Printing with Profiles - Adobe Photoshop Elements

Creation and usage of ICC printer profiles; written for Adobe® Photoshop® Elements versions 2, 3, 4, 5, Mac OS® and Windows®.

Contents

1. Introduction

*This document is a guide on how to print documents
from Adobe® Photoshop® Elements using ICC profiles
and how to print a testchart in order to create an ICC profile.
It is also written to promote the use of Midox Color's Profile Service,
a convenient and affordable way to obtain professional custom ICC profiles.*

To be able to create an ICC profile for a printer, a testchart needs to be printed. A testchart consists of one or more image files containing a number of patches. The print(s) from a testchart can be measured using a spectrophotometer and these measurements can then be used to create the profile. Midox Color has several testcharts available for creating ICC printer profiles, which are free to download from the Midox Color website:

http://www.midox.nl/en/downloads.html

or:

http://www.midox-color.com/downloads.html

For most users, who print directly from an application to a printer on their computer, an RGB profile is the correct choice. This is because most printer drivers - for Mac OS® and Windows® - are created to handle RGB data. Midox Color has two testcharts for creating RGB profiles, of which TC9.18 is most used for professional photo output. TC2.83 is less accurate (created from fewer patches), but still gives high quality results, ideal for evaluation prints on cheaper materials. Testcharts currently available:

RGB TC2.83
For creating RGB profiles using the TC2.83 standard.
Patch amount: 283

RGB TC9.18
For creating professional RGB profiles using the TC9.18 standard.
Patch amount: 918

CMYK TC3.5
For creating CMYK profiles using the TC3.5 standard.
Patch amount: 432

CMYK ECI2002
For creating professional CMYK profiles using the ECI2002 standard.
Patch amount: 1485

All testcharts come in multiple lay-outs and can be used for paper sizes as small as A6; (4x6 inch / 10x15 cm borderless). Not sure which testchart to choose? Or would you like to create printer profiles for Hexachrome, CMYK-RB, CMYK-RG or a custom multicolor setup? Please contact Midox Color.

Note: All profiles created by Midox Color comply with ICC Specification Version 4 (or Version 2 if requested).

2. Preparation

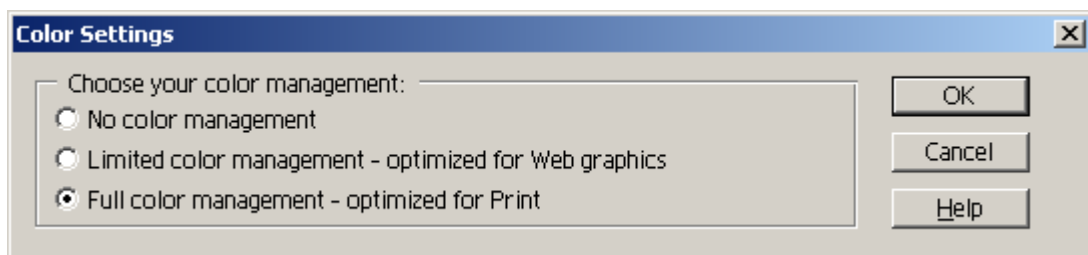## 2.1 Color settings in Photoshop Elements 2, 3

Before you open any files, please check the color settings in the application. To open the Color Settings dialog in Photoshop Elements, choose from the menu or use the keyboard shortcut:

Windows: **Edit > Color Settings...**

Shift ⇧ + Ctrl + K

Mac OS: **Photoshop Elements > Color Settings...**

Shift ⇧ + Command ⌘ + K

Photoshop Elements 2 above, and version 3 below.

In this dialog, please choose:

- **Full Color Management**

Midox Color recommends using this setting. It will make sure embedded profiles are preserved. When opening a file without a profile in version 3, you will be prompted to choose between sRGB, Adobe RGB (1998) or leaving colors unmanaged; version 2 gives no warning. Also, when creating a new document, Adobe RGB (1998) will be assigned to it.

2.2 Color settings in Photoshop Elements 4, 5

Before you open any files, please check the color settings in the application. To open the Color Settings dialog in Photoshop Elements, choose from the menu or use the keyboard shortcut:

