

# Color Pilot 21.07

## User Guide

07 - 2021

# Contents

- 1. Copyright Notice..... 8**
- 2. Color Pilot: Your Color Management Application..... 10**
  - 2.1. Color Management in Your Workflow..... 10
  - 2.2. Color Management for Proofing..... 11
  - 2.3. Color Management for Digital Printing.....13
  - 2.4. Color Management for Conventional Printing..... 14
  - 2.5. Equinox and Expanded Gamut Printing..... 14
  - 2.6. Installing Color Pilot..... 16
  - 2.7. Migrating from a Previous Color Engine Pilot Version..... 16
  - 2.8. Licensed and License-free Modes..... 17
  - 2.9. Good Practices..... 18
- 3. Prerequisites for Effective Color Management..... 19**
  - 3.1. Preparing Your Devices for Proofing..... 19
  - 3.2. Preparing Your Digital Press..... 20
  - 3.3. Preparing Your Conventional Press.....20
  - 3.4. Preparing Your Press for Expanded Gamut Printing..... 21
    - 3.4.1. Making Sure your Press is Stable.....21
    - 3.4.2. Choosing your Inks..... 22
    - 3.4.3. Choosing your Printing Target.....28
- 4. Understanding Color Accuracy..... 29**
  - 4.1. Quantifying Colors..... 29
  - 4.2. The Difference Between Colors.....31
    - 4.2.1. Delta E..... 31
    - 4.2.2. Other Color Difference Indicators..... 31
- 5. The Color Pilot User Interface.....33**
  - 5.1. Views..... 34
  - 5.2. Search.....36
  - 5.3. Keywords..... 36
    - 5.3.1. Adding Keywords.....36
    - 5.3.2. Removing Keywords.....37
    - 5.3.3. Managing Keywords..... 37
  - 5.4. Navigation Pane.....38
    - 5.4.1. Exporting the Library..... 39
  - 5.5. Picker.....39
- 6. General Configuration..... 41**
  - 6.1. General..... 41

6.1.1. Default Formulas.....	41
6.1.2. Profiles.....	42
6.1.3. Test Charts.....	43
6.1.4. Check and Recalibrate.....	43
6.1.5. Relinearization.....	44
6.1.6. Check Strategy (Proofing).....	44
6.1.7. Check strategy (Digital Printing).....	45
6.1.8. Ink Books.....	47
6.1.9. Color Strategies.....	48
6.1.10. Logging.....	53
6.1.11. Start Up.....	53
6.1.12. Extra.....	54
6.2. Servers.....	56
6.2.1. Esko Server.....	56
6.2.2. Esko Cloud.....	58
6.2.3. PantoneLIVE.....	61
6.2.4. Proof.....	64
6.3. Database.....	65
6.3.1. The Color Database.....	65
6.3.2. The Curves and Screens Databases.....	66
6.3.3. Location of the Database.....	66
6.3.4. Working with a Database in a Data Center.....	68
6.4. Spectrophotometer.....	70
<b>7. Using a Spectrophotometer.....</b>	<b>72</b>
7.1. Supported Spectrophotometers.....	72
7.2. Connecting the Spectrophotometer.....	73
7.3. Calibrating the Spectrophotometer.....	73
7.4. Measurement Conditions.....	74
<b>8. Working with Ink Books and Inks.....</b>	<b>76</b>
8.1. Your Ink Books Library.....	76
8.2. Working with Ink Books.....	78
8.2.1. Types of Ink Books.....	79
8.2.2. Creating an Ink Book.....	82
8.2.3. Upgrading Legacy Ink Books to the New Format.....	82
8.2.4. Uploading Ink Books to Esko Cloud.....	83
8.2.5. Exporting Ink Books.....	85
8.2.6. Importing an Ink Book.....	87
8.3. Working with Inks.....	89
8.3.1. Types of Ink.....	90
8.3.2. Ink Information.....	91
8.3.3. Adding an Ink to an Ink Book.....	93
8.3.4. Editing an Ink.....	101

8.3.5. Changing an Ink's Opacity.....	105
8.3.6. Setting a Digital Standard.....	106
8.3.7. Comparing Inks.....	107
8.4. Esko Cloud Enterprise Server.....	112
8.5. PantoneLIVE Ink Books and Inks.....	115
8.5.1. The PantoneLIVE Workflow.....	115
8.5.2. Using PantoneLIVE.....	116
8.6. Outputting Inks and Ink Books.....	119
8.6.1. Printing Inks and Ink Books.....	119
8.6.2. Proofing Inks and Ink Books.....	123
8.6.3. Exporting Inks and Ink Books to PDF.....	127
8.7. Check Gamut.....	131
8.7.1. Checking the Spot Color Conversion.....	133
8.7.2. Checking if the Colors are in Gamut.....	134
<b>9. Working with Profiles.....</b>	<b>137</b>
9.1. What is a Profile?.....	137
9.2. Using Profiles for Color Management.....	138
9.3. Your Profiles Library.....	139
9.3.1. Types of Profiles.....	140
9.3.2. Profile Information.....	141
9.4. Profiling Your Proofer.....	148
9.4.1. Get Started.....	149
9.4.2. Measure.....	153
9.4.3. Summary.....	159
9.5. Profiling Your Digital Press.....	159
9.5.1. Creating a Profile with an Inline Spectrophotometer.....	161
9.5.2. Creating a Profile with an Offline Spectrophotometer.....	169
9.6. Profiling Your Conventional or Equinox Press.....	180
9.6.1. Overcoming the Challenges of Press Profiling.....	182
9.6.2. Defining your Ink Set.....	182
9.6.3. Setting your Desired Curves.....	183
9.6.4. Printing and Measuring your Charts.....	184
9.6.5. Processing your Profile Sections.....	194
9.6.6. Updating your RIP Curves with your Profile Data.....	206
9.6.7. Completing an Unfinished Profile.....	207
9.7. Comparing Profile Measurements.....	207
9.8. Exporting Profiles.....	211
9.8.1. Exporting a Single Profile.....	211
9.8.2. Exporting Multiple Profiles.....	212
9.9. Importing Profiles.....	213
<b>10. Working with Color Strategies.....</b>	<b>216</b>
10.1. Your Color Strategies Library.....	216

10.2. Creating a Proofing Color Strategy.....	218
10.3. Editing Your Proofing Color Strategy.....	219
10.3.1. Changing the Profiles.....	220
10.3.2. Mapping Ink Books and Inks.....	221
10.3.3. Using Dot Gain Curves.....	222
10.3.4. Defining Color Conversion Settings.....	223
10.3.5. Exceptions.....	227
10.3.6. Choosing the Output Separations.....	244
10.4. Checking Your Proofing Color Strategy.....	245
10.4.1. Get Started.....	246
10.4.2. Measure.....	246
10.5. Creating a Digital Printing Color Strategy.....	252
10.6. Editing Your Digital Printing Color Strategy.....	253
10.6.1. Changing the Profiles.....	254
10.6.2. Mapping Ink Books and Inks.....	255
10.6.3. Using Dot Gain Curves.....	256
10.6.4. Defining CMYK Conversion Settings.....	257
10.6.5. Defining Spot Color Conversion Settings.....	261
10.6.6. Choosing the Output Separations.....	293
10.7. Checking Your Digital Printing Color Strategy.....	294
10.7.1. Get Started.....	295
10.7.2. Measure.....	297
10.8. Default Digital Printing Color Strategies.....	305
10.8.1. Enhanced Productivity Mode (EPM) Default Color Strategies.....	306
10.9. Converting Classic Strategies to Digital Printing Strategies.....	307
10.9.1. Compatibility Between Classic and Digital Printing Strategies.....	308
10.10. Creating an Equinox Color Strategy.....	309
10.11. Editing Your Equinox Color Strategy.....	310
10.11.1. Changing the Profiles.....	311
10.11.2. Defining CMYK Conversion Settings.....	311
10.11.3. Defining Spot Color Conversion Settings.....	315
10.11.4. Choosing the Output Separations.....	329
10.12. Importing a Color Strategy.....	330
10.13. Exporting Color Strategies.....	331
10.13.1. Exporting a Single Color Strategy.....	332
10.13.2. Exporting Multiple Color Strategies.....	332
10.14. Previewing a Color Strategy's Conversion.....	333
10.14.1. Previewing a Color Conversion.....	333
10.14.2. Previewing a Gradient Conversion.....	334
10.15. Check Gamut.....	339
10.15.1. Checking the Spot Color Conversion.....	341
10.15.2. Checking if the Colors are in Gamut.....	342
<b>11. Working with Overprint Charts.....</b>	<b>345</b>

11.1. Creating a Custom Chart Layout.....	345
11.2. Creating a Custom Patch Set for Your Charts.....	348
11.3. Exchanging Charts Between Sites.....	351
11.3.1. Exporting a Chart.....	351
11.3.2. Importing a Chart.....	352
11.4. Measuring your Printed Charts.....	353
11.4.1. Find and Repair Bad Measurements.....	357
<b>12. Working with Ink Limitation Sets for Digital Presses.....</b>	<b>359</b>
12.1. Creating an Ink Limitation Set.....	360
12.1.1. Defining Ink Limits for Individual Inks.....	361
12.1.2. Linearization.....	369
12.1.3. Defining the Total Ink Limit.....	372
12.1.4. Evaluating and Saving your Ink Limits.....	374
12.2. Ink Limitation Set Information.....	375
12.3. Editing an Existing Ink Limitation Set.....	377
12.4. Exporting an Ink Limitation Set.....	378
12.5. Importing an Ink Limitation Set.....	379
12.6. Previewing your Colors' Conversion with an Ink Limitation Set.....	379
12.6.1. Previewing a Color Conversion.....	380
12.6.2. Previewing a Gradient Conversion.....	380
<b>13. Working with Screens and Curves.....</b>	<b>384</b>
<b>14. Working with Proofer.....</b>	<b>385</b>
14.1. Color Managing Your Proofer.....	385
14.2. Your Proofing Device(s).....	386
14.3. Creating a Profile for Your Proofer.....	387
14.3.1. Get Started.....	390
14.3.2. Measure.....	393
14.3.3. Summary.....	399
14.4. Checking Your Color Strategy.....	399
14.4.1. Get Started.....	400
14.4.2. Measure.....	401
14.5. Detecting and Correcting Proofer Drift.....	406
14.5.1. When to Check and Recalibrate.....	408
14.5.2. Checking and Recalibrating Your Profile.....	408
14.5.3. If the Recalibration Fails.....	418
14.6. Refining Spot Colors.....	419
14.6.1. Get Started.....	420
14.6.2. Refine Cycles.....	422
14.6.3. Finish.....	432
14.7. Proofing Inks and Ink Books.....	432
14.8. Using Your Multicolor Proofer as CMYK.....	436

<b>15. Working with Digital Presses.....</b>	<b>437</b>
15.1. Your Digital Press(es).....	437
15.2. Color Managing Your Digital Press.....	438
15.3. Choosing a Digital Press Configuration.....	438
15.4. Exporting and Importing Digital Press Configurations.....	439
15.5. Defining Ink Limits for Your Digital Press Configuration.....	440
15.5.1. Defining Ink Limits for Individual Inks.....	442
15.5.2. Linearization.....	449
15.5.3. Defining the Total Ink Limit.....	452
15.5.4. Evaluating and Saving your Ink Limits.....	454
15.6. Removing an Ink Limitation Set from Your Digital Press Configuration.....	455
15.7. Creating a Profile for Your Digital Press Configuration.....	455
15.7.1. Creating a Profile with an Inline Spectrophotometer.....	458
15.7.2. Creating a Profile with an Offline Spectrophotometer.....	466
15.8. Checking Your Color Strategy.....	478
15.8.1. Get Started.....	478
15.8.2. Measure.....	480
15.9. Defining Print Settings.....	488
15.10. Refining Spot Colors.....	489
15.10.1. Get Started.....	490
15.10.2. Refine Cycles.....	491
15.10.3. Finish.....	503
15.11. Printing Inks and Ink Books.....	503

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## 2. Color Pilot: Your Color Management Application

Color management is making sure that colors are reproduced consistently at different stages of the printing process.

This consistency is especially important for specific "brand" colors, that have to look the same when printed on different substrates (cardboard, paper, plastic...).

**Note:**

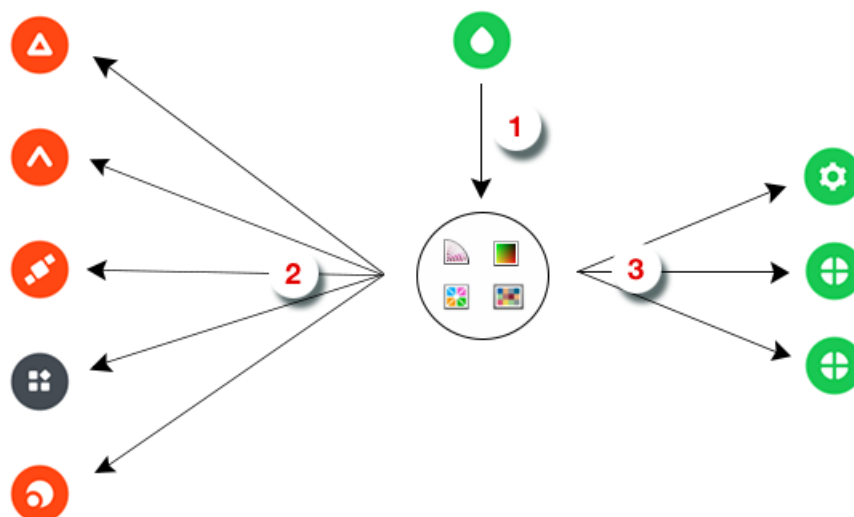
Color Pilot can be used to color manage different types of presses (offset, flexo, gravure, digital) and/or proofers. It can be used for CMY, CMYK, CMYK + spot colors, and/or *expanded gamut printing* (Equinox).



Depending on your license and the way you *configure* your Color Pilot application for your workflow, different functionality may be available to you. Don't hesitate to ask your Esko sales representative about which license would suit your workflow best.




This manual covers all the functionality available in Color Pilot for the different workflows and licenses.

### 2.1. Color Management in Your Workflow






Color Pilot is at the heart of Esko's renowned color management. Once you have defined your color management settings in Color Pilot, you can automatically use them in your other Esko applications. This ensures color consistency throughout your workflow.






1. Use **Color Pilot**  to create / manage your color management settings:
  -  inks and ink books

-  profiles
-  color strategies
-  overprint charts

These settings are stored in your [color database](#).

2. You can use these color management settings in your editor of choice (**ArtPro+** , **ArtPro** , **PackEdge** , **Plato** , **DeskPack** )

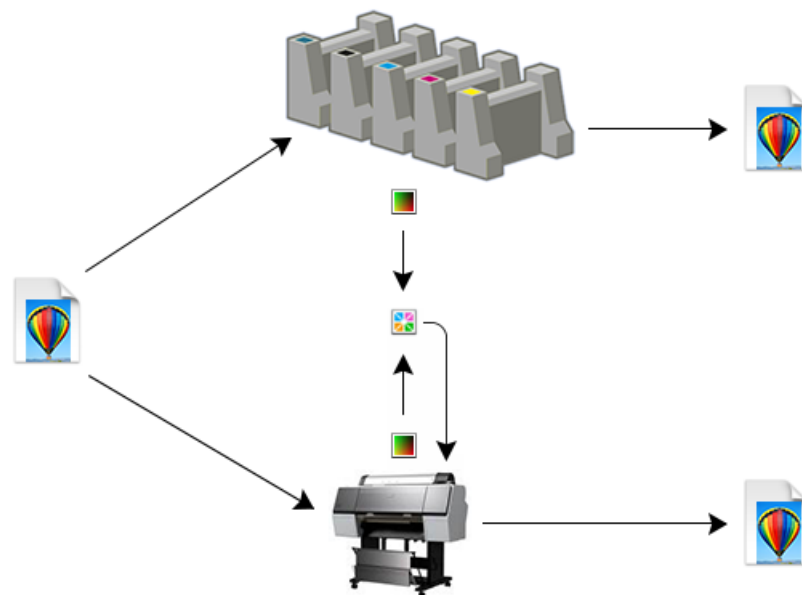
For example, you can replace an ink in your ArtPro file by another ink present in your color database.

3. You can also use these settings in your workflow (**Automation Engine** , **Imaging Engine** , **Pack Proof** )




For example, you can use profiles or a color strategy from your color database to get a good color match when proofing with Pack Proof.

## 2.2. Color Management for Proofing

When proofing a file, you want to reproduce the colors you will get from the press on your proofer, to check whether they are satisfactory.



For this you need:

- a profile  for your press, describing all the colors your press can print,
- a profile  for your proofer, describing all the colors your proofer can print,
- a color strategy  that converts colors from your press profile to your proofer profile, so that the press colors can be reproduced accurately on your proofer.

You can create these in Color Pilot.

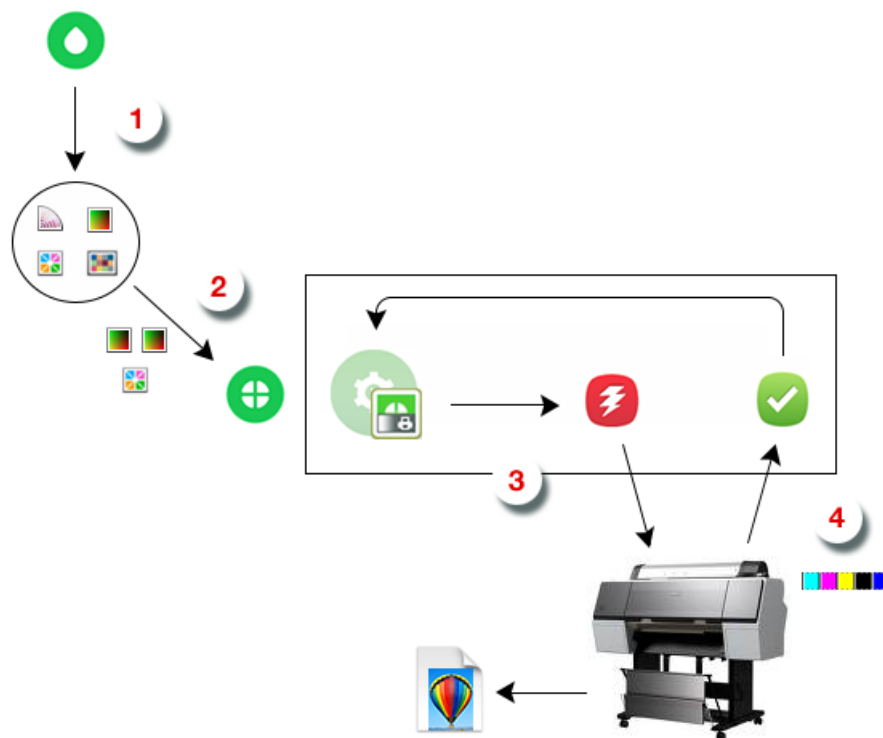
**Note:**






You need to have at least the press and proofer profile, but we recommend you also make the color strategy, as a color strategy contains additional settings to refine your color conversion.

See [Working with Profiles](#) on page 137 and [Working with Color Strategies](#) on page 216 for more information.



**Color Managing Your Proof with Color Pilot and Pack Proof**



You can do this in the following way:



1. In **Color Pilot** , you create your press profile , your proofer profile , and your color strategy .
2. In **Pack Proof** , you use that color strategy (or only your press and proofer profile) to color manage your file.

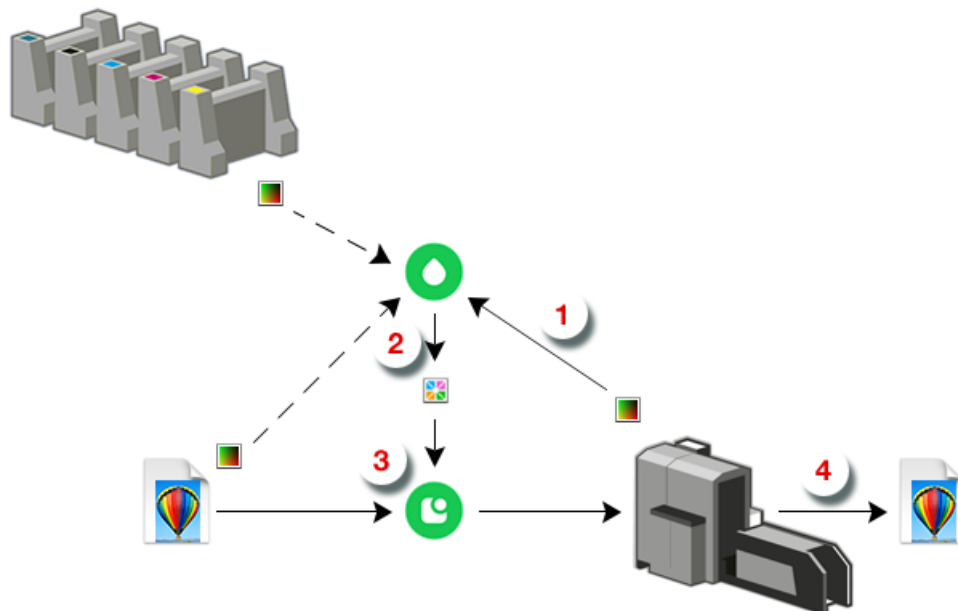
Pack Proof consists of the following software components:







- the **Proof for Contract Approval** task  in Automation Engine,
- the **Esko Proof Server** (running in the background),
- the **Fiery Command WorkStation** application  (the client application of the Esko Proof Server),

- the **Fiery Verify**  tool.
- 3. You proof your color managed file (the **Proof for Contract Approval** task sends it to the **Esko Proof Server**, that sends it to your proofer).
- 4. With the **Verify** tool, you measure the verification strip  on your proof to check its color accuracy. The results are sent back automatically to the **Proof for Contract Approval** task.

## 2.3. Color Management for Digital Printing

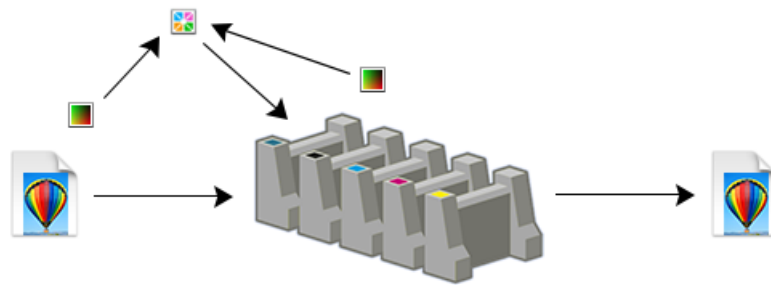
In a digital printing workflow, you can use color management to make sure that your print's colors match what the file's designer intended, or to simulate another printing process (for example offset) on your digital press.






1. In **Color Pilot** , you create a digital press profile , that describes the colors your digital press can reproduce with the ink set you are using.  
For more information, see [Profiling Your Digital Press](#) on page 159.
2. You then create a color strategy  for printing to your digital press, using:
  - your digital press profile  as output profile,
  - an input profile  reflecting the printing process you want to simulate on your digital press (for example a conventional press profile, or the profile embedded in your input file).
3. In your **Digital Front End**  software, you apply your color strategy to your input file.
4. You then send your color managed file to your digital press, that prints it with satisfactory color accuracy.

## 2.4. Color Management for Conventional Printing

When working with an offset, flexo or gravure press, you want to make sure the colors on press reproduce your input file's colors faithfully.



For this you need:

- a profile  for your input file (or a reference profile, for example from an ISO standard), describing how the colors in your input file should print,
- a profile  for your press, describing all the colors your press can print,
- a color strategy  that converts colors from your input file or reference profile to your press profile, so that the file colors can be reproduced accurately on your press.

You can create a press profile and a color strategy in Color Pilot.

**Note:**

You need to have at least the input/reference profile and the press profile, but we recommend you also make the color strategy, as a color strategy contains additional settings to refine your color conversion.

See [Working with Profiles](#) on page 137 and [Working with Color Strategies](#) on page 216 for more information.

## 2.5. Equinox and Expanded Gamut Printing

**What is Equinox?**

Equinox is Esko's unique color technology for expanded gamut printing (printing with a standardized set of more than 4 inks). This is sometimes also called "extended gamut printing".

It combines Esko's unique color algorithms and workflow expertise to bring unparalleled control of multicolor process to the printing industry.

It is compatible with any 5, 6, or 7 inks of your choice.

### The Benefits of Expanded Gamut Printing

"Four color process" (CMYK) is capable of producing the limited range of colors represented by the triangle below.



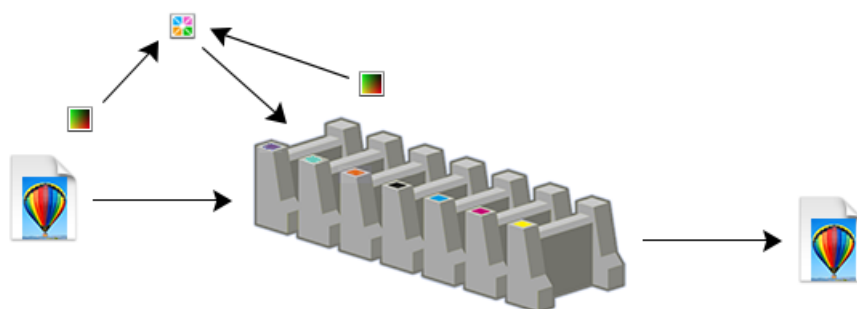
Spot colors have traditionally been used to achieve colors outside the CMYK gamut. However, printing with spot colors is not economical. It requires blending custom inks, cleaning and prepping the press decks for each job, and makes it impossible to "gang" items with unique colors on the same form.

Adding extra colors "between" Cyan, Magenta and Yellow (an **Orange or Red** ink, a **Green** ink, and a **Blue or Violet** ink, as on the color hexagon below) expands the gamut and reduces the need for custom spot colors.






Additionally, images are more colorful and closer to the original. The press can use the same 7 inks for every job, resulting in important cost savings in the press room.

### Working with Equinox in Color Pilot



To reproduce your colors faithfully on a press set up for expanded gamut printing, you need:

- a profile  for your input file (or a reference profile, for example from an ISO standard), describing how the colors in your input file should print,

- a profile  for your expanded gamut printing press, describing all the colors your press can print,
- a color strategy  that converts colors from your input file or reference profile to your press profile, so that the file colors can be reproduced accurately on your press.

For more information about how to color manage your press with Equinox, see:

- [Preparing Your Press for Expanded Gamut Printing](#) on page 21,
- [Profiling Your Conventional or Equinox Press](#) on page 180,
- [Creating an Equinox Color Strategy](#) on page 309.

### Equinox Licensing

- To really benefit from the advantages of expanded gamut printing for your color workflow, you need an **Equinox license**. This unlocks all of Color Pilot's Equinox functionality.

Please contact your Esko sales representative for commercial information.

- Without an Equinox license, you will not have all the functionality for the workflow described above, but you can still benefit from the **state-of-the-art profiling techniques** that Esko developed for the Equinox workflow.

You can use Color Pilot's profiling wizard to precisely profile different types of presses (offset, flexo, gravure...).

## 2.6. Installing Color Pilot

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You can install Color Pilot using the **Imaging Engine Installation DVD**. Please check your [Imaging Engine user guide](#) for installation information.

**Note:** You can also find a link to the installation information in the installation DVD.

## 2.7. Migrating from a Previous Color Engine Pilot Version

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Color Pilot is the successor to Esko's Color Engine Pilot application, with the same functionality but a new (and user friendly) user interface.

Your [installation DVD](#) will install both Color Pilot and the "Classic" Color Engine Pilot on your system.

If you were using the Classic Color Engine Pilot previously, you can continue using it as before, however we recommend you use the new Color Pilot, as it offers Esko's latest color management technology innovations in an easy to use application.

Those innovations include:

- a better simulation of spot color tints (including for refined spot colors),
- a better simulation of spot colors over process colors overprints,
- a better overprints simulation for gravure printing,
- a better black generation,
- smoother gradients.

### Setting up Color Pilot for Proofing

To take advantage of those color management technology innovations, make sure you do the following:



1. Use one of the [proofers tested and supported by Esko](#).
2. Set it up as follows in **Command WorkStation** (the client application of the Esko Proof Server):
  - a. Add it as a **Printer**, and make a workflow from the **Esko Proofing workflow** template for it.
  - b. Fill in all the necessary settings (about the device, substrate, etc).
  - c. Make sure the correct [Esko EPL linearization file](#) is attached to it.

Please see the Esko Proof Server documentation on the [Pack Proof documentation page](#) for details.

3. [Profile your proofer](#) in **Color Pilot**.
4. [Create a proofing color strategy](#) in **Color Pilot**, with your **press profile** as input profile, and your **proofer profile** as output profile.
5. Use this proofing color strategy in **Pack Proof** (in the **Proof for Contract Approval** task).

See the [Pack Proof documentation](#) for details.

