX3 is generated automatically following a file name convention.

**Note** This step cannot be undone. After leaving the **Finalizing** page, you will not be able to go back to a previous step. You could only reset GMG SmartProfiler to cancel the complete process and restart from the beginning.

#### 5.7 Initial Calibration of the Printer

In this (optional) step, the new printer calibration file is used for an initial calibration of the printer–medium combination. This step is identical to the procedure when recalibrating the printer later.

See also:

- "About "Recalibrate"" on page 62

### 5.7.1 Threshold Values

The defined **Threshold Values** need to be reached for a successful printer calibration. Use higher values if you want to speed up the calibration process (less steps) on the cost of color accuracy.

---

**Note** If you enter **0.00**, no thresholds will be used, that is, the calibration will always be successful after the first iteration, regardless of the results.

---

**Delta E** is the distance between output and target color. The higher Delta E, the stronger is the deviation from the target color.

**Delta L** refers to the luminescence, that is, to the Black (K) channel. The higher Delta L, the stronger is the deviation of the luminescence from the target color.

### 5.7.2 Printing and Measuring of Test Charts

For the following steps, you will need to **print** and **measure** test charts with a spectrophotometer. Each color patch on a test chart represents a fulcrum, that is, data point, in the corresponding data table. By measuring patches, the data table is filled with data points.

For further information on the printing and measuring process, please see the following links.

- "Printing Test Charts" on page 59
- "Measuring Test Charts" on page 38

### 5.7.3 Evaluating Measurement Results

In the **Printing** step, you have printed a color patch for each fulcrum in the printer calibration or color profile. In the **Measuring** step, you have measured the color values of each patch as **Current** values. In the **Evaluating** step, you will now **compare** the **Current** values with the **Target** values.

The aim of the iteration cycle is to match the **Target** values as closely as possible, within the tolerances defined on the **Settings** page. Following each iteration cycle, the program computes new CMYK output values based on the deviation between the target values and the measured current values. When creating a printer calibration file, the **full gamut** file linked within the printer calibration will be used as a reference to calculate the new output values. When creating an MX4 color profile, the **gamut** file linked within the MX4 profile will be used. The new output values are used in the next **Printing** step. Thus, the **Current** values will become closer to the tolerances with **each** iteration, that is, **Printing**, **Measuring**, and **Evaluating**.

You can repeat the iteration cycle until the values are either within the tolerances or until you decide to end the cycle by accepting the best iteration.

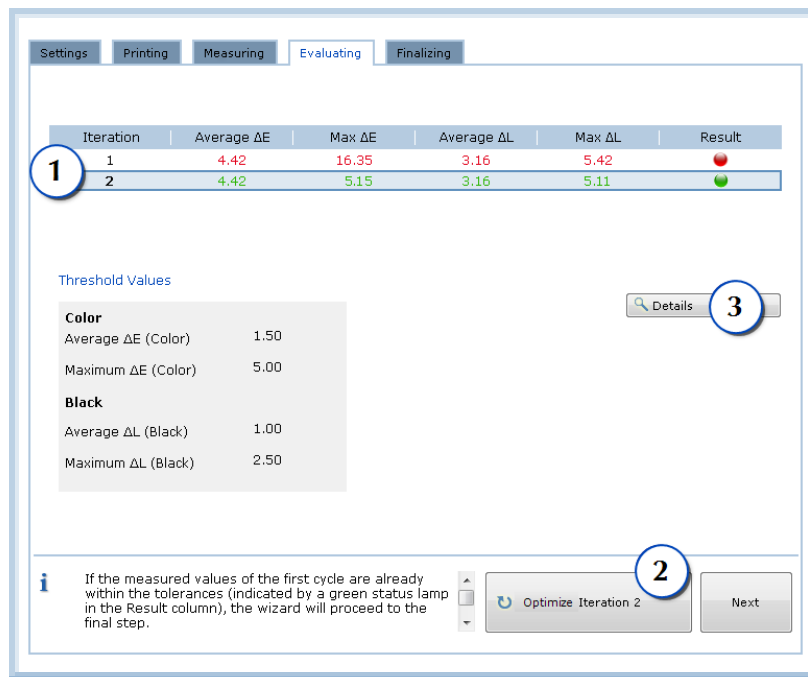


Fig. 16 Evaluating page after successful iteration cycle.

### Accepting a successful iteration

The **Evaluating** page provides you with an overview on the results of the ongoing iteration cycle. The results of each **Iteration** (**printing** and **measuring** the test charts) are listed in a table (1).

If the current values of the first cycle (**Iteration 1**) are already within the tolerances (indicated by a green status lamp in the **Results** column), you can click the **Next** button to accept the results. In the screen shot, the results of **Iteration 1** have not been within the tolerances (failed iteration).

### Repeating a failed iteration

A failed iteration will be indicated by a red status lamp in the **Results** column. If an iteration fails, steps 1 and 2 will be repeated: The test chart will again be **printed** with the new output values and **measured**. Generally, it makes sense to optimize the **last** iteration. However, you can also select a different one from the list and continue the iteration cycle from this iteration, thus ignoring the following iterations. The button label **Optimize Iteration 2** (2) shows that **Iteration 2** will be optimized when the button is clicked.

You can show a table with all measured and target values for all patches by selecting an **Iteration** from the list and clicking the **Details** button (3). This can give you a hint on where to look for the problem if the printer cannot be calibrated. For example, if there are prominent color deviations in a specific color channel, you might need to replace the ink or clean the print heads. If the paper tint values (0, 0, 0, 0) are out of tolerances, you might have loaded the wrong media type into the printer.

### Ending the iteration cycle by accepting a failed iteration

The iteration cycle can be repeated until the measured values are within the **tolerances** of the target values. However, if you are satisfied with the results of an iteration, you can also decide to end the iteration cycle and to proceed, thus **ignoring** the tolerances. To do so, **select the iteration** you are satisfied with from the list and click **Next** to proceed.

### 5.7.4 Finalizing

In this step, you will accept the **Results** of the iteration cycle and save the new output CMYK values and the **Current** values from the last iteration within the printer calibration file or profile.

You will find a short summary of the **Results** in the info pane on the right side. Please check the results carefully.

**Note** This step cannot be undone. After leaving the **Finalizing** page, you will not be able to go back to a previous step. You could only reset GMG SmartProfiler to cancel the complete process and restart from the beginning.

---

### 5.8 Gamut

The gamut and full gamut file describe the printer gamut (the color space the printer can print according to its technical specifications and the selected medium and print mode) in a "neutral state" **before** calibration (**full** gamut) and in a **calibrated** state (gamut).

Both files describe the relationship between output colors (in CMYK) and resulting color values (in Lab). This relationship is used when **estimating** current values in GMG SmartProfiler or GMG ProfileEditor.

#### 5.8.1 What is a gamut file used for?

The gamut serves as an **output intent** for a printer–medium combination when creating an MX4 color profile.

The **gamut** file can also be viewed in GMG 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.

#### 5.8.2 How does a gamut file work?

The input values (measured from the color patches) are computed with the printer calibration to produce the output values (the color values the software outputs to the printer, that is, are written to the output TIFF or PDF). The measurement values for the fulcrums in the profile test chart describe the gamut of this printer–medium combination. Thus, the gamut file describes the color space the printer is able to print according to its technical specifications and according to the medium and print mode in the "**calibrated** state" **after** calibration.

#### 5.8.3 How is a gamut file created?

The gamut is created in a similar way as the full gamut. The only difference is that the test chart is printed with a **printer calibration** file. This is why you need to calibrate the printer first **before** you create the gamut file.

The gamut file is created during the **Create New Printer-Medium Combination** process, following the **Calibrate Printer** step. Despite this fact, it is actually not being used to calibrate the printer, but plays an important role in the profile making process (**Create New Profile**), see chapter "Profile" on page 54.

The gamut file is valid only for the specific printer–medium combination and measuring device that were used when creating the gamut file.

#### 5.8.4 Where can I find the gamut file?

As the gamut file is required each time you iterate or calibrate the MX4 color profile, the **link** to the file will be saved within the **MX4 color profile** when creating the profile.

See also:

- "Gamut—Finalizing" on page 49
- "Profile" on page 54

#### 5.8.5 Printing and Measuring of Test Charts

For the following steps, you will need to **print** and **measure** test charts with a spectrophotometer. Each color patch on a test chart represents a fulcrum, that is, data point, in the corresponding data table. By measuring patches, the data table is filled with data points.