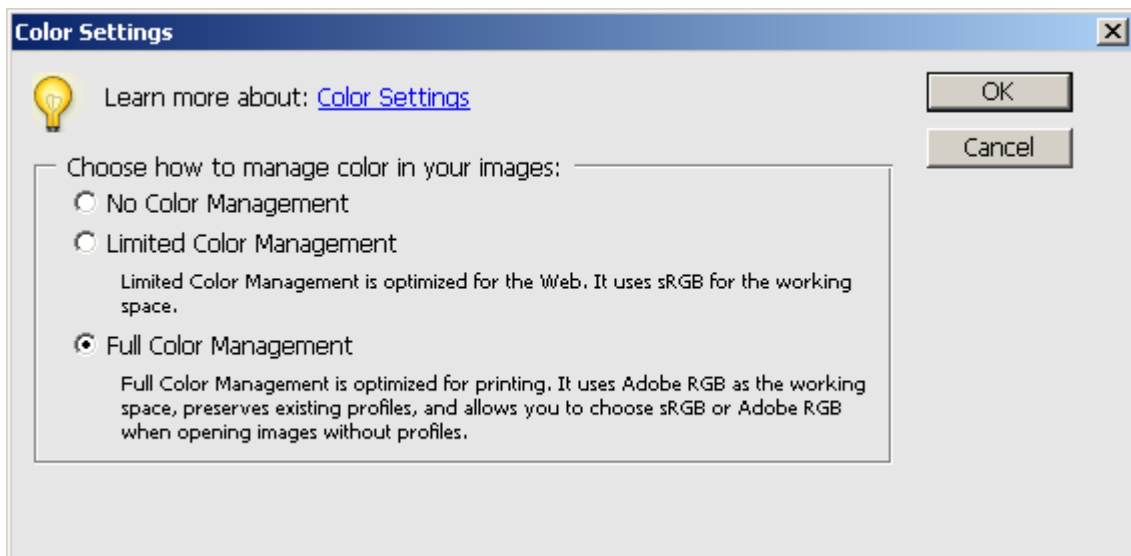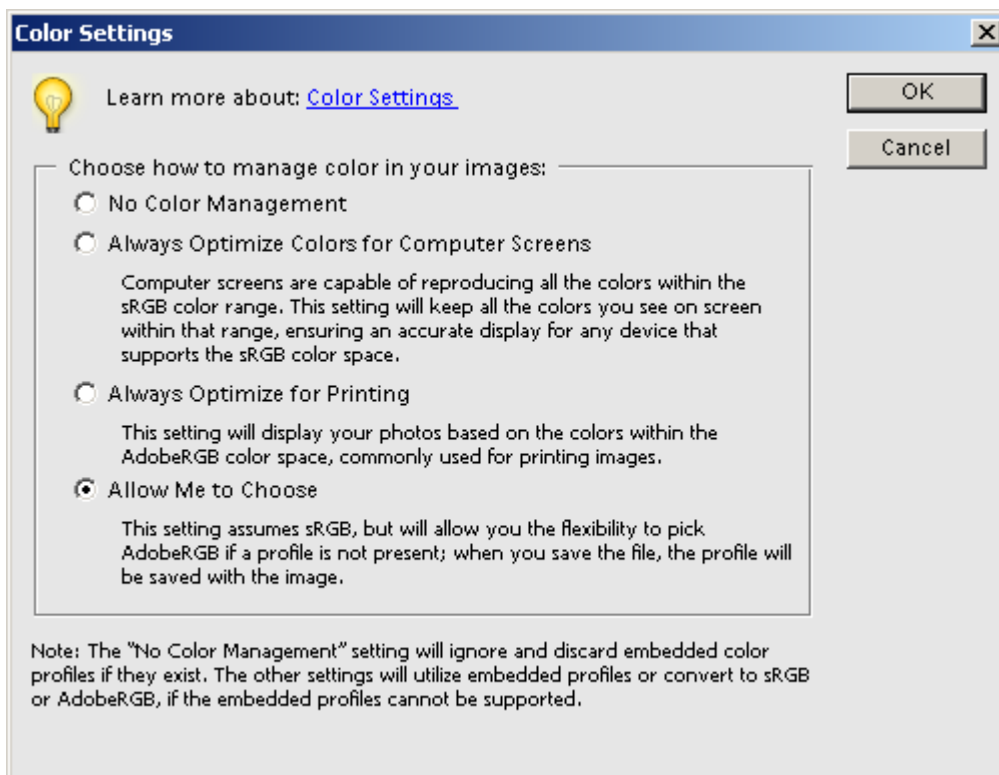Windows: **Edit > Color Settings...**

Shift ⇧ + Ctrl + K

Mac OS: **Photoshop Elements > Color Settings...**

Shift ⇧ + Command ⌘ + K

In this dialog, please choose:

• **Allow Me to Choose**

Midox Color recommends using this setting. It will make sure embedded profiles are preserved, and when opening a file without a profile, you will be prompted to choose between sRGB, Adobe RGB (1998) or leaving colors unmanaged. Also, when creating a new document, sRGB will be assigned. If you want this to be Adobe RGB (1998), you can later change the Color Settings to Always Optimize for Printing. Doing so will mean that files with no embedded profile will automatically have Adobe RGB (1998) assigned to it, when opened.

2.3 About the printer

A printer profile is created for a certain printer plus printing materials, but also for the software used to drive the printer. This guide focuses on printing directly from an application to a printer using an installed printer driver. A printer driver can have numerous settings that influence how the printer produces color. Later on in this guide you will be prompted to select the correct settings. The settings used when printing a testchart, must also later be used when printing documents with the resulting ICC printer profile. When choosing settings, please focus on these two main issues:

1 - Disabling any form of automatic color correction.