### Evaluating the Color Management Technology Innovations

If you wish, you can evaluate Color Pilot's color management technology innovations by proofing a **test chart** with both your previous Color Engine Pilot proofing setup, and your [new Color Pilot proofing setup](#), and comparing the two proofs side by side.

You can find the test chart on your the Esko Proof Server installation DVD, by opening the DVD's contents in your file explorer and going to **Extra > Pack Proof Comparison Chart**.

**Note:** If you need help, the migration to Color Pilot (including the test chart based evaluation) is also available as a service. Please contact your Esko representative for more information.

## 2.8. Licensed and License-free Modes

Color Pilot is available in both licensed and license-free mode.

- In licensed mode, all of the Color Pilot functionality is available.
- In license-free mode, you can only create custom overprint charts and measure printed charts (see [Working with Overprint Charts](#) on page 345).

### Tip:

If you have several sites, you can for example have a fully licensed Color Pilot at the main site, and a license-free Color Pilot at your auxiliary sites.

When a press at an auxiliary site needs profiling, you can print and measure the profiling charts using the license-free Color Pilot, then export the measurement files and send them to your main site.

Your color expert at the main site can then [create a profile](#) in the fully licensed Color Pilot for that press.

### Knowing Which Mode You are In

You can see whether the application is licensed when opening it. In license-free mode, you will see:

- a warning with the message `No license was found. The application will start up in license free mode with reduced functionality (unless you chose to hide this warning when using Color Pilot previously)`,

**Note:** If you don't want the warning to pop up next time you use the application, you can select **Do not show this warning again** before clicking **Continue** (you can always reactivate it in the [Preferences](#) if desired).

- the text `License: None - Measurement Only` on the splash screen itself (you can also open the splash screen from **Help > About...** at any time).

If you see this but think that you should have a license, please ask your administrator to double-check whether you have a license and whether it is present in your Esko Network or Local License Manager. For more information please consult the [Licensing and Activation](#) documentation.

### Your License and Your Color Database

If you are working in license-free mode, a simpler version of the [color database](#) is installed on your local computer the first time you use Color Pilot. It contains default [overprint charts](#), and any custom overprint chart you create will be saved there.

If you then license your copy of Color Pilot, you will get access to the full color database (containing [inks](#), [profiles](#), [color strategies](#)...). Color Pilot will ask you to choose where to install it the next time you start up (see [Location of the Database](#) on page 66 for an explanation of the different possibilities).

Your custom overprint charts will automatically be transferred to your full color database.

### Different Licenses

Color Pilot can be used to color manage different types of presses (offset, flexo, gravure, digital) and/or proofers. It can be used for CMY, CMYK, CMYK + spot colors, and/or [expanded gamut printing](#) (Equinox).

Depending on your workflow and your license, different functionality may be available to you in Color Pilot. Don't hesitate to ask your Esko sales representative about which license would suit your workflow best.

This manual will cover all the functionality available in Color Pilot for the different workflows and licenses.

## 2.9. Good Practices

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Never use two or more Color Engine Pilot/Color Pilot applications simultaneously. This could lead to inconsistencies in your color database, as the Color (Engine) Pilot has been designed as a single point of access to the color database.

- Always work in the same Color (Engine) Pilot.
- If multiple servers (such as two DFE Servers or two Automation Engine servers, or a DFE Server and an Automation Engine server) use the same color database, always use the Color (Engine) Pilot with the highest version number.

## 3. Prerequisites for Effective Color Management

---

Before you can set up color management in your workflow, there are a few preparatory steps you need to take.



**Attention:** Without these steps, you will not be able to achieve color consistency, even when putting lots of effort into color management!

### Make Sure Your Proofing/Printing Devices are Stable

Printing variation has even more impact on your printed result than accurate color management. Make sure that your devices (still) print in a stable way (at different times of the day and on different places of the substrate) before starting to color manage them.

Depending on your workflow, see:

- [Preparing Your Devices for Proofing](#) on page 19,
- [Preparing Your Digital Press](#) on page 20,
- [Preparing Your Conventional Press](#) on page 20,
- [Preparing Your Press for Expanded Gamut Printing](#) on page 21.

### Make Sure You Have the Right Viewing Conditions

The Color Pilot supports the graphic arts industry standard illuminant, D50. When evaluating color, make sure you use a D50 light booth.

### Make Sure You Have a Good Measuring Device

You need to use a spectrophotometer for measuring colors. See the [Using a Spectrophotometer](#) chapter for more information.

## 3.1. Preparing Your Devices for Proofing

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### Make Sure Your Press is Stable

This is very important as you cannot obtain consistent color if your press has wide variations. Make sure that:

- your dot gain is stable and under control (you can use [Curve Pilot](#) for dot gain compensation),
- your press prints reasonably consistently over time (for example, check that you don't have drastic color variations between the first print run in the morning and a print run later in the day),
- your press prints reasonably evenly (for example, you don't have drastic color variations between the left side and the right side of your sheet),
- you keep your printing conditions consistent (ask the press operator to let you know of any changes to the press -for example if he/she is planning to change the substrate or use ink from a different manufacturer- as you will need to update your color management settings to reflect those changes).

### Make Sure Your Proofer is Stable

Specific operation and maintenance guidelines can vary depending on your proofer type and model, but we recommend the following for all proofers:

- Keep the proofer's environment consistent (in terms of moisture, temperature...).
- Regularly do a nozzle check, and check that there are no mechanical problems.
- Make sure you keep using the same inks and the same substrate (if you change those, you will need to update your color management settings to reflect that).

For best color management results, make sure that you also:

- Use one of the [proofer models tested and supported by Esko](#).
- Use the **EPL linearization file** made by Esko for your proofer model.

#### Note:

An EPL linearization file adjusts how your proofer prints to get best results on a certain substrate (it adapts the quantities of inks used so that your proofer can achieve maximum color density without hue shifts).

Esko provides you with a number of EPL files made in controlled conditions for different proofer models and substrate types. We strongly recommend you use the one made for your proofer and substrate combination (before profiling your proofer). This will improve the color accuracy of your proofs. Please see [this knowledge base article](#) to know how to use and evaluate the EPL file(s) made for your proofer series.

- Esko EPL files are installed automatically when you install the Esko Proof Server.
- In some specific cases (for example if you want to use a very low resolution for content proofing), there is no EPL made for your proofer and substrate combination. You can then [make a custom one using Command WorkStation](#) (the client application of the Esko Proof Server).

## 3.2. Preparing Your Digital Press

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The preparation you need to do to make sure your digital press prints in a stable way heavily depends on the type of press you are using.

We recommend you ask your digital press vendor for guidelines for your specific digital press type and model.

## 3.3. Preparing Your Conventional Press

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### Make Sure Your Press is Stable

This is very important as you cannot obtain consistent color if your press has wide variations. Make sure that:

- your dot gain is stable and under control (you can use [Curve Pilot](#) for dot gain compensation),
- your press prints reasonably consistently over time (for example, check that you don't have drastic color variations between the first print run in the morning and a print run later in the day),
- your press prints reasonably evenly (for example, you don't have drastic color variations between the left side and the right side of your sheet),

- you keep your printing conditions consistent (ask the press operator to let you know of any changes to the press –for example if he/she is planning to change the substrate or use ink from a different manufacturer– as you will need to update your color management settings to reflect those changes).

### Choosing your Printing Target

A common method of performing quality control on your press output is by using a **dot gain target** (deciding what dot gain you want your printed output to have, and making the press match it).

This may be required if you are working with a pre-media house or a large brand owner (for example they may need you to print G7 compliant or ISO certified), or you may have your own quality target or follow another standard (for example if you are printing on less usual substrates).

Your dot gain target can be defined by:

- G7 (a specification from *IDEAlliance*'s GRACoL committee, aimed at matching color on printing devices, with an emphasis on gray balance),
- an ISO standard (ISO 12647 is a family of standards applicable to the printing processes, for example *12647-2* covers offset printing),
- another standard applicable to your specific type of printing (for example if you are printing on less usual substrates),
- your own target dot gain curves.

Color Pilot can help you get from the initial dot gain on your press to your desired dot gain target. This is achieved by synchronizing the profile you are making for your press to your desired target.

Synchronizing a profile to a target means applying a compensation on the profile data, so that when printing with this profile, the dot gain on press will match the dot gain specified in the target.

## 3.4. Preparing Your Press for Expanded Gamut Printing

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Before you start profiling your press for Equinox expanded gamut printing, there are some preparatory steps you need to take:

1. Making sure your press is stable.
2. Choosing the inks you will use for printing with Equinox.
3. Defining the calibration curves and tolerances you want to use as your quality target.

You can try and match your press output to either:

- a widely accepted standard (for example, you might want to achieve the dot gain specified by the GRACoL G7 specification, or one of the ISO 12647 standards),
- your custom desired dot gain and Delta E tolerances.

### 3.4.1. Making Sure your Press is Stable

This is very important as press variation can have even more of an impact on your printed results than variation in the press profile.

#### Dot Gain

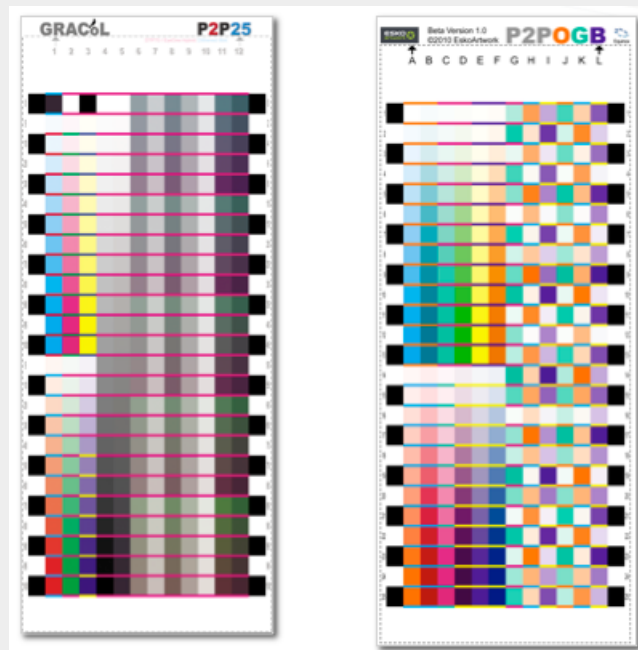
You should make sure your dot gain is stable and under control. Make sure you have some good initial dot gain curves (adapted to your press) set in the RIP when printing your profiling charts.

We recommend you use a PressSync curve set for this (see the [PressSync documentation](#) for more information), so that once you have made the profile, you can update that curve set with the profile data.

### Gray Balance

If you are printing towards G7, make sure your gray balance is good, and adapt your dot gain curves if needed to correct any color cast.

**Tip:** You can use a P2P test chart to measure both dot gain and gray balance. You can also make a custom P2P chart with the expanded gamut inks you want to use (see [Choosing your Inks](#) on page 22).



### 3.4.2. Choosing your Inks

With Equinox, you mix your inks on press rather than in the ink room.

You can use Equinox with 5, 6 or 7 inks, but choosing 7 inks will maximize the gamut expansion for your images.

In the picture below, you can see the original CMYK gamut on the left, and the gamut expansion provided by the 3 added colors on the right.

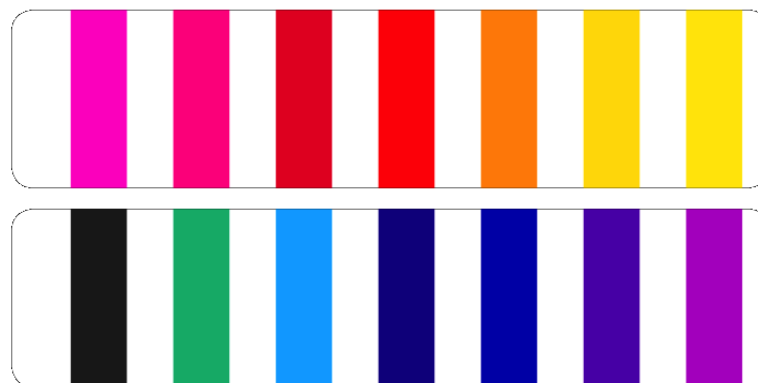


With Equinox, you don't have to use predetermined inks, you can choose the inks that work best for your jobs.

Below are a few guidelines to help you in your decision: they indicate what we found to give the best results in the majority of cases. However, we recommend you test inks on your press, to make the best choice for your individual requirements.

**Inks Choice Guidelines**

We recommend you choose single-pigment inks if possible, to get purer colors. You can for example choose inks from your ink supplier's base colors (as in the example below). Consult your ink supplier for advice.



We also recommend you consider the following factors in your decision:

- The level of gamut expansion you want.
- The type of images you usually print.
- The cost of certain inks.
- The printability of certain inks.
- The compatibility of certain inks with your proofing system.

**Choosing your CMYK Inks**

You can choose any Cyan, Magenta, Yellow and Black inks, but we recommend you keep using the ones you already use, as you have "tried and tested" them for your press.

### Choosing your Orange/Red Ink

You can choose either a red or an orange ink.

#### Choosing a Red Ink



You may want to choose a red ink if you generally print jobs that need more red than orange (for example for fashion work).



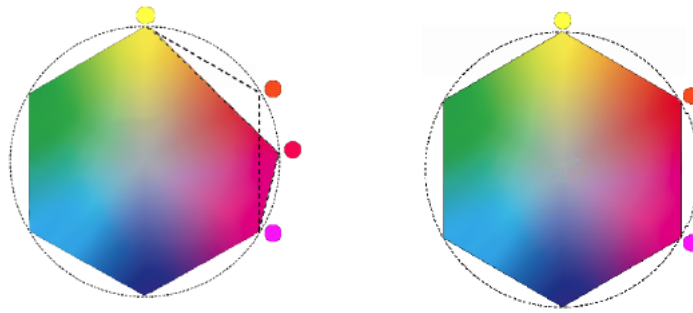
#### Choosing an Orange Ink



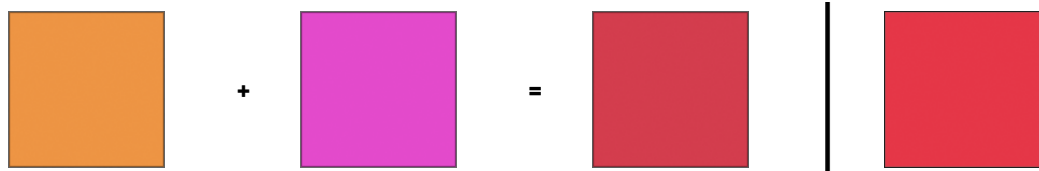
You may want to choose an orange ink for two reasons:

- To get maximum gamut expansion: as you can see below, adding a red ink (on the left) provides less gamut expansion than adding an orange ink (on the right).





- If you print jobs that have bright orange hues: you can reproduce a bright red quite accurately by mixing orange and magenta inks, but you can't reproduce a bright orange with the same accuracy from a red and a yellow ink.

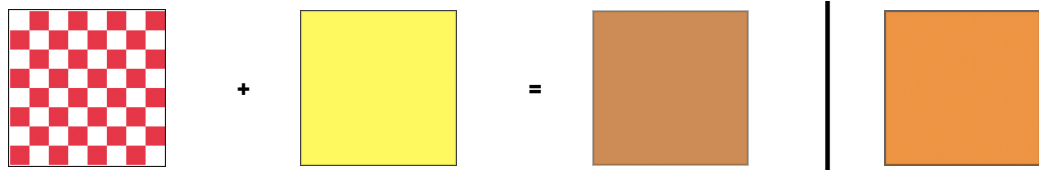


Orange

Magenta

Result

Red



Red

Yellow

Result

Orange

### Choosing your Green Ink

You can choose either a bright green ink (green ink mixed with yellow ink) or a single-pigment green ink (Phthalo Green).

#### Choosing a Bright Green Ink



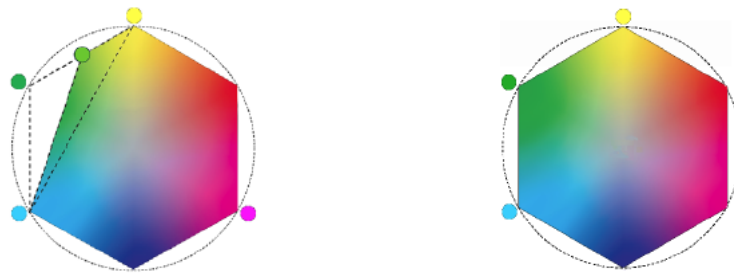
You may want to choose a bright green ink (for example Pantone 354 C) to match a similar ink in your proofing system (for example Kodak Approval).

#### Choosing a Single-Pigment Green Ink

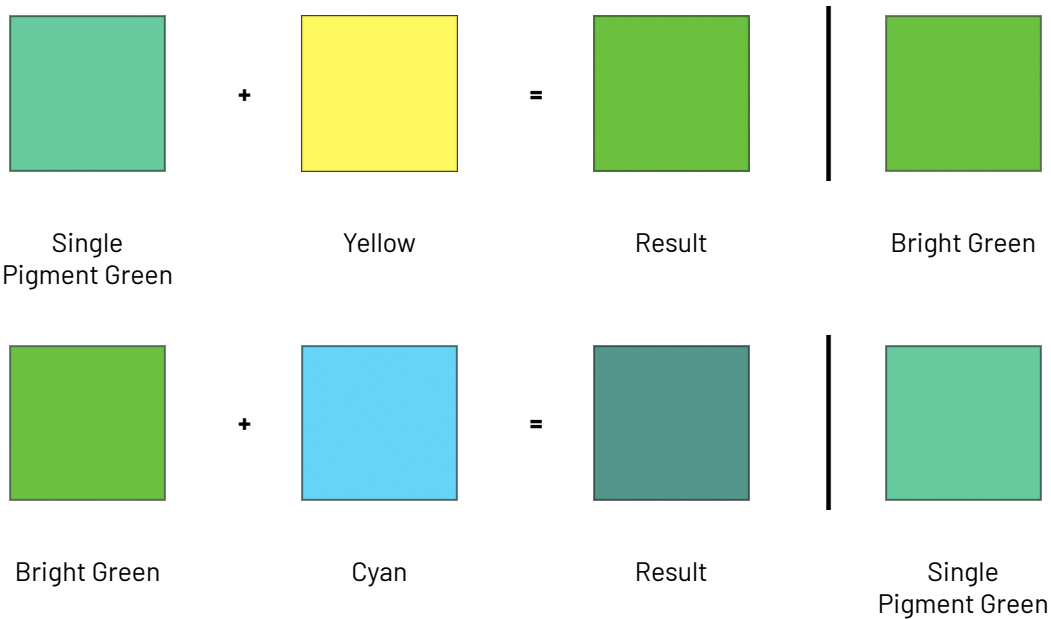


You may want to choose single-pigment green ink (for example Pantone Green C) for two reasons:

- To get maximum gamut expansion: as you can see below, adding a bright green ink (on the left) provides less gamut expansion than adding a single-pigment green ink (on the right).



- If you print jobs that have green hues close to the single-pigment green color: you can reproduce a bright green quite accurately by mixing green and yellow inks, but you can't reproduce a Phthalo Green with the same accuracy from a bright green and a cyan ink.



### Choosing your Blue/Violet Ink

You can choose either a blue or a violet ink.

#### Choosing a Blue Ink



You may want to choose a blue ink (for example Pantone Reflex Blue) for three reasons:

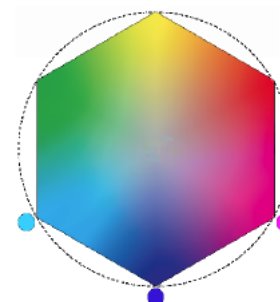
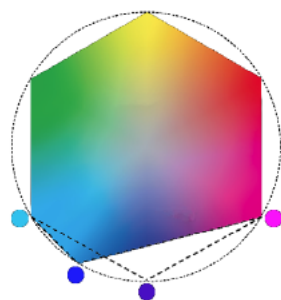
- To match a similar ink in your proofing system (for example Kodak Approval).
- If blue ink is more stable on your press than violet ink.
- Because blue ink may be less expensive than violet ink.

### Choosing a Violet Ink

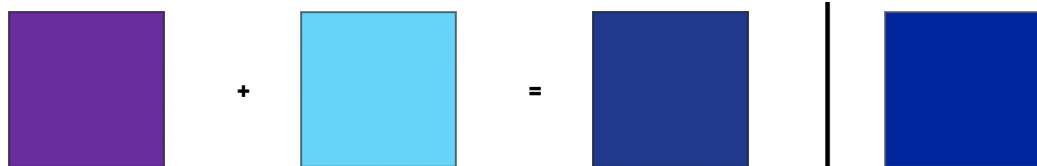


You may want to choose a violet ink (for example Pantone Violet C) for three reasons:

- To get maximum gamut expansion: as you can see below, adding a blue ink (on the left) provides less gamut expansion than adding a violet ink (on the right).



- If violet ink is more stable on your press than blue ink.
- If you print jobs that have lots of violet hues: you can reproduce a blue quite accurately by mixing violet and cyan inks, but you can't reproduce a violet with the same accuracy from a blue and a magenta ink.

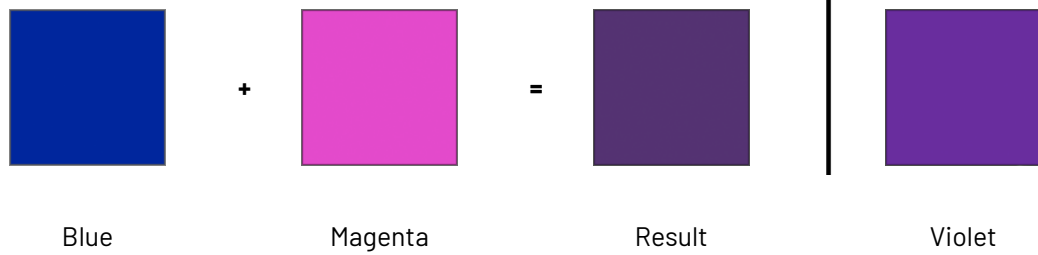


Violet

Cyan

Result

Blue



### 3.4.3. Choosing your Printing Target

A common method of performing quality control on your press output is by using a **dot gain target** (deciding what dot gain you want your printed output to have, and making the press match it).

This may be required if you are working with a pre-media house or a large brand owner (for example they may need you to print G7 compliant or ISO certified), or you may have your own quality target or follow another standard (for example if you are printing on less usual substrates).

Color Pilot can help you get from the initial dot gain on your press to your desired dot gain target. This is achieved by synchronizing the profile you are making for your press to your desired target.

Synchronizing a profile to a target means applying a compensation on the profile data, so that when printing with this profile, the dot gain on press will match the dot gain specified in the target.

#### Printing to G7

Color Pilot provides out-of-the-box support for G7.

G7 is a specification from *IDEAlliance's* GRACoL committee, aimed at matching color on printing devices, with an emphasis on gray balance.

For *expanded gamut printing*, printing to G7 means that:

- your CMYK inks should have the dot gain specified by G7,
- your expanded gamut inks should have linear dot gain (this is measured using the *SCTV* metric).

#### Printing to ISO, another Standard or a Custom Target

You can use a curve set you created in Curve Pilot to define the standard you want to print to. This can be for example:

- an ISO standard (ISO 12647 is a family of standards applicable to the printing processes, for example *12647-2* covers offset printing),
- another standard applicable to your specific type of printing (for example if you are printing on less usual substrates),
- your own target dot gain curves.

A curve set contains a target for each ink of your ink set (among other information).

For more information about curve sets, please see the *Curve Pilot PressSync documentation*.

## 4. Understanding Color Accuracy

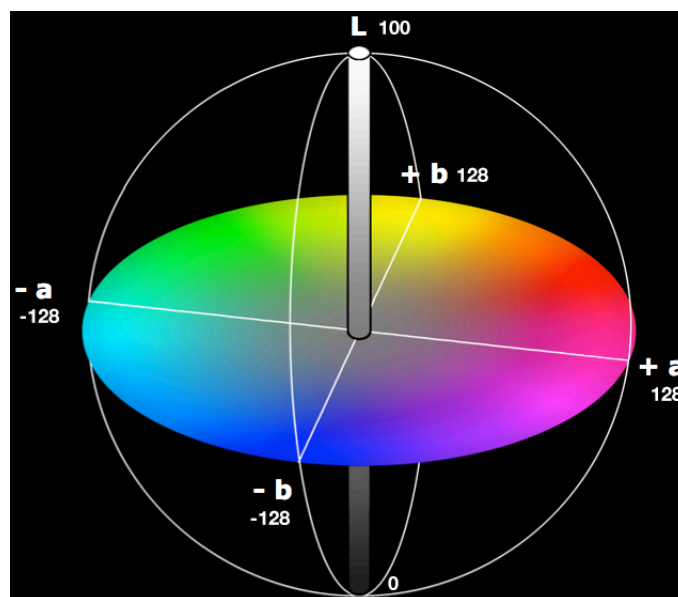
### 4.1. Quantifying Colors

#### The Lab Color Space



Colors are generally defined by their position in the **Lab** color space, which is a 3D color model representing all colors visible to the average human eye (developed by the Commission Internationale de l'Eclairage).


It is based on three axes:

- the **L** axis (going from 0 to 100) defines the lightness of the color (a dark color has a low **L** value, a light color has a high one),
- the **a** axis (going from -128 to 128) defines how green or red a color is (a greenish color has a low **a** value, a reddish color has a high one),
- the **b** axis (going from -128 to 128) defines how blue or yellow a color is (a blueish color has a low **b** value, a yellowish color has a high one).



For example:

Color	Lab values
 light yellow	Lab (100, 0, 60)
 dark green	Lab (15, -128, 0)

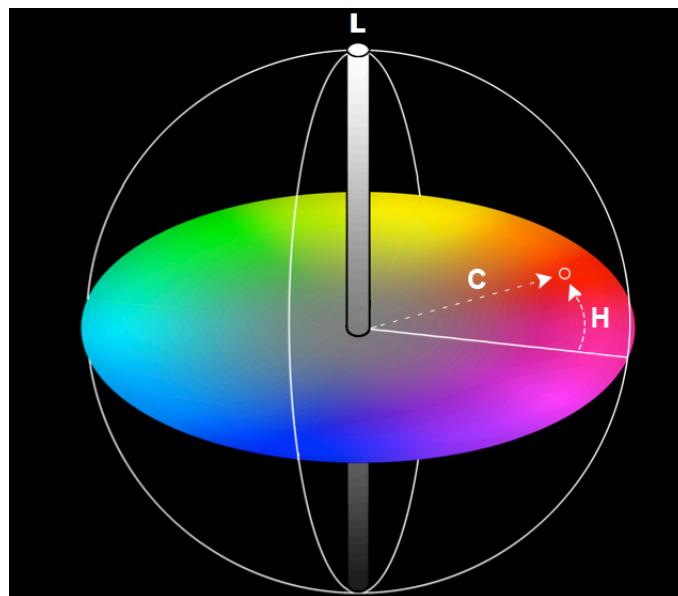
Color	Lab values
 medium gray	Lab (50, 0, 0)

**The LCh Color Space**




Colors can also be defined using the **LCh** color model, that consists of three axes:

- the **L** axis (going from 0 to 100) defines the **lightness** of the color (a dark color has a low **L** value, a light color has a high one),
- the **C** axis (going from 0 to 128) defines the **chroma** of a color, or how saturated/colorful it is (a pastel or grayish color has a low **C** value, a bright saturated color has a high one),
- the **h** axis (going from 0 to 360) defines the **hue** of a color, or what we commonly think of as the actual color (blue, red, yellow...).

Hues are organized based on the **color wheel**, which is a representation of all visible colors, arranged in a circle. Complementary colors such as blue and orange are located directly across from each other, while neutral colors like grays are in the middle.



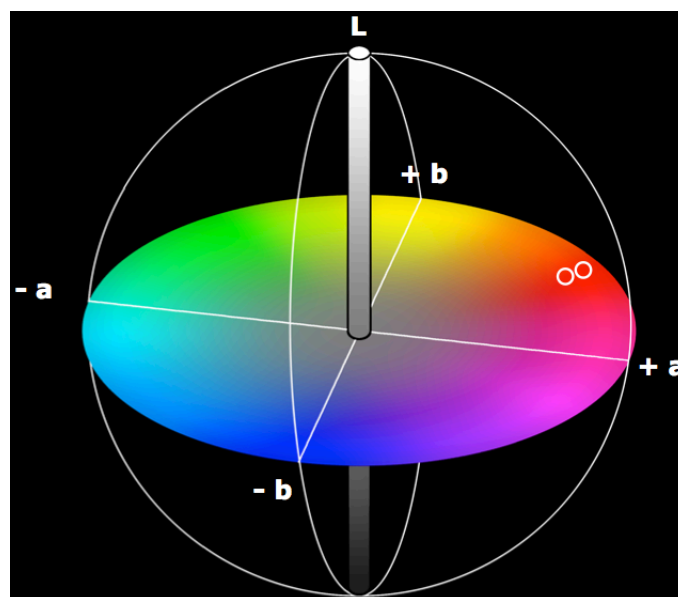
For example:

Color	LCh values
 light green	LCh (100, 40, 170)
 bright red	LCh (50, 128, 20)
 dark grayish purple	LCh (20, 20, 300)

## 4.2. The Difference Between Colors

### 4.2.1. Delta E

The difference between two colors is often calculated in **Delta E** (or  $\Delta E$ ) units: this is the difference between the colors' respective positions on the **L**, **a** and **b** axes.