For further information on the printing and measuring process, please see the following links.



- "Printing Test Charts" on page 59
- "Measuring Test Charts" on page 38

### 5.8.6 Gamut—Finalizing

By clicking **Next**, you will accept the new gamut file and save it in the application data folder of the program folder. When creating an MX4 color profile later, the gamut file path will be saved within the MX4 profile and the gamut will define the output intent of the profile.

---

**Note** This action cannot be undone. After leaving the **Finalize** page by clicking the **Next** button, you will not be able to go back to a previous step. In such a situation, you can only reset GMG SmartProfiler to cancel the complete process and restart from the beginning.

---

See also:

- "Gamut" on page 48
- "Profile" on page 54

## 5.9 Finalizing the New Printer Calibration

In this step, you will accept all new created files and **upload** all required files to the GMG ColorServer hotfolder, overwriting the current calibration settings.

---

**Note** This step cannot be undone. After leaving the **Finalizing** page, you will not be able to go back to a previous step. You could only reset GMG SmartProfiler to cancel the complete process and restart from the beginning.

---

The final **MX3** file will be saved in the **Calibrations** subfolder of the main program.

**Advanced Info** When you open the final **PDF hotfolder** in GMG ColorServer, you will find the printer calibration file path under **MX Color Processing > Printer Calibration**. **Image hotfolder: ColorServer > Printer Calibration**. A **linear** MX4 color profile will be added temporarily until you have created a new color profile.

Before you can use the hotfolder, go to the next step and create a new MX4 profile (**Create New Profile**) that will be used together with the new printer calibration.

---

**Note** An MX3 printer calibration can be used **only** together with an **MX4** profile and **only** for the **printer–medium** combination it has been created for. The MX3 printer calibration needs to be created **first**, as a prerequisite for the MX4 profile creation. If the selected hotfolder has already been configured to use an MX4 profile **before** you created the new printer calibration, the MX4 profile will be temporarily **replaced** with a **linear** MX4 profile (**overwriting** the current color management settings of this hotfolder).

---

## 6. About "Create New Profile"

Click the **Create New Profile** button if you want to **create a new MX4 color profile** for the selected hotfolder, for example, to improve the profile quality. GMG SmartProfiler will switch to profiling mode, taking you through the process step by step.

Color management in GMG ColorServer is based on a **DeviceLink** technology, using MX4 color profiles. The main advantage of such a DeviceLink profile is that it directly links an input and output color space, resulting in a high color matching quality, optimized for the printer–medium combination the profile was created for. Accordingly, **each** printer–medium combination requires its own MX4 profile.

**Note** When using the **Create New Profile** wizard, you can only create a **new version** of the color profile, but you **cannot** change any parameters of the existing printer–medium combination. If you want to support a new target **printing condition** or a new **print medium**, you will need to create a new printer-medium combination first. If you are using a **printer calibration file** together with the profile, it might make sense to create a new printer calibration first before creating the new profile.

**Tip** If a GMG ProfileEditor license is available, you can also use the profiling wizard to create general purpose profiles for **RGB-to-CMYK separations**, **CMYK-to-CMYK reseparations**, and **CMYK-to-CMYK conversions**.

The wizard enables you to use multiple **iteration cycles**, similar to a control loop, to optimize the color profile. The steps required to create the profile depend on whether you use an MX3 printer calibration file together with the MX4 color profile (see figure "Fig. 17" below) or not (see figure "Fig. 18" on the facing page) .

### Creating an MX4 color profile for use with a printer calibration

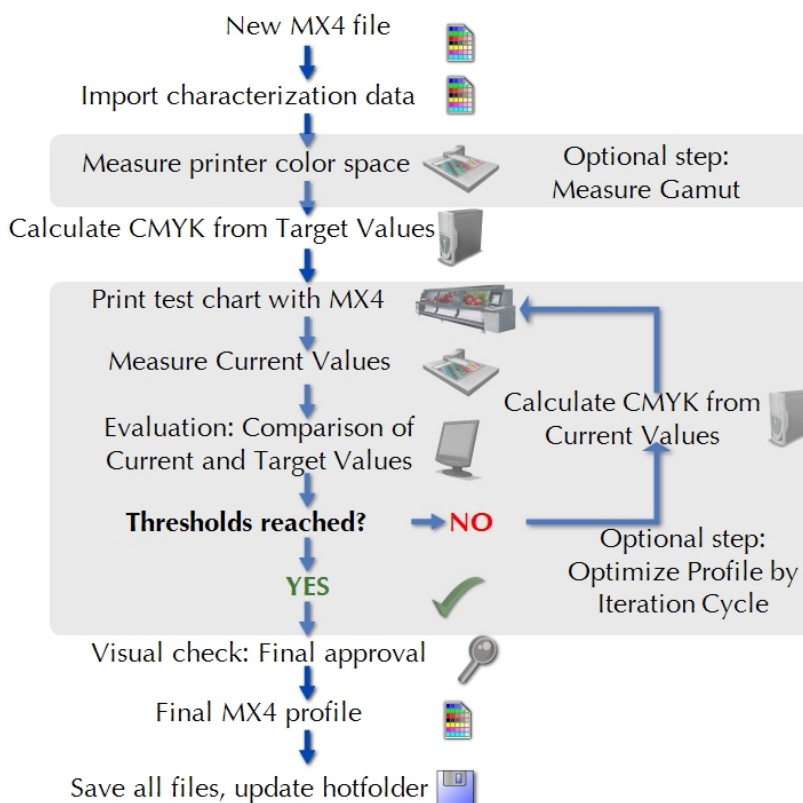


Fig. 17 Creation of an MX4 color profile.

The flowchart provides an overview of the steps involved in creating a new MX4 color profile. Optional steps are highlighted by a gray background.

With an MX3 printer calibration file, the **gamut** is used as the output intent of the MX4 color profile. The gamut file will generally be created at the end of the process of creating the printer calibration file. However, if no printer calibration is available, you can also create the gamut file before creating the MX4 color profile.

The ink limit and linearization are part of the MX3 printer calibration file.

**Target values** will be imported from characterization data describing the target printing condition, for example, ISO Coated v2 (39L). The CMYK color values will be calculated from the Lab target values. If you select the option **Optimize Profile by Iteration Cycle**, a test chart (ECI2002) will be printed (with the printer calibration and MX4 profile). The **current values** of the print will be measured and **compared** to the **target values**. The profile will be recalculated and the test chart will be printed again with the recalculated profile. These iterative steps (printing, measuring the current values and recalculating) need to be repeated until the current and target values meet within the desired Delta E tolerances.

### Creating an MX4 color profile for use without a printer calibration

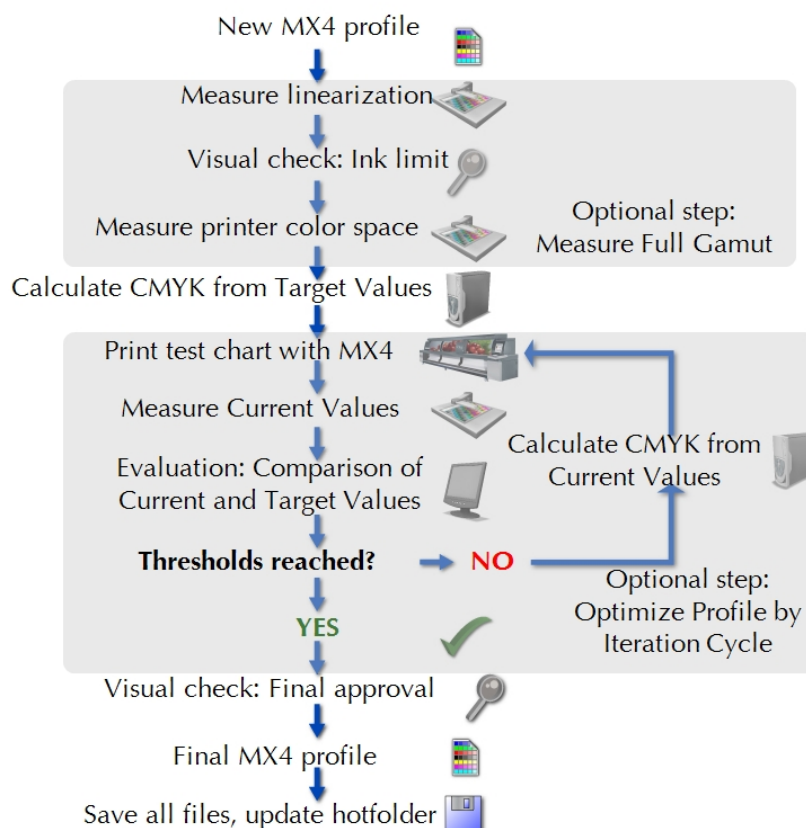


Fig. 18 Creation of an MX4 color profile without an MX3 printer calibration file.