This is mainly colormanagement and automatic image enhancement inside the printer driver. This needs to be disabled, because Adobe will manage colors. You'll find the settings among the settings/properties/preferences of your printer located with the paper type settings and/or on a separate tab called **Color, Color Options** or **Color Management**. All depends on your make and type of printer and the driver installed. The particular setting(s) may be called:

No Color Adjustment	*(on)*
Disable ICM	*(on)*
ICM	*(off)*
ColorSync	*(off)*
PhotoEnhance	*(off)*
Colorsmart	*(off)*

In some cases you have to enable options like **Colormanagement**, **Color Adjustment** or **ICM** to be able to choose **No Colormanagement**, **No Color Adjustment** or **Disable ICM**. Or you may be able to choose an option called **Managed by application** or **Application managed colors**. Please refer to the printer's manual or the internet to discover how to switch off colormanagement and/or automatic color adjustment for your printer.

2 - Choosing the right paper settings.

The paper type settings control how the printer will dose it's colors. In some cases there are additional options to control this. For example color correction controls or ink volume control for overall ink usage or individual inks.

Some tips:

- ✔ Please make sure the printer is clean and does not produce any stains or lines.
- ✔ Perform tasks, like Printing Alignment and Nozzle Cleaning, if necessary.
- ✔ If your printer has a procedure to linearize/calibrate, please complete this procedure before printing a testchart. (This procedure can later be used to reset the printer to the state the profile was created for.)
- ✔ If you're considering updating the printer driver, please do so before printing a testchart.

2.4 Exploring the printer

This is an optional step for those who want to find the best printer settings before printing the final testchart.

Different paper type settings will produce different results on a printer. Additional settings, such as ink volume/density controls, can offer even more control. To provide a way to explore these settings and find out which are best for a particular combination of printing materials, Midox Color has created **RGB-Evaluation-Print.tif**, which can be downloaded from www.midox.nl and is present in RGB testchart downloads. It is an RGB image that, like a testchart, has no embedded color profile. It can be printed like a testchart, as described in chapter **3. Printing a testchart** on page **9**. Repeat this procedure with different paper/ink settings and compare the results - printing at 100% is not necessary. Midox Color suggests evaluating these prints in three ways:

1 - Check how saturated maximum colors are (cyan, magenta, yellow, black, red, green, blue). There are two areas (see **1** in image below) where colors are maximum. By experimenting with different settings you will be able to choose a setting where saturation is best.

2 - Check when the last shade can be distinguished from maximum color and when the first can be distinguished from white. The image has an area (see **2** in image below) where colors decrease from maximum (left) and an area where colors increase from white (right). This is done in 5 point steps - on a 256 step range (0-255) - showing only both ends of the range. To compare steps to maximum, a bar with maximum color is placed along side (see image directly below). Choose a setting where most steps are visable.
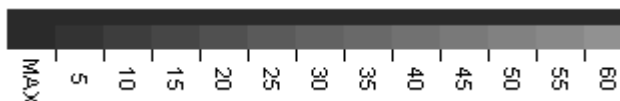
3 - Check the overall appearance. The bottom of the image (see **3** in image below) has an area with gradients from white to maximum, containing all 256 steps; start and end are marked by lines.
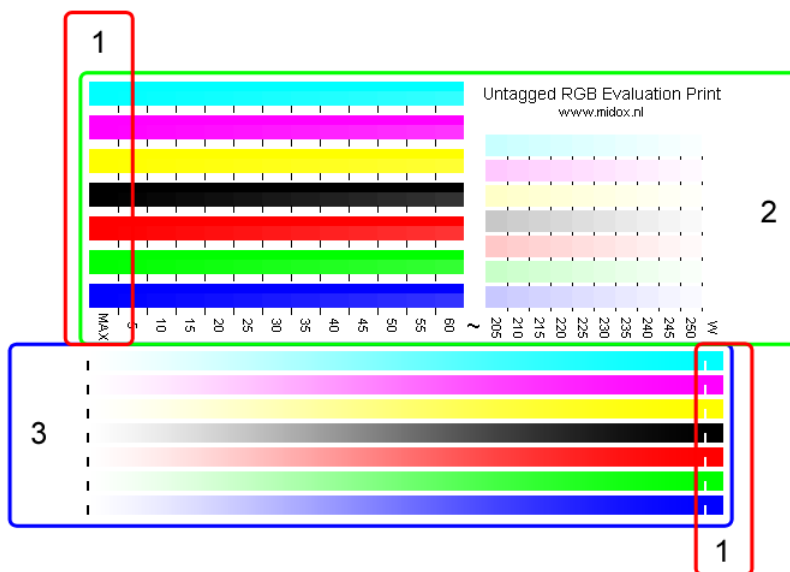
2.5 Rendering intent

When printing documents using an ICC printer profile, you have the option of choosing a rendering intent. There are four options to choose from. **Saturation** will preserve saturation as much as possible and is rarely used for printing photographic images. **Absolute Colorimetric** is used for proof printing, which is not covered in this manual. **Relative Colorimetric** is used to print colors as consistent as possible while correcting for difference in white point. All colors will appear just right, when the print is viewed under a light source the profile was created for. This is D50 by default (5000º Kelvin), but can be another light source. **Perceptual** is a rendering intent often used for photographic images. Colors from the source document will be converted proportionally into the destination print space. This way relations between different colors are kept intact as much as possible.