The more different two colors are, the higher the Delta E number is. Generally a human eye can perceive color differences that are above 2 Delta E.

**Note:**

There are several Delta E formulas, that have been developed at different points in time (**CIE76**, **CMC**, **CIE94** and **CIE2000**).

- If your company is already using one of those formulas, we recommend that you use the same one.
- If not, you should use **CIE2000**, which is the best reflection of the visual difference between colors.
- However, if you are trying to verify a proof according to the ISO 12647-7 proofing standard, you should use the formula specified in the standard, **CIE76**.

### 4.2.2. Other Color Difference Indicators

Apart from *Delta E*, there are other color difference indicators you can use to assess the color accuracy of a proof.

- **Delta H** is the difference in hue between two colors (in the *LCh color space*).

The generally accepted Delta H tolerances are a maximum of 1.5 for gray areas, and of 2.5 for primary colors.

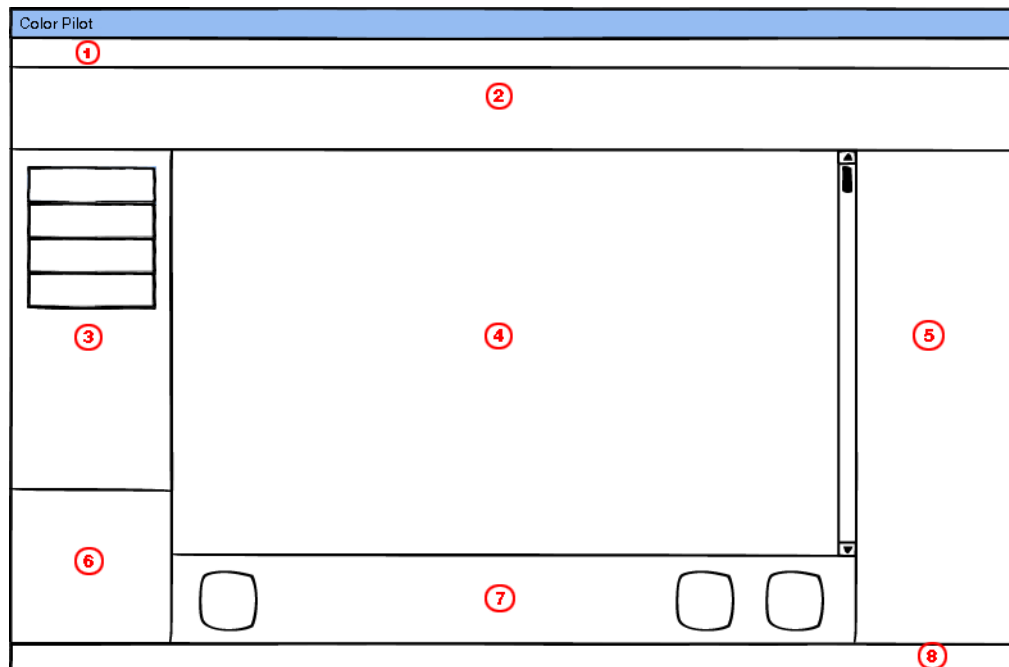
- **Delta Ch** is the difference in chroma/saturation between two colors (in the LCh color space).
- **Delta T** is the colorimetric dot gain for primary colors (defined by the ISO 12647 norm).

The generally accepted Delta T tolerance is a -5% to +5% tone value difference.



## 5. The Color Pilot User Interface

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1. **Menus:** most of the functions available here are also available elsewhere in the application. The functions specific to the menus are:
  - **File > Export Library...**, where you can export all your *Library objects* for the application,
  - **Edit > Preferences...**, where you perform *general configuration* for the application,
  - **Window > New Window...** that opens an additional **Color Pilot** window,
  - **Window > Log Window** (if you have *enabled logging* for troubleshooting purposes),
  - **Keywords > Edit Keywords...** where you can *manage your keywords*,
  - **Help > Contents...** which opens the online help (this manual) in your browser,
  - **Help > About...** which shows the version and build of the application.
2. **Top tool bar:** this contains the *View buttons*, the *Search field*, and a button to show or hide the *Picker* (when applicable).
3. **Navigation pane:** this offers you different views to help you work with Color Pilot functionality.
4. **Main pane:** this shows what you selected in the navigation pane. For example if you selected **Ink Books** in the navigation pane, you will see all your ink books in the main pane.
5. **Picker:** this pane is visible if you clicked the **Show Picker** button. With the Picker you can drag and drop an item from a different location in Color Pilot into the main pane.  
See *Picker* on page 39 for more information.
6. **Selected Item area:** this shows more information about the item you selected in the main pane.

For example if you selected an ink, it will show its name, its type...

7. Bottom tool bar: this contains tools relevant to the library item you are working on.

For example if you are working on ink books, the tool bar will contain the **New Ink Book, Compare Inks, Print Ink Book...** tools.



8. Connection details: this shows:

- Status of the connection to Esko Cloud. A tooltip also shows who you're logged in as (user/equipment + name). There are 3 possible statuses:
  - Connected to Esko Cloud (green LED indicator): The user is successfully connected to Esko Cloud, all cloud functionality is available.
  - Using Esko Cloud in offline mode (orange): The user has specified to connect to Esko Cloud, but for some reason the connection was not successful. Downloaded books are still available for a limited period.
  - Not connected to Esko Cloud (grey): The user has specified to connect to the cloud but the connection failed (and has for more than one month) or the connection succeeded but the credentials are invalid.
- Status of the connection to the **Database**, which can be:
  - a **Local** database,
  - a database located on a **Remote** computer,
  - a database whose location is defined on the **Server** you are connected to,
  - an **Embedded** mini database (when using the application in *license-free mode*).

See [Location of the Database](#) on page 66 for more details about the possible database locations.

If you are using a **Remote** database, or the database from your **Server**, the name of the remote computer or server is indicated.

Hover on the database location to see the path to both the **Color** and **Curves** databases.

- whether a spectrophotometer is connected  or not , and which spectrophotometer it is. If you are working with the *dummy spectro*, this will also show **(Dummy Mode)**.

You can right-click the spectrophotometer status button to [Reconnect](#) or [Calibrate](#) the spectrophotometer, or change its [Measurement Condition](#).


## 5.1. Views


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Use the **View** buttons in the top tool bar to display the items in the main panel in different ways.


- Use the list view  to show the items in a list.

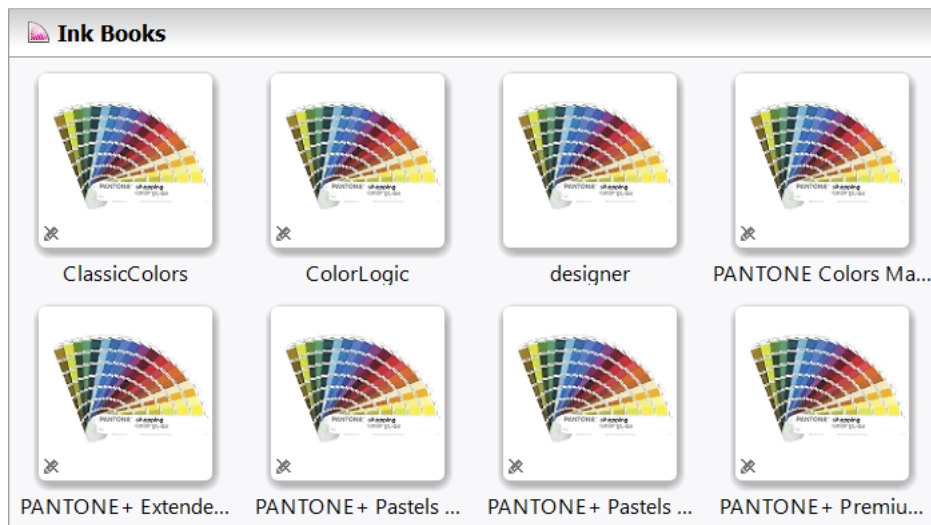
Ink Book Name	Kind	Keywords
ClassicColors	✗ Esko Ink Book	
ColorLogic	✗ Esko Ink Book	
designer	Esko Ink Book	
PANTONE Colors Matte	✗ Esko Ink Book	
PANTONE GoeGuide Coated	✗ Esko Ink Book	
PANTONE GoeGuide Uncoated	✗ Esko Ink Book	
PANTONE+ Extended Gamut Coated	✗ Esko Ink Book	
PANTONE+ Pastels & Neons Coated	✗ Esko Ink Book	
PANTONE+ Pastels & Neons Uncoated	✗ Esko Ink Book	
PANTONE+ Premium Metallics Coated	✗ Esko Ink Book	
PANTONE+ Solid Coated	✗ Esko Ink Book	
PANTONE+ Solid Uncoated	✗ Esko Ink Book	
process	✗ Esko Ink Book	
TOYO Color Finder	✗ Esko Ink Book	
toyo94	✗ Esko Ink Book	
Visualizer Standard Finishes	✗ Esko Ink Book	

- Use the grouped list view  to show the items in a grouped list (showing the items and their contents, or items grouped by kind).

Ink Book Name	Ink Name	Defined by	Keywords
<b>▼ PANTONE Colors Matte</b> 	<span style="background-color: yellow;">■</span> PANTONE Yellow M <span style="background-color: yellow;">■</span> PANTONE Yellow 012 M <span style="background-color: orange;">■</span> PANTONE Orange 021 M <span style="background-color: orange;">■</span> PANTONE Warm Red M <span style="background-color: red;">■</span> PANTONE Red 032 M <span style="background-color: red;">■</span> PANTONE Rubine Red M <span style="background-color: magenta;">■</span> PANTONE Rhodamine Red M <span style="background-color: purple;">■</span> PANTONE Purple M <span style="background-color: purple;">■</span> PANTONE Violet M <span style="background-color: blue;">■</span> PANTONE Blue 072 M <span style="background-color: blue;">■</span> PANTONE Reflex Blue M <span style="background-color: cyan;">■</span> PANTONE Process Blue M <span style="background-color: green;">■</span> PANTONE Green M <span style="background-color: black;">■</span> PANTONE Black M <span style="background-color: yellow;">■</span> PANTONE Process Yellow M <span style="background-color: magenta;">■</span> PANTONE Process Magenta M <span style="background-color: cyan;">■</span> PANTONE Process Cyan M <span style="background-color: black;">■</span> PANTONE Process Black M <span style="background-color: yellow;">■</span> PANTONE Hexachrome Yellow M <span style="background-color: orange;">■</span> PANTONE Hexachrome Orange M	✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate ✗ Measured Solid and Substrate	

**Note:** This view is only available for items containing other items. For example you can see ink books (and the inks they contain) in grouped list view, but you can't use the grouped list view when working at the ink level.

- Use the icons view  to show the items as icons on a grid.



**Tip:** Use the slider  to change the icons' size.

## 5.2. Search

You can use the **Search** field in the top tool bar to easily find what you are looking for in the main pane.

You can search on the item's properties (**Name, Kind, Ink Set...**), or on [keywords](#).

In some libraries, you can filter the search on a specific property by clicking the arrow  next to the **Search** field and selecting that property.

For example, in the **Profiles** library, you can click the search arrow, click **Ink Set is** then select an ink set to only show profiles with that ink set.

This filter is remembered: it will disappear if you go to a different library but will be applied again when you go back to the **Profiles** library.

To remove the filter, click  under the **Search** field.

## 5.3. Keywords

You can assign keywords to any item in your Color Pilot database (profile, ink, color strategy...).

You can use these keywords to group items logically, and to easily find them again using the [Search](#).



### 5.3.1. Adding Keywords

To add a keyword to one or more item(s), you can:

- Use the menu:
  - a) Select the item(s) in the main pane.

- b) Choose **Keywords > Add Keywords....**
- c) In the **Add keywords** dialog, enter your keyword or choose an existing keyword in the list.

**Tip:** To enter several keywords, use a comma , to separate them.

- d) Click **OK**.
- Use a right-click:
  - a) Right-click the item(s) and select **Add Keywords....**
  - b) Enter your keyword(s) in the **Add keywords** dialog.
- Click twice in the **Keywords** column next to the item and enter your keyword (only in list  or grouped list  view).
- Add keywords to profiles and color strategies when creating them.

You can now see your keyword in the **Keywords** column in the main pane (in list view and grouped list view) and in the **Selected Item** area.

### 5.3.2. Removing Keywords

To remove a keyword attached to an item:

1. Select the item in the main pane.
2. Choose **Keywords > Remove Keywords....**  
You can also right-click the item and select **Remove Keywords....**
3. In the **Remove Keywords** dialog, enter the keyword to remove or select it in the list.  
Click **OK**.

The keyword is not attached to the item anymore, but is not deleted from the database (other items that have this keyword attached still keep it).

To completely delete a keyword, see [Managing Keywords](#).

### 5.3.3. Managing Keywords

You can also define keywords without linking them to a database item, or delete existing keywords from the database.

1. Choose **Keywords > Edit Keywords....**
2. In the **Edit Keywords** dialog, you can add, delete or rename keywords.

To...	do the following...
<b>add a new keyword</b>	<ol style="list-style-type: none"> <li>1. click +,</li> <li>2. enter the keyword name,</li> <li>3. click <b>OK</b>.</li> </ol>
<b>delete a keyword</b>	<ol style="list-style-type: none"> <li>1. select the keyword in the dialog,</li> <li>2. click -,</li> </ol>

To...	do the following...
	<ol style="list-style-type: none"> <li>3. if the keyword is assigned to any item, you will need to confirm your choice.</li> </ol>
<b>rename a keyword</b>	<ol style="list-style-type: none"> <li>1. select the keyword in the dialog,</li> <li>2. click <b>Rename</b>,</li> <li>3. if the keyword is assigned to any item, you will need to confirm your choice,</li> <li>4. enter the keyword's new name,</li> <li>5. click <b>OK</b>.</li> </ol>

3. Click **Done** to close the dialog.

## 5.4. Navigation Pane

The navigation pane offers you different views to help you work with Color Pilot functionality.

Click one of the settings categories in the navigation pane to show the related items in the main pane.

### Color

The **Color** library shows the different types of color management settings in your color database (depending on your [license and setup](#), you may see some or all of the following):

- [Ink Books](#)
- [Profiles](#)
- [Color Strategies](#)
- [Overprint Charts](#)
- [Ink Limitation Sets](#)

### Screens and Curves

From the **Screens and Curves** library, you can access:

- Screens
- Curves
- Printing Conditions

These are used when making printing conditions. See the [Print Control Wizard documentation](#) to learn more.

### Devices

Under **Devices** you can see:

- the [Proofers](#) set up in the Proof Server your Color Pilot is connected to (see the [Proof Server Preferences](#) for connection details),
- the [Digital Presses](#) connected to the Digital Front End server your Color Pilot is working with (see the [Esko Server Preferences](#) to connect to your DFE Server).

**Tip:** You can export all your color management settings (including digital press configurations) in one go from the **File > Export Library...** menu. See [Exporting the Library](#) on page 39.

### Enterprise Servers

This section is visible when you are connected to one or more of these:

- the PantoneLIVE® cloud database. It gives you access to all your PantoneLIVE ink books.  
See [PantoneLIVE](#) on page 61 for more information.
- An Esko Cloud enterprise server (when configured in the preferences).  
See [Esko Cloud](#) on page 58 for more information.

## 5.4.1. Exporting the Library

To export all your color management settings (including digital press configurations) in one go, use **File > Export Library...**

**Note:** This does not export Esko Cloud ink books.

1. In the **Export Library** dialog that opens, choose how you want to export your color management settings:
  - a) **Browse...** to your desired location.
  - b) Choose whether to **Export as one single archive** or not.
    - If you are exporting to a single archive, enter the **File Name** to use (or use the default `Archive.fp`).
    - If you are exporting the color management settings individually, they will be exported under their own name by default. You can rename them by double-clicking in the **Export As** column.  
You can also **Remove** color management settings from the list before exporting.
  - c) Choose whether to **Include screens, curves and printing conditions** or not.

**Note:**

- If you have no screens, curves and printing conditions in your database, or you have no license for working with any of these types of resources, this setting is not shown.
- Even if the setting is off, any curves that are referenced by color strategies will still be exported.

2. Click **Export** when you are done.  
Your color management settings are exported in the File Packer (.fp) format.

## 5.5. Picker

Click the **Show Picker** button  to show or hide the **Picker**.

The Picker is a selection tool: you select an item in the Picker then drag and drop it into the main pane or on a relevant tool (for example the [Compare Inks tool](#)). This way, you can work with items from different locations in Color Pilot together.

For example, you can use the Picker to:

- copy an ink into another ink book in the main pane,
- drag an ink to compare into the **Compare Inks** dialog,
- add a dot gain curve to an ink in the **Color Strategy** editor.

**Note:**

The Picker only shows items types relevant to what you are working on in the main pane (for example inks if you are in the **Ink Books** library, color strategies and inks if you are working with the **Check Gamut** tool...).

If there are no relevant item types, the Picker is not available (if it was open when switching to a location where no relevant types are available, it will be closed automatically).



## 6. General Configuration

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You can specify a number of preferences in Color Pilot so that these settings are kept between the different Color Pilot sessions.

This is where you connect to your Automation Engine server or the server driving your digital press, specify the location of your color database, choose your preferred spectrophotometer, etc.

Choose **Edit > Preferences**.

**Note:**

The preferences you can set depend on:

- your license (only some of the options are available in [licence-free mode](#)),
- the devices you are connected to – proofer(s) and/or digital press(es).

### 6.1. General

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The **General** tab opens automatically when you open the **Preferences** window. In this tab, you can set preferences that will be used throughout the application so that it is tailored to your way of working.

You can find a topic list on the left and clicking a topic will display settings on the right.

#### 6.1.1. Default Formulas

Click **Default Formulas** and choose:

1. The default  **$\Delta E$  Formula** to use when calculating the accuracy of color matches (the lower the Delta E, the closer the two colors are to each other).

See [Delta E](#) on page 31 for more information about Delta E.

This default formula is used in color strategies, and tools like Compare Inks, Check Gamut... You can use one of the following formulas:

**CIELAB Delta E (Classic),**

**Delta E 94,**

**Delta E 2000,**

**CMC (1:1),**

**CMC (2:1),**

**Delta E 2000 (2:1:1).**

**Note:** If your company is already using one of those formulas, we recommend that you choose the same one. If not, you should choose Delta E 2000, which is the best reflection of the visual difference between colors.

2. The default **Tone Metric** to use when measuring the tone value of tints, **for CMYK** and **for Expanded Gamut and Spot Inks**.

- If you are using a densitometer (and working with dot gain), you can use the following density formulas:

**ANSI A**  
**ANSI T**  
**DIN**  
**DIN B**  
**ISO Status A**  
**ISO Status M**  
**ISO Status T**  
**ISO Status E**  
**ISO Status I**

**Note:**

- Density formulas are typically used to measure the tone of CMYK inks.
- ISO Status A, M, T, E and I are the density formulas defined in the ISO 5-3:2009 standard.

- If you are using a spectrophotometer to measure tone, you can use the following formulas:
  - **% SCTV** (Spot Color Tone Value): use this to calculate the tone of color tints using [Lab values](#) (based on the spectral data you measure) instead of density values.

This formula is defined in the ISO 20654 standard, and is increasingly used to measure expanded gamut and spot inks (especially for assessing intermediate tones of these inks).

This is because these inks cannot be as accurately measured as process inks by a densitometer, as densitometers only have filters for Cyan, Magenta and Yellow.

However, you can also use Spot Color Tone Value to measure process colors, as it gives reliable results on all inks, substrates and print processes.

- **% ΔE-P**: use this to calculate the tone of color tints by measuring the color difference between a tint patch and your paper.

This is often used to measure the tone value of expanded gamut and spot inks.

Like [Delta E](#), the Delta E-P formula is based on the [Lab color space](#).

## 6.1.2. Profiles

Click **Profiles** and choose a **Monitor Profile** amongst the monitor profiles in the Color Pilot database.

Choosing a profile which is appropriate for your monitor will increase the accuracy of the colors displayed. However, you should never judge color accuracy on a monitor as this will not reflect your final output.

### 6.1.3. Test Charts

Click **Test Charts** and define how you want the test charts' text to appear:

1. Choose the **Font** to use (from all the fonts available on your computer),
2. Choose the **Units** to use for setting the font size (**Decimal** or **Imperial**).

### 6.1.4. Check and Recalibrate

Click **Check and Recalibrate** to set preferences for when you are *checking and recalibrating a proofer profile*.

1. If you are planning to use an inline spectrophotometer (such as ILS20 or ILS30) to check and recalibrate your proofer, set a **Maximum amount of inline cycles**.

After performing this number of cycles, the wizard will stop the recalibration and use the best results from all cycles.

This is to avoid that the inline recalibration wizard proofs and measures charts for hours if for example you have a problem with inks which makes it impossible for the recalibration to succeed.

See *Automatic Check and Recalibrate (Using Inline Measurement)* on page 409 to know how to perform an inline check and recalibration.

2. Set the **expiration interval** for your recalibrations.

After this period, the last new profile or successful check or recalibration on a proofer is considered outdated.

For more information on the effects of setting this interval, see *Your Proofing Device(s)* and *Creating a Profile for Your Proofer*.

3. Set the Delta E tolerances to use when checking and recalibrating your profiles (either inline or offline):

- **Average Delta E**

**Note:** A human eye can generally perceive color differences above 2 Delta E. It is extremely difficult to reproduce colors with an average Delta E below 0.5.

- **Maximum Delta E**
- **Substrate Delta E**
- **Primaries Delta H**
- **Grey Delta E**

See *Delta E* and *Delta H* for more information about the tolerance units.

4. Select the **Delta E Formula** to use for calculating these Delta E values (this can be different from your *general Delta E formula*).

### 6.1.5. Relinearization

When *checking and recalibrating a proofer profile*, you can perform a **Relinearization** as an optional first step (see *Relinearization* on page 406 for more information).

1. Choose whether you want to:
  - **Always perform relinearization,**
  - **Never perform relinearization,**
  - be asked whether to perform the relinearization step every time (**Ask me every time I start the check and recalibrate procedure**).
2. Under **Relinearization Tolerances**, set the tolerances that determine whether your relinearization passes or fails (see *Relinearization Results*).
  - In **Overall hue shift**, set how much the measured ink or substrate hue may differ from the corresponding ink or substrate hue in the profile before giving an error (and making the relinearization fail). This is measured in *Delta H*.
  - In **Solid lightness / chroma**, set how much the measured solid density may differ from the solid density in the profile before giving an error (and making the relinearization fail). This is measured in *Delta E*.

### 6.1.6. Check Strategy (Proofing)

Click **Check Strategy** to set color tolerances for checking how well your color strategy reproduces your press' colors on your proofer (using the *Check Strategy* tool).

1. Select what kind of tolerances you want to use.  
By default, this is set to **ISO 12647-7:2016 Contract Proof**, but you can also choose **ISO 12647-7:2007 Contract Proof**, or define **Custom** tolerances.
2. If you have chosen to define **Custom** tolerances, you can set tolerances for the following:

This tolerance...	applies to...	and is set in...
<b>Substrate</b>	the color difference for the substrate patch (the white point of your input profile, consisting of 0% of all input inks)	<i>Delta E</i>
<b>Control Strip Average</b>	the average color difference for the patches in your control strip	Delta E
<b>Control Strip Maximum</b>	the maximum color difference for the patches in your control strip	Delta E

This tolerance...	applies to...	and is set in...
<b>CMY Neutral Average</b>	the average color difference for the gray patches	<i>Delta Ch</i>
<b>CMY Neutral Maximum</b>	the maximum color difference for the gray patches	Delta Ch
<b>CMY Neutral Average</b>	the average color difference for the gray patches	<i>Delta H</i>
<b>Average CMYK</b>	the average color difference for the CMYK patches	Delta E
<b>Average CMYK and Extended Gamut</b>	the average color difference for the CMYK and extended gamut inks patches (only when using a multicolor input profile)	Delta E
<b>Average Outer Gamut</b>	the average color difference for patches at the edge of the gamut (this is a fixed set of patches defined in the ISO standard)	Delta E
<b>Maximum</b>	the maximum color difference	Delta E
<b>Maximum Best 95% of CMYK</b>	the maximum color difference of the best 95 % of the patches (everything except the worst 5%)	Delta E
<b>Primary Solids</b>	the color difference for the 100% CMYK patches	Delta E
<b>Primary Solids</b>	the color difference for the 100% CMYK patches	Delta H
<b>Primaries Maximum Tone Value Difference</b>	the maximum tone value difference per CMYK ink (taking into account all ink tints)	<i>Delta T</i>

**Note:** You can also enable/disable individual tolerances as desired.

3. Select the **Delta E Formula** to use for calculating the Delta E values (you can choose a Delta E formula or use the one *from the color strategy* you are checking).

### 6.1.7. Check strategy (Digital Printing)

Click **Check Strategy** to set color tolerances for checking how well your color strategy reproduces the desired colors on your digital press (using the *Check Strategy* tool).

1. You can set tolerances for the following:

This tolerance...	applies to...	and is set in...
<b>Substrate</b>	the color difference for the substrate patch (the white point of your input profile, consisting of 0% of all input inks)	<i>Delta E</i>
<b>CMY Neutral Average</b>	the average color difference for the gray patches	<i>Delta Ch</i>
<b>CMY Neutral Maximum</b>	the maximum color difference for the gray patches	Delta Ch
<b>CMY Neutral Average</b>	the average color difference for the gray patches	<i>Delta H</i>
<b>Average CMYK</b>	the average color difference for the CMYK patches	Delta E
<b>Average CMYK and Extended Gamut</b>	the average color difference for the CMYK and extended gamut inks patches (only when using a multicolor input profile)	Delta E
<b>Average Outer Gamut</b>	the average color difference for patches at the edge of the gamut (this is a fixed set of patches defined in the ISO standard)	Delta E
<b>Maximum</b>	the maximum color difference	Delta E
<b>Maximum Best 95% of CMYK</b>	the maximum color difference of the best 95 % of the patches (everything except the worst 5%)	Delta E
<b>Primary Solids</b>	the color difference for the 100% CMYK patches	Delta E
<b>Primary Solids</b>	the color difference for the 100% CMYK patches	Delta H
<b>Primaries Maximum Tone Value Difference</b>	the maximum tone value difference per CMYK ink (taking into account all ink tints)	<i>Delta T</i>

Not all tolerances are relevant for all types of patches. For **Stability Patches**, the following tolerances are not available:

- **Average Outer Gamut**
- **CMY Neutral Average**
- **CMY Neutral Maximum**

**Note:** You can also enable/disable individual tolerances as desired.

2. Select the **Delta E Formula** to use for calculating the Delta E values (you can choose a Delta E formula or use the one from the color strategy you are checking).

## 6.1.8. Ink Books

Click **Ink Books** and choose:

1. The ink book you want to look into when encountering unregistered inks in a PDF file (inks from ink books that don't exist in the color database, or with a blank ink book name).

The Color Pilot will first look for the unregistered ink in the **process** and **ClassicColors** ink books, then (if it doesn't find it) in the ink book you select here, then in the other ink books in your color database.

If it still cannot find a matching ink, it will use the color information in the PDF to create a temporary ink for color management purposes.

2. The *measurement condition* you want to use for PANTONE ink books.

This uses the color values measured under that measurement condition by PANTONE for the following PANTONE ink books:

- PANTONE+ Solid Coated
- PANTONE+ Solid Uncoated
- PANTONE+ Pastels & Neons Coated
- PANTONE+ Pastels & Neons Uncoated
- PANTONE+ Extended Gamut Coated

The default measurement condition is M2, but we recommend that you choose the same measurement condition that you use elsewhere in your color workflow (for example when measuring *profiles* and *custom spot colors*), for better color consistency. For example, use M1 everywhere if you want to work with the FOGRA51 standard.

**Note:**

- The measurement condition you choose here will be applied to all ink books listed above. You cannot use several measurement conditions at the same time.  
For consistent results, it is important that you use the same measurement condition for all your color management!
- After changing the measurement condition used for your PANTONE ink books, you need to restart your Color Pilot and all other applications using your color database.

When looking at an [ink's details](#), you will see the Lab/LCH values and spectral values measured using your chosen measurement condition.

## 6.1.9. Color Strategies

Click **Color Strategies** and select the default options to use when creating color strategies (you can always change these options for individual color strategies if needed).