Without an MX3 printer calibration file, the **full gamut** is used as the output intent of the MX4 color profile. The ink limit and linearization will be part of the MX4 profile.

All other steps are independent from the MX3 printer calibration file.

## 6.1 Settings

### 6.1.1 General

<i>Group</i>	<i>Short description</i>
<b>Hotfolder</b>	Select the <b>Hotfolder</b> on the GMG ColorServer system you want to update the color management settings for. (When opening GMG SmartProfiler from the context menu of a hotfolder, the corresponding hotfolder has already been preselected.)
<b>Printing Method</b>	Select the <b>Printing Method</b> most closely matching the used <b>printer</b> .
<b>Test Chart Parameters</b>	The program automatically selects the required test chart type for each step. You only need to define the <b>Patch Size</b> according to the print quality and the medium. The <b>higher</b> the quality and the <b>finer</b> the medium, the <b>smaller</b> the patch size.

#### Printing Method

If your printer is not available in the list, you can select one of the following default printing methods matching the used printer.

##### Inkjet

- Commercial digital printing on inkjet-based digital presses
- **High-quality**, offset look and feel and photo quality, fine art, large banner ad design, packaging
- Typical examples: Mimaki, Roland

##### Large Format Printer (LFP)

- Commercial large format digital printing
- All media types
- Medium to large scale productions
- Typical examples: Agfa, HP Scitex, Vutek

##### Laser/Digital Press

- Commercial digital printing on toner-based digital presses
- Paper type 1 and 2 (glossy and matte coated media)
- Medium to large scale productions
- Customized direct mailings
- Typical examples: Canon, HP Indigo, Xerox

#### Test Chart Parameters

##### Type

<i>Option</i>	<i>Description</i>
<b>Inkjet &amp; Laser</b>	Test charts optimized for inkjet and laser printers. Depending on the test chart type and selected <b>Patch Size</b> , the page size might vary. The maximum page size is A3.
<b>LFP</b>	Test charts optimized for large format printers. Depending on the test chart type and selected <b>Patch Size</b> , the page size might vary. These test charts have a gray border as an anti-ghosting area for improved ink homogeneity. Crop the test chart to the dotted line before measuring.

#### Rotation

For sheet-fed media. Rotate the test chart pages to match the medium loaded in the printer.

**Note** If you are using an **X-Rite Eye-One** or **Eye-One iO** measuring device, the white or black separating lines in-between patches should be oriented **in parallel** (not at a right angle) to the printing direction. Reason: If ghosting should occur, the separating lines would not be clearly visible anymore. This could lead to measurement failures.

### Test chart orientation for LFP printers

**Note** If you are using a **printer** with print heads aligned in an array, you should pay attention to the rows of patches on a test chart **being orientated in a right angle** (not in parallel) to the print head array.

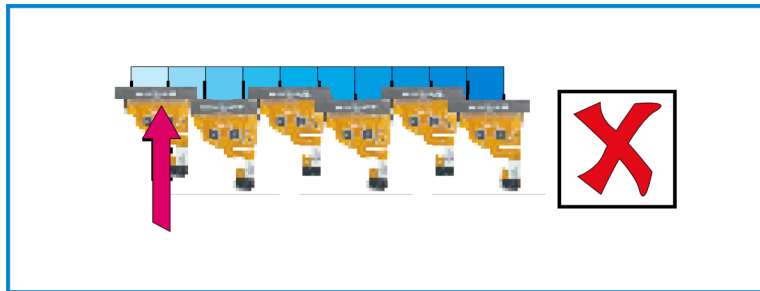


Fig. 19 Printing a test chart with an LFP printer, not recommended orientation.

Patches are printed with different print heads. This could lead to irreproducible color deviations from patch to patch, which can make profiling difficult.



Fig. 20 Printing a test chart with an LFP printer, recommended orientation.

Patches are printed with the same print head, resulting in more reproducible and homogenous color values.

### Patch size

Select the **Patch Size** according to the **quality** of the print medium. The **finer** the medium, the **smaller** the patch size. The smaller the patch size, the smaller the test chart, requiring less media.

A **medium** patch size is generally recommended, because the medium patch size compensates variations both of the printer and of the measuring device.

**Small** patches are only recommended for printers showing an exceptionally high level of stability.

### Averaging measured data

Select multiple **Copies** if you want to average the measured data (advantage: compensation for color shifts from print to print, higher profile quality). You can use a lower number of copies (or none) for printers showing an exceptionally high level of stability.

See also:

- "Measuring Test Charts" on page 38

### 6.1.2 Profile

On the **Profile** page, you can determine how many sub steps will be involved in creating the MX4 color profile. The info pane shows all automatically created metadata stored within the MX4 file.

Group	Short description	See also
<b>Source Color Space (Target Values)</b>	<p>Import the characterization data from an existing print standard as <b>Target Values</b> for the new profile. The <b>Source Color Space</b> should be identical with the <b>Normalizing Color Space</b>. If you have created the hotfolder in GMG SmartProfiler, the <b>Normalizing Color Space</b> defined on the <b>Hotfolder</b> page will be pre-selected.</p> <p>You will find CSC files for widely used printing conditions in the <b>Gamut_Files</b> sub-folder of the <b>AppData</b> folder (default path: <i>C:\Program Files\GMG\SmartProfiler\AppData\Gamut_Files\</i>). The folder <b>Visual_Optimized</b> contains gamut files that have been visually optimized by GMG ColorExperts, including gamut files for use with <b>UV cut</b> filters. The gamut files are based on measurement data from an X-Rite Eye-One iSis, but can also be used together with other measuring devices. Characterization data can also be found in the internet.</p>	"Creating a Hotfolder" on page 28
<b>Output Color Space (Gamut)</b>	<p>Only visible if no gamut has been measured and linked to the selected hotfolder yet. You can <b>import</b> the full gamut from a file, e.g., from an <b>ICC profile</b> provided by the manufacturer of the printer or <b>measure</b> the gamut in a following step. If you use the <b>Measure Gamut</b> option, you may create a new <b>printer linearization</b> and you will need to create a <b>Full Gamut</b> file.</p>	"Gamut" on page 48
<b>Optimize Profile by Iteration Cycle</b>	<p>Enabling the option <b>Optimize Profile by Iteration Cycle</b> activates three extra steps after the profile has been calculated allowing you to print a test chart, measure the current values and recalculate the profile until the current and target values meet within the desired Delta E tolerances.</p>	

### 6.1.3 Measurement Settings

After connecting the measuring device to the computer and starting GMG SmartProfiler, the program automatically detects all connected **measuring devices** and you just select the spectrophotometer you want to use for the calibration.

Depending on the used measuring device, some **Measuring Mode** parameters can be changed from within the software, for example, switching from **Scan** mode to **Single Patch** readings.

**Note** Please check the measuring parameters such as **Standard Observer Angle**, **Illumination Type**, and **Filter** to ensure the software settings in GMG SmartProfiler are correct and match the configuration of the connected measuring device. Otherwise, this will result in wrong measurement values.

#### Connection to computer

GMG SmartProfiler looks for measuring devices connected to **USB** ports first. If the program cannot find a USB measuring device, you will be asked whether GMG SmartProfiler should also look for measuring devices connected to a **serial** port, for example, an X-Rite Spectrolino/SpectroScan. This action might take some time.

If the program could not find any measuring device, please check all connections, make sure the measuring device is running, and then click the **Refresh** button on top of the **Measuring Device** list to update the list. The program will then search for a connected measuring device again.

#### Using a UV Cut Filter

UV light affects color measurements made with spectrophotometers. Therefore, spectrophotometers can have integrated UV cut filters that may achieve more reproducible results in the visible color space. The software is capable of working with UV and non-UV measuring devices.

**Note** The **target values** in an MX4 color profile must be in accordance with the filter settings of the measuring device used for creating the profile. If you use a measuring device with a UV cut filter, please make sure that you import a characterization data file specified for **UV cut**. (For further information, see chapter "Profile" on page 54.)