Midox Color recommends using **Relative Colorimetric with Black Point Compensation** as default and **Perceptual** as a safe alternative. Some (exaggerated) examples where a perceptual rendering intent is desirable:
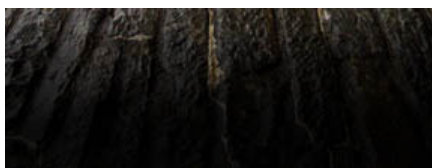

Original - flowers

Relative Colorimetric

An array of bright colors that doesn't exist in the destination space is converted to the same color.
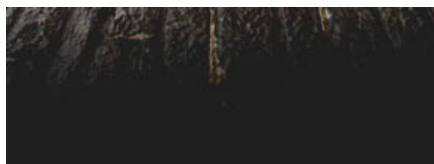

Perceptual

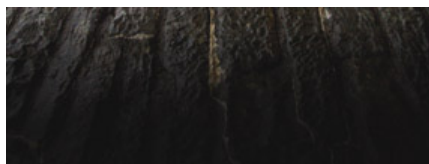*Same array of bright colors that doesn't exist in the destination space is now converted to multiple colors.*

Original - stones in shadow

Relative Colorimetric

An array of dark colors that doesn't exist in the destination space is converted to the same color.

Perceptual

Same array of dark colors that doesn't exist in the destination space is now converted to multiple colors.

2.6 Where to place an ICC or ICM file

Before you can select a profile from any list of available profiles in Adobe applications, you have to copy or move the ICC or ICM file to the correct location on your system, using Finder™, Explorer or another filebrowser. In some cases, you may need to restart the application in order to see the profile in the list. Below you'll find the paths where ICC files can be placed. Midox Color recommends using the common profile folder for your operating system, marked with ←.

Path operating systems:

|		
Mac OS X:	**/Library/ColorSync/Profiles**	←
or:	**/System/Library/ColorSync/Profiles**	
or:	**/Users/your_username_here/Library/ColorSync/Profiles**	
Mac OS 8 or 9:	**System Folder > ColorSync Profiles**	←
Windows XP:	**C:\windows\system32\spool\drivers\color**	←
Windows 2000:	**C:\winnt\system32\spool\drivers\color**	←
Windows NT:	**C:\winnt\system32\color**	←
Windows 95/98/ME:	**C:\windows\system\color**	←

Path Adobe applications:

Windows:	**C:\Program Files\Common Files\Adobe\Color\Profiles**
or:	**C:\Program Files\Common Files\Adobe\Color\Profiles\Recommended**
Mac OS X:	**/Library/Application Support/Adobe/Color/Profiles**
or:	**/Library/Application Support/Adobe/Color/Profiles/Recommended**
Mac OS 8 or 9:	**System Folder > Application Support > Adobe > Color > Profiles**
or:	**Sys... > Application Support > Adobe > Color > Profiles > Recommended**

3. Printing a testchart

3.1 Open the testchart

Open the testchart in Photoshop Elements. Testchart images do not have an embedded profile. When opening the image file(s), Photoshop Elements versions 3, 4 and 5 will give a Missing Profile dialog; version 2 will give no warning.
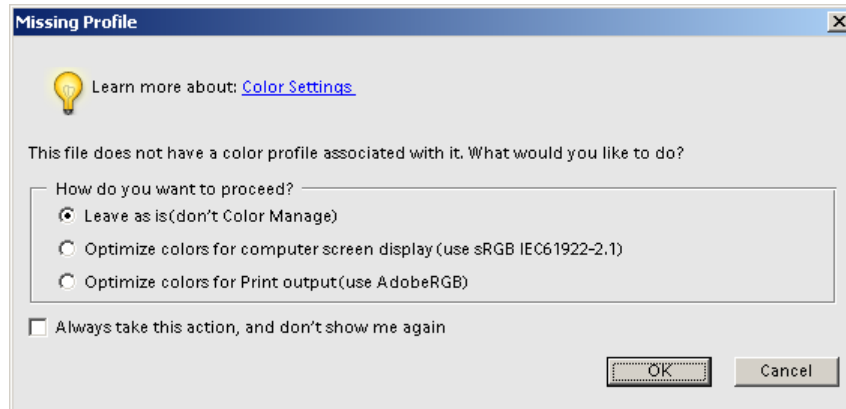
Here, please select:

- **Leave as is (don't Color Manage)**

and click **OK**.