### Proofing

Fill in default settings to use when creating **Proofing** color strategies.

1. Select the **Press Profile** to use as input.

By default, this is `ISOcoated_v2_eci.icc` but you can choose:

- **<Last Used Profile>** (when you [create a proofing strategy](#), the **Press Profile** you choose will be saved to the Preferences),
- **<Same as Output Profile>**,
- or click **Select...** and choose another profile.

2. Select the **Proofer Profile** to use as output.

By default, this is set to **<None>**, but you can choose:

- **<Last Used Profile>**
- or click **Select...** and choose another profile.

**Note:** If you select default profiles here, the application will also suggest a default name when creating a color strategy (using the `<Press_Profile_Name_To_Proofer_Profile_Name>` format).

3. Choose the **Rendering Intent** to use for color conversion.

You can choose between:

- **Absolute Colorimetric**
- **Relative Colorimetric**
- **Perceptual**
- **Saturation**

See [Rendering Intent](#) on page 225 for more information.

**Note:** You can only choose a **Perceptual** or **Saturation** rendering intent if you are working with an [ICC Proofer Profile](#).

4. Under **Tolerances for spot colors**, define your color difference tolerance in [Delta E](#).

This is the color difference under which you consider colors to be **on Target** (meaning that they can be reproduced accurately).



**Tip:**

- The default tolerance is 1.5  $\Delta E$ . Generally a human eye can perceive color differences that are above 2  $\Delta E$ .
- If for example you know that you cannot get your proof's colors under a certain  $\Delta E$  number due to some instability of your proofer or spectrophotometer, you should use that number here.

When a color conversion's result exceeds your tolerance, Color Pilot will indicate it (typically with a warning 🚩 icon). The tolerance is used when:

- evaluating *exceptions*' color values against the original spot colors in your *proofing color strategies*,
- *refining* those exception values or *tweaking them manually*,
- *checking* if spot colors converted by a color strategy fall within the *gamut* of the strategy's output profile,
- *checking* how well your color strategy reproduces your press' colors on your proofer,
- *exporting an ink book to PDF* using your color strategy.

**5.** Choose how to display **predicted  $\Delta E$  values** that are under your tolerance.

By default, Color Pilot displays any predicted Delta E value that falls under your tolerance as *Less than* the tolerance. This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail by deselecting **Hide predicted  $\Delta E$  values below the 'On Target' tolerance**.

## Digital Printing

Fill in default settings to use when creating **Digital Printing** color strategies.

**1.** Select an **Input Profile**.

By default, this is set to **<Last Used Profile>** (when you *create a digital printing strategy*, the **Input Profile** you choose will be saved to the Preferences), but you can choose:

- **<Same as Output Profile>** (to get a "linear" color strategy, that you can use in many cases),
- or click **Select...** and choose another profile.

**Note:**

If you are working with files that were prepared for a different printing process, you should use a profile representing that printing process as input profile.

For example, if your files were prepared for offset, you can select `ISOcoated_V2_eci.icc` as input profile, to help you simulate a typical offset press on your digital press.

**2.** Select an **Output Profile**.

By default, this is set to **<Last Used Profile>** (when you create a digital printing strategy, the **Output Profile** you choose will be saved to the Preferences), but you can choose:

- **<None>**
- or click **Select...** and choose another profile.

**Note:** If you select default profiles here, the application will also suggest a default name when creating a color strategy (using the `<Input_Profile_Name_To_Output_Profile_Name>` format).

**3. Choose what to use as **Black Generation for Process Inks.****

Black generation determines the level of Black versus CMY used when converting colors through your color strategy.

**Note:** This is only available if you have upgraded from an older Color Engine Pilot application and your color database contained black generation presets.

You can choose either:

- one of your old presets,
- **Default (Single Color Black),**

**Single Color Black** preserves both the black separation and the color accuracy.

- It maps the black channel of the source profile onto the black channel of the destination profile, so black objects stay only black.
- In the rest of the color space, it converts the colors as needed to preserve the color accuracy. This provides a better conversion of CMY+K overprints.

- **Default (No Black Mapping).**

**No Black Mapping** uses the same amount of black in the target as in the source profile, wherever possible.

This keeps the general level of black, but black objects may contain some CMY after conversion (and vice-versa), to preserve the accuracy of the final colors.

**Note:**

- What you select in **Black Generation for Process Inks** is only used in non-linear color strategies (that have a different input and output profile).
- If you are working with an ICC destination profile, your color strategy will always use that profile's B2A tag for color conversion (so you will not be able to choose a black generation mode).

**4. Choose what to use as **Black Generation for Spot Colors.****

You can choose either **Maximal Black** (the default) or **Minimal Black**.

See [Black Generation](#) on page 263 for more information.

**5. Under **Tolerances for spot colors**, define your color difference tolerance in [Delta E](#).**

This is the color difference under which you consider colors to be **on Target** (meaning that they can be reproduced accurately).

**Tip:**

- The default tolerance is 1.5  $\Delta E$ . Generally a human eye can perceive color differences that are above 2  $\Delta E$ .
- If for example you know that you cannot get your colors under a certain  $\Delta E$  number due to some instability of your digital press or spectrophotometer, you should use that number here.

When a color conversion's result exceeds your tolerance, Color Pilot will indicate it (typically with a warning 🚩 icon). The tolerance is used when:

- evaluating *exceptions*' color values against the original spot colors in your *digital printing color strategies*,
- *refining* those exception values or *tweaking them manually*,
- *checking* if spot colors converted by a color strategy fall within the *gamut* of the strategy's output profile,
- *exporting an ink book to PDF* using your color strategy,
- *printing an ink book* using your color strategy.

**6.** Choose how to display **predicted  $\Delta E$  values** that are under your tolerance.

By default, Color Pilot displays any predicted Delta E value that falls under your tolerance as *Less than* the tolerance. This is because very low theoretical Delta E values may not be achievable in a real life setup (due to digital press instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail by deselecting **Hide predicted  $\Delta E$  values below the 'On Target' tolerance**.

## Equinox

Fill in default settings to use when creating **Equinox** color strategies.

**1.** Select an **Input Profile**.

By default, this is set to **<Same as Output Profile>** (to get a "linear" color strategy, that you can use in many cases), but you can choose:

- **<Last Used Profile>** (when you *create an Equinox strategy*, the **Input Profile** you choose will be saved to the Preferences),
- or click **Select...** and choose another profile.

**Note:** If you are working with files that were prepared for a different printing process/a different ink set, you should use a profile reflecting this as input profile.

**2.** Select an **Output Profile**.

By default, this is set to **Esko\_Sample\_Equinox** but you can choose:

- **<Last Used Profile>** (when you create an Equinox strategy, the **Output Profile** you choose will be saved to the Preferences),
- **<None>**,

- or click **Select...** and choose another profile.

**Note:** If you select default profiles here, the application will also suggest a default name when creating a color strategy (using the <Input\_Profile\_Name\_To\_Output\_Profile\_Name> format).

**3. Choose what to use as **Black Generation for Process Inks.****

Black generation determines the level of Black versus CMY used when converting colors through your color strategy.

**Note:** This is only available if you have upgraded from an older Color Engine Pilot application and your color database contained black generation presets.

You can choose either:

- one of your old presets,
- **Single Color Black** (see [Single Color Black](#) for more information).

**Note:**

- What you select in **Black Generation for Process Inks** is only used in [non-linear color strategies](#) (that have a different input and output profile).
- If you are working with an ICC destination profile, your color strategy will always use that profile's B2A tag for color conversion (so you will not be able to choose a black generation mode).

**4. Choose what to use as **Black Generation for Spot Colors.****

You can choose either **Maximal Black** (the default) or **Minimal Black**.


See [Black Generation](#) on page 263 for more information.

**5. Under **Tolerances for spot colors**, define your color difference tolerance in [Delta E](#).**

This is the color difference under which you consider colors to be **on Target** (meaning that they can be reproduced accurately).

**Tip:**

- The default tolerance is 2 ΔE (generally a human eye can perceive color differences that are above 2 ΔE).
- If for example you know that you cannot get your colors under a certain ΔE number due to some instability of your press or spectrophotometer, you should use that number here.

When a color conversion's result exceeds your tolerance, Color Pilot will indicate it (typically with a warning  icon). The tolerance is used when:

- evaluating [color builds](#)' values against the original spot colors in your [Equinox color strategies](#),
- [tweaking the color builds manually](#),
- [checking](#) if spot colors converted by a color strategy fall within the [gamut](#) of the strategy's output profile,

- [exporting an ink book to PDF](#) using your color strategy.
6. Choose how to display **predicted  $\Delta E$  values** that are under your tolerance.

By default, Color Pilot displays any predicted Delta E value that falls under your tolerance as `Less than` the tolerance. This is because very low theoretical Delta E values may not be achievable in a real life setup (due to press instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail by deselecting **Hide predicted  $\Delta E$  values below the 'On Target' tolerance**.

### 6.1.10. Logging

In case you experience problems with the application and need support help, click **Logging** and select the following options (this will provide more information to your customer support contact):

1. Select **Enable Log Window** to show logging information in a log window, that you can open from **Window > Log Window**.
2. Select **Enable Extra Logging** to show more extensive logging information.
3. Select **Log Ink Book Corruption** if you experience problems with corrupt ink books.

If this is selected, the application shows a warning if one of your ink books becomes corrupted, and offers you to save a zip file with the relevant data, that you can send to Esko support for troubleshooting purposes.

The corrupted ink book then becomes read-only, to prevent further corruption.

4. Select **Ask to save a log after completing a refine spot colors session** if you want to be able to [save a report](#) after refining spot color conversion values for [a proofer](#) or [a digital press](#).

**Note:** These options come into effect the next time you start the application.



**Attention:** Only select these options when you need to troubleshoot the application, as they may affect performance!

### 6.1.11. Start Up

Click **Start Up** and:

1. Choose if you want to **Always maximize the application window on start up** (for example if you are working with a big screen).
2. Select **Give warning when application starts up in license free mode** if you want to see a warning if for some reason your license is not available when starting up Color Pilot.

**Note:**

- Color Pilot can run in license free mode but with much reduced functionality. See [Licensed and License-free Modes](#) on page 17 for more information.
  - If you see a warning about the license free mode but think that you should have a license, please ask your administrator to double-check whether you have a license and whether it is present in your Esko Network or Local License Manager.
- For more information please consult the [Licensing and Activation](#) documentation.

### 6.1.12. Extra

Click **Extra** if you want to set advanced options.

**Note:** These options are meant for specific use cases. We recommend you don't use them if these use cases don't apply to your way of working.

1. Select **Strategy and Ink Limitation Viewer** if you want to use tools to:
  - preview how your color strategies convert your colors (see [Previewing a Color Strategy's Conversion](#) on page 333),
  - preview how your colors will be converted when applying an ink limitation (see [Previewing your Colors' Conversion with an Ink Limitation Set](#) on page 379).
2. Select **Enable overprint chart selection when creating a proofer profile** if you want to [select the chart to use](#) when profiling your proofer.

By default, Color Pilot selects the chart for you (this is the chart adapted to the ink set you are using on your proofer and to the substrate set for it in Fiery Command WorkStation).

If you also want to be able to [create a custom patch set](#) to use when profiling your proofer, select both **Enable overprint chart selection when creating a proofer profile** and **Enable patch set creator**.



**Attention:**

This is only meant for advanced users and/or very specific use cases (for example if you experience an issue and your Esko Customer Support contact instructs you to do this).  
It is **not recommended** in most cases as Esko's profiling technology is optimized for profiles measured from certain standard sets of patches.

3. If you want to use a custom [patch set](#) when [profiling your digital press](#), select **Enable custom patch sets when creating a digital printing profile**.

If you want to be able to [create custom patch sets](#) yourself, select both **Enable custom patch sets when creating a digital printing profile** and **Enable patch set creator**.



**Attention:**

This is only meant for advanced users and/or very specific use cases (for example if you experience an issue and your Esko Customer Support contact instructs you to do this).

It is **not recommended** in most cases as Esko's profiling technology is optimized for profiles measured from certain standard sets of patches.


4. If you have a multicolor proofer (for example CMYKOG or CMYKOGV) but you want to proof using only CMYK and not the additional inks, select **Enable using multichannel proofers as a CMYK device**.

You may want to do this in case you both:

- want your proofs' colors to be more stable (as printing with CMYK gives a more stable output than using additional inks),
- don't need a wide *gamut* (as you will be able to reproduce less colors with CMYK than when using additional inks).

After selecting this option, you will be able to *use your multicolor proofer as a CMYK only proofer*. If you have several multicolor proofers, you can choose how to use each proofer individually.



**Attention:** If you do this you will need to *re-profile your proofer*. Any *recalibration* or unfinished task (marked with ) will be removed as well.

5. Choose which *ink book format* you want to use:

- By default, Color Pilot uses the *new ink book format* (**Enable new ink book format** is selected, and **Use legacy format when creating new ink books** is not).

This means that:

- all new ink books that you *create* will be new format ink books,
- your existing *legacy format* ink books will not change, but you will be able to *upgrade* them to the new format if desired (except for read-only ink books),
- when *importing CxF ink books*, Color Pilot will import them as new format ink books.



**Attention:**

If you are still using older Esko applications (including Color Pilot) with version number 18.1 or lower, you will not be able to use your new format ink books in these applications.

Therefore we recommend you **first upgrade any older Esko application** you are using before using the new ink book format.

- If you want to work as you did in older Color Pilot versions, you can keep using the *legacy ink book format*.

In this case, deselect **Enable new ink book format**. This will automatically select **Use legacy format when creating new ink books**.

- If you want to keep using the legacy format to create ink books, but also be able to upgrade your older ink books to the new format, select both **Enable new ink book format** and **Use legacy format when creating new ink books**.

**Note:** Changing which option(s) you select here will never delete or change your existing legacy or new format ink books. You will always be able to access them in your [Ink Books Library](#).

## 6.2. Servers

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Use the **Servers** preferences to connect to the server(s) that Color Pilot is working with. These can be:

- an **Esko Server**, that will be using the color management settings that you define in Color Pilot.

This server can be either:

- an Automation Engine or a Digital Front End server located in your **LAN** (Local Area Network),
- an Automation Engine in a **data center** (when using Automation Engine as a hosted solution managed by Esko).

See [Esko Server](#) on page 56.

**Important:** When using an Esko Server, make sure you use the color database defined on this server (select **Obtain from Esko server** in the [Database Preferences](#)).

- **Esko Cloud**, to access ink books stored in the cloud.

See [Esko Cloud](#) on page 58.

- a **PantoneLIVE**® server, to be able to use PantoneLIVE ink books and inks.

See [PantoneLIVE](#) on page 61.

- a **Proof** server, to get information about the proofing devices you are working with.

See [Proof](#) on page 64.

**Note:**

You can use several of these servers depending on your needs. However, you cannot use Automation Engine in a **data center** together with **Esko Cloud** or **PantoneLIVE**® (or a DFE Server driving a digital press).

You can use Automation Engine in a **LAN** together with **Esko Cloud** and/or **PantoneLIVE**® if you wish.

### 6.2.1. Esko Server

On the **Esko Server** tab, connect to the server that will be using the color management settings that you define in Color Pilot.

This server can be either:

- an Automation Engine or a Digital Front End server located in your **LAN** (Local Area Network),
- an Automation Engine in a **data center** (when using Automation Engine as a hosted solution managed by Esko).




**Attention:** When using Automation Engine in a **data center**, you cannot connect to [Esko Cloud](#), [PantoneLIVE](#)®, or a DFE Server driving a [digital press](#).


1. If your Esko Server is located on your premises (in your Local Area Network):



- a) Select **Connect to AE-Server in a LAN**.
- b) In **Server Name**, enter the name of your Automation Engine server.

**Note:** If you are working with a digital press, enter the name of the **DFE Server** driving your digital press instead.

- c) Click the **Check Connection** button.  
If the connection is successful, you will see a green dot  with the text *Connected*.
2. If your Automation Engine server is in a **data center** (when using a hosted solution managed by Esko):
  - a) Select **Connect to AE-Server in a datacenter**.
  - b) In **Server Name**, enter the address of your hosted Automation Engine server, that was given to you by your Esko representative (it should be something like [datacentername].esko-saas.com).
  - c) Click the **Sign In...** button.
  - d) Enter your **User Name** and **Password** in the pop-up that opens, and click **Sign In**.

If the authentication is successful, you will see a green dot  with the text *Connected*.

**Note:** For security reasons, you will need to sign in to the data center again every time you start Color Pilot up. You will see the same **Sign In** pop-up while the application splash screen loads.

3. Go to the **Database** tab and select **Obtain from Esko server** to make sure your Color Pilot application uses the same database as your Esko Server.  
See [Setting Your Color Database Location](#) on page 67.
4. If you are done setting preferences, click **OK** and **restart Color Pilot** for your changes to take effect.
5. If you are working with a **data center**, you will need to synchronize your Color Pilot data with the database in the data center before using Color Pilot.  
See [First Synchronization with the Data Center](#) on page 57.


## First Synchronization with the Data Center

To work with an Automation Engine server hosted in a **data center**, you need to:

- connect to the data center in the [Esko Server preferences](#),
  - set up the synchronization with the data center, as explained below.
1. Download and install the **Automation Engine Syncer** tool (that will manage the synchronization between your local Color Pilot and the data center):
    - a) Go to your Automation Engine server's **Tools** page, using the link given to you by your Esko representative (it will be something like [https://\[datacentername\].esko-saas.com/workspaces/#/downloads?tab=tools](https://[datacentername].esko-saas.com/workspaces/#/downloads?tab=tools)).
    - b) Sign in with your data center **User Name** and **Password** (the same ones that you used to [connect Color Pilot to Automation Engine in the data center](#)).
    - c) On the **Tools** page, click the **Download** button next to **Esko Editor Connection Tools** (this tools bundle contains the **Automation Engine Syncer**).
    - d) Save the executable file (Automation Engine Editor Connection Tools [version].exe) on your Color Pilot computer.
    - e) Double-click this file and follow the instructions of the installation wizard.
  2. Restart Color Pilot.

This synchronizes the data that you see in Color Pilot with the data in the data center's database, so that you are working with the most current version of the color data.

**Note:**

- The first synchronization can take a long time. You can see the synchronization progress by clicking the Automation Engine Syncer icon  in your computer tray.
- If another user is uploading his/her changes to the data center at that time, your Color Pilot won't be able to do its first synchronization (to avoid having incomplete data). In this case, retry later.

## 6.2.2. Esko Cloud

### Concept

Esko Cloud is an Esko web architecture based on AWS (Amazon Web Services). It allows many forms of cloud based collaboration. For example to exchange Automation Engine Jobs or to store Esko ink books in the cloud.

Storing ink books in the cloud is only possible by using the Color Pilot's function to **Upload to Esko Cloud**.

This functionality only becomes available after configuring Esko Cloud in your Color Pilot preferences (see below).

### Requirements

- Requirements for the **owner** of an **Esko Cloud Account (ECA)**

The concept of Color Trace, making use of ink book information present on Esko Cloud, requires an ECA. Go to <https://www.esko.com/en/myaccount> to check your ECA details.

Note that, to *configure* Esko Cloud within Color Pilot, you don't need the related Esko Cloud Account Name and Esko Cloud Account Number. However, to make *use* of the Esko Cloud, you do need an ECA account.

Also, the owner of the ECA can decide to give external people access to an Esko Cloud ink book. For example the brand owner that grants access to the color specialist at a converter / printer. External people don't need an ECA ; they only need an Esko ID and the right permissions.

- Requirements for a **user** of an **Esko Cloud Account (ECA)**

- An **Esko ID**

An Esko ID is used to sign in to Esko Cloud as a user. Note that the user (the Esko ID) must be added as a user to Esko Cloud as well. Learn more in the [documentation of Esko Share & Approve](#) (Getting Started, 4.3. Invite additional internal users).

- An **Equipment token**

In Esko Cloud, the term 'equipment' is used to define remote devices but also applications. An Equipment Token is used to sign in to Esko Cloud as an Equipment, in our case the Color Pilot application.

## Configuring Esko Cloud in Color Pilot



**Attention:** If you are connected to an *Automation Engine server in a data center*, you cannot use Esko Cloud at the same time.

Go to **Edit > Preferences > Servers > Esko Cloud**.

- **Domain:** Select the correct Esko Cloud domain. Which one you need depends on your company's location. The Esko Cloud location (domain) is based on the address linked to the company code. So if you are located in the US then select the domain `us.esko.cloud`. For all other locations you can use `eu.esko.cloud`.

**Note:** To add extra domains, choose **Select Domain** in the list of domains.

Once the correct domain is selected you can sign in **as a user** or connect **as an equipment**. This choice depends on what you want to do:

- When you just want **access** to ink books in the cloud, sign in as a **user**.
- When you want to **make** Esko Cloud **ink books available to other Esko applications**, you have to connect as an equipment.

The options below describe how to do this.

**Note:** You can at the same time be signed in as a user and be connected as an equipment. In that case the option 'connect as equipment' is ignored.

- **Sign in to have access to ink books on Esko Cloud:** Enable this option to sign in as a user.
  1. Click **Sign In...** and enter your Esko ID account.
  2. Click **OK** to close the preferences.
  3. A new **Esko Cloud Enterprise Server** becomes available that gives an overview of all Esko Cloud ink books that the signed in user has access to.

**Note:** Color Pilot will automatically retrieve a user token from Esko Cloud. The token expires after 30 consecutive days without internet access. In case of an expired token, sign in again to restore the connection with Esko Cloud.

**Note:** The user's sign in settings are stored in Color Pilot's preferences. However, these preferences are specific to the Windows user. If you log in to Windows as a different user, your sign in settings will not be remembered. This is done intentionally to avoid unauthorized access to the cloud.

- **Make downloaded ink books available to other Esko applications:** Enable this option to connect as an equipment.

You need an equipment token to use this option. If you are the owner of the Esko Cloud site then you can generate a token (on the Share & Approve pages of Esko Cloud).

Learn how to do this in [below page](#).



**Attention:** Both the domain name and the equipment token are stored in the CMS database. That is why, when you redirect Color Pilot to a different CMS database, you will lose the Esko Cloud connection (the Esko Cloud configuration is lost and the Esko Cloud ink books are not available anymore for other Esko applications).

## How to Generate an Equipment Token for Esko Cloud

Follow these steps:

### 1. In Esko Cloud, Create a Color Pilot Equipment

1. Log in to the Share & Approve site with your Esko ID
  - a. URL for customers in the USA: <https://approve.us.esko.cloud/sites/>
  - b. URL for all others: <https://approve.eu.esko.cloud/sites/>
2. Click on the section **My Network**.
3. Click on the equipment icon.
4. Click **Add Equipment**.
5. In **Equipment type**, select **Color Pilot**.
6. Enter an equipment **Name** and click **Create**.

**Important:** Don't use the generated token key. We still need to add the equipment to a group and that will generate a new token key.

7. Click **Go to equipment list** to return to the equipment overview.

### 2. In Esko Cloud, add the Color Pilot Equipment to a Group

1. Click on the section **My Network**.
2. Click on the "Groups" icon.
3. Click on the group you want to add the equipment to (check below table to learn about the group rights).
4. Click **Add Members** and select the equipment.
5. Click **Add**.
6. Close the window **Add members to group**.
7. Return to the section **My Network** and click on the equipment icon.
8. Click on the equipment and then click **Edit**.
9. Click **Generate New Token**.
10. Copy the token key and click **Save**.

### 3. Use the Color Pilot Equipment token in the preferences of Color Pilot

1. In Color Pilot, go to **Edit > Preferences > Servers > Esko Cloud**.
2. Paste the token key in the **Token** field.
3. Click **Check Connection**.
4. Click **OK** to close the preferences dialog.
5. A new **Esko Cloud Enterprise Server** becomes available in the interface, giving an overview of all Esko Cloud ink books that this connected equipment has access too.

**Note:** The token expires after 30 consecutive days without internet access. In case of an expired token, generate a new one on the Esko Cloud (Share & Approve) site to restore the connection with Esko Cloud.

**Note:** You need a new token key each time you change the rights of an equipment (when you add it to another group).

**An overview of the rights per group on Esko Cloud ink books:**

Table:

Group Name	Esko Cloud Library Rights	Ink Book Library Rights
Administrators	delete download share	edit delete upload
Calibration SuperUsers	delete download share	edit delete upload
Calibration Users	delete (*) download share (*)	edit delete (*) upload
Calibration ReadOnly	download	

(\*) Only for ink books of which the User / Equipment is the owner of that book.

### 6.2.3. PantoneLIVE

PantoneLIVE® is a database of Pantone inks in the cloud. It contains information about how different tints of an ink look like, and how the ink will look like on different substrates.

Because it is in the cloud, the same color data is accessible to every actor of the packaging production, globally (while being protected by a login). This ensures that you get predictable and accurate color every step of the way, saving time and costs.

For more information, see [PantoneLIVE Ink Books and Inks](#) on page 115.

**Note:** To be able to use PantoneLIVE, you need to have bought a PantoneLIVE license from X-Rite.



**Attention:** If you are connected to an [Automation Engine server in a data center](#), you cannot use PantoneLIVE at the same time.

To work with PantoneLIVE inks in Color Pilot:

1. Claim your PantoneLIVE license from the X-Rite website.  
See [Getting your PantoneLIVE License from the X-Rite website](#) on page 62.
2. Set up your access to the PantoneLIVE cloud database in Color Pilot.  
See [Setting up PantoneLIVE in Color Pilot](#) on page 63.

**Note:** Once your Color Pilot application is successfully connected to the PantoneLIVE cloud database, you can also use PantoneLIVE in other Esko applications (without needing any additional setup).

## Getting your PantoneLIVE License from the X-Rite website

Before you can use PantoneLIVE, you need to claim your PantoneLIVE license from the [X-Rite website](#).

**Note:**

If you have received an email from X-Rite with instructions on how to do this, follow these instructions (as they might be more up-to-date than the instructions below).

Otherwise, follow the steps below.

1. Go to <https://my.xrite.com/> and log in with your **My X-Rite** account.  
This is the account you created or received when buying your PantoneLIVE license.
2. Click **My PantoneLIVE**.  
This opens the **PantoneLIVE License Management** page, that contains your PantoneLIVE licenses.
3. Scroll down and find the license(s) available for your account at the bottom of the page.
4. Expand the details of your license by click the small arrow ▼ next to the license type.  
Your license type may look like **PLIVE 1 Yr Lic Production Apps (PLV-PRD)**.  
You will see one or more lines, with your license renewal code, its expiration date, and whether this license is already in use (in the **Assigned To** column). Your license information should say **Unused** for you to be able to use it.
5. Click **edit** at the end of the license line (the one you want to use if you have several license lines).
6. A pop-up opens with your license information, your **Activation Code** and other fields. Do one of the following:
  - If you are planning to use PantoneLIVE yourself, either:
    - select **Use this activation yourself** (you will only need to enter your credentials in Color Pilot),
    - copy the **Activation Code** and paste it in a text file (you will need to enter your credentials and use this activation code in Color Pilot).
  - If you are not planning to use PantoneLIVE yourself (if have bought the license for your company's designer, for example), enter the **User Name** and **Email** of the person that will use the license, and a **Message** for that person if desired.

The person that you assign the license to will receive an email to get their activation code from X-Rite. See [Getting a License Bought for You](#) on page 63.

Click **Done** to close the pop-up.

After the page refreshes, you should see your user name (or the user name of the person that will use the license) in the **Assigned To** column.

7. Log off the X-Rite website.

You can now set up your access to the PantoneLIVE cloud database in your Color Pilot application.

See [Setting up PantoneLIVE in Color Pilot](#) on page 63.

## Getting a License Bought for You

If your administrator bought a PantoneLIVE license for you, and [assigned it to you](#) on the X-Rite website, you will receive an email from X-Rite with instructions on how to claim that license. This will typically be as follows:

1. You will get an email from [pantoneLiveorders@xrite.com](mailto:pantoneLiveorders@xrite.com).
2. In that email, click **Click here to claim your activation code**.
3. On the X-Rite web page that opens, log in with your **My X-Rite** account (if you don't have a **My X-Rite** account, create one first).
4. This opens a page containing your **Activation Code**.  
Copy this activation code and paste it in a text file.

You can now set up your access to the PantoneLIVE cloud database in your Color Pilot application.

See [Setting up PantoneLIVE in Color Pilot](#) on page 63.

## Setting up PantoneLIVE in Color Pilot

### Important:

To set up access to the PantoneLIVE cloud database from Color Pilot, you need:

- a **My X-Rite** account and a PantoneLIVE license,
- to have claimed that license from the X-Rite website.


See [Getting your PantoneLIVE License from the X-Rite website](#) on page 62 (or [Getting a License Bought for You](#) on page 63 if your administrator bought your license).