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Some measuring devices are available either with or without UV filters. Other measuring devices support switching the UV cut filter on and off. For more information on the supported hardware settings, please refer to the specification of the spectrophotometer's manufacturer.

If the print medium contains a high amount of **optical brighteners**, it is recommended to use a **UV cut** filter when creating the corresponding profiles. Otherwise, use of a UV cut filter is not required.

The **ISO 12647-7 standard** specifies that **no** UV cut filters should be used for producing hard-copy digital proof prints intended to simulate a printing condition.

### Backing

As most print media are not 100% opaque, the color of the substrate (for example the measuring table) underneath the test chart also affects the measurement values. Generally, it is recommended to use white backing for single-sided prints.

We also recommend using **white backing** when creating a **validation print** profile. The **ISO 12647-7 standard** specifies that **white backing** should be used for producing hard-copy digital proof prints intended to simulate a printing condition.

**Tip** In case white backing is not available on your measuring device, you can place a highly opaque sheet (or multiple layers if the opacity is not sufficient) of white medium underneath the test chart. Preferably, the medium should have a lightness (L\*) value between 92 and 97. The saturation value (C\*) should not exceed 2.4.

---

## 6.2 Profile

### 6.2.1 Rendering Intents

Gamut mapping is performed with specific calculation modes, also called rendering intents.

**Note** For RGB-to-CMYK profiles, gamut mapping is always recommended, as CMYK color spaces are generally considerably smaller than RGB color spaces.

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#### When do I use which rendering intent?

Choosing an ideal rendering intent depends on the differences between the input and output color space of the profile and on the purpose for which the profile will be used.

When comparing the input and output color space, the **luminance range** (dynamic range) is the most important factor. If the input and output color spaces are almost identical, input colors can be reproduced on the target printing system. If the luminance range of the input color space is much higher than the luminance range of the output color space, input colors must be either scaled or clipped to match the limited luminance range.

In the following, we provide a few hard-and-fast rules to help you decide which rendering intent you might need.

- Input color space = **RGB**? => If yes, use **Best Visual Impression – Perceptual**.
- Input color space = **CMYK**
  - Profile will be used for **proofing** or **validation prints**? => If yes, do **not** use gamut mapping.
  - Output color space **completely covers** the input color space? => If yes, do **not** use gamut mapping.
  - Output color space **almost identical** to input color space (comparable luminance ranges)? (Example: using two similar print media on the same printing system) => If yes, use **Best Color Accuracy – Relative Colorimetric**. In-gamut colors will not be changed by the profile. The higher the difference between the two color spaces, the more out-of-gamut colors will be clipped.
  - Output color space considerably **smaller** than input color space? (Example: Conversion from offset to newsprint) => If yes, use **Best Visual Impression – Perceptual**. The higher the difference between input and output color space, the higher will be the gamut compression, that is, the higher will be the colorimetric deviation from the original colors.

The rendering intents are explained in more detail in the following table.

<i>Available options</i>	<i>Description</i>
<b>Best Visual Impression – Perceptual</b>	<p>This rendering intent aims at preserving the <b>visual impression</b> of the original image, including saturation and detail, in the limited output color space.</p> <p>The color space will be <b>scaled</b> to fit into the output color space, that is, all color values including in-gamut colors will be redistributed. Central colors are remapped more precisely, that is, changed less than colors at the edges of the gamut.</p>
<b>Best Color Accuracy – Relative Colorimetric</b>	<p>(Only available for CMYK-to-CMYK profiles)</p> <p>This rendering intent aims at achieving the highest <b>color accuracy</b>. In-gamut colors are reproduced in a color-accurate manner in the output color space. Higher saturated (out-of-gamut) colors are <b>clipped</b>.</p> <p>Relative colorimetric aligns the <b>white point</b> of the input color space to the output color space, leading to a color compensation when printing on <b>tinted</b> paper. As a result, all in-gamut colors are <b>modified</b> with respect to the new white point. Apart from that, changes to in-gamut colors are kept to a minimum, so that a maximum color accuracy is achieved.</p>
<b>No Gamut Mapping</b> (absolute colorimetric)	<p>Creating a profile without gamut mapping has a similar meaning than using an absolute colorimetric rendering intent for ICC based color management. In-gamut colors are color-accurately reproduced and out-of-gamut colors are clipped.</p> <p>Without gamut mapping, it might not be possible to reproduce the <b>Source Color Space (Target Values)</b> in the <b>Output Color Space (Gamut)</b>, depending on the technical limitations of the printer–medium combination and depending on how different the printer gamut is from the input color space. The deviation between <b>Current</b> and <b>Target</b> values might be quite high, resulting in high delta E values. It might not be possible to achieve much improvement even by using an iteration cycle.</p>

## Gamut Mapping

Gamut mapping refers to the mapping of two distinct color spaces, for example, RGB to CMYK, or a CMYK image and the gamut of a specific printer or press. In the software, gamut mapping is performed when setting up an MX4 profile. With GMG GamutViewer, integrated into GMG ProfileEditor, you can compare the input and the output color space in a 2D or 3D view.

## Do I need gamut mapping—Yes or No?

In general, you will need a gamut mapping in the following cases.

- For all profiles with an **RGB** input color space



For **CMYK-to-CMYK** profiles, there is no fast and easy rule. The decision whether to use a gamut mapping or not depends not only on the input and output color space, but also on the images and motifs you want to process.

- ▼ If in doubt, create a profile with **Perceptual** gamut mapping and optimize it by using an iteration cycle.
- ▼ Gamut mapping modifies the **target values** so that it will be possible to reproduce the target values within the limits of the printer gamut. The target values and the corresponding Delta E values are important quality criteria when reproducing a target printing condition on a proofing system. Therefore, do **not** use gamut mapping for **validation prints**.

### 6.2.2 Optical Brightener Compensation (OBC)

**Note** Please select **no filter (Filter = None)** in the **Measurement Settings** if you want to create a profile with OBC. Selecting a filter will gray out the **Optical Brightener Compensation** option so that it cannot be accidentally used with filtered measurement data.

Many print media contain fluorescent whitening agents to enhance the whiteness effect. Such additives absorb light in the UV range and re-emit light in the blue range. While our eyes perceive the increased amount of reflected blue light as simply brighter or bluish-white, a spectrophotometer tells a different tale, measuring shades of blue which do not match our visual impression. For example, a measured \*b value of -5 (which suggests a definite blue appearance) is usually perceived as a bright white. A profile based on such measurement values usually produces prints with an overall bluish cast.

Some measuring devices feature a **UV cut filter** which blocks the UV amount of the light source of the measuring device. Visually, however, profiles calculated with UV cut measurements tend to produce prints that have a rather yellowish cast to them. The discrepancy between measured and perceived color often leaves the user end up with prints that are either too blue or too yellow.

To strike a balance between those two effects, we have integrated an **Optical Brightener Compensation (Profile: Calculating tab > Separation / Gamut Settings)**. Select this option to generate counter-balancing **Lab Target Values** based on averaged values of a visually correct and media-neutral paper white tint. This way, you can prevent potential problems caused by optical brighteners in print media with just one click.

### 6.2.3 Separation Settings

GMG SmartProfiler automatically lists all separation modes available for the **Printing Method** you have selected in a previous step. With an additional license, you can choose between **Standard** and **Eco Save** separations. In **Eco Save Mode**, GMG SmartProfiler calculates profiles with optimized TAC and UCR/GCR settings leading to an ink save in between 10-25%.

The names of the separation modes are made up of the **printing method** and in some cases also contain the supported **colors** and additional settings such as preserving the **purity** of certain colors.

#### Example:

#### UV 4c (CMYK) Pure M+Y

Description: The example separation mode is ideal for inkjet printers that use CMYK UV inks. The profile is calculated with pure Magenta and Yellow gradations.

#### Separation Parameters

The available range of values depends on the selected separation mode.

Option Description	
<b>Black Start</b>	Percentage at which the K channel should start to print. For example, if this value had been set to 2% and the original color value in the document was C100, M50, Y50, K1, the 1% K would not be printed.
<b>TAC</b>	(Total Area Coverage) Maximum amount of ink applied to a medium for reproducing the target color (in the darkest shadow

area). The four primary colors CMYK (in percent) are summed up to compute this value. The TAC depends on the printing process and medium used. For example, a total ink application of 350% can be achieved on glossy paper. For comparison, the total ink application on newspaper is only 270%. If the TAC is exceeded, the ink spreads, resulting in dot gain and unsharpness. Please refer to the technical specification of the manufacturer of the print medium for further information.