3.2 Print

Choose your version:

3.2.1 Photoshop Elements 2

In Photoshop Elements choose **File > Print...** from the menu or use the keyboard shortcut:

    Ctrl + P   **(Windows)**

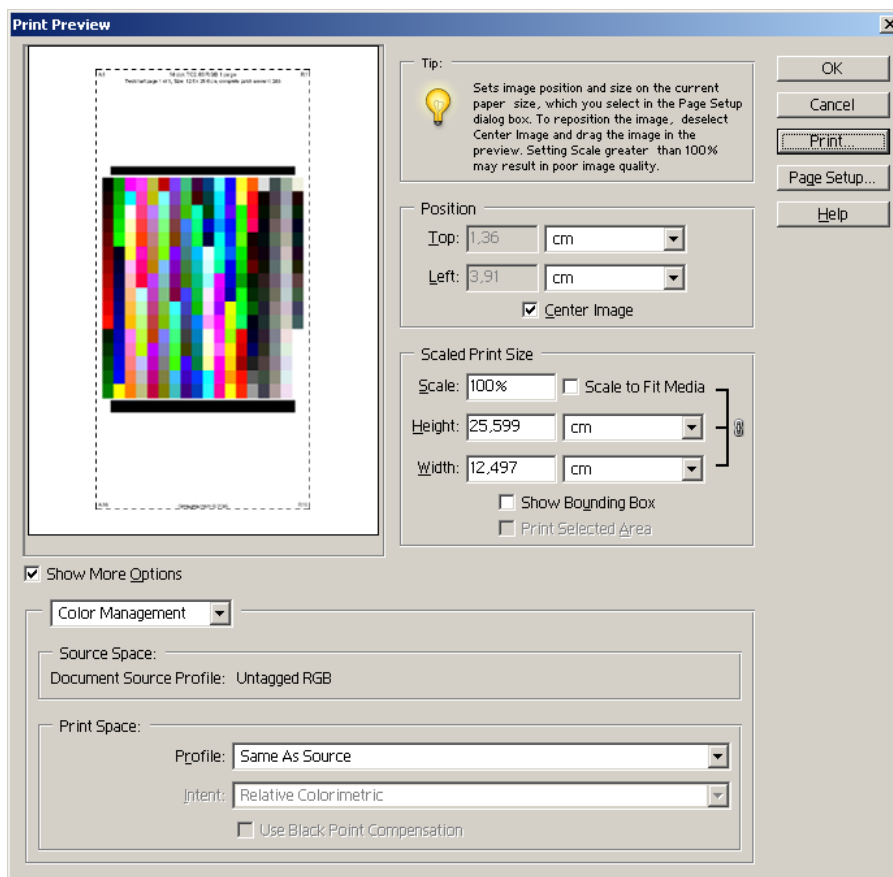   **Command ⌘ + P**   **(Mac OS)**

Click **Page Setup...** to choose the right printer, paper size and orientation. Back in the print options dialog, make sure **Scale** is set to **100%** (uncheck Scale to Fit Media). Enable **Show More Options** and select **Color Management** from the pull-down menu.

The **Source Space** section now reads:

    • **Document Source Profile**:   Untagged RGB

At the **Print Space** section:

    Profile: select **Same As Source**

Click **Print...** and continue at chapter **3.3 Choose correct printer settings** on page **12**.

3.2.2 Photoshop Elements 3, 4, 5

In Photoshop Elements choose **File > Print...** from the menu or use the keyboard shortcut:

    Ctrl + P   **(Windows)**

    Command ⌘ + P   **(Mac OS)**

Click **Page Setup...** to choose the right printer, paper size and orientation. Back in the print dialog, select **Actual Size** from the **Print Size** pull-down menu (this makes sure **Scale** is set to **100%**). Enable **Show More Options** to view the **Color Management** section:

   **Source Space**:   now reads 'Untagged RGB'
    Printer Profile: select **Same As Source** from the pull-down menu
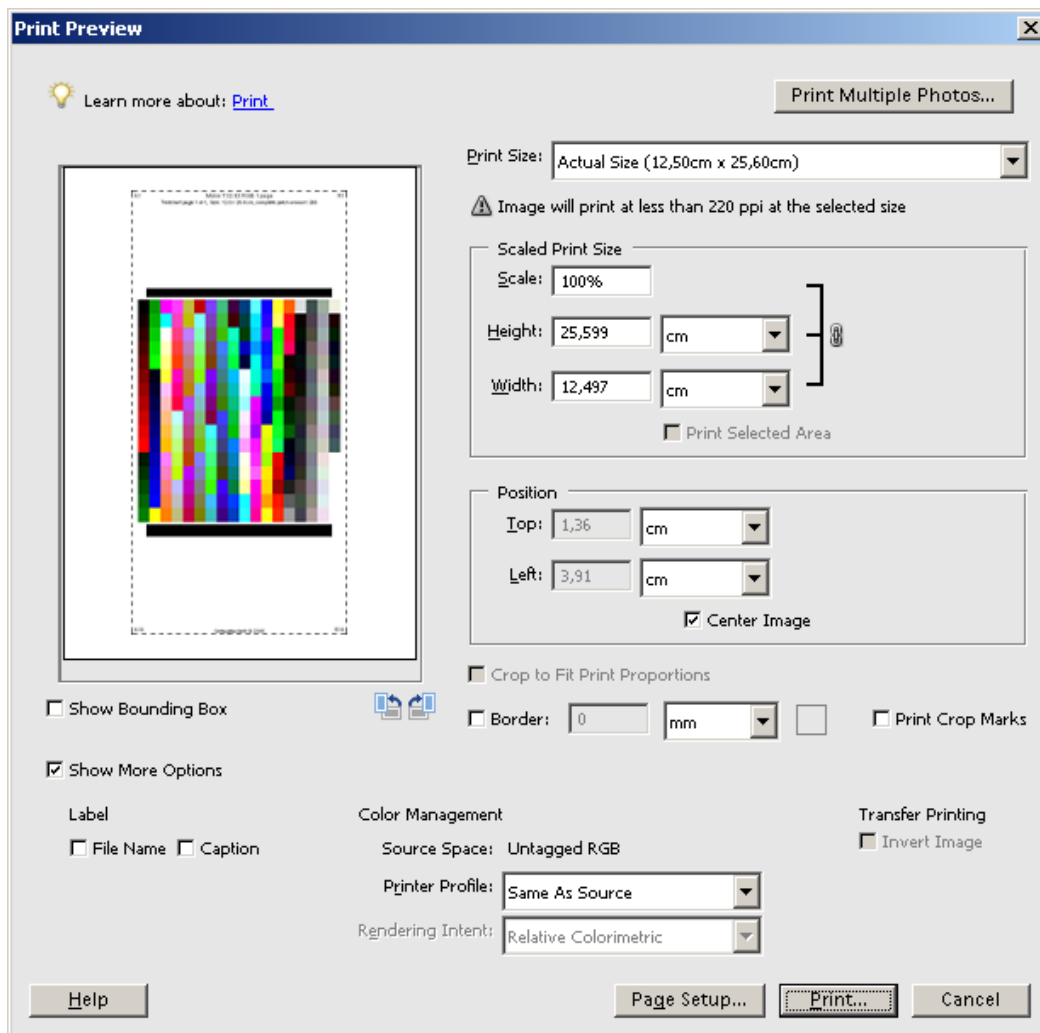
Click **Print...**

3.3 Choose correct printer settings

After choosing **Print...** in the Photoshop Elements dialog, you will get a print dialog enabling you to choose the correct printer settings. The appearance and available options of this dialog depends on your operating system and installed printer driver.
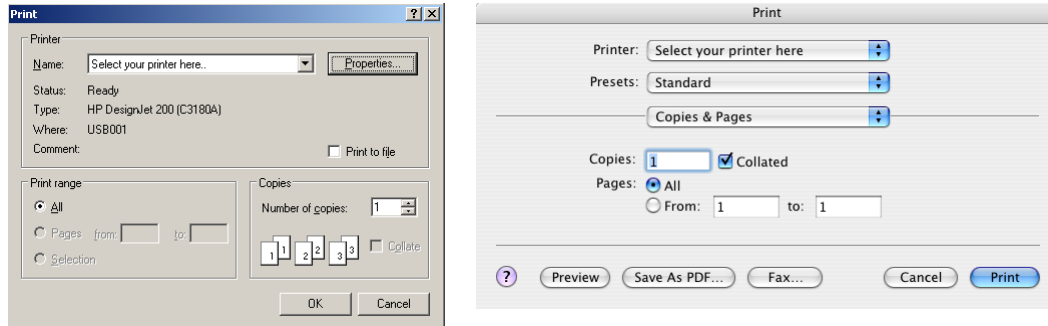
> **1** - **Disable colormanagement** and/or other forms of
>   **automatic color adjustment/enhancement/correction**.
>
> **2** - Choose the best paper settings for the materials used.
>
>
> Please **save or note the settings** used here.
> You will need them when printing documents using the created ICC profile.
>
> See also **About the printer** (page 5).

Mac OS: Enter the printer settings tabs from the bottom pull-down menu, which first reads **Copies & Pages**. The ColorSync-tab can be left in it's default setting, as ColorSync will not be used. On OS X, any printer's settings can be saved as a preset. The print dialog has a pull-down menu, where presets can be loaded or saved. If you load an existing preset and then change some of the settings for a particular job, then please save or save a new preset.

Windows: The settings can be accessed by clicking **Setup**, **Properties** or **Preferences** of the selected printer. In most cases you will need to enter **Advanced...** to find all relevant settings. One set of custom printer settings can be saved by setting a printer's **Printing Preferences...**. These will then become the default settings for that particular printer. Additional presets can only be saved when the printer driver offers this function.

You are free to choose the printer settings for which the profile will be created. In all cases, the printer's automatic color functions need to be disabled, as colors are managed by the application. If you're using a testchart lay-out with multiple image files, please make sure you open and print all files the same way.

Click **Print** or **Ok** to print the testchart.

4. Printing with ICC printer profiles

4.1 Open a document

Open a document you want to print. If the document has an embedded profile, it will be honoured (preserved), you will get no warning. If the document has no embedded profile, Photoshop Elements 3, 4 and 5 will present a warning dialog, where you will be prompted to choose sRGB or Adobe RGB.