In Color Pilot:

1. Go to **Edit > Preferences** and click **Servers > PantoneLIVE®**.
2. Select **Connect to PantoneLIVE®**.  
This makes the rest of the connection settings available.
3. Enter the URL of the PantoneLIVE server you want to connect to in **Server Name**.  
This is typically `https://ws.pantoneLive.com`, unless your X-Rite representative gave you a different URL to use.
4. Enter the **User Name** and **Password** of your My X-Rite account.
5. If desired, you can connect to PantoneLIVE through a proxy server:
  - a) Select **Use a proxy server**.
  - b) Enter the proxy server's **Address** and **Port**.
  - c) If the proxy server requires authentication, select **Use authentication** and fill in the **User Name** and **Password** to use.
6. Click the **Check Connection** button to verify your account.
7. Unless you already [activated your license on the X-Rite website](#), Color Pilot will ask you to enter a **PantoneLIVE activation code**.

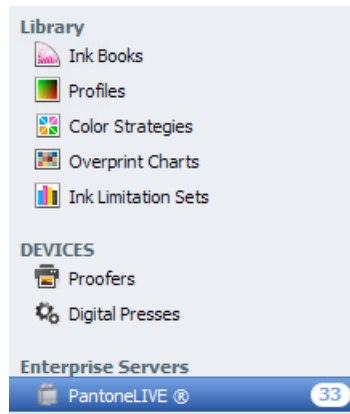
Enter the activation code you copied from the X-Rite website (when claiming the licence [you bought](#) or that [your administrator bought for you](#)).

**Note:** If you click **Cancel** instead, you will not be connected to PantoneLIVE, but you can always connect later by clicking the **Activate License** button.

If the activation code is correct and the connection is successful, you will see a green dot  with the text **Connected**.

8. Click **OK** to save your preferences, then restart Color Pilot.

The navigation pane now contains an **Enterprise Servers** category with a **PantoneLIVE®** entry, showing the number of PantoneLIVE ink books in the cloud available for download.



If there is a problem with the connection to the PantoneLIVE cloud database, you will see a warning icon instead of the number of ink books (hover on the PantoneLIVE entry to see a description of the problem).

Click the **PantoneLIVE®** entry to access the PantoneLIVE ink books (see [Using PantoneLIVE](#) on page 116 for more information about working with PantoneLIVE).

PantoneLIVE ink books are now also available in other Esko applications.

## 6.2.4. Proof

If you want to use your Color Pilot application for color managing your proofs, you need to connect it to your Esko Proof Server. You can do this on the **Proof** tab.

**Note:** Make sure your Esko Proof Server is running before you do this.

1. Define your **Proof server location**:

- Select **<None>** if you don't want to connect to a Proof Server (if for example you are working exclusively with a digital press).

**Note:** Some of the color management for proofing functionality will not be available if Color Pilot is not connected to a Proof Server.

- Select **On local computer** if your Proof Server is located on the computer running your Color Pilot application.




**Tip:**

If the Proof Server and Color Pilot applications installed on your local computer have the same version number, the first time you start up Color Pilot, it will detect your Proof Server and connect to it automatically.

In this case you don't need to do anything.

- Select **On remote computer** if your Proof Server is located on a computer in your network. Fill in the name or IP address of that computer.

**2.** Click the **Check Connection** button.

If the connection is successful, you will see a green dot  with the text *Connected*.

You can now see the proofing devices set up in your Proof Server in Color Pilot (when clicking **Proofers** in the [navigation pane](#)).

See [Working with Proofers](#) on page 385 for more information.

## 6.3. Database

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All of the data you see in Color Pilot is stored in three databases:

- the color database,
- the curves database,
- the screens database.

These three databases are always located next to each other.

**Note:** You only have a screens and a curves database if you have a license to make printing conditions. You can learn more about printing conditions in the [Print Control Wizard documentation](#).

### 6.3.1. The Color Database

#### What is the Color Database?

The color (management) database (also called "CMS database") contains all the color management settings used to process your files (profiles, color strategies, ink books, etc.). It contains both a set of default settings, and any custom settings you have created.

#### Using the Color Database with Esko Applications

You create color management settings in Color Pilot, and use these settings in your other Esko applications (Automation Engine, ArtPro+...). See [Color Management in Your Workflow](#) on page 10.

If you are working with several Esko applications, we recommend that they all use the same color database, so that your custom settings are automatically shared between all applications.

#### Using the Color Database with your DFE Server Software

You create color management settings in Color Pilot, and use these settings in your other applications (DFE Server, DeskPack plug-ins, Automation Engine... as applicable).

We recommend that all of your applications using color management use the same color database, so that your custom settings are automatically shared between all applications.

### 6.3.2. The Curves and Screens Databases

If you have a license to make printing conditions, you will also have a screens database and a curves database.

- The curves database stores curves used for dot gain compensation while RIP'ing.
- The screens database stores screens used for RIP'ing.

Some of these screens and curves are also used in printing conditions (you can learn more about making printing conditions in the [Print Control Wizard documentation](#)).

You can see all the screens, curves and printing conditions by clicking **Screens, Curves** or **Printing Conditions** in the [navigation pane](#).

### 6.3.3. Location of the Database

In Color Pilot's **Database** preferences, you need to select a database location. This location is the server or computer where your [color database](#) is installed.

If you have a license to make printing conditions, you will also have a screens database and a curves database. These three databases are always located next to each other, so you only need to select one location.

#### Where and How Should I Install my Database?

- If you are working with an Automation Engine server [in your Local Area Network](#), we recommend you install your color database (and the screens and curves databases if applicable) when installing Automation Engine, before you install Color Pilot and the other applications that will use the color database.

In this case, you should install the color database in a central location (either your Automation Engine server or a "central resources server" connected to your Automation Engine server), and your other Esko applications will get the location of the color database from your Automation Engine server.

- If you are working with an Automation Engine server [in a data center](#) (when using a hosted solution managed by Esko), your color, screens and curves databases are also in the data center.

In this case, Color Pilot and other Esko applications that use the color database need to synchronize to the data center regularly to keep their color data up-to-date.

See [Working with a Database in a Data Center](#) on page 68 for more information.

- If you are not using Automation Engine, we recommend you install the color database when installing Color Pilot, before you install the other applications that will use the color database.

In this case, you should make sure that you install your color database on a server accessible to your other Esko applications.

**Note:**

The color database is located in a folder called `bg_data_cms_v010`, created when installing Color Pilot.

For example, if you installed your Color Pilot on your server's `C :` drive, you will find the color database in `C :/Esko/bg_data_cms_v010`. This folder is automatically shared.

`bg_data_cms_v010` has two subfolders:

- `r` (read), that has all the default settings,
- `w` (write) where all your custom settings are saved.

### Setting Your Color Database Location

**Note:**

- If you are working in *license-free mode*, a simpler version of the color database is installed in a default location on your local computer the first time you use Color Pilot. It contains default overprint charts, and any custom overprint chart you create will be saved there.
- If you then license your copy of Color Pilot, you will get access to the full color database (containing inks, profiles, color strategies...). Color Pilot will ask you to choose where to install it the next time you start up. Your custom overprint charts will automatically be transferred to your full color database.

Under **Location of Color Engine Database** (in Color Pilot's **Database** preferences), choose where your *color database* (and screens and curves databases if applicable) are located:

- Select **Obtain from Esko server** if your databases are located on the server running your Automation Engine server (or DFE Server, when working with a digital press), or if the location is defined on this server.

**Note:**

Select this when working with:

- an Automation Engine server or a DFE Server located *in your Local Area Network* (but not on the same computer as your Color Pilot application),
- an Automation Engine server located *in a data center* (a hosted solution managed by Esko).

You need to **connect to the server you are working with** in the *Esko Server* tab. You can click the **Select** link to go to the **Servers** tab and connect to the **Esko Server**.

- Select **On remote computer** if your databases are located on another computer in your network. Fill in the name or IP address of that computer.
- Select **On local computer** if your databases are located on the computer running your Color Pilot application.

**Note:** This is selected automatically if you installed Color Pilot, the color database and the Automation Engine server/DFE Server on the same computer.

Under **Path details**, you will see the location of the **Color database**, **Curves database** and **Screens database** on your chosen computer.

**Important:** You must **restart Color Pilot** after changing the database location.

### 6.3.4. Working with a Database in a Data Center

When working with an Automation Engine server hosted in a data center, the color database (and screens and curves databases if applicable) is also in the data center.

This color database can be used by several Color Pilots and other Esko applications.

#### Network Requirement

When working with a data center, the computer where your Color Pilot application is installed needs to have an active network connection at all times.

If your connection drops at some point, you will need to [sign in](#) to the data center again when your connection is back up.

If you have an active connection but cannot reach the data center (for example if you are on a Virtual Private Network that suddenly stops working, or if for some reason the data center server is down), you will see an error message indicating this in the **Sign in** dialog. In this case, your Color Pilot will switch to [read-only mode](#) as a precaution.

See also [Connection Issues while Editing the Database](#) on page 70.

#### Synchronizing

To make sure that each Color Pilot connected to the data center looks at the most recent version of the color data, it needs to **synchronize** with the data center database.

After the [initial synchronization](#), Color Pilot will :



- synchronize automatically when starting up (after you [signed in](#) to the data center),
- check whether it has the most up-to-date data, and prompt you to synchronize otherwise, when you start [editing the color data](#),
- upload your changes to the data center database (so that other applications can have the most recent changes too) after you are done editing the color data.

#### Note:

Before synchronizing, the data center checks whether no other user is uploading changes at this time. If this is the case, you will not be able to synchronize at this moment, to avoid having incomplete data or conflicts in the data.

- If you were starting Color Pilot up, you can choose to skip the synchronization for now, and work with a slightly older database, or wait a moment and retry to synchronize.
- If you want to edit the color data, you will need to wait until the other user has finished uploading his/her changes, and then synchronize to get the latest data, before you can [make your own changes](#).

#### Read-Only Mode

When you start your Color Pilot up, it is in read-only mode. You can see a closed lock icon  at the bottom left of the application window, and small locks on your color settings icons (for example on your ink books: .

This means that you cannot make changes to the database at this point. For example, you won't be able to:

- create a color setting (ink, profile, color strategy...),
- delete, rename or duplicate a color setting,
- import color settings,
- add or remove keywords,
- set a profile on a proofer, or check and recalibrate it,
- change the measurement condition of the Pantone ink books.

## Making Changes to the Database

Since the database is shared by several applications in a data center setup, you can only make changes under certain conditions:

- you need to have **edit rights** on the database (this is determined by your administrator),

### Tip:

If you are an Automation Engine administrator in the data center, you automatically have edit rights on the database.

To give another user edit rights, you need to give this user the **Color Pilot: create/modify/delete (Colors, Curves and Screens)** permission. Please see the [Automation Engine documentation](#) for more details.

- no other user is editing the database at the same time (to avoid conflicts in the data).

To edit the color data:

1. Click the lock icon  at the bottom left so that it looks unlocked .

### Note:

- If another user is already editing the data (from another application connected to the data center), the lock will not unlock, and you will see a message detailing which user is busy editing, on which application and computer, and since when. In this case, you should try again later.
- If the color data in the data center was changed since you last [synchronized](#), you will be prompted to synchronize again to get the latest data before editing.

2. Edit the color data as needed.
3. Click the lock again to upload your changes to the data center database, and go back to read-only mode.

### Note:

If another application connected to your data center is synchronizing at that time (for example, an ArtPro+ or another Color Pilot is starting up and synchronizing its color data), you will temporarily not be able to upload your changes (to avoid conflicts in the data for the other application).

In this case, you can either wait a few seconds and click **Retry**, or **Cancel** the upload, stay in edit mode a bit longer and retry uploading later.

**Note:** If you try closing your Color Pilot before uploading your changes to the data center, you will get a warning that you need to upload your changes first.

### Connection Issues while Editing the Database

As long as your Color Pilot is running and [connected to the data center](#), you can [edit the color data](#) for as long as you want, and no other user will be able to edit it at the same time.

#### Dropped Connection

In case your Color Pilot loses its connection to the data center (your VPN connection drops, your Color Pilot application or the whole computer crashes, etc.), the data center gives you a grace period of 2 hours.

- If you restore the connection within those 2 hours (your Color Pilot is back online and you are signed in to the data center), you will be able to continue with your changes as they were before the connection dropped.
- If you don't, other users can start editing the color data after those 2 hours (this is to prevent that nobody can edit the color data for a very long time).

In this case, once another user has uploaded his/her changes, you will not be able to upload yours anymore, as the color data you started working from will now be out-of-date.

- If your connection drops for more than 2 hours but **no one else** tries to edit the color data in the meantime, you can still continue with your changes after restoring your connection.

This could be useful if for example you are your company's color expert, and the only one that edits the color data. In this case, you can even start making changes, then put your computer to sleep overnight, and continue your changes in the morning.

## 6.4. Spectrophotometer

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### Selecting the Spectrophotometer You Are Working with

By default, Color Pilot automatically detects the spectrophotometer connected to your computer.

If you always use the same spectrophotometer, you can select it in the **Preferred spectrophotometer** list in order to speed up the automatic detection.

### Using a "Dummy" Spectrophotometer

If you want to demonstrate how to use Color Pilot with a spectrophotometer (for example to a customer or colleague) but don't have one connected, you can select the **Use dummy spectro** option.

This simulates an X-Rite iLiO spectrophotometer.

**Note:** Don't forget that you will only be able to simulate measurements with this option. To perform real measurements, you will need to connect a real spectrophotometer to your application.

### Selecting the Measurement Condition You Are Working with

Measurement conditions have been introduced by the printing industry to correct measurement variations caused by optical brightening agents in newer substrates.

See [Measurement Conditions](#) on page 74 for more detailed information.

If you tend to always use the same measurement condition, you can select it here as **Preferred Measurement Condition**.

It will then be used automatically when measuring if:

- the spectrophotometer currently connected to your application supports it (if it doesn't, Color Pilot will use a measurement condition supported by that spectrophotometer instead),
- you haven't changed it for the current Color Pilot session or measuring session (you can do this if you sometimes need to use different measurement conditions, see [Working with Your Spectrophotometer's Measurement Conditions](#) on page 75).

### Using an Inline Spectrophotometer

If you have a digital press with an inline spectrophotometer, you can choose whether to use it by default to measure the press' output (when [profiling](#) your digital press or [refining spot colors](#) on your digital press).

Under **When starting a wizard that supports inline measurement:**

- select **Always use inline spectrophotometer** if you want Color Pilot to always use the inline spectrophotometer.
- select **Never use inline spectrophotometer** if you want Color Pilot to always ignore the inline spectrophotometer and use the offline one instead.
- select **Ask me every time I use the wizard** if you want Color Pilot to always ask you whether to use the inline or offline spectrophotometer.

**Note:** If you have a proofer with an inline spectrophotometer, you will always be asked whether to use the inline or an offline spectrophotometer (when [checking and recalibrating](#) your proofer profile).

### Using a "Dummy" Digital Press

If you want to simulate measuring with an inline spectrophotometer on a digital press, but you are not connected to one, you can select the **Enable digital press simulator application** option.

You will be able to open the simulator from **Window > Digital Press Simulator**.

### Selecting the Measurement Condition of Your Inline Spectrophotometer

When using your press or proofer's inline spectrophotometer, the measurement condition set on the inline spectrophotometer may not match the one used in your device's profile.

To avoid differences in the way your color is measured, you can select **Always check the measurement condition of the inline spectrophotometer when starting a wizard**. When you use your inline spectrophotometer, this will give you a warning telling you:

- the measurement condition set on your inline spectrophotometer,
- the measurement condition your profile was measured with,
- how to change your inline spectrophotometer's measurement condition to match your profile's (you need to do this in Command WorkStation, the client application of the Esko Proof Server).

**Note:** This is most useful when working with an ILS30 inline spectrophotometer (which supports M0, M1 and M2). ILS20 models only support M0 (so if your profile was measured with another measurement condition there will always be some color variation).

## 7. Using a Spectrophotometer

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To measure a color, a spectrophotometer shines light on it, then measures which wavelengths the color reflects or absorbs.

The result of this measurement is spectral data, which describes the color sample comprehensively. From this spectral data, Color Pilot can derive the [Lab values](#) of that color under the industry standard (D50) illuminant.

### 7.1. Supported Spectrophotometers

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#### Inline Spectrophotometers

An inline spectrophotometer is a spectrophotometer that is mounted on your digital press or proofer, so that it can measure your prints automatically without you needing to take them off the press or proofer and measure them manually.

Color Pilot supports:

- an inline spectrophotometer (ISPM) mounted on an HP Indigo digital press.
- an ILS20 or ILS30 inline spectrophotometer mounted on an Epson 7900 series proofer.

#### Offline Spectrophotometers

The following spectrophotometers are supported (for connecting to a USB port):

- X-Rite i1i0 (generation 1, 2 and 3)
- X-Rite i1Pro (generation 1, 2 and 3)
- X-Rite eXact / eXact Scan

**Note:**

- You need to calibrate the eXact Scan on your substrate before each measurement / set of measurements (for all [measurement conditions](#) except M1).
- An aperture of 2 mm is recommended for accurate measurements.

- Barbieri Spectro Swing





**Attention:**

- Some spectrophotometers cannot be used for certain types of measurements. For example:
  - with an eXact spectrophotometer that doesn't have scan support (or a manual scan mode), you can only measure single color patches (and not large charts),
  - with an i1Pro 3 Plus, you can only measure single color patches (of the right size),
  - with a Barbieri Spectro Swing, you cannot measure individual inks,
  - when measuring test charts for printing conditions, you can only use an X-Rite i1iO.
- Not all spectrophotometers support all [measurement conditions](#). Please consult the [Color Pilot system requirements](#) for a comprehensive overview.

## 7.2. Connecting the Spectrophotometer

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1. Connect the spectrophotometer to a free USB port on your PC (not via the keyboard or monitor).
2. If the drivers have not been installed, the system will detect the new hardware and will prompt you to install the drivers.

Install them using the CD or DVD supplied by the manufacturer.

The application detects the connected spectrophotometer automatically on start up. It then shows a green dot and the name of the connected spectrophotometer in the [spectrophotometer status area](#) at the bottom right of the application window.

**Tip:** If you selected the spectrophotometer you are connecting as **Preferred spectrophotometer** in the [Preferences](#), the automatic detection will be faster.



**Note:** If a spectrophotometer is connected after the application is started, you need to right-click the dot in the spectrophotometer status area and select **Reconnect** to detect it.

## 7.3. Calibrating the Spectrophotometer

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You need to calibrate your spectrophotometer the first time you measure with it after starting your Color Pilot application.

In this case, the application will automatically open the **Calibrate Spectrophotometer** dialog, but you can also calibrate at any time by:

- right-clicking the green dot  in the [spectrophotometer status area](#) and selecting **Calibrate**,
  - clicking the **More Actions** button  and selecting **Calibrate Spectrophotometer** in any dialog asking you to measure with the spectrophotometer.
1. The spectrophotometer needs to measure the white point reference, to check for any drifting in the measurement hardware.

If you are working with an X-Rite i1 or i1iO, place the spectrophotometer on the white point reference, and click **Next** in the **Calibrate Spectrophotometer** dialog.

**Note:**

Calibration is an automatic process and may take some time.

If necessary, you can stop the calibration or reconnect the spectrophotometer at any time: click the **More Actions** button and select **Stop Spectrophotometer** or **Reconnect Spectrophotometer**.

You will need to do this for example if the spectrophotometer was accidentally disconnected, or if you have connected a different spectrophotometer.

If you are working with a Barbieri Spectro Swing, it will measure its built-in white point reference automatically.

2. When the calibration is complete, the **Calibrate Spectrophotometer** dialog will indicate that your spectrophotometer is calibrated.

Click **OK**.

## 7.4. Measurement Conditions

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Your spectrophotometer can have one or more measurement conditions.

### What is a Measurement Condition?

Measurement conditions have been introduced by the printing industry to correct measurement variations caused by optical brightening agents in newer substrates.

Measuring a substrate containing optical brightening agents with a light source containing ultraviolet radiation causes fluorescence, making the substrate appear "whiter than white". The more UV is in the light source, the higher the fluorescence, and the whiter the substrate appears.

Different measurement conditions correspond to different amounts of UV, and will give different Lab values for the white point (which also affects printed inks).

- **M0** represents an incandescent lamp close to CIE's (Commission Internationale de l'Eclairage) "Standard Illuminant A", with a color temperature of about 2856 K.

This is the measurement condition still used by most of the world's spectrophotometers and densitometers.

As M0 does not define how much UV is in the light source, it is not recommended to use it to measure substrates with optical brightening agents (that cause fluorescence), especially if you need to exchange measurement data between facilities (that may use different types of spectrophotometers).

- **M1** represents a light source matching CIE's "Illuminant D50", but with a controlled amount of UV radiation, and compensating for the fluorescence caused by that radiation. Note that this compensation is only valid for measuring optically brightened papers, but not for measuring fluorescent inks or toners.
- **M2** represents a light source that excludes UV radiation (like a UV filter), so that substrates with optical brightening agents can be measured without fluorescence under this measurement condition.
- **M3** excludes UV radiation too, but also contains a polarization filter, which reduces the measurement differences between wet and dry samples, by minimizing the extra reflection from the "glossy" surface of the wet ink.



**Attention:**

For consistent results, we recommend you always use the same measurement condition (also when exchanging measurement data between facilities).



This is especially critical when measuring your substrate several times (as different measurement conditions will give different Lab values for the white point), but also when measuring profiles, spot colors...

**Working with Your Spectrophotometer's Measurement Conditions**

Different spectrophotometers have different measurement conditions available. For example, older versions of the X-Rite i1 and i1i0 spectrophotometers only support M0.

The Barbieri Spectro Swing measures in a similar way to M0, but is not actually compliant with the XRG standard (the [X-Rite Graphic Arts standard](#), that defines measurement conditions).

You can set which measurement condition to use with your spectrophotometer from Color Pilot (as long as this measurement condition is actually available on your spectrophotometer). You can do this:

in the <a href="#">spectrophotometer status area</a>	by right-clicking the green dot  and selecting <b>Measurement Condition</b> then the measurement condition that you want to use
in every dialog asking you to measure with the spectrophotometer	by clicking the <b>More Actions</b> button  and selecting <b>Measurement Condition</b> then the measurement condition that you want to use

**Note:** For an overview of supported measurement conditions by spectrophotometer in the different versions of Color Engine Pilot/Color Pilot, see [this knowledge base article](#).

**Tip:**

If you tend to always use the same measurement condition, you can set it as **Preferred Measurement Condition** in the [Preferences](#).

However, if you then connect a spectrophotometer that doesn't support this **Preferred Measurement Condition**, Color Pilot will use a measurement condition supported by that spectrophotometer instead.

## 8. Working with Ink Books and Inks



The Color Pilot comes with a number of predefined ink books, but also contains tools to add custom ink books and inks.

**Note:** If you are [working with a data center](#), you will need to unlock the database before making any changes to your inks or ink books. See [Making Changes to the Database](#) on page 69 for more information.

### 8.1. Your Ink Books Library

Click the **Ink Books Library** in the navigation pane to see [all inks books](#).

#### Viewing Inks

- In the list  and icons  [views](#), double-click an ink book to see its inks, or right-click the book and select **Open**.

You can click the **Ink Books** link to go back to the ink book level.


- The grouped list view  shows ink books and inks.

Within an ink book, you can either:


- view inks in a list :

	PANTONE Medium Yellow C
	PANTONE Bright Orange C
	PANTONE Bright Red C
	PANTONE Strong Red C
	PANTONE Pink C
	PANTONE Medium Purple C
	PANTONE Dark Blue C
	PANTONE Medium Blue C
	PANTONE Bright Green C
	PANTONE Neutral Black C

In this view, you can see a small color patch for each ink, and additional information:

- the [ink type](#) (under **Defined by**),
- the [Measurement Condition](#) used (for [measured inks](#), if you are in a [new format ink book](#)),
- any [Keywords](#) associated with the ink.
- view bigger color patches :



- view the color patches on ink book pages :



The page size depends on the *ink book type*. For example, *predefined Pantone ink books* have 7 inks per page (displayed horizontally, whereas they are vertical in a physical Pantone book).

When viewing inks on pages, you can navigate through the pages using the arrows in the top tool bar.

In all views, you can also see whether the ink is *read-only* , or if it has been *edited* .

You can also select an ink to see *more information*.



## 8.2. Working with Ink Books

From the **Ink Books Library**, you can:

Create an ink book.	See <a href="#">Creating an Ink Book</a> on page 82.
Open an ink book to see its inks.	See <a href="#">Viewing Inks</a> on page 76.
Delete an ink book.	<p>Right-click the book and select <b>Delete</b> (or select it and press the <b>Delete</b> key) then click <b>Yes</b> to confirm.</p> <p>If it is used by a <a href="#">color strategy</a> or printing condition, you will not be able to delete it.</p> <p>Please see the <a href="#">Print Control Wizard</a> user guide for more information about printing conditions.</p>
Rename an ink book.	<p>Right-click the book and select <b>Rename</b> (or select it then click its name), then enter a new name and click <b>Enter</b>.</p> <p>If it is used by a color strategy or printing condition, you will not be able to rename it.</p>
Duplicate an ink book.	Right-click the book and select <b>Duplicate</b> , then enter a new name for the duplicate and click <b>Enter</b> .
Upgrade a <a href="#">legacy ink book</a> to the <a href="#">new format</a> .	See <a href="#">Upgrading Legacy Ink Books to the New Format</a> on page 82.
Upload local changes to an ink book on Esko Cloud	Right-click the book and select Upload Changes.
Uploading an ink book to Esko Cloud	Right-click the book and select <b>Upload to Esko Cloud</b> . Select a <b>Company</b> when there is more than one company for which you have the right to upload ink books.
See where an ink book is used.	Right-click the book and select <b>Show Links</b> to see which color strategies or printing conditions use it.
Export an ink book (to share with another Color Pilot/Color Engine Pilot application or a third party application).	See <a href="#">Exporting Ink Books</a> on page 85.
Import an ink book that was previously exported.	See <a href="#">Importing an Ink Book</a> on page 87.
Print or proof an ink book, or export it to PDF.	See <a href="#">Outputting Inks and Ink Books</a> on page 119.

Check how an ink book's inks will be converted by a color strategy.	See <a href="#">Check Gamut</a> on page 131.
Add (or remove) keywords to find your ink book more easily.	See <a href="#">Keywords</a> on page 36.

**Note:**

- If the ink book is read-only , or if it is used in a color strategy, you cannot rename or delete it.
- You cannot upgrade read-only  legacy ink books.
- If you want to upload legacy ink books to Esko Cloud, you need to upgrade them first. Right-click the ink book and choose either **Upgrade Legacy Ink Book** or **Upload to Esko Cloud**. In the latter case Color Pilot will automatically upgrade the ink book.

## 8.2.1. Types of Ink Books

### Ink Book Formats

By default, Color Pilot uses a new ink book format, that offers several improvements on the previous (now legacy) format, including the possibility to upload it to Esko Cloud.

However, you can still keep working with the legacy format if you wish.

You can find more details below, and set the ink book format you want to work with in the [Preferences](#) (see also [Choosing the Ink Book Format to Use](#) on page 80).

#### The Legacy Ink Book Format

This is the ink book format used in all versions of Color Engine Pilot/Color Pilot prior to Color Pilot 18.1.

Using the legacy format can be useful if you want to exchange ink books with users running an older version of Color Pilot or other Esko software. Otherwise, we recommend that you use the new format.

Ink books using the legacy format have a pink icon .



**Attention:**

When [working over a network](#), legacy ink books are vulnerable to corruption in certain cases.

Since corrupted ink books are unusable, Color Pilot checks for this every time you modify an ink book.

If one of your ink books is corrupted, you will see an error message asking you to contact Esko Support, and your ink book will become read-only.

In the error message, click **Save logging info** to create a zip file of the logging information and select a location to save it. You will need this file when you talk to Esko Support.

#### The New Ink Book Format

The new ink book format (available in Color Pilot 18.1 and later versions) offers you the following benefits:

- your [color database](#) takes less disk space,
- working with ink books is faster (for example exporting, duplicating or deleting large ink books),
- new ink books are not vulnerable to corruption,
- your ink books can store additional information about inks, for example when an ink is a reference or a dependent aim,
- you can upload your ink books to [Esko Cloud](#).

Ink books using the new format have a blue icon .



**Attention:**

If you are still using older Esko applications (including Color Pilot) with version number 18.1 or lower, you will not be able to use your new format ink books in these applications.

This means that inks from new format ink books may show up as "missing" in these applications. For example, if you open a color strategy containing an ink from a new format ink book in an old Color Pilot version, this ink will be listed as "missing", and its color patch will be replaced by a black cross.

Therefore we recommend you **first upgrade any older Esko application** you are using before using the new ink book format.

**Choosing the Ink Book Format to Use**

You can choose the ink book format to use in the [Preferences](#). By default, Color Pilot uses the new ink book format, which means that:

- you can migrate existing ink books to the new format, and perform operations on them.
- all newly created ink books will use the new format.