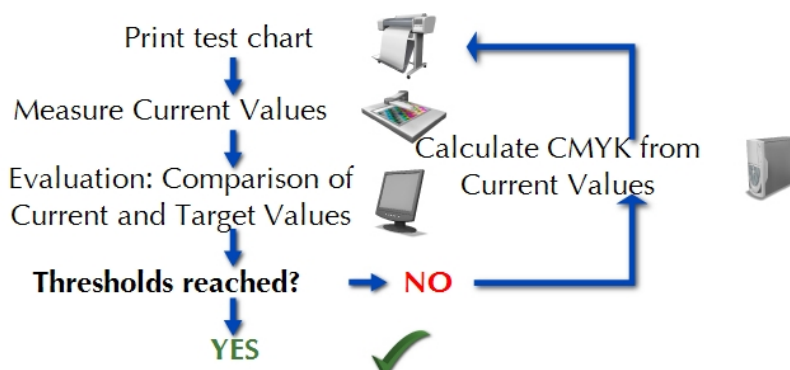
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See also:

- "Printing Method" on page 64
- "Rendering Intents" on page 55
- "Gamut Mapping" on page 56

### 6.2.4 Iteration Cycle: Printing, Measuring, Evaluating

In the following steps, you will perform an **iteration cycle** to optimize the data.



In the **Printing** step of the iteration cycle, you will print a color patch for each fulcrum in the printer calibration or color profile. In the **Measuring** step, you will measure the color values of each patch as **Current** values. In the **Evaluating** step, you will **compare** the **Current** values with the **Target** values.

The aim of the iteration cycle is to match the **Target** values as closely as possible, within the tolerances defined on the **Settings** page. Following each iteration cycle, the program computes new CMYK output values based on the deviation between the target values and the measured current values. The new output values are used in the next **Printing** step. Thus, the **Current** values will become closer to the tolerances with **each** iteration, that is, **Printing**, **Measuring**, and **Evaluating**.

For further information on the individual steps performed in an iteration cycle, please see the following links.

- "Printing Test Charts" on page 59
- "Measuring Test Charts" on page 38
- "Evaluating Measurement Results" on page 46

### 6.2.5 Create Profile—Finalizing

By clicking **Next**, you will accept the calculated **CMYK color values** and save them within a temporary MX4 profile. The info pane shows all automatically created metadata that will be stored within the MX4 file. The name of the MX4 is generated automatically following a file name convention.

To complete the profile, you will be taken to the **Finalizing** step which features an optional visual evaluation of the profile.

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**Note** This action cannot be undone. After leaving the **Finalize** page by clicking the **Next** button, you will not be able to go back to a previous step. In such a situation, you can only reset GMG SmartProfiler to cancel the complete process and restart from the beginning.

---

## 6.3 Finalizing

### 6.3.1 Printing Test Charts

Test charts with color patches for spectrophotometric measurements are used for the following steps. Each color patch on a test chart represents a fulcrum, that is, data point, in the corresponding data table. By measuring patches, the data table is filled with data points.

Test charts have a different layout and size depending on the part of the printer calibration or profile they are used for and depending on the measuring device. GMG SmartProfiler automatically creates the correct test chart required for each step. For a **PDF** hotfolder, the test charts are created in **PDF 1.3** file format. For an **image** hotfolder, the test charts are created in **TIFF** file format. All test charts will be saved in the **Output Folder** of the corresponding hotfolder, so that you can employ the usual hotfolder-based print workflow to print test charts.

See also:

- "Test Chart Parameters" on page 65
- "Measuring Test Charts" on page 38
- "Evaluating Measurement Results" on page 46
- "Printing Documents" on page 37

### 6.3.2 Visual Evaluation of the Print Quality

You can print a test chart to visually check the print quality.

We recommend this check for two purposes:

- **Before** profiling:
  - Printer and frontend RIP: Use your standard print and RIP settings.
  - Printer only: Deactivate the color management and linearization of the frontend RIP. This will be the basis for the profiling process with GMG SmartProfiler.
- **After** profiling: As a final approval of the profile and to document the profile quality for later reference.

#### Where to find the test chart

<installation path>AppData/Charts/Visual\_Profile\_Check\GMG\_TestForm\_visual\_<version No.><printer type><orientation>.pdf



Fig. 21 Visual test chart.

All test objects are numbered on the chart. You will find a detailed explanation for all objects in the following table.

No. Object	Description
1 Register marks	There are four register marks in each corner of the test chart to control the color register. The color register determines the overlay of the different printing colors in the printing process. If the color register is not correctly adjusted, the register marks will appear blurred or slightly shifted. By arranging

## 6. About "Create New Profile"

No.	Object	Description	
		the register marks in groups of four, the test chart enables you to determine whether the color register is prone to variations across the sheet.	
2	Color density bars	Solid bars in the primary colors to determine whether a stable color tone is printed across the sheet.	
3	GMG Unified Control Wedge	Measure the control strips (ISO Coated v2 (39L) from FOGRA on the left side, GRACoL on the right side) to determine whether the measured color values are within the tolerances as defined by ISO standards.	
4	Memory bars	<p>The memory bars have to be assessed with an eye to the gray 4c background.</p> <p>If you can see shadow images of the bars on the background, this could mean that the print heads need to be cleaned. If this is the case, the printer status might not be suitable for profiling. Please perform any necessary printer maintenance actions, reset GMG SmartProfiler, and restart the profiling process.</p>	"Printer Maintenance" on page 16
5	Test images	Test images with a lot of detail and mixed colors are used to visually assess the profile quality.	
6–7	Gradations	<p>The gradations reflect the smallest printable dot. Furthermore, you can check the linearity of your printing system. If the gradations show any breaks, the printer linearization might not be sufficient.</p> <p>The gradations will also reveal gradation breaks or solarizations that might be caused by the profile.</p> <p>The gray gradation strips can be used to evaluate the neutral gray.</p>	"Ink Limit and Linearization" on page 37
8	Grayscale images	Grayscale images reflect the selected separation settings. You can use the images to check the gray balance.	"Separation Settings" on page 57
9	Overinking	For evaluating the ink limit and overinking.	"Evaluating the Ink Limit" on page 40
10	CMYK background	<p>The gray 4c background serves to evaluate the homogeneity of the print. Attention should be paid to an overall smoothness of the background. There should be no color shifts or banding.</p> <p>If you can see shadow images of the GMG Unified Control Wedge control strips on the background, this could mean that the print heads need to be cleaned. If this is the case, the printer status might not be suitable for profiling.</p>	"Printer Maintenance" on page 16
11	Overprinting CMYK, RGB	(PDF only) If the object shows a clear overprinting of the primary colors, the overprinting parameter in the printer frontend is set correctly.	"Connecting the Printer" on page 16
12	Siemens stars	<p>(PDF only) Siemens stars are a very useful pattern to check the resolution of a printer. The pie-shaped bright spokes of the stars on a dark background become narrower towards the center of the star. The higher the resolution of the printer, the closer to the center of the star they will appear to merge.</p> <p>Comparing the test chart to recent reference prints can help to detect any printer deviations. Artifacts at the border of the stars are an indication of a frontend optimization. Such an optimization has a detrimental effect when it comes to printing characterization charts and might negatively affect the profile quality.</p>	"Connecting the Printer" on page 16
13	Type	(PDF only) Type reveals any font or color replacement in the printer frontend. It also reveals whether the printer frontend applies anti-aliasing or not. Anti-aliasing might negatively affect the profile quality. Test charts should be printed without anti-aliasing.	"Connecting the Printer" on page 16
14	Strokes	(PDF only) Strokes with different weights are used to check the print resolution. Comparing the test chart to recent reference prints can help to detect any printer deviations. If strokes with the same weight appear to be different with respect to the dark or light background they are printed on, this might be caused by frontend parameters. This might falsify measurement results and thus negatively affect the profile quality.	"Connecting the Printer" on page 16

### 6.3.3 Finalizing the New Color Profile

In this step, you will accept all new created files and **upload** all required files to the GMG ColorServer hotfolder, overwriting the current color management settings.

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**Note** This step cannot be undone. After leaving the **Finalizing** page, you will not be able to go back to a previous step. You could only reset GMG SmartProfiler to cancel the complete process and restart from the beginning.

---

The final **MX4** file will be saved in the **Profiles** subfolder of the main program folder.