4.2 Print

Choose your version:

4.2.1 Photoshop Elements 2

In Photoshop Elements choose **File > Print...** from the menu or use the keyboard shortcut:

    Ctrl + P   **(Windows)**

    Command ⌘ + P   **(Mac OS)**

Click **Page Setup...** to choose the right printer, paper size and orientation. Back in the print options dialog, choose settings for position and size. Then enable **Show More Options** and select **Color Management** from the pull-down menu.

The **Source Space** section now reads:

    • **Document Source Space**:   current colorspace
                                       (Adobe RGB in this example)

At the **Print Space** section:

    Profile: select **your printer profile** from the pull-down menu
    Intent: choose between **Relative Colorimetric** (with or without
                         Use Black Point Compensation) or **Perceptual**
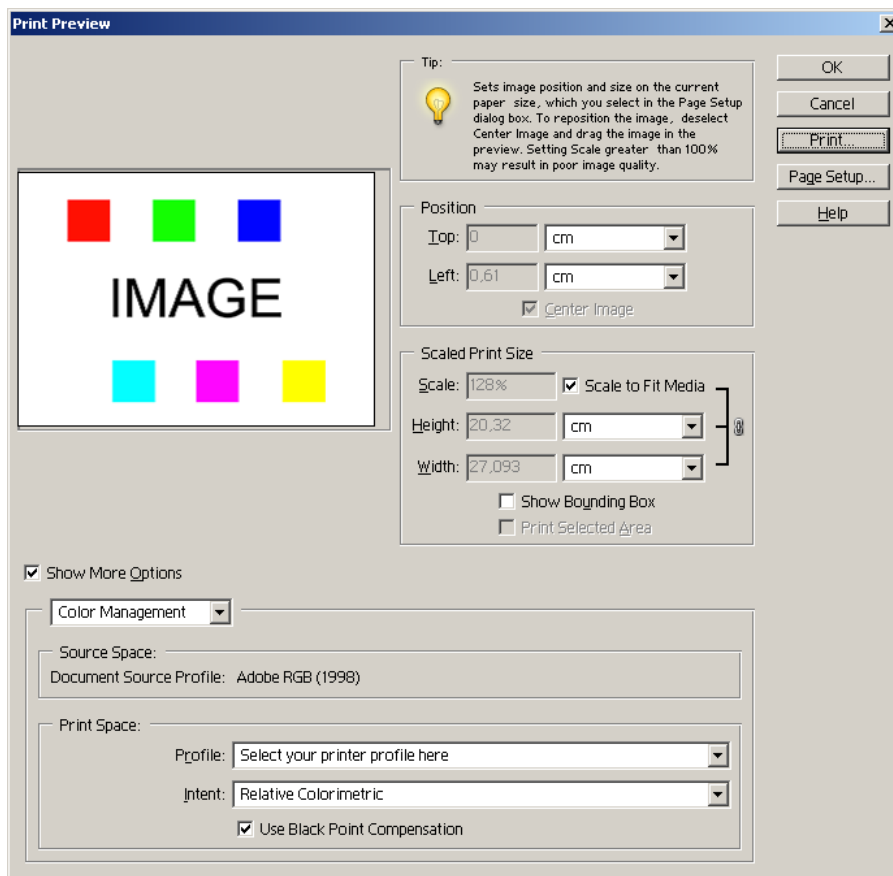
Click **Print...** and continue at chapter **4.3 Choose same printer settings** on page **16**.
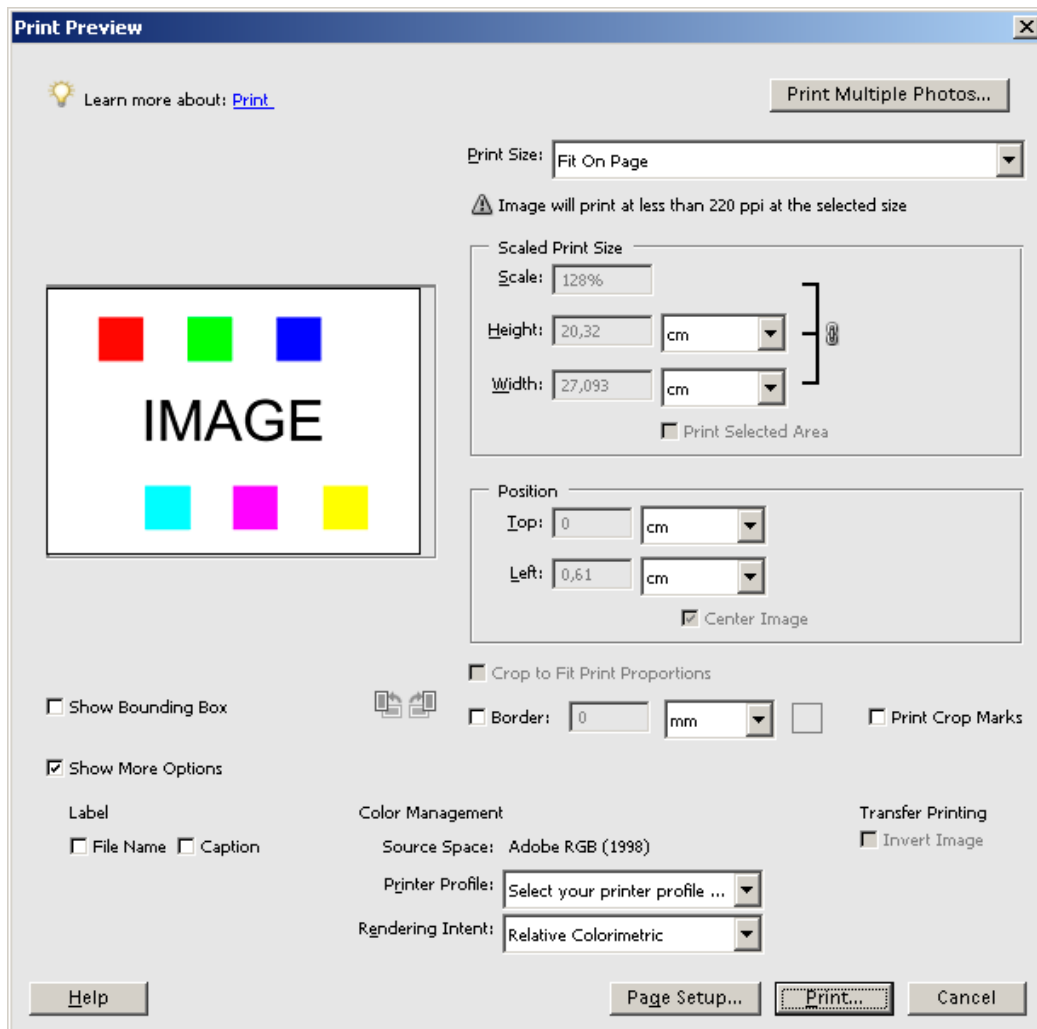
4.2.2 Photoshop Elements 3, 4, 5