This applies to:

- ink books created from the [Ink Books library](#),
- ink books created using **Add Color Builds to Ink Book / Add Exceptions to Ink Book** in a color strategy,
- ink books imported from CxF,
- downloaded new PantoneLIVE books.

This choice only affects [new ink books](#), as your existing (legacy) ink books will keep their existing format unless you [upgrade](#) them to the new format.

Other [changes](#) you make to your ink books (renaming, duplicating, exporting ...) don't change the ink book format.

As a summary:

If you want to...	then...
use the new format for all new ink books, and <a href="#">upgrade</a> your older ink books to the new format as needed	leave the default <a href="#">ink book format preferences</a> as they are: <ul style="list-style-type: none"> <li>• <b>Enable new ink book format</b> selected,</li> <li>• <b>Use legacy format when creating new ink books</b> deselected</li> </ul>
keep using the legacy format (as in Color Pilot versions older than 18.1)	<ul style="list-style-type: none"> <li>• deselect <b>Enable new ink book format</b></li> </ul>



If you want to...	then...
	<ul style="list-style-type: none"> <li>• <b>Use legacy format when creating new ink books</b> becomes selected automatically</li> </ul>
<p>keep using the legacy format to create ink books, but be able to <a href="#">upgrade</a> your older ink books to the new format</p>	<p>select both options in the preferences:</p> <ul style="list-style-type: none"> <li>• <b>Enable new ink book format</b></li> <li>• <b>Use legacy format when creating new ink books</b></li> </ul>

### Predefined Ink Books

Your Color Pilot application comes with a number of predefined ink books (including PANTONE books).

All predefined ink books except **designer** are read-only 📖 (you cannot edit or delete them). Inks in read-only ink books are also read-only.

You can [add your custom inks](#) to the designer book, but you can also [create custom ink books](#) for this purpose.

#### If You are Working with a Data Center

The [color database](#) in your [data center](#) comes with the following predefined ink books:

- ClassicColors
- ColorLogic
- designer
- PANTONE METALLICS Coated
- PANTONE+ Extended Gamut Coated
- PANTONE+ Pastels & Neons Coated
- PANTONE+ Pastels & Neons Uncoated
- PANTONE+ Solid Coated
- PANTONE+ Solid Uncoated
- process
- Visualizer Standard Finishes

All predefined ink books except **designer** are [new format](#) ink books. The **designer** book is a [legacy format](#) ink book, that can also be used with older Esko applications (prior to version 18.1).

#### In All Other Cases

If you are working with a database installed on your premises (either on your Color Pilot computer or on a server in your Local Area Network), it contains the following predefined ink books:

- ClassicColors
- ColorLogic
- designer
- PANTONE Colors Matte
- PANTONE GoeGuide Coated
- PANTONE GoeGuide Uncoated
- PANTONE METALLICS Coated
- PANTONE+ Extended Gamut Coated

- PANTONE+ Pastels & Neons Coated
- PANTONE+ Pastels & Neons Uncoated
- PANTONE+ Solid Coated
- PANTONE+ Solid Uncoated
- process
- TOYO Color Finder
- toyo94
- Visualizer Standard Finishes

All predefined ink books are *legacy format* ink books, that can also be used with older Esko applications (prior to version 18.1).



**Note:** Some older Esko applications (version 16.0 or earlier) cannot use the PANTONE+ Extended Gamut Coated book (that contains the ink definitions for PANTONE Coated inks when printed with extended gamut inks).

### 8.2.2. Creating an Ink Book

You can add a new ink book to the library in list or icons view.

1. Click the **New Ink Book** button in the bottom tool bar.

Depending on what you selected in the *Preferences*, you will create:

- an ink book using the *legacy format* (the **New Ink Book** button is pink )
- an ink book using the *new format* (the **New Ink Book** button is blue )



**Note:** You may see a warning when creating a legacy format ink book, as we recommend using the new ink book format when creating ink books (for *several reasons*).

By default, your new ink book will be empty, and be called `Untitled_Ink_Book` (or `Untitled_Ink_Book(n)` where (n) is a number, if you have created several untitled ink books).

2. Give the new ink book a name.
3. *Add inks* to your ink book.

### 8.2.3. Upgrading Legacy Ink Books to the New Format

You can upgrade *legacy ink books* to the *new format* if you selected the **Enable new ink book format** option in the *Preferences*.

- You cannot upgrade read-only  ink books.
- When opening a legacy ink book that you can upgrade, you will see **Legacy ink book**  mentioned in the top-right corner.



**Attention:**

If you are still using older Esko applications (including Color Pilot) with version number 18.1 or lower, you will not be able to use your new format ink books in these applications.

This means that inks from new format ink books may show up as "missing" in these applications. For example, if you open a color strategy containing an ink from a new format ink book in an old Color Pilot version, this ink will be listed as "missing", and its color patch will be replaced by a black cross.

Therefore we recommend you **first upgrade any older Esko application** you are using before using the new ink book format.



1. Duplicate the legacy ink book(s) that you want to upgrade so you have a backup.

After the upgrade, you will not be able to downgrade your ink book(s) again.

2. Right-click the ink book(s) you want to upgrade and select **Upgrade Legacy Ink Book**.

Read the warning and click **Yes** if you want to proceed.

**Note:** You will be able to use your ink book as before the upgrade: any references to this book in color strategies are updated automatically, the ink positions in the ink book are kept, etc.

You can see that your chosen ink books are upgraded to the new format (they now have a blue icon  instead of a pink one .

## 8.2.4. Uploading Ink Books to Esko Cloud

### Preparation

- Ink books can be uploaded to Esko Cloud when Esko Cloud is [configured in the Preferences](#).
- Only ink books using the [new ink book format](#) can be uploaded. Legacy ink books must first be upgraded. When you try to upload, Color Pilot will do this for you automatically after showing a warning dialog.

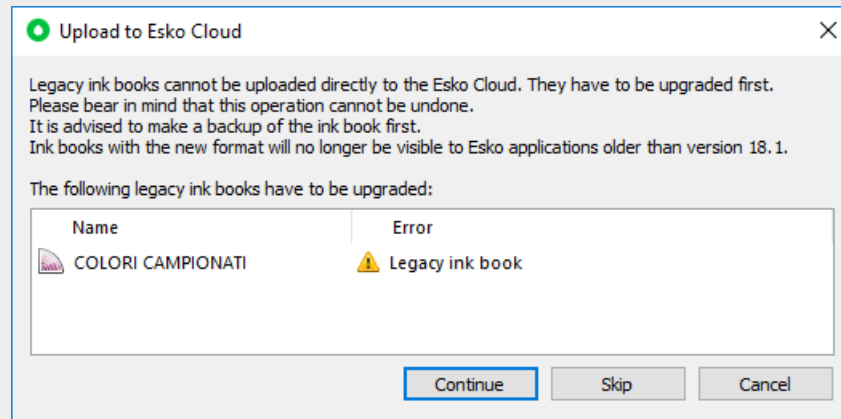
See [Upgrading Legacy Ink Books to the New Format](#) on page 82.

### Procedure

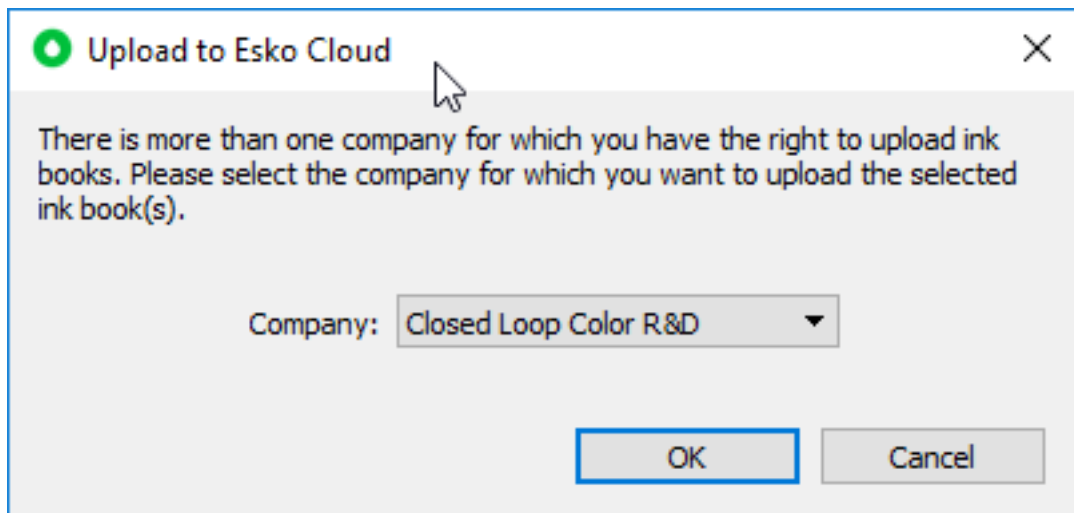
1. Right-click an ink book and select **Upload to Esko Cloud**.

**Note:**

- Read-only ink books cannot be uploaded.
- If you don't have the rights to upload, you will see the message **There are no companies for which you have the right to upload ink books**. Contact the owner of your Esko Cloud site for permissions.
- If you selected one or more legacy ink books, you will get the chance to automatically upgrade them to the new ink book format before starting with the upload process. You can also **Skip** this automatic conversion and do it manually.



2. If you have access to several companies, select the **Company** you want to upload the ink book to (you will not see this if you only have access to one company).



**Note:** Contact the Esko Cloud site owner if you don't see the name of the company you want to upload the ink book to.

Once uploaded:

- the ink book icon will change to a cloud icon.
- in the ink book main pane, the **Company** and **Owner** columns are updated.

- the ink book is listed in the **Esko Cloud Enterprise Server** view.

**Note:** Uploaded Esko ink books are shared with the user groups Administrators, Calibration ReadOnly, Calibration User and Calibration SuperUsers.

## 8.2.5. Exporting Ink Books

You can export a single ink book or multiple ink books to share them with another Color Pilot/Color Engine Pilot application or any third party application that supports the CxF/X-4 standard.

- To share ink books with another Color Pilot/Color Engine Pilot application, export them to the File Packer (.fp) format.

**File Packer** files are archives that you can use to exchange different types of color management settings (profiles, color strategies, ink books...) between different versions of Color Pilot/Color Engine Pilot.

- To share ink books with a third party application, export them to the CxF/X-4 format.

**CxF/X-4** is an ISO standard that allows communicating ink definitions with a range of third party applications.

Ink books exported to CxF/X-4 are compliant with the ISO/DIS 17972-4 norm.

**Note:**

- The CxF/X-4 format is meant for exporting ink definitions based on [spectral data](#).  
If you export an ink book containing inks that don't have spectral data (such as [Lab or RGB based inks](#)) to the CxF/X-4 format, your exported ink book will not be fully compliant with the ISO/DIS 17972-4 norm.
- The CxF/X-4 format doesn't preserve the position of the inks on the ink book's pages. Therefore, we recommend you don't use this format when exchanging ink books between Color Pilot/Color Engine Pilot applications.

- Esko Cloud ink books lose their cloud information (company / owner) when exporting. Ink properties such as digital standard information are not lost. Exchanging cloud ink books should be done via the cloud by using the **Share** function.

**Note:** You can only export Esko Cloud ink books when you have edit rights.

### Exporting a Single Ink Book

1. In the **Ink Books Library**, click the ink book to export and select **File > Export (Ctrl+Alt+E)** on the main menu, or right-click the ink book to export and select **Export...**
2. In the **Export As** dialog that opens:
  - a) browse to your desired location,
  - b) change the file name if desired,
  - c) choose the file type to use for the export,
    - Choose **File Packer files (\*.fp)** if you want to later import your ink book into another Color Pilot/Color Engine Pilot application.

- Choose **CxF/X-4 files (\*.cxf)** if you want to later import your ink book into a third party application that supports the CxF/X-4 standard.

**Note:**

- The CxF/X-4 format is meant for exporting ink definitions based on *spectral data*.  
If you export an ink book containing inks that don't have spectral data (such as *Lab or RGB based inks*) to the CxF/X-4 format, your exported ink book will not be fully compliant with the ISO/DIS 17972-4 norm.
- The CxF/X-4 format doesn't preserve the position of the inks on the ink book's pages. Therefore, we recommend you don't use this format when exchanging ink books between Color Pilot/Color Engine Pilot applications.

d) click **Save**.

### Exporting Multiple Ink Books

1. In the **Ink Books Library**, select the ink books to export.

**Tip:**

- To select a consecutive group of ink books, click the first ink book, press and hold down the **Shift** key, and then click the last ink book.
- To select non-consecutive ink books, press and hold down the **Ctrl** key, and then click each ink book that you want to select.
- To select all ink books, press **Ctrl+A**.

2. Go to **File > Export (Ctrl+Alt+E)**, or right-click the ink books to export and select **Export...**

3. In the **Export** dialog that opens, choose how you want to export your ink books:

a) **Browse...** to your desired location.

b) Choose whether to **Export as one single archive** or not.

- If you are exporting to a single archive, enter the **File Name** to use (or use the default `Archive.fp`).

The archive is a File Packer file.

- If you are exporting the ink books individually, they will be exported under their own name by default. You can rename them by double-clicking in the **Export As** column.

For each ink book, you can choose the file type to use for the export.

- Choose **File Packer** if you want to later import your ink books into another Color Pilot/Color Engine Pilot application.
- Choose **CxF/X-4 File** if you want to later import your ink book into a third party application that supports the CxF/X-4 standard.

**Note:**

- The CxF/X-4 format is meant for exporting ink definitions based on [spectral data](#). If you export an ink book containing inks that don't have spectral data (such as [Lab or RGB based inks](#)) to the CxF/X-4 format, your exported ink book will not be fully compliant with the ISO/DIS 17972-4 norm.
- The CxF/X-4 format doesn't preserve the position of the inks on the ink book's pages. Therefore, we recommend you don't use this format when exchanging ink books between Color Pilot/Color Engine Pilot applications.

If desired, you can **Remove** ink books from the list before exporting.

4. Click **Export** when you are done.

## 8.2.6. Importing an Ink Book

You can import ink books that have been exported to one of the following formats:

- **File Packer** (. *fp* file): an archive format that can be used to exchange different types of color management settings (profiles, color strategies, ink books...) between different versions of Color Pilot/Color Engine Pilot.
- **Color Exchange Format** (. *cxf* file): an exchange format for color information used by a number of third party applications. Color Pilot supports the CxF3 and CxF/X-4 formats (CxF/X-4 is an ISO standard).
- **Zip** (regardless of the extension): zip files containing multiple exported ink books (in the formats listed above).

**Note:**

- When importing a File Packer archive (or a zip file containing multiple File Packer archives), the [ink book format](#) will be the same as the original ink book(s) it was exported from.
- When importing a CxF file (or a zip containing multiple CxF files), the ink book format will depend on what you selected in the [Preferences](#):
  - if you are working with the [new ink book format](#) (you selected **Enable new ink book format** only in the Preferences), your imported CxF ink books will have the new format,
  - if you are working with the [legacy ink book format](#) (you selected both **Enable new ink book format** and **Use legacy format when creating new ink books**, or only **Use legacy format when creating new ink books**), your imported CxF ink books will have the legacy format.

1. Select the exported ink book(s) to import:
  - a) Either:
    - go to **File > Import**,
    - press **Ctrl+Alt+E**,
    - right-click in the main pane of the **Ink Books Library** and select **Import...**
  - b) Browse to the ink book(s) to import.

You can select several ink book files using the **Shift** key, or select all ink book files using **Ctrl+A** (if the location you browsed to only contains ink books).

**Tip:** You can also just drag the ink book to import into your Color Pilot window.

2. In the **Import** dialog that opens, you will see that the ink book(s) have the state `Ready for import`.

**Note:**

If you already have an ink book with this name in the **Ink Books Library**, the state will be `Ready for merge`.

When you import the ink book it will be merged with the one already existing. This means that any new ink in the imported ink book will be added to the existing ink book, but inks that are already in the existing ink book will not be replaced.

If desired, you can:

- a) Change the name of the file(s) in the **Import as** column.

**Tip:** You can do this to avoid merging an ink book you are importing with one that has the same name in your library.

- b) Add or remove ink books to import using the **+** or **-** buttons.

**Tip:** You can also add other exported color settings to import, for example profiles or color strategies.

- c) Review any ink book information shown on the **Details** tab.

**Note:**

Third party CxF files may contain several spectral values for the same ink percentage, based on different [measurement conditions](#).

In this case, you need to choose which measurement condition to use when importing those files (on the **Details** tab).

3. Import the ink book(s) by either:
  - Selecting the ink book(s) to import (using **Shift** to select several ink books) and clicking **Import Selection** at the bottom right.
  - Clicking **Import All** to import all ink books in the dialog.

You will see a progress bar, and import details on the **Logging** tab at the bottom of the dialog.

Once the ink books are imported, they will have the `Imported` (or `Merged`) state.

If you select an imported ink book, you can see its contents on the **Details** tab at the bottom of the **Import** dialog. If the ink book was merged you will see the message `Already exists in database` for the inks you already had.

4. When you are done, **Close** the **Import** dialog.




## 8.3. Working with Inks

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Inside an ink book, you can:

Add inks of <i>different types</i> .	See <a href="#">Adding an Ink to an Ink Book</a> on page 93.
See more information about an ink.	See <a href="#">Ink Information</a> on page 91.
Edit an ink.	See <a href="#">Editing an Ink</a> on page 101.
Copy and paste an ink to another place in the ink book, or to another ink book.	See <a href="#">Copying an Existing Ink to an Ink Book</a> on page 93.
Delete an ink.	Right-click it and select <b>Delete</b> (or select it and press the <b>Delete</b> key) then click <b>Yes</b> to confirm.  If it is used by a <a href="#">profile</a> , <a href="#">color strategy</a> or printing condition, you will not be able to delete it.  Please see the <a href="#">Print Control Wizard</a> user guide for more information about printing conditions.
Rename an ink.	Right-click it and select <b>Rename</b> (or select it then click its name), then enter a new name and click <b>Enter</b> .  If it is used by a profile, color strategy or printing condition, you will not be able to rename it.
Duplicate an ink.	Right-click it and select <b>Duplicate</b> , then enter a new name for the duplicate and click <b>Enter</b> .
See where an ink is used.	Right-click it and select <b>Show Links</b> to see which profiles, color strategies or printing conditions use it.
Change an ink's opacity (only in <a href="#">new format ink books</a> ).	See <a href="#">Changing an Ink's Opacity</a> on page 105.
Set a digital standard	Right-click it and select <b>Digital Standard</b> , click on <b>Set as Digital Standard</b> to define an ink as a <b>Reference</b> or <b>Dependent Aim</b> .
Check how one or more inks will be converted by a color strategy.	See <a href="#">Check Gamut</a> on page 131.
Compare an ink to other inks.	See <a href="#">Comparing Inks</a> on page 107.
Print or proof some inks, or export them to PDF.	See <a href="#">Outputting Inks and Ink Books</a> on page 119.





**Note:**

- You cannot delete, rename or duplicate inks from read-only  ink books, or add or paste inks into those ink books.
- If an ink is used in a profile or color strategy, you cannot delete or rename it.

### 8.3.1. Types of Ink


The way the ink patch is shown (in icons  view) gives you information about how the ink was created.


#### Measured Inks

Ink patch	Ink type	To create such an ink
	Ink created from a single measurement (the solid patch).	See <a href="#">Measuring a Solid Patch Only</a> on page 95.
	Ink created from two measurements (the substrate and the solid patch).	You cannot create such an ink in Color Pilot. However, you can find such inks in certain <a href="#">predefined ink books</a> (like the PANTONE books).
	Profiled ink created using multiple measurements (substrate, solid and tints).	See <a href="#">Measuring a Solid and Tints</a> on page 96.
	Profiled ink created using multiple measurements, including overprints (on white, grey and black).	See <a href="#">Measuring a Solid, Tints and Overprints</a> on page 98.


**Note:** Inks created from measurements contain spectral information.

#### Inks Created from Color Values



Ink patch	Ink type	To create such an ink
	Ink created using <a href="#">Lab or LCh</a> values.	See <a href="#">Creating an Lab or LCH Color</a> on page 94.

Ink patch	Ink type	To create such an ink
	Ink created using RGB values.	You cannot create RGB inks in Color Pilot.

### Non Editable Inks

Inks with this symbol  are non editable (which means you can't change the inks' values, rename or delete them).

This is the case for example with PANTONE inks, but any type of ink can be non editable (as shown in the examples below). All inks in a read-only ink book are non editable.

Ink patch	Ink type	To create such an ink
	Non editable profiled ink	You cannot create non editable inks.
	Non editable Lab color	

## 8.3.2. Ink Information

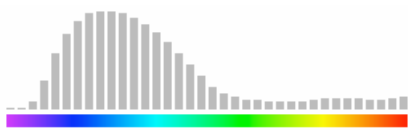
Select an ink to see more information about it in the right pane. The information you can see depends on the *type of ink*.

For all inks, you can see:

- the ink patch,
- the ink **Name**,
- *how the ink was created* (in **Defined by**),
- the **Lab/LCh** values for that ink,
- the **Opacity** of the ink.

**Note:**

- When working with a *new format ink book*, you can see (and *change*) the opacity percentage for any type of ink.
- When working with a *legacy ink book*, only inks *measured* using at least two measurements have an opacity percentage.

For...	you can also see...
RGB inks	the <b>RGB</b> values
all inks	information about the <b>Digital Standard</b> when set (digital standard, reference, substrate, printing technique, ink type).
all <i>measured inks</i>	<ul style="list-style-type: none"> <li>the ink's <b>Tone Value</b> (you can choose the <b>Formula</b> to use to calculate it; by default, the one you selected in the <i>Preferences</i> is used),</li> <li>the <b>Measurement Condition</b> used when measuring the ink (only in <i>new format ink books</i>)<sup>1</sup>,</li> <li>the spectral curve of the ink.</li> </ul> 
For inks measured using at least two measurements: <ul style="list-style-type: none"> <li><b>Measured Solid and Substrate</b></li> <li><b>Measured Solid and Tints</b></li> <li><b>Measured Solid, Tints and Overprints</b></li> </ul>	<ul style="list-style-type: none"> <li>color patches of the measurements (including overprints on black and grey if they are available)<sup>2</sup>,</li> </ul> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><b>Tip:</b> You can click one of the color patches to see its <b>Lab/LCh</b> values, a bigger RGB preview of the patch, and its spectral curve.</p> </div> <ul style="list-style-type: none"> <li>the option to take into account the substrate color or not when viewing the measurements' patches (<b>Show Background</b>). Deselect <b>Show Background</b> to show the patches as they appear in most editing applications, select it to show the patches as they look on print.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><b>Note:</b> This only affects the patches' preview and not their <b>Lab/LCh</b> values or spectral curves.</p> </div>

<sup>1</sup> If you have saved an ink *from a color strategy exception*, the *measurement condition* for the ink is the one used to measure your strategy's output profile.

<sup>2</sup> When using the *legacy ink book format*, Color Pilot calculates the overprints for the *Measured Solid and Tints* inks, and displays them the same way as for *Measured Solid, Tints and Overprints* inks. However, this is a simulation, and therefore less accurate than measuring actual ink overprints.

When using the *new ink book format*, this is not the case.

**Tip:**

- You can use any of the tints' patches as a regular ink by dragging it into your ink book, or copying it and pasting it into any ink book.

It will automatically be given a name that reflects what tint it is (for example `Blue on Black 80%`), but you can change the name if desired.

This can be useful if you want to *refine* a particular tint as an exception in a color strategy, for example.

- You can also compare it with other inks by dragging it into the *Compare Inks* tool.

**PantoneLIVE Ink Information**

If you have *PantoneLIVE inks* in your color database, you can also see information about these inks. However, you:

- cannot see overprints on grey and black,
- cannot see the ink's spectral curves,
- cannot copy a tint to an ink book to use it as a regular ink,
- cannot compare a tint with other inks by dragging it into the **Compare Inks** tool.
- cannot set a digital standard.

### 8.3.3. Adding an Ink to an Ink Book

**Copying an Existing Ink to an Ink Book**

This can be useful for example if you want to use the spectral information and accuracy of a PANTONE ink but you want to give the ink another name.



**Attention:** If you copy a PANTONE color into a Designer book in PackEdge, you lose the accuracy and it becomes an RGB color.

You cannot copy or move inks into read-only  ink books.

**Copying an Ink from Another Ink Book**

1. Open the ink book you want to copy inks from.
2. Select all the inks to copy.

You can use the **Shift** or **Ctrl** keys to select multiple inks.

3. Choose **Edit > Copy**.

You can also right-click the selected ink and choose **Copy**, or use **Ctrl+C**.

4. Open to the ink book you want to copy inks into.
5. Paste the inks by going to **Edit > Paste**, right-clicking the main pane and choosing **Paste**, or using **Ctrl+V**.

**Tip:**

- In [grouped list view](#), you can simply drag and drop an ink into another ink book to copy it there.
- You can also use the [Picker](#) to copy inks into another ink book:
  1. In the main pane, open to the ink book you want to copy inks into.
  2. Click the **Show Picker** button.
  3. In the Picker, go to the ink book you want to copy inks from.
  4. Select the inks to copy, and drag and drop them into the ink book in the main pane.

**Note:**

When copying an ink from a [new format ink book](#) into a [legacy format ink book](#), you can lose some information:

- the [measurement condition](#) used (for [measured inks](#)),
- the [opacity percentage](#) (for inks [created from color values](#) or [from a single measurement](#)).
- the digital standard information.

**Copying an Ink within an Ink Book**

If you copy and paste an ink into the same ink book, Color Pilot adds \_ (2) to the pasted ink name.

If you don't want to duplicate the ink but just move it to another place in the ink book, drag it to your desired place.

**Creating an Lab or LCH Color**

1. Open the ink book you want to add the ink into.
2. Click **Add Lab Color** in the bottom tool bar.
3. In the **Create ink for ink book** dialog, choose in which **Color Space** you want to create the ink: **Lab** or **LCH**.
4. Define the new ink's Lab or LCH values by doing one of the following:
  - moving the sliders,
  - entering values in the numeric fields,
  - picking a color in the color space patch.

**Tip:** You can drag the **L** slider to view lighter or darker slices of the color space in the patch on the right.

Click **OK** when you are done.

5. The ink color patch is shown in the ink book. Give the ink a name.  
The ink book is saved automatically.

**Note:**

If you are in list view, the new ink will be added to the first available empty patch.

If you are in [page view](#), you can choose where the ink will be added by selecting an empty patch before clicking **Add Lab Color**.


## Measuring an Ink with a Spectrophotometer


You can add inks to your color database by measuring printed samples. For example, you can measure printouts of the spot colors used on your press, so that you can later simulate them more accurately on your proofs.

Depending on your workflow and the color accuracy you want, you can choose to measure:

- a single patch of your ink (the 100% patch),
- a gradation from the substrate to the solid patch (tints from 0% to 100%),
- the same gradation, but printed on white, grey and black, to measure how the ink overprints on other inks.

**Note:** We recommend you always use the same *measurement condition* on your spectrophotometer.

1. Open the ink book you want to add a measured ink into.
2. If you want to add the ink to a specific patch in the ink book, click **Show inks on pages**  and select your desired empty patch.

If you are in list view , the new ink will be added to the first available empty patch.

3. Click **Add Measured Ink**  in the bottom tool bar.

**Note:** If the spectrophotometer was not calibrated, Color Pilot will *calibrate it* at this point.

4. In the **Add Measured Ink** dialog, select what you want to measure:
  - **Solid only**
  - **Solid and tints**
  - **Solid, tints and overprints**
5. If you want to measure several patches (**Solid and tints** or **Solid, tints and overprints**) to define your ink, select the **profiling chart** you want to use.

You can either:

- select a predefined **Ink Profiling** chart, in either **11 steps** or **25 steps** (the chart *layout* is automatically adapted to your connected spectrophotometer),
- create a custom chart,
- use a custom chart that you have previously created.


6. Click **Continue** and follow the instructions in the dialog or wizard.

See:

- [Measuring a Solid Patch Only](#) on page 95.
- [Measuring a Solid and Tints](#) on page 96.
- [Measuring a Solid, Tints and Overprints](#) on page 98.

## Measuring a Solid Patch Only

If you *have chosen* to measure a single patch of your ink, follow the instructions in the **Measure ink for ink book** dialog.

If necessary, you can use the **More Actions** button  to reconnect or calibrate the spectrophotometer, or change its *measurement condition*.

1. After pressing the measurement button on the spectrophotometer, you can see a preview patch and the ink's **Lab/LCh** values.  
If you are satisfied with the measurement, click **OK**. If not, you can remeasure your patch.
2. Color Pilot adds the ink to your ink book. Give the ink a name.  
The ink book is saved automatically.

### Remeasuring an Ink

You can remeasure a measured ink, provided that there are no links to the ink (from color strategies, profiles or printing conditions).