**Advanced Info** When you open the final **PDF hotfolder** in GMG ColorServer, you will find the color profile file path under **MX Color Processing > ColorServer**.

## 7. About "Recalibrate"

You can calibrate your printer or press easily by using GMG SmartProfiler. Click the **Recalibrate** button if you wish to **update** your printer **calibration** (or **color profile**, if no MX3 calibration file is used) linked to the selected hotfolder. GMG SmartProfiler will switch to calibration mode, taking you through the process step by step.

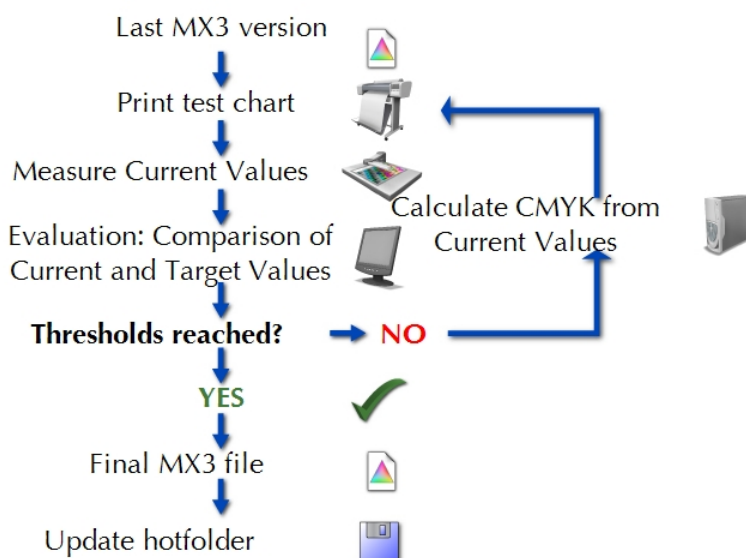
**Note** To ensure a high color accuracy and to ensure that the printer will print within the tolerances defined by the print standard, it is strongly recommended to calibrate the printer on a **daily** basis.

Combined with MX4 color management profiles, a regular printer calibration ensures a consistent representation of colors. Undesired printer deviations caused by varying environment conditions such as temperature and humidity are counterbalanced.

To calibrate your printer or press, you will need either an MX3 printer calibration or an MX4 profile created specifically for your printer–medium combination. If you have neither, you will need to decide whether you want to use an MX3 printer calibration. If so, you will need to create the MX3 printer calibration first and then the MX4 profile. If not, creating an MX4 profile will be sufficient.

GMG SmartProfiler uses multiple **iteration cycles**, similar to a control loop, to **optimize** and update the calibration. The steps of each cycle are visualized in the wizard.

Each time a calibration is started, the output values are taken from the last saved printer calibration file. This way, the number of iterations you need for a successful printer calibration is minimized (saving valuable time and media).



See also:

- "Creating a Printer Calibration File" on page 35
- "About "Create New Profile"" on page 50
- "Supported File Types" on page 64

### 7.1 Starting the Recalibration Process

During the recalibration process, you will print and measure test charts until the measured values are within the defined tolerances. The printer calibration file linked to the hotfolder will be automatically updated with optimized values.

**Note** For the process, you will need a measuring device connected to the computer.

**Note** Before starting the process, make sure the **printer** parameters are matching with the **hotfolder** settings. Make sure the correct print medium is loaded into the printer and all relevant hardware parameters such as ink type and print mode are correct as well.

**How to start the process**

- 1. Start GMG SmartProfiler.  
The start screen of the program shows all available processes.
- 2. Click the button or link corresponding to the **Recalibration** mode.
- 3. Select a hotfolder corresponding to the printer–medium combination you want to recalibrate from the **Hotfolder** list.



Fig. 22 Starting the Recalibration mode.

Click the button or link corresponding to the **Recalibration** mode. GMG SmartProfiler will switch to the selected mode, taking you through the process step by step.  
If you need further information at any point during the process, press F1 on the keyboard to show the **Help**.

**7.2 Settings**

**7.2.1 General**

Group	Short description
Hotfolder	Select the <b>Hotfolder</b> on the GMG ColorServer system you want to update the color management settings for. (When opening GMG SmartProfiler from the context menu of a hotfolder, the corresponding hotfolder has already been preselected.)
Printing Method	Select the <b>Printing Method</b> most closely matching the used <b>printer</b> .
Test Chart Parameters	The program automatically selects the required test chart type for each step. You only need to define the <b>Patch Size</b> according to the print quality and the medium. The <b>higher</b> the quality and the <b>finer</b> the medium, the <b>smaller</b> the patch size.

### Supported File Types

You can, of course, calibrate all MX3 printer calibrations and MX4 profiles created in GMG SmartProfiler. In addition to these, GMG SmartProfiler also supports files created or modified in GMG ProfileEditor, provided the following requirements are met. If a file is not supported by GMG SmartProfiler, you will be notified by an error message.

- **MX3** printer calibrations are based on a **TC3** test chart.
- **MX4** profiles are based on an **ECI2002** test chart.
- Fulcrums have not been manually added to or deleted from the profile. You can check the fulcrums in GMG ProfileEditor, **3d/4d Color Space** tabbed page.
- The internal parameter **Type = CMYK Conversion Profile** is used. You can check the parameter in GMG ProfileEditor, **Common** tabbed page > **Profile Properties** > **Type = CMYK Conversion Profile**.
- A valid **gamut** (csc) file is linked within the file. You can check the gamut file reference in GMG ProfileEditor, **Common** tabbed page > **Gamut/Separation** > **Gamut**.
- Only **CMYK MX4** profiles can be calibrated. **RGB MX4** profiles are **not** supported.
- Only **ColorServer** MX4 profiles can be calibrated. **InkOptimizer** profiles are **not** supported.

### Printing Method

If your printer is not available in the list, you can select one of the following default printing methods matching the used printer.

#### Inkjet

- Commercial digital printing on inkjet-based digital presses
- **High-quality**, offset look and feel and photo quality, fine art, large banner ad design, packaging
- Typical examples: Mimaki, Roland

#### Large Format Printer (LFP)

- Commercial large format digital printing
- All media types
- Medium to large scale productions
- Typical examples: Agfa, HP Scitex, Vutek

#### Laser/Digital Press

- Commercial digital printing on toner-based digital presses
- Paper type 1 and 2 (glossy and matte coated media)
- Medium to large scale productions
- Customized direct mailings
- Typical examples: Canon, HP Indigo, Xerox



Test Chart Parameters

Type

Option	Description
Inkjet & Laser	Test charts optimized for inkjet and laser printers. Depending on the test chart type and selected <b>Patch Size</b> , the page size might vary. The maximum page size is A3.
LFP	Test charts optimized for large format printers. Depending on the test chart type and selected <b>Patch Size</b> , the page size might vary. These test charts have a gray border as an anti-ghosting area for improved ink homogeneity. Crop the test chart to the dotted line before measuring.

Rotation

For sheet-fed media. Rotate the test chart pages to match the medium loaded in the printer.

**Note** If you are using an **X-Rite Eye-One** or **Eye-One iO** measuring device, the white or black separating lines in-between patches should be oriented **in parallel** (not at a right angle) to the printing direction. Reason: If ghosting should occur, the separating lines would not be clearly visible anymore. This could lead to measurement failures.

Test chart orientation for LFP printers

**Note** If you are using a **printer** with print heads aligned in an array, you should pay attention to the rows of patches on a test chart **being orientated in a right angle** (not in parallel) to the print head array.

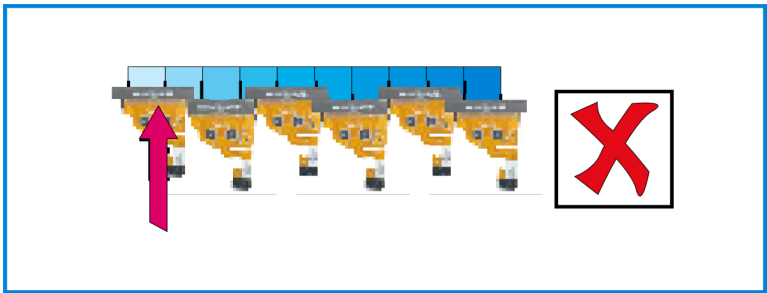


Fig. 23 Printing a test chart with an LFP printer, not recommended orientation.

Patches are printed with different print heads. This could lead to irreproducible color deviations from patch to patch, which can make profiling difficult.