In Photoshop Elements choose **File > Print...** from the menu or use the keyboard shortcut:

    Ctrl + P   **(Windows)**

    Command ⌘ + P   **(Mac OS)**

Click **Page Setup...** to choose the right printer, paper size and orientation. Back in the print dialog, choose settings for position and size. Enable **Show More Options** to view the **Color Management** section:

    Source Space: current colorspace (Adobe RGB in this example)
    Printer Profile: select **your printer profile** from the pull-down menu
    Rendering Intent: choose between **Relative Colorimetric** or **Perceptual**

Click **Print...**

4.3 Choose same printer settings

After choosing **Print...** in the Photoshop Elements dialog, you will get a print dialog enabling you to choose the printer settings. The appearance and available options of the following dialogs and tabs depend on your operating system and installed printer driver. Please select all color-related settings the chosen ICC printer profile was created for.
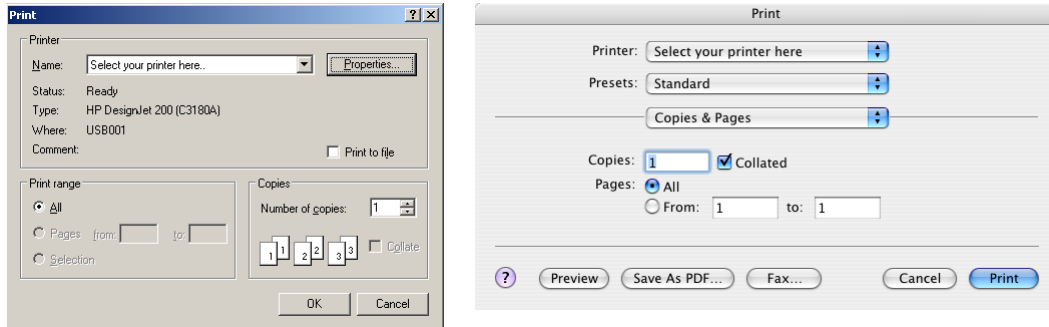
Load the settings you **saved or noted** when printing the testchart.

Did you have to adjust one or more settings for the current job, after loading saved settings; i.e. the paper format? Then please check all color-related settings. Changing some settings may cause default settings to become active.

If you don't know which settings were used, then please **disable** the printer's **colormanagement** and/or **automatic color correction** and choose paper type settings that best describe the materials you are using.

See also **About the printer** (page 5).

Mac OS: Enter the printer settings tabs from the bottom pull-down menu, which first reads **Copies & Pages**. The ColorSync-tab can be left in it's default setting, as ColorSync will not be used. On OS X, any printer's settings can be saved as a preset. The print dialog has a pull-down menu, where presets can be loaded or saved. If you load an existing preset and then change some of the settings for a particular job, then please save or save a new preset.

Windows: The settings can be accessed by clicking **Setup**, **Properties** or **Preferences** of the selected printer. In most cases you will need to enter **Advanced...** to find all relevant settings. One set of custom printer settings can be saved by setting a printer's **Printing Preferences...**. These will then become the default settings for that particular printer. Additional presets can only be saved when the printer driver offers this function.

Click **Print** or **Ok** to print the document.

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Midox Color

Dirk Costerplein 184
2624 TX Delft

The Netherlands
Europe