1. Right-click the ink to remeasure and select **Remeasure Ink**.
2. Place the spectrophotometer on the sample and click its measure button.

**Note:** If the spectrophotometer was not calibrated, Color Pilot will *calibrate it* at this point.



**Attention:** It is not possible to measure individual inks with a Barbieri Spectro Swing spectrophotometer.

The ink's color information is updated but its name stays the same.

### Measuring a Solid and Tints

If you *have chosen* to measure a gradation from the substrate to the solid patch, the **Add Measured Ink** wizard opens.

1. Enter the **Ink Name**.
2. Enter the **Opacity** of your ink.

**Note:**

Color Pilot uses this information to model how your ink will overprint on other inks (so that even if you are not *measuring overprints*, it can calculate a good approximation for them).



You can find out your ink's opacity from your ink vendor.

If you cannot/don't have time to obtain this information, you can also enter 100% for opaque or nearly opaque inks, or 0% for more transparent inks, but bear in mind that the calculated overprints will then be less accurate.

3. You can see a preview of your gradation, the chart name (if you *have chosen* to use an existing chart), and the chart's dimensions.
4. If you *have chosen* to create a **New Chart**, define what tints you want to include in your chart:  
Under **Set number of tints** at left, choose either:
  - **Automatically**, and set the number of **steps** in your gradation (the substrate and the solid patch are always included).  
You can set between 1 and 25 steps (1 step being only the substrate and solid measurements). The default is 10 steps (10 color patches and a substrate patch).



When defining a gradation automatically, the percentages of the steps are always equidistant (for example a 2 steps gradation is 0%, 50% and 100%, and a 3 steps gradation is 0%, 33%, 67% and 100%).

- **Manually**, and add  or remove  steps from the gradation (the default 10 steps gradation or the last gradation you used).

You can use this to add more steps in a trouble area (for example 1%, 2%, 5%, 7% if you have problems reproducing the highlights of that ink).

You can also edit the existing percentages, by clicking a percentage and using the arrows next to it.

You cannot edit or remove the 0% and 100% patches.

The preview is updated automatically.

**Note:**

If:

- you make a gradation of less than 5 steps/6 patches (5 color patches and a substrate patch),
- you want to measure it using the M1 or M2 *measurement condition*,

you will only be able to *measure your gradation manually*.

5. If you already have a printed version of your chart (for example you want to use a strip printed on the side of one of your jobs), you can start *measuring it*.

Otherwise, define how you want to print your chart then export it as a PDF for printing on your press.

- a) Click **Print Settings...** to open a dialog where you can prepare your chart for printing.
- b) Set the **Patch Width** and **Patch Height** to use.

Color Pilot makes sure that the dimensions you enter are compatible with your connected spectrophotometer (for example, for an X-Rite i1i0, your patches must be between 7 and 20 mm wide/high).

- c) If you want to add marks for corner alignment, select **Mark reference points**.
- d) Select **Add tint percentage values** to print the corresponding percentages above your tint patches.
- e) You can also **Put gaps between patches** if your spectrophotometer needs them to read the chart.

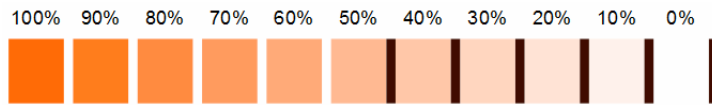
In **Gap Mode**, choose the color of the gaps:

- Choose **Black or White (M1/M2)** if you are measuring with the M1 or M2 *measurement condition*.

Each gap will be either black or white, depending on the lightness of the neighboring patches.

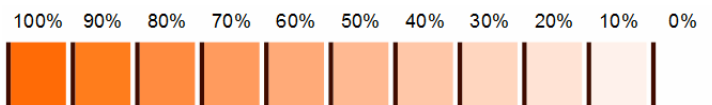
Since Color Pilot doesn't know upfront what color the ink you're going to measure is, you should indicate what your solid will look like so that it prints the right color gap automatically for your each of your tints.

Click **Pick Color...** and select a color close to your solid patch in the color picker. The preview updates to show a simulation of the solid, tints, and gap colors.




- Choose **Black and White (M0/M3)** if you are measuring with the M0 or M3 measurement condition.


Each gap will consist of both black and white.



- When you are done preparing the chart, click **Export Chart for Printing...** and save the chart (as a PDF) to your desired location.  
Send this PDF to your press for printing.
  - Click **OK** to close the **Print Settings** dialog.
- If you are creating a custom chart, you can also save it to reuse it later to measure another ink.
    - Click **Save Chart...** in the **Add Measured Ink** wizard.
    - Enter the **Chart Name** to use and click **Save**.
  - Measure your printed chart with your spectrophotometer.

You can measure it either:

- **Automatically:** press the play button  to start, then follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button after each action to get to the next one.
- **Manually:** place the spectrophotometer over each patch and press the measure button.

If necessary, you can use the **More Actions** button  to stop, reconnect or calibrate the spectrophotometer, or change your measurement condition.

You can switch between automatic and manual measuring modes, but any measurements you have already made will be discarded. To switch to manual mode while you are measuring automatically, you need to stop the spectrophotometer first.

If you are not satisfied with your measurement, you can measure your ink patches again.

- Click **Save Ink** when you are done.

Your measured ink is added to your ink book. You can see the measured patches' color values in the [ink details](#).

### Measuring a Solid, Tints and Overprints

If you [have chosen](#) to measure a gradation and overprints, the **Add Measured Ink** wizard opens.

1. Enter the **Ink Name**.
2. You can see a preview of your gradation, the chart name (if you *have chosen* to use an existing chart), and the chart's dimensions.
3. If you *have chosen* to create a **New Chart**, define what tints you want to include in your chart:

Under **Set number of tints** at left, choose either:

- **Automatically**, and set the number of **steps** in your gradation (the substrate and the solid patch are always included).

You can set between 1 and 25 steps (1 step being only the substrate and solid measurements). The default is 10 steps (10 color patches and a substrate patch, on each of the background colors).

When defining a gradation automatically, the percentages of the steps are always equidistant (for example a 2 steps gradation is 0%, 50% and 100%, and a 3 steps gradation is 0%, 33%, 67% and 100%).

- **Manually**, and add  or remove  steps from the gradation (the default 10 steps gradation or the last gradation you used).

You can use this to add more steps in a trouble area (for example 1%, 2%, 5%, 7% if you have problems reproducing the highlights of that ink).

You can also edit the existing percentages, by clicking a percentage and using the arrows next to it.

You cannot edit or remove the 0% and 100% patches.

The preview is updated automatically.

**Note:**

If:

- you make a gradation of less than 5 steps,
- you want to measure it using the M1 or M2 *measurement condition*,

you will only be able to *measure your gradation manually*.

4. Define how you want to print your chart and export it as a PDF for printing on your press.
  - a) Click **Print Settings...** to open a dialog where you can prepare your chart for printing.
  - b) Set the **Patch Width** and **Patch Height** to use.
 

Color Pilot makes sure that the dimensions you enter are compatible with your connected spectrophotometer (for example, for an X-Rite i1i0, your patches must be between 7 and 20 mm wide/high).
  - c) If you want to add marks for corner alignment, select **Mark reference points**.
  - d) Select **Add tint percentage values** to print the corresponding percentages above your tint patches' columns.
  - e) You can also **Put gaps between patches** if your spectrophotometer needs them to read the chart.
 

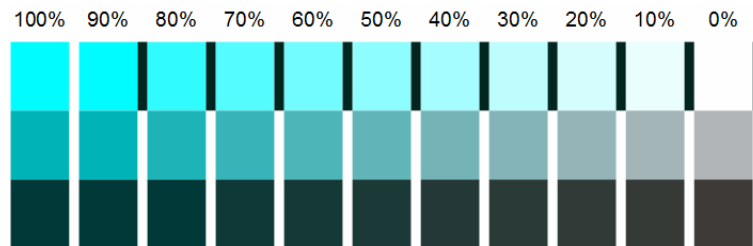
In **Gap Mode**, choose the color of the gaps:

    - Choose **Black or White (M1/M2)** if you are measuring with the M1 or M2 *measurement condition*.

Each gap will be either black or white, depending on the lightness of the neighboring patches.

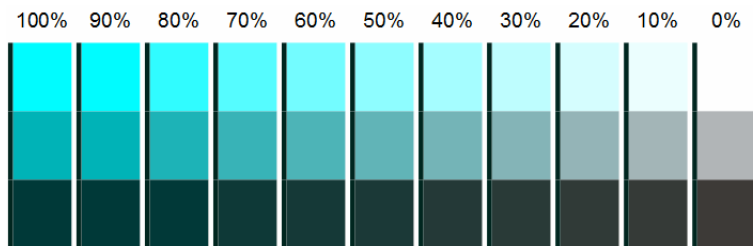
Since Color Pilot doesn't know upfront what color the ink you're going to measure is, you should indicate what your solid will look like so that it prints the right color gap automatically for your each of your tints.

Click **Pick Color...** and select a color close to your solid patch in the color picker. The preview updates to show a simulation of the solid, tints, and gap colors.




- Choose **Black and White (M0/M3)** if you are measuring with the M0 or M3 measurement condition.

Each gap will consist of both black and white.




- f) When you are done preparing the chart, click **Export Chart for Printing...** and save the chart (as a PDF) to your desired location.  
Send this PDF to your press for printing.
- g) Click **OK** to close the **Print Settings** dialog.
5. If you are creating a custom chart, you can also save it to reuse it later to measure another ink.
  - a) Click **Save Chart...** in the **Add Measured Ink** wizard.
  - b) Enter the **Chart Name** to use and click **Save**.
6. Measure your printed chart with your spectrophotometer.

You can measure it either:

- **Automatically:** press the play button  to start, then follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button after each action to get to the next one.

**Note:** The exact measuring method depends on your spectrophotometer model. For example, with an i1i0, the measurement is fully automatic, whereas with an i1Pro, you need to move the spectrophotometer to the next row of patches each time.

- **Manually:** place the spectrophotometer over each patch and press the measure button.

If necessary, you can use the **More Actions** button  to stop, reconnect or calibrate the spectrophotometer, or change your measurement condition.

You can switch between automatic and manual measuring modes, but any measurements you have already made will be discarded. To switch to manual mode while you are measuring automatically, you need to stop the spectrophotometer first.

If you are not satisfied with your measurement, you can measure your ink patches again.

7. Click **Save Ink** when you are done.

Your measured ink is added to your ink book. You can see the measured patches' color values in the [ink details](#).

The overprints measurements are also used to automatically calculate the ink's opacity.

### 8.3.4. Editing an Ink

You can edit any [measured ink](#) created from two or more measurements (except [non editable inks](#)).

You can:

- adjust the color of one or more of your ink's tints (including the solid and substrate),
- add extra tints so that your ink is more accurate throughout the tonal range.

1. Open your chosen ink for editing by either:

- double-clicking it,
- right-clicking it and selecting **Edit Ink...**
- selecting it and pressing **Enter**.

In the **Edit Ink** view, you can see the ink percentages that were measured, with their corresponding patches, and their [Lab/LCh](#) values.

2. To adjust a tint's color, see [Adjusting a Tint's Color](#) on page 102.

3. To add extra tints, see [Adding a Tint](#) on page 103.

4. If desired, you can also change the **Ink Opacity** (it is set to 0% by default).

The opacity will be used to calculate how this ink overprints on other inks.

5. When you are finished editing your ink, click **Save and Close** to go back to the ink book.

Your ink now has a pencil icon in the top right corner, to indicate it has been edited.



Your changes are also reflected in the [ink details pane](#).

### Adjusting a Tint's Color

You can adjust the color of one or more of your ink's tints, including the solid and substrate.

You can do this either by remeasuring the tint, or by editing its *Lab/LCh* color values.

1. In the *Edit Ink view*, select the patch of the tint you want to adjust.
2. If you want to measure a printed patch of that tint, do the following:
  - a) Click the **Measure...** button (or right-click the tint in the row of patches and select **Measure...**).
  - b) Follow the instructions from the **Measure Sample** pop-up.

**Tip:** If necessary, you can use the **More Actions** button  to reconnect or calibrate the spectrophotometer, or change its *measurement condition*.

After pressing the measurement button on the spectrophotometer, you can see a preview patch and the ink's Lab/LCh values.

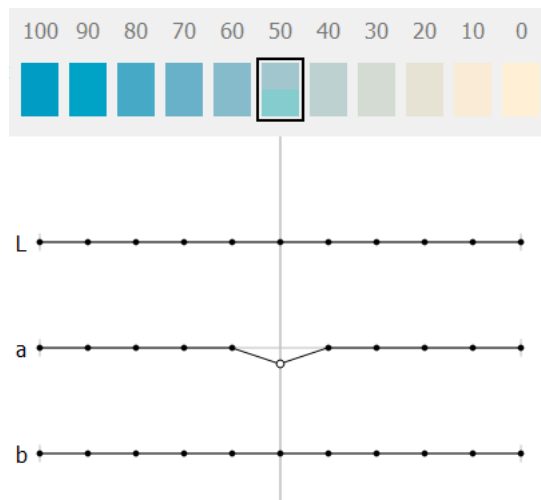
- c) If you are satisfied with the measurement, click **OK**. If not, you can remeasure your patch.

After measuring, you can see the color difference in your tint's color patch above the **Lab/LCh** values, and in the row of patches above the curves. The **L, a** or **b** (or **L, C, h**) curves also reflect the color change.

3. If you want to edit your tint's **Lab/LCh** values manually, you first need to decide whether you only want to change this tint's value, or also change the neighboring values proportionally.

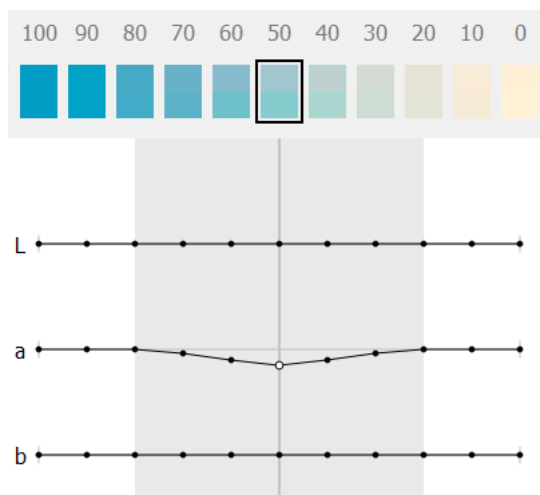
- If you only want to change this tint, leave the slider under the tint curves on **No Smoothing**.

You can then *change your tint's values* independently of the neighboring tints.



- If you want to change the neighboring values proportionally, move the slider to the right towards **Max Smoothing**.

The further right you move the slider, the more other tints will be adjusted. The tints closer to the one you are editing will be adjusted more than the ones further. The range of adjusted tints is indicated in gray.



4. Then you need to decide how to change the tint's color values. You can either:

- edit the absolute **Lab** or **LCh** values using the **L**, **a**, **b**, or **L**, **C**, **h** fields (see [Lab](#) or [LCh](#) for more information about how those color spaces work),
- select **Difference** to enter the difference between the initial values and your desired values (for example, enter 5 in the **L** field to add 5 to the lightness value, or -5 to subtract 5),
- drag your tint's points on the **L**, **a**, **b** curves up or down.

**Note:** This is a lot less precise.

If you want to use **L**, **C**, **h** curves instead, select **LCh values** in the drop-down menu under the curves.


**Note:** You can change the color values by a maximum of +/- 15 Lab, and you cannot go beyond the [borders of the Lab color space](#) (for example, you cannot go under 0 L or over 100 L).

## Adding a Tint

You can add extra tints to an ink so that it is more accurate throughout the tonal range.


You can either measure the new tints, or define their [Lab/LCh](#) color values.

1. To add a tint:

- a) In the [Edit Ink view](#), select a patch close to the tint you want to add.
- b) Click  (or right-click the patch and select **Insert Tint**).
- c) Color Pilot suggests a percentage halfway between the patch you selected and the next patch.  
If this is not the exact percentage you wanted to add, enter your desired tint percentage.
- d) By default, Color Pilot calculates **Lab/LCh** values for the new percentage based on the existing percentages' values.  
If you [define your tint's values manually](#), these default values will be used as a starting point.

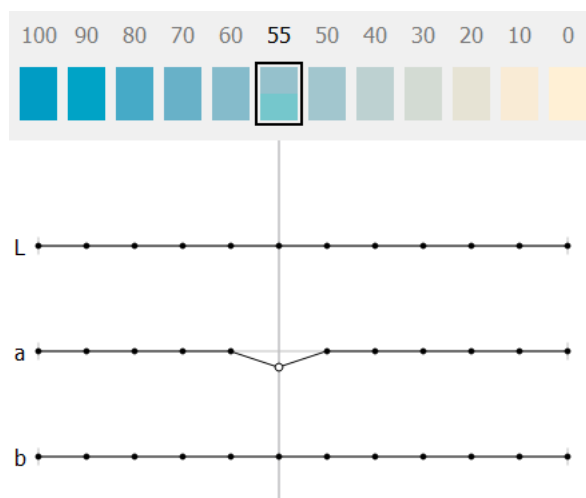
2. If you want to measure a printed patch of your new tint, do the following:

- a) Click the **Measure...** button (or right-click the tint in the row of patches and select **Measure...**).
- b) Follow the instructions from the **Measure Sample** pop-up.

**Tip:** If necessary, you can use the **More Actions** button  to reconnect or calibrate the spectrophotometer, or change its *measurement condition*.

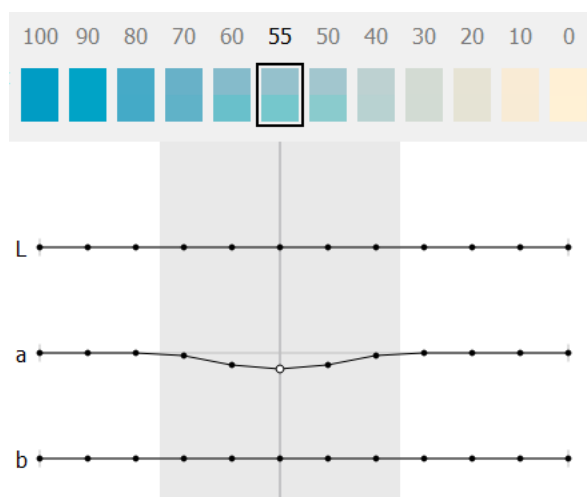
After pressing the measurement button on the spectrophotometer, you can see a preview patch and the ink's Lab/LCh values.

- c) If you are satisfied with the measurement, click **OK**. If not, you can remeasure your patch.
- 3. If you want to define your tint's **Lab/LCh** values manually, you first need to decide whether you only want to edit this tint's value, or also change the (existing) neighboring values proportionally.
  - If you only want to define this tint, leave the slider under the tint curves on **No Smoothing**.  
You can then *define your tint's values* independently of the neighboring tints.



- If you want to change the neighboring values proportionally, move the slider to the right towards **Max Smoothing**.  
The further right you move the slider, the more other tints will be adjusted. The tints closer to the one you are editing will be adjusted more than the ones further. The range of adjusted tints is indicated in gray.






4. Then you need to decide how to define your tint's color values. You can either:

- enter your desired **Lab** or **LCh** values using the **L**, **a**, **b**, or **L**, **C**, **h** fields (see [Lab](#) or [LCh](#) for more information about how those color spaces work),
- select **Difference** to enter the difference between the initial values calculated by Color Pilot and your desired values (for example, enter 5 in the **L** field to add 5 to the lightness value, or -5 to subtract 5),
- drag your tint's points on the **L**, **a**, **b** curves up or down.

**Note:** This is a lot less precise.

If you want to use **L**, **C**, **h** curves instead, select **LCh values** in the drop-down menu under the curves.

**Note:** You can change the color values by a maximum of +/- 15 Lab, and you cannot go beyond the [borders of the Lab color space](#) (for example, you cannot go under 0 L or over 100 L).

If desired, you can also delete a tint using  (or by right-clicking it and selecting **Remove Tint**).


You can only delete tints you have added in this editing session (if you have previously added tints and saved the ink, you cannot delete those tints anymore, and you cannot delete the ink's original tints).

### 8.3.5. Changing an Ink's Opacity

An ink's opacity affects how it overprints on other inks. An opacity of 0% means that the ink is fully transparent, while 100% means that it is fully opaque.

When working with [new format ink books](#), you can change the opacity of any [type of ink](#) (except [non-editable inks](#)).

1. Right click the ink and select **Set Opacity...**
2. Enter the opacity percentage to use and click **OK**.

Your ink now has a pencil icon  in the top right corner, to indicate it has been edited, and you can see its opacity percentage in the [ink details](#).

You can also define the opacity of an ink (in any non read-only ink book) when:

- [editing it](#),
- measuring its [solid and tints patches](#).

**Note:** When measuring an ink's [solid, tints and overprints](#), the opacity is calculated automatically from the overprints measurements.

### 8.3.6. Setting a Digital Standard

#### Concept

The digital standard function allows to define an ink either as a reference or as a dependent aim. This adds information to the ink which then can be used by the WebCenter Color Trace solution.

This digital standard information enables to do an ink mapping from a reference to a dependent aim for a document in a WebCenter project. Learn more in the [WebCenter documentation](#).

#### What is a Reference ink?

This is an ink that acts as a reference for a dependent aim.

Reference inks are typically used by designers when they don't have an idea yet about how the design will be printed.

#### What is a Dependent Aim?

This is an ink with an ink definition valid for a specific combination of printing technique, ink type and substrate.

The Lab values of these 2 inks might well be different.



#### How to Create a Reference ink?

1. Right-click an ink and select **Digital Standard**.
2. Then select **Set as Digital Standard**.
3. Select **Reference** as digital standard.

**Important:** Reference inks must be uploaded to Esko Cloud if you want to link them to a dependent aim.

4. Click **OK**.

### How to Create a Dependent Aim Ink?

1. Right-click an ink and select **Digital Standard**.
2. Then select **Set as Digital Standard**.
3. Select **Dependent aim** as digital standard.
4. Select a reference ink

**Important:** This ink must be part of an Esko Cloud ink book. If the ink is not a reference ink, Color Pilot will offer to make it a reference ink.

**Important:** It's not allowed to select an ink from a read-only ink book.

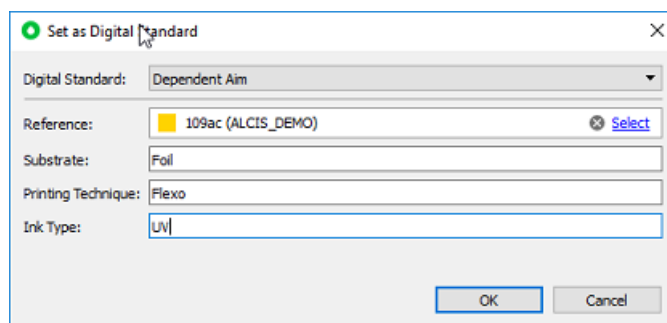
**Note:**

Only these Pantone ink books can be used as a reference:

- PANTONE+ Solid Coated
- PANTONE+ Solid Uncoated
- PANTONE+ Pastels & Neons Coated
- PANTONE+ Pastels & Neons Uncoated
- PANTONE+ Extended Gamut Coated
- PANTONE+ Premium Metallics Coated


These are the Pantone books that are also available to WebCenter via the Standard Color Data account.

5. Define the printing conditions. An example:



6. Click **OK**.

## 8.3.7. Comparing Inks

If you want to compare an ink to another ink, you can use the **Compare Inks**  tool (in the **Ink Books Library**'s bottom tool bar). Use it to see both ink's patches and Lab/LCh values side by side, and the Delta E difference between the two inks.

You can make as many comparisons as you want (always comparing inks in pairs), in a single ink book or across ink books.

1. Add the first ink to the comparison.

You can either:

- add an **ink from an ink book**,
- add a **new Lab or LCh color**,
- add a **device color**,
- **measure a color**.

See [Adding Inks to Compare](#) on page 110 for details.

2. At the top of the **Compare Inks (1)** dialog, choose the **Delta E Formula** to use for the comparison. By default, Color Pilot uses the Delta E formula you chose [in the Preferences](#).

3. Add the second ink to compare to the ink pair in the dialog.

The dialog now shows both inks' information (color patch, ink provenance and Lab/LCh values), and the Delta E difference between the two inks.

You can click the small triangle left of the color patches to show/hide an ink pair's information, or press **Ctrl** and click a triangle to show/hide all ink pairs' information.

**Tip:**

To quickly compare two inks of the same ink book, select both and click the **Compare Inks** button in the tool bar.

If you select three or more inks, each ink will be in a separate ink pair on its own. You can then select the second ink to compare for each pair.

You can also drag and drop several inks into your **Compare Inks** dialog. If you drop them on top of other inks already in the dialog, Color Pilot will ask you whether to **Replace** those inks, or **Add** them to free comparison slots at the end of the dialog.

4. If you want to compare more ink pairs, you can either add them to the same **Compare Inks (1)** dialog (for example drag them to the next **Drag an ink here** areas), or open a new **Compare Inks** dialog.

You can use as many **Compare Inks** dialogs as you want. Use the **Window** menu to switch between **Compare Inks** dialogs.

5. If you want to see an average Delta E calculated across a variety of illuminants, click the **More Actions** button and select **Show ΔE Averaged Across Illuminants**.

This applies to every pair of [spectral inks](#) in your **Compare Inks** dialog, and uses the following standard illuminants:

- CIE Illuminant D50
- CIE Illuminant D65
- CIE Illuminant F11
- CIE Illuminant F7
- CIE Illuminant F2
- CIE Illuminant A

**Tip:** This can help you detect metamerism (colors that look the same under one illuminant but different under another one).

**Note:** After selecting this, it will be used by default for your next ink comparisons (but you can always turn it off).


6. You can also:

- Replace an ink to be compared by either:
  - dragging another ink onto the ink to replace,
  - right-clicking the ink to replace and adding another ink/Lab color/color from profile/new measurement.
- Remove inks from the **Compare Inks** dialog:
  1. Select the inks to remove.
  2. Click the **More Actions** button (or right-click) and select **Clear Selected Inks**.

You can also **Clear All Inks**.
- Rename an ink:
  1. Select the ink to rename.
  2. Click the **More Actions** button (or right-click) and select **Rename Ink**.
  3. Type in your desired name.
- Copy any ink from the **Compare Inks** dialog (created from Lab values, profile values or a measurement) to an ink book: just drag the ink to the ink book.




You can also copy and paste inks between an ink book and your **Compare Inks** dialog, or between slots of the **Compare Inks** dialog.

### Finding the Best Match for an Ink

To search for an ink book, or all ink books, for the closest match, you can use the **Find Best Match**  tool (in the **Ink Books Library**'s bottom tool bar).

1. **Select an ink** to find the best match for.

To select an ink, you can either:




- Select the ink in the main pane and click **Find Best Match**  in the bottom tool bar.
- Right-click the ink and select **Find Best Match > New Window**.
- Click **Find Best Match** , then drag and drop the ink anywhere in the **Find Best Match (1)** dialog that opens.
- Click **Find Best Match** , then click the **Select** link in the **Ink** field at the top of the **Find Best Match (1)** dialog that opens, and select an ink from an ink book.

**Tip:**

- You can also add measured colors or Lab values by dragging them from the **Compare Inks** tool. See [Adding Inks to Compare](#) on page 110.
- You can also add tints and/or overprints on gray or black from the [ink information pane](#) (if they are available for your chosen ink).

**2. Select an ink book** where you want to look for the best match.

To select an ink book, you can either:

- Select the ink book in the main pane and click **Find Best Match**  in the bottom tool bar.
- Right-click the ink book and select **Find Best Match > New Window**.
- Click **Find Best Match** , then drag and drop the ink book anywhere in the **Find Best Match (1)** dialog that opens.
- Click **Find Best Match** , then click the **Select** link in the **Look in** field at the top of the **Find Best Match (1)** dialog that opens, and select an ink from an ink book.

**Note:**

- You can open the tool either with an ink or with an ink book selected, but not both. This means that you will have to add either the ink or the ink book by dragging or clicking the appropriate **Select** link.
- To find the best match **in all ink books**, open the tool in any of the ways described above, then click the **Select** link in the **Look in** field, and select **<All Ink Books>**.

**3. Select the Delta E Formula** to use for calculating the Delta E values.

You will now see a list of the (up to one hundred) closest matches from the selected ink book. The matches are ordered by ascending  $\Delta E$  value. For each matching ink, you can see:

- The **name** of the match
- The **ink book** containing the match (only when searching all ink books)
- The  **$\Delta E$  value** between the match and the ink you selected
- The **LabCh values** for the ink.



You can also see a bigger comparison between the ink and the selected match below the list, so you can visually assess the quality of the match.

Matches can be copied or dragged out of the tool to the application or to other **Compare Inks** or **Find best Match** windows.