Fig. 24 Printing a test chart with an LFP printer, recommended orientation.

Patches are printed with the same print head, resulting in more reproducible and homogenous color values.

### Patch size

Select the **Patch Size** according to the **quality** of the print medium. The **finer** the medium, the **smaller** the patch size. The smaller the patch size, the smaller the test chart, requiring less media.

A **medium** patch size is generally recommended, because the medium patch size compensates variations both of the printer and of the measuring device.

**Small** patches are only recommended for printers showing an exceptionally high level of stability.

### Averaging measured data

Select multiple **Copies** if you want to average the measured data (advantage: compensation for color shifts from print to print, higher profile quality). You can use a lower number of copies (or none) for printers showing an exceptionally high level of stability.

See also:

- "Measuring Test Charts" on page 38

### 7.2.2 Measurement Settings

After connecting the measuring device to the computer and starting GMG SmartProfiler, the program automatically detects all connected **measuring devices** and you just select the spectrophotometer you want to use for the calibration.

Depending on the used measuring device, some **Measuring Mode** parameters can be changed from within the software, for example, switching from **Scan** mode to **Single Patch** readings.

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**Note** Please check the measuring parameters such as **Standard Observer Angle**, **Illumination Type**, and **Filter** to ensure the software settings in GMG SmartProfiler are correct and match the configuration of the connected measuring device. Otherwise, this will result in wrong measurement values.

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### Connection to computer

GMG SmartProfiler looks for measuring devices connected to **USB** ports first. If the program cannot find a USB measuring device, you will be asked whether GMG SmartProfiler should also look for measuring devices connected to a **serial** port, for example, an X-Rite Spectrolino/SpectroScan. This action might take some time.

If the program could not find any measuring device, please check all connections, make sure the measuring device is running, and then click the **Refresh** button on top of the **Measuring Device** list to update the list. The program will then search for a connected measuring device again.

### Identical Measuring Device Settings when Recalibrating

The measuring device **type** and use of **filters**, the **illumination**, the **observer angle** settings, and the **backing method**, will result in **different** measurement values. Therefore, it is very important that a **recalibration** or **check** of an MX3 printer calibration or MX4 color profile is performed with **identical** measurement parameters.

When recalibrating, GMG SmartProfiler reads the measurement parameters from the MX3 printer calibration or MX4 color profile and checks whether the connected measuring device is **compatible** with the settings.

## 7.3 Calibrating Printer

In this step, the last saved printer calibration file (or MX4 color profile if no printer calibration file is used in the hotfolder) is used as a basis for a recalibration of the printer. During the following iterative cycle, the output values in the printer calibration file (or MX4 color profile) will be optimized to reach the target values. The existing printer calibration file (or MX4 color profile) will then be replaced with the modified file.

### 7.3.1 Threshold Values

The defined **Threshold Values** need to be reached for a successful printer calibration. Use higher values if you want to speed up the calibration process (less steps) on the cost of color accuracy.

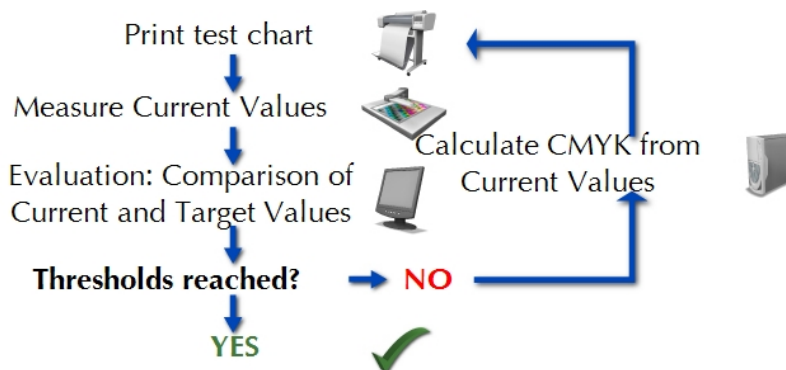
**Note** If you enter **0.00**, no thresholds will be used, that is, the calibration will always be successful after the first iteration, regardless of the results.

**Delta E** is the distance between output and target color. The higher Delta E, the stronger is the deviation from the target color.

**Delta L** refers to the luminescence, that is, to the Black (K) channel. The higher Delta L, the stronger is the deviation of the luminescence from the target color.

### 7.3.2 Iteration Cycle: Printing, Measuring, Evaluating

In the following steps, you will perform an **iteration cycle** to optimize the data.



In the **Printing** step of the iteration cycle, you will print a color patch for each fulcrum in the printer calibration or color profile. In the **Measuring** step, you will measure the color values of each patch as **Current** values. In the **Evaluating** step, you will **compare** the **Current** values with the **Target** values.

The aim of the iteration cycle is to match the **Target** values as closely as possible, within the tolerances defined on the **Settings** page. Following each iteration cycle, the program computes new CMYK output values based on the deviation between the target values and the measured current values. The new output values are used in the next **Printing** step. Thus, the **Current** values will become closer to the tolerances with **each** iteration, that is, **Printing**, **Measuring**, and **Evaluating**.

For further information on the individual steps performed in an iteration cycle, please see the following links.

- "Printing Test Charts" on page 59
- "Measuring Test Charts" on page 38
- "Evaluating Measurement Results" on page 46

### 7.3.3 Finalizing

In this step, you will accept the **Results** of the iteration cycle and save the new output CMYK values and the **Current** values from the last iteration within the printer calibration file or profile.

You will find a short summary of the **Results** in the info pane on the right side. Please check the results carefully.

**Note** This step cannot be undone. After leaving the **Finalizing** page, you will not be able to go back to a previous step. You could only reset GMG SmartProfiler to cancel the complete process and restart from the beginning.



## 8. Glossary

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### 3

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#### **3DAP**

(Digital Data Delivery for Australian Publications, 3DAP) Proofing standard for the magazine publishing industry in Australia, initiated by an industry group committee. GMG ColorProof also provides 3DAP profiles for color management approved by the 3DAP Committee for various printers and media.

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### C

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#### **CMYK Colors**

In CMYK printing processes, colors are separated into CMYK process colors. CMYK or process color printing is usually contrasted with spot color printing, in which certain spot color inks are used to produce the desired colors. Some printing presses can print with both four-color process inks and additional spot color inks.

#### **Color Gamut**

Subset of colors that can be accurately represented in a given color space or by a certain output device, for example, a printer. The term gamut is often used when referring to the mapping of two color spaces (gamut mapping). If colors are out-of-gamut, they cannot be adequately represented by the target output device.

#### **Color Management**

Color management is the controlled conversion of colors between the original gamut and the target gamut. The device-dependent MX technology used in GMG products provides optimized results for a broad range of high-quality printers and media.

#### **Color Space**

Range of colors defined by the input or output device, for example, a screen, or a printer. In mathematical color models, a certain color is represented as a coordinate in a three-dimensional (e. g. RGB) or four-dimensional (e. g. CMYK) color space.

#### **Continuous Forms Printing**

Printing process used by business forms presses for the production of business forms, for example, newsletters. A continuous roll of paper is fed through the printing press. Pages are separated and cut to size after they have been printed. ColorProof also provides proof profiles for continuous forms printing according to Fogra standards for various printers and media.

#### **Contone**

(continuous tone, CT) A printing technique that produces photographic-like output resolution. Contone printers achieve so many levels of shades that the difference between one shade and the next is imperceptible to the human eye.

#### **Control Strip**

Strip with defined color patches printed together with the job for quality assurance. Color values are measured with a spectral photometer and compared to reference or target values.

**CSW**

You can save the SmartProfiler progress including all temporary data at any stage as a CSW file and resume the job later.

**CTF**

(Computer to Film, CTF) Imaging technology used in lithographic printing. An image file is output to a photographic film which is then used to expose a printing plate. Opposite to Computer to Plate (CTP), where an image file is output directly to a printing plate.

**CTP**

(Computer to Plate, CTP) Imaging technology used in modern printing processes. An image file is output directly to a printing plate. Opposite to Computer to Film (CTF), where an image file is output to a photographic film which is then used to expose a printing plate.

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**D****DeviceCMYK**

Device-dependent color space, specified for PDF 1.0. Color space of the output device that is used to reproduce an image. For example, the color space of a monitor (in case of DeviceRGB) or a printer (in case of DeviceCMYK). This default color space is applied to PDF or PS objects without an embedded target color space ICC profile.

**DeviceGRAY**

Device-dependent color space, specified for PDF 1.0. Color space of the output device that is used to reproduce an image. For example, the color space of a monitor (in case of DeviceRGB) or a printer (in case of DeviceCMYK). This default color space is applied to PDF or PS objects without an embedded ICC profile (which would define the target color space).

**DeviceLink**

A DeviceLink profile is designed for color transformations from a defined input color space to a defined output color space. A DeviceLink profile links the color spaces of two distinctive devices. The input color space is defined by the gamut of the input device, for example, a camera. The output color space is defined by the gamut of the output device, that is, a specific printer or press and print medium. MX profiles are DeviceLink profiles. DeviceLink color transformations generally provide a higher quality and have the advantage that information on the black channel is maintained during the transformation. In contrast, ICC profiles use a device-independent intermediate color space, usually Lab, to link two device-dependent color spaces.

**DeviceN**

Device-dependent color space, specified for PDF 1.3. A DeviceN color space can comprise up to eight separations. It is used mainly for spot colors, but can also include process color separations.

**DeviceRGB**

Device-dependent color space, specified for PDF 1.0. Color space of the output device that is used to reproduce an image. For example, the color space of a monitor (in case of DeviceRGB) or a printer (in case of DeviceCMYK). This default color space is applied to PDF or PS objects without an embedded ICC profile (which would define the target color space).

## **E**

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### **ECI**

(ECI European Color Initiative) The ECI was founded in June 1996 on the initiative of the publishing houses Bauer, Burda, Gruner+Jahr, and Springer in Hamburg. It is a group of experts with the objective to standardize color management, proofing, and printing. The ECI publishes reference printing conditions and standards for quality control used in the printing process.

## **F**

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### **FOGRA**

(FOGRA Graphic Technology Research Association) Association of representatives of the printing industry and suppliers, with the objective to promote print engineering and its technologies in the fields of research, development, and application. The FOGRA publishes reference printing conditions and standards for quality control used in the printing process such as media wedges.

## **G**

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### **GMG Workflow**

GMG provides a perfect solution for all color management applications in commercial printing. The GMG workflow covers the entire production process, starting from normalization of incoming data, separations optimized for a target printing condition, digital proofing, and standardization of printing processes.

### **GRACoL**

(General Requirements for Applications in Commercial Offset Lithography, GRACoL) Printing standard initiated by the GRACoL Committee. GMG ColorProof also provides proof profiles approved by the GRACoL Committee for various printers and media.

## **H**

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### **HexaChrome**

HexaChrome is a registered trademark of Pantone, Inc. and uses six colors for printing. In addition to four special process colors, HexaChrome adds orange and green inks to expand the color gamut. It is also often referred to as CMYKOG printing.

### **Highlights**

Color tone giving the visual impression of a high lightness of the corresponding color channel. See also Midtone and Shadows.

## **I**

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### **Image Metadata**

Information about a file which can be stored in the same file. Image metadata can include the color depth, the image resolution, the date of creation, information on the author, and other data, such as an embedded ICC profile.

### **ISO**

(International Organization for Standardization, ISO) The ISO defines world-wide industrial and commercial standards, for example, for printing processes.

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**J**

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**Job**

Processing one or multiple files together in GMG software products. Jobs can be generated manually by loading a file into the software or in an automated fashion by moving files into a hot-folder.

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**L**

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**Lab**

(CIELab, Lab) CIE (Commission Internationale d'Eclairage) 1976 ( $L^*$ ,  $a^*$ ,  $b^*$ ) Three-dimensional color space that is considered to be perceptually linear. A change of a certain amount in a color value produces a change of about the same visual importance to the human eye. CIELab describes colors as perceived by a human observer (or measured by a photometer). The  $L^*$  value closely matches human perception of lightness,  $a^*$  describes the magenta and green axis, and  $b^*$  the blue and yellow axis. The gamut of the CIELab color space is much larger than the color space of most input and output devices, including the human eye. The CIELab color space has been created to serve as a device-independent reference standard. It is therefore often used as a profile connection space (PCS) in color management.

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**M**

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**Media Size**

Width and height of a print medium, basically paper size. For paper rolls, only the width is defined.

**Medium**

Printers and printing machines print on different media or printing substrates, generally different paper types, but also, for example, flexible foils for flexographic applications.

**Metadata**

Information about a file which can be stored in the same file. Image metadata can include the color depth, the image resolution, the date of creation, information on the author, and other data, such as an embedded ICC profile.

**Midtone**

Color tone giving the visual impression of a middle lightness of the corresponding color channel. See also Highlights and Shadows.

**Multicolor File**

Image file that includes a separate channel for each color, including spot color channels.

**Multicolor Printing**

In multi color printing, spot colors are used additional to or instead of standard CMYK process colors, resulting in a larger (or different) gamut of the printing machine.

**MX Technology**

DeviceLink color management technology developed by GMG. Device-dependent alternative to an ICC based color management. MX DeviceLink profiles achieve the highest color management quality and can maintain color separations, thus preserving the black channel of the source profile. Profile types are MX3, MX4, and MX5.



## O

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### **Out-of-gamut**

Out-of-gamut colors cannot be adequately represented by the target output device, i. e. they are out of the gamut of the output device.

## P

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### **PCS**

(Profile Connection Space, PCS) Device-independent reference color space that is used as an interface between different input and output devices. ICC Color management is based on a transformation to the PCS (generally Lab color space) first and then to the color space of the target device; colors are calculated based on the profile for the respective input or output device. A relationship between two devices is defined by the relationships of the two devices to the PCS. This way, a direct relationship between the two devices does not need to be known or defined. The higher variability often comes at the price of quality loss.

### **Primary Colors**

In the printing industry, the primary colors typically refer to the four inks Cyan, Magenta, Yellow and Black. Any color tone can be reproduced by combining the primary colors or by printing screens of primary colors on top of each other. See also CMYK colors.

### **Printing Substrate**

Printers and printing machines print on different media or printing substrates, generally different paper types, but also, for example, flexible foils for flexographic applications.

### **Process Colors**

In CMYK printing processes, colors are separated into CMYK process colors. CMYK or process color printing is usually contrasted with spot color printing, in which certain spot color inks are used to produce the desired colors. Some printing presses can print with both four-color process inks and additional spot color inks.

### **PSR**

(Process Standard Rotogravure, PSR) The Reference Color Space Gravure standard for publication gravure printing, as initiated by the European Color Initiative (ECI). GMG ColorProof also provides proof profiles for PSR approved by ECI for various printers and media.

## R

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### **RIP**

(Raster Image Processor, RIP) File transformation into a contone or 1-bit image format that can be read by an output device (e. g. a printer or an imagesetter). For example, transforming vector graphics into rasters. Generally, a color transformation is also required to match the color space of the output device.

## S

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### **Shadows**

Color tone giving the visual impression of a low lightness of the corresponding color channel. See also Midtone and Highlights.

**Spot Color**

In contrast to CMYK or process colors, a specific colored ink is used in spot color printing to produce a certain color. Spot colors extend the gamut of a printing machine. In multi-color printing, spot colors are used in addition to or instead of CMYK process colors.

**SWOP**

(Specifications Web Offset Publications, SWOP) Printing standard for web offset printing in the United States initiated by an industry group committee, updated now by IDEAlliance Inc. GMG ColorProof also provides proof profiles approved by the SWOP committee for various printers and media.

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**W****White Gap**

Visible white gaps (without ink) in a printed image that can result if plates are not exactly aligned (are out of registration) in the printing machine. A method to avoid white gaps is Overprinting.

**White Point**

Color value of a white object viewed under a standard illuminant through a standard observer angle. The white point depends on the printer gamut and the print medium.

**Wildcards**

Wildcards are used to search for text strings, such as particular characters or patterns of characters. A wildcard character may be substituted for any of a defined subset of characters. In Flow-Connect, you can use filters to process only specific files. For example, if you use "\*.xml" as a filter, only files with the file extension ".xml" will be processed.

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**X****XML**

(XML, Extensible Markup Language) A new standard developed by the World Wide Web Consortium (W3C). XML is not a fixed set of elements like HTML, but rather a meta-language (a language for describing languages). XML enables authors to define their own tags.

**XSL**

(Extensible Stylesheet Language, XSL) XSL is a stylesheet language for XML documents, defining the layout, styles, colors, etc. of how the XML document will look like in the application in which it is displayed.