**Note:** The tool always shows up to one hundred matches (depending on the number of inks in the ink book), even if all matches are bad matches. You should always check the  $\Delta E$  value of the match before using it in your color management!

**Adding Inks to Compare**

- To add an **ink from an ink book**, you can either:


- Select the ink you want to compare in the main pane and click **Compare Inks**  in the bottom tool bar.
- Right-click the ink you want to compare and select **Compare Inks > New Window**.
- Click **Compare Inks** , then drag and drop the ink you want to compare (from the main pane, the *ink information pane* or the *Picker*) into the **Drag an ink here** area of the **Compare Inks (1)** dialog that opens.

**Tip:** You can also add tints and/or overprints on grey or black from the ink information pane (if they are available for your chosen ink).


- Copy an ink from an ink book, the ink information pane or the Picker, click **Compare Inks**  and paste it into the **Compare Inks (1)** dialog.
- To add a **new Lab or LCh color** to the comparison, do the following:
  1. Click the **Compare Inks** button in the bottom tool bar.
  2. In the **Compare Inks (1)** dialog that opens, click the **More Actions** button  (or right-click an empty slot) and select **Add Lab Color...**
  3. In the **Add Lab Color** dialog that opens, choose whether you want to define an **Lab** or an **LCh** color in **Color Space**.
  4. Use the sliders or the numeric fields to define your color, and click **OK**.
  5. In the **Compare Inks (1)** dialog, give a name to your new color if desired.
- To add a **device color** (a color defined by percentages of an output profile's inks):
  1. Click the **Compare Inks** button in the bottom tool bar.
  2. In the **Compare Inks (1)** dialog that opens, click the **More Actions** button  (or right-click an empty slot) and select **Add Color from Profile...**
  3. In the **Add Color from Profile** dialog that opens, use the sliders or the numeric fields to define your color, and click **OK**.  
If you already added a device color previously, Color Pilot remembers its values.
  4. By default, the color is named after its percentages values (for example C:0 M:95 Y:70 K:0) but you can rename it as desired (right-click it and select **Rename Ink**).
- To **measure a color** to be compared:
  1. Click the **Compare Inks** button in the bottom tool bar.
  2. In the **Compare Inks (1)** dialog that opens, click the **More Actions** button (or right-click an empty slot) and select **Add New Measurement...**
  3. Follow the instructions in the **Add New Measurement** dialog that opens to measure the color with your spectrophotometer.
  4. In the **Compare Inks (1)** dialog, give a name to your new color if desired.


## Working with Ink Comparisons

- You can save an ink comparison so you can refer to it again later, on the same or on a different site. Do this as follows:

- a) Click the **More Actions** button  and select **Save...**
- b) In the dialog window that appears, enter a name for the ink comparison file (with the `.cis` extension) and select a location for it.

**Note:** The `.cis` file type is compatible with older versions of Color Engine Pilot.

- c) Click **Save**.
- To reload an ink comparison you have saved:
  - a) Click the **More Actions** button  and select **Load...**
  - b) In the dialog window that appears, navigate to the location where you saved the `.cis` file and click **Open**.

**Note:** You can also reload a previous ink comparison by using the drop-down list next to the **Compare Inks**  button and selecting **Load...**

## 8.4. Esko Cloud Enterprise Server

### Concept

The Esko Cloud Enterprise Server is available once [Esko Cloud is configured](#).



**Attention:** If you are working with an [Automation Engine server in a data center](#), you cannot work with Esko Cloud at the same time.

When that is the case an overview of the uploaded Esko ink books that the signed in User or connected Equipment has access to.

### Note:

If the Esko Cloud library doesn't list any ink book at all, then first check the Esko Cloud connection status in the application status bar at the bottom.

The status can either be:

- **Connected to Esko Cloud** (green icon): The user / equipment is successfully connected to the cloud ; all cloud functionality is available.
- **Using Esko Cloud in offline mode** (orange icon): The user / equipment has specified to connect to the cloud, but for some reason the connection was not successful. Check your Esko Cloud settings in preferences.
- **Not connected to Esko Cloud** (grey icon): The user / equipment has specified to connect to the cloud, but the connection failed since more than one month or the connection succeeded but the credentials are invalid.



**Note:**

Another reason for not seeing any ink book could be related to access rights.

- You won't see any ink book if you're not added as a user to the organization on the Share & Approve site.
- The user / equipment was not added to either one of the Calibration groups or the Administrators group.

In both cases, contact the Esko Cloud site owner to either add you as a user or give you proper access rights.

**The Esko Cloud Library**

The Esko Cloud library shows an overview of Esko Cloud ink books and their properties.

- **Ink Book Name**
  - An icon showing a cloud and a lock indicates read-only rights.
  - A pencil icon to the right of the name indicates that local changes aren't uploaded yet.
- **Download State**
  - Grey: ink book not downloaded.
  - Green: ink book downloaded.
  - Orange: ink book downloaded but a new version is available in the cloud.
- **Company:** Esko Cloud Account name that the ink book is hosted on.
- **Owner:** Name of the user / equipment which owns the ink book.
- **Date Modified:** The date when the most recent changes were uploaded to the cloud.

**Actions on Esko Cloud Ink Books**

• **Downloading Esko Cloud ink books**

When its download state is grey, click on the ink book name, and see the **Download** button.

To download multiple ink books, make a selection, right-click and select **Download** (or use the **Download** button in the bottom tool bar).

• **Updating Esko Cloud ink books**

When its download state is orange an update is available in the Esko Cloud. Click on the ink book name, and see the **Update** button.

To update multiple ink books, make a selection, right-click and select **Update** (or use the **Update All** button in the bottom tool bar).

**Note:** When the local ink book also has changes you either have the choice to cancel the update or to overwrite the local changes. If you go for an update then Color Pilot will offer you the option to make a local copy.

• **Deleting Esko Cloud ink books**

Right-click the ink book and select **Delete**.

Deleting ink books is only possible when you have the rights to do so (see the table below).

• **Sharing Esko Cloud ink books**

Sharing ink books is only possible when you have the rights to do so (see the table below).

If you have the proper rights, you can share the ink book with a user, a group or an equipment that is part of the same company.

**Important:** The sharing of ink books is an access right on top of the rights that users already have a member of a group.

- **Share with a User**

1. Right-click the ink book and select **Share**.
2. Click the plus symbol at the bottom and select **Add User....**
3. Select one or multiple users and click **Continue**.
4. Select a **role**:
  - **Viewer:** The user can download the book. He is not allowed to edit the downloaded book, view the spectral data of inks, or copy inks to another book.
  - **Editor:** The user can download and use the book, make changes locally and upload these changes to the cloud, and also copy inks to other books. He can not delete the book from the cloud.
  - **Administrator:** The user has full editor rights and can also (un-)share the book with other users and can also delete the book.
5. Click **OK** to close the **Share Cloud Ink Book** dialog.

- **Share with a Group**

- Right-click the ink book and select **Share**.
- Click the plus symbol at the bottom and select **Add Group....**
- Select one or multiple groups and click **Continue**.

**Note:** All groups available to this organization are listed, also those that are not related to sharing ink books. We recommend to not use the following groups: Application Managers, Group Managers, User Managers.

- Select a **Role: Viewer, Editor** or **Administrator**.
- Click **OK** to close the **Share Cloud Ink Book** dialog.

- **Share with an Equipment**

- Right-click the ink book and select **Share**.
- Click the plus symbol at the bottom and select **Add Equipment....**
- Select one or multiple equipments and click **Continue**.

**Note:** All equipment types are listed (Automation Engine, Color Pilot and WebCenter), also those that are not related to sharing ink books. We recommend to not use the equipment 'Automation Engine' as there is currently no use case for this in this software version.

- Select a **Role: Viewer, Editor** or **Administrator**.
- Click **OK** to close the **Share Cloud Ink Book** dialog.

- **How to See with Whom an Ink Book is Shared?**

The Esko Cloud Library doesn't show with whom an ink book is shared, but there is an easy way to find out:

1. Select the Esko Cloud ink book.
  2. Right-click and select **Share...**
  3. This opens the **Share Cloud Ink Book** dialog. Here you can see with whom the ink book is shared.
- **How to Change existing Access Rights?**
    1. Select the Esko Cloud ink book.
    2. Right-click and select **Share...**
    3. Select the user, group or equipment.
    4. Click the pencil icon to open the **Edit a user, group or equipment** dialog.
    5. Change the access rights by selecting a different **role**.

**Table: Access Right / Permissions for Color Pilot related Roles**

Role	Download rights	Delete rights	Edit rights	Share rights
Administrator / Owner	V	V	V	V
Editor	V		V	
Viewer	V			

## 8.5. PantoneLIVE Ink Books and Inks

PantoneLIVE® is a database of Pantone inks in the cloud. It contains information about how different tints of an ink look like, and how the ink will look like on different substrates.

Because it is in the cloud, the same color data is accessible to every actor of the packaging production, globally (while being protected by a login). This ensures that you get predictable and accurate color every step of the way, saving time and costs.

See [The PantoneLIVE Workflow](#) on page 115.

The PantoneLIVE® technology has been jointly developed by Esko and X-Rite/Pantone, with the collaboration of SunChemical for ink manufacturing.

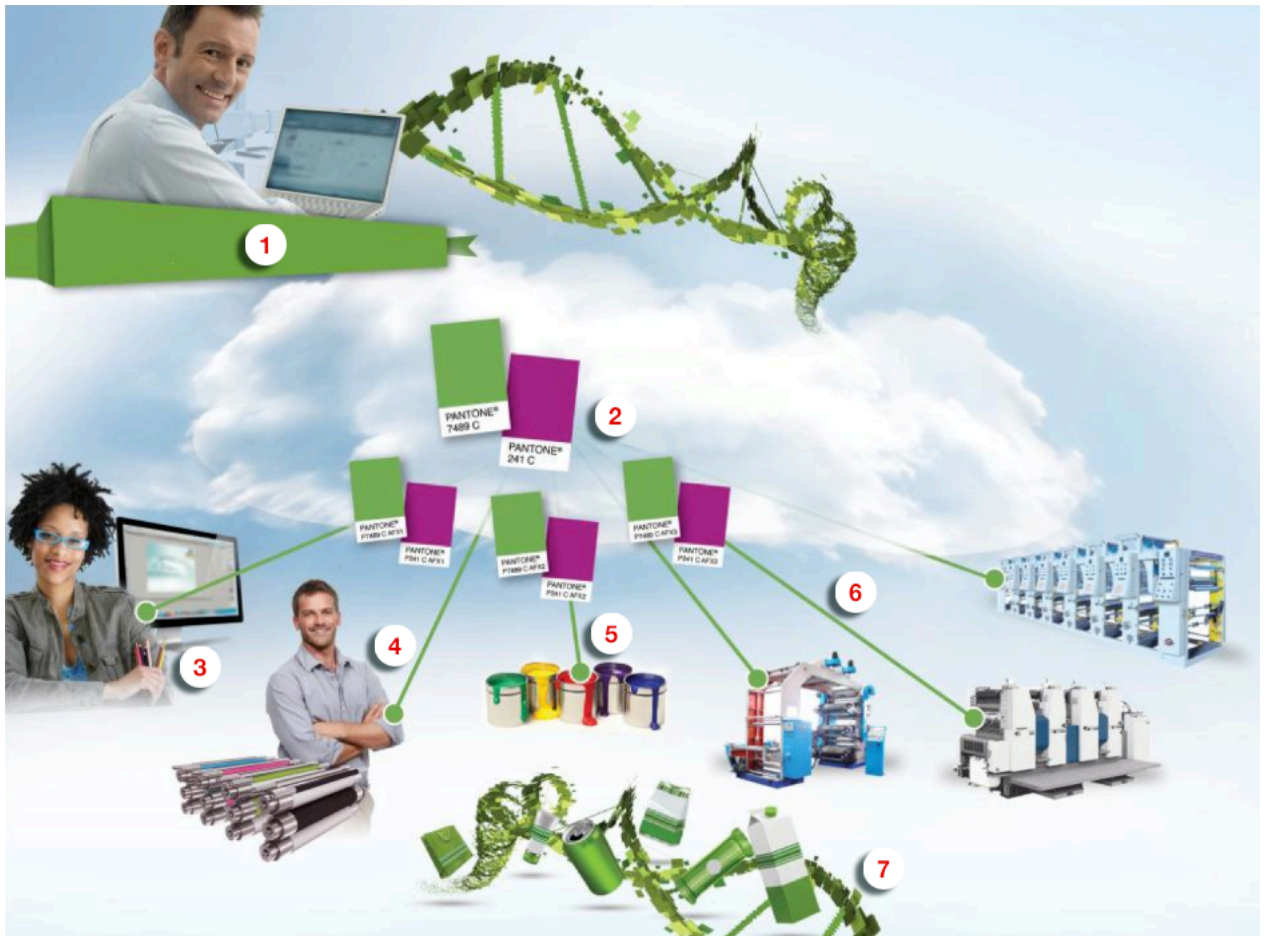
To be able to use it in the Color Pilot and other Esko products, you need a license from X-Rite.

From more information about X-Rite, please go to <http://www.xrite.com/>.



**Attention:** If you are working with an *Automation Engine server in a data center*, you cannot work with PantoneLIVE® at the same time.

### 8.5.1. The PantoneLIVE Workflow



1. The brand owner chooses the exact Pantone colors to put on the products, to best reflect the brand's identity.
2. The PantoneLIVE cloud database doesn't only contain information about Pantone colors, but also about how different tints of these colors look like, and how the colors will look like on different substrates.  
Each Pantone color in the cloud database is a "master standard", and the representation of how it looks like on a specific substrate is a "dependent standard", which is linked to the master standard.
3. The designer uses the PantoneLIVE database colors chosen by the brand owner for the products' designs.
4. The prepress operator uses those same colors when getting the files production ready, and makes sure that the correct dependent standards are used for the different products.
5. The ink manufacturer mixes the inks based on the relevant PantoneLIVE color data.
6. The different production processes print the products' packaging and associated materials using the dependent standards from the PantoneLIVE cloud database.
7. At the end of the chain, the brand owner sees consistent results on different products and types of packaging.

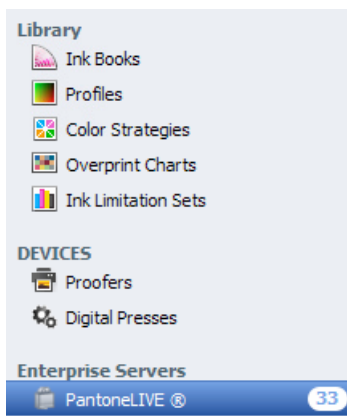
### 8.5.2. Using PantoneLIVE


Once you have [set up](#) your access to the PantoneLIVE cloud database, you can:

- download PantoneLIVE ink books from the PantoneLIVE cloud,
- use the inks in these ink books as you would use your other inks (for example in [color strategies](#)),
- regularly synchronize your local copy of the PantoneLIVE ink books with the PantoneLIVE database in the cloud, to make sure you have the latest version of those ink books (or synchronize the whole library to get recently added ink books).

You can find your PantoneLIVE ink books in two places in Color Pilot:

- under **Enterprise Servers > PantoneLIVE®**, you can download and synchronize your PantoneLIVE ink books (see [Downloading PantoneLIVE Inks from the Cloud](#) on page 117),



- in the **Ink Books Library**, you can find the PantoneLIVE ink books you have already downloaded alongside all your other ink books (they have a green icon ). There you can use them as you use other ink books.

**Note:**

PantoneLIVE ink books and inks are read-only. You cannot edit them, export them, or copy PantoneLIVE inks into other ink books.

However, if you have downloaded the wrong ink book or have an ink book you no longer use, you can delete it from your local copy of the PantoneLIVE database. See [Deleting your Copy of a PantoneLIVE Ink Book](#) on page 118.

Once you have downloaded the PantoneLIVE ink books in Color Pilot, these ink books will automatically be available in other Esko applications that are connected to your [color database](#).




**Attention:** If your PantoneLIVE license expires, you will no longer be able to use your PantoneLIVE ink books in Color Pilot or other Esko applications (they will automatically be deleted from your color database).

### Downloading PantoneLIVE Inks from the Cloud

To download PantoneLIVE ink books to your color database:

1. Access your PantoneLIVE ink books by clicking **PantoneLIVE®** under **Enterprise Servers** in the navigation pane.


The first time you use PantoneLIVE after [connecting to the PantoneLIVE cloud](#), all PantoneLIVE ink books have a grey dot  with the status `This ink book has not been downloaded.`

**Note:** The ink books available depend on the type of PantoneLIVE account you have. In case you think that a specific ink book is missing for your account, please contact X-Rite.


2. Click the **Synchronize All**  button in the bottom tool bar.


You will see a progress bar while Color Pilot downloads the ink books from the cloud.

**Note:** Downloading multiple ink books can require quite some time (over 10 minutes).

Once ink books are downloaded, they have a green dot  with the status `This ink book has been downloaded and is up to date.`

3. Alternatively, you can:
  - download only one ink book: select it and click the **Download** button next to it,
  - download only a few ink books: select them, right-click and select **Download**.

After using PantoneLIVE for a while, you may see that some of your ink books have the status  `This ink book has been updated and needs to be synchronized.` This means that these ink books were updated in the PantoneLIVE cloud database. You should synchronize those ink books again.


If you see ink books greyed out and with the status  `This ink book is no longer available,` it means that they have been removed from the PantoneLIVE cloud database.

If you have downloaded such ink books, you will not be able to use their inks anymore (for example in a [color strategy](#)), but if they are already added to existing color strategies, those will still work.

Synchronizing all your PantoneLIVE ink books will not delete those ink books, but you can [delete them](#) manually.

### Deleting your Copy of a PantoneLIVE Ink Book


You may want to delete your local copy of a PantoneLIVE ink book if:

- you have downloaded the wrong ink book,
- you have an ink book you no longer use,
- the ink book is deprecated (it has the status  `This ink book is no longer available`) and you want to clean it up.

You can delete (your local copy of) a PantoneLIVE ink book from the **Ink Books Library** like any other ink book: right-click it and select **Delete**.



**Attention:** As for other ink books, you can only delete a PantoneLIVE ink book if its inks are not used elsewhere (for example in a [profile](#) or [color strategy](#)).

If the ink book you deleted is still available in the PantoneLIVE cloud database (if it is not deprecated), it will be shown as  `This ink book has not been downloaded in Enterprise Servers > PantoneLIVE®.` You can download it again if needed.

### Working With and Without an Internet Connection

You **must** have an internet connection on your Color Pilot computer when [setting up access to PantoneLIVE](#) in Color Pilot's Preferences.

If the internet connection on your Color Pilot computer is not available anymore, you cannot [download](#) or update your PantoneLIVE ink books.

However, you can still:

- open your downloaded PantoneLIVE ink books, and use the PantoneLIVE inks as usual (for example in a color strategy),
- use PantoneLIVE inks in other Esko applications as usual.

## 8.6. Outputting Inks and Ink Books

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### 8.6.1. Printing Inks and Ink Books

If you are connected to a digital press, you can easily print inks and ink books to have a visual reference of what your spot colors look like on your digital press with a certain substrate.

You can then present these printouts to customers to set the expectations right before they order production work using these colors.

If a customer is hesitating between different ink sets for their job (for example CMYK vs. 7 color printing, or EPM/CMY vs. CMYK), you can print their job's inks using different color strategies, to help them make a decision based on both quality and cost.


1. Open the **Print Ink Book** dialog by doing one of the following:

- selecting one or more inks/an ink book and clicking the **Print Ink Book** tool  in the bottom tool bar,
- right-clicking one or more selected inks/an ink book and choosing **Print Ink Book...**
- dragging one or more inks/an ink book onto the **Print Ink Book** tool,
- dragging one or more inks from the Picker onto the **Print Ink Book** tool.

**Note:** You cannot print more than one ink book at once. If you have selected more than one ink book, you will see a dialog asking you to choose only one.

2. On the **Press** tab of the **Print Ink Book** dialog, select a digital press and a configuration:

- a) Click the **Select** link next to **Press Configuration**.
- b) In the dialog that opens, select your **Digital Press**, the **Configuration** to use, and click **Select**.

Make sure you select a digital press configuration that has a valid profile (this is indicated by a green check .

3. Review the **Print Settings...** and change them if necessary.

These are the same as the [general Print Settings](#) you set for your digital press.

Changing them here only affects printing the ink book or inks, but you can select **Save Settings to Digital Press** in the **Print Settings** dialog to set them as general print settings for your digital press (to replace the settings defined [when configuring your digital press](#)).

4. Select a **Color Strategy** matching your chosen press configuration.

5. On the **Ink Book** tab, choose if you want to **Print**:

- the **Entire Ink Book** (this is selected by default if you selected a whole ink book when opening the **Print Ink Book** tool).

You can see all of the ink book's inks in the **Inks** list below.

**Tip:** You can see the ink book's total number of pages next to **Current Ink Book**.

- a **Page Range**; then enter the page range in the following format:
  - 1, 3, 5 to print pages 1, 3 and 5,
  - 1–5 to print pages 1 to 5,
  - 1, 3–5 to print pages 1 and 3 to 5.

Press **Enter** or **Tab** to see the inks that will be printed in the **Inks** list.

- an **Ink Selection** (this is selected by default if you selected one or more inks when opening the **Print Ink Book** tool).

Then use the **+** or **-** buttons to add or remove inks from the **Inks** list.

**Note:**

- If you select a large number of pages, the **Print Ink Book** tool will first fill a complete sheet (using the maximum repeat length defined on the press). If the pages do not fit on one sheet, more than one print job will be created.
- It is not possible to print inks from several ink books at once.

6. On the **Layout** tab, choose the **Layout Style** to use: **PANTONE Ink Book Format** or **Small Ink Book Format**.

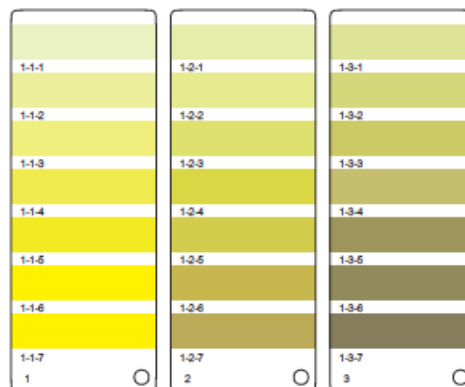
Both formats display the ink patches in one or more vertical strips. Each strip is surrounded by a black line, shows the ink name under each ink patch and the page number from the ink book at the bottom of the strip.

- The **PANTONE Ink Book Format** displays ink patches to resemble a physical PANTONE ink book. Ink patches are 42 x 17 mm with 9 mm between two patches.





- The **Small Ink Book Format** display ink patches in a more compact way, using less paper. Ink patches are 30 x 7 mm with 3 mm between two patches.



7. Choose what to do with **Empty Patches**. You can either:

- select **Include, preserving ink book layout** if you want to print the ink patches in the order you see them in the ink book (one strip will be printed for each ink book column. Strips may contain empty patches).



**Attention:**

An ink book **column** is displayed as a **row** of ink patches in the **Ink Books** library.

PANTONE ink books have 7 ink patches per column and 1 column per page. Other ink books may have a different number of ink patches and columns per page.

- select **Skip them, minimizing paper use** if you want to only print patches containing inks (one strip may then contain patches from more than one column, if some columns had empty patches).

**Note:** Empty pages and empty columns are always skipped.

8. If desired, add some extra information to the print out:

- the **Output values** (from your color strategy) that are used by the press to print each ink;
- which ink patches cannot be satisfactorily simulated by the press (select **Mark 'out of gamut' inks** for this);

**Note:**

This is calculated by comparing the *expected Delta E* of the inks on print to your *Delta E* tolerance for out of *gamut* colors.

By default, the tolerance used in the one you set *in the Preferences*, but you can *change it here* if desired.

- the ink book column numbers next to the page numbers, in the format `page number-column number` (select **Column and page numbers**);
- the **Expected ΔE** between the ink in your color database and the patch output on the press.  
The **ΔE Formula** used for calculating this is the formula *from your color strategy*.  
If you have selected **Mark 'out of gamut' inks**, you can adjust the **Tolerance** to use if desired.

**Note:** You can only add **Output values**, **Expected ΔE** and **Mark 'out of gamut' inks** when printing with the **PANTONE Ink Book Format**.

9. In **Patches per Strip**, select how many ink patches you want to print per vertical strip: either a custom number or the value **from the ink book** (how many ink patches the ink book contains per column; for example, this is 7 for **PANTONE** ink books, and 4 for the **process** ink book).

10. Select **Enable step and repeat and finishing marks** if you want to use the Step and Repeat and finishing marks functionality on the DFE Server.

This option is useful if you intend to cut out the individual pages of the ink book.

The next time you print an ink book, Color Pilot will suggest what you selected here by default.

**Note:** When printing on an HP Indigo 8000 press, this option is not available.

11. Click the **Print** button to send the ink book/ink patches to print as one or more PDFs to the DFE Server.

They are automatically ripped on the DFE Server. You can then print the PDF(s) from the DFE Server Client.

**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the chart is printed on the first press engine to safeguard against color variation inside the color profiles.

To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE Server client.


## 8.6.2. Proofing Inks and Ink Books

If you are connected to a proofer, you can easily proof inks and ink books on it.

You can do this to have a physical sample of a custom ink book for example, or to have a visual reference of what certain spot colors look like on a certain substrate. You can then present these proofs to customers to set the expectations right before they order production work using these colors.

If a customer is hesitating between different ink sets for their job (for example CMYK vs. 7 color printing, or CMY vs. CMYK), you can proof their job's inks using different color strategies, to help them make a decision based on both quality and cost.

1. Open the **Proof Ink Book** dialog by doing one of the following:

- selecting one or more inks/an ink book and clicking the **Proof Ink Book** tool  in the bottom tool bar,
- right-clicking one or more selected inks/an ink book and choosing **Proof Ink Book...**
- dragging one or more inks/an ink book onto the **Proof Ink Book** tool,
- dragging one or more inks from the Picker onto the **Proof Ink Book** tool.

**Note:** You cannot proof more than one ink book at once. If you have selected more than one ink book, you will see a dialog asking you to choose only one.

2. On the **Proofer** tab of the **Proof Ink Book** dialog, select the proofer you want to use:

- a) Click the **Select** link next to **Proofer**.
- b) In the dialog that opens, select your **Proofer** and click **Select**.

You can see your proofer's **Ink Set** and the **EPL [linearization file](#)** it uses.

**Note:** Make sure you have [made a profile](#) and a [color strategy](#) for the proofer you want to use.

**Tip:** If you have already proofed an ink book or some inks on a proofer, it will be selected by default (but you can always change it).

3. Click **Proof settings...** to change the following proofing options as desired:
  - a) Choose the **Rotation** to apply when printing.
  - b) Select **Create a preview on the Proof Server** if you want to preview your proofing job in Fiery Command Workstation (the client application of the Esko Proof Server) before outputting it on your proofer.
  - c) Select **Add White Underprint** if you want a white underprint on your proof (this is only available if your proofer supports white ink).
  - d) Color Pilot will send your proofing job to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
    - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your proof (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other tasks until the proof is ready.
    - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other tasks as soon as this proofing job has been sent to the Proof Server (you will see feedback until the moment your job is sent to the Proof Server, but no feedback that is has been proofed).
  - e) Click **OK**.

4. In **Color Strategy**, select a color strategy you made to output to your proofer profile.

5. On the **Ink Book** tab, choose if you want to **Print**:

- the **Entire Ink Book** (this is selected by default if you selected a whole ink book when opening the **Proof Ink Book** tool).

You can see all of the ink book's inks in the **Inks** list below.

**Tip:** You can see the ink book's total number of pages next to **Current Ink Book**.

- a **Page Range**; then enter the page range in the following format:

- 1, 3, 5 to print pages 1, 3 and 5,
- 1-5 to print pages 1 to 5,
- 1, 3-5 to print pages 1 and 3 to 5.

Press **Enter** or **Tab** to see the inks that will be printed in the **Inks** list.

- an **Ink Selection** (this is selected by default if you selected one or more inks when opening the **Proof Ink Book** tool).

Then use the **+** or **-** buttons to add or remove inks from the **Inks** list.

**Note:** It is not possible to proof inks from several ink books at once.

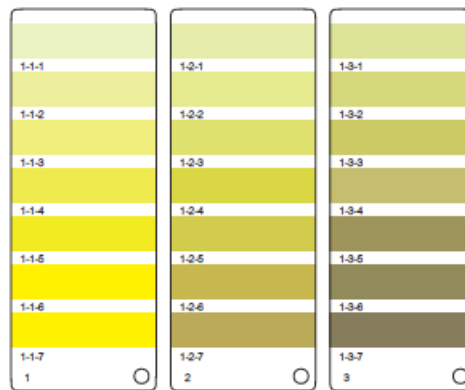
6. On the **Layout** tab, choose the **Layout Style** to use: **PANTONE Ink Book Format** or **Small Ink Book Format**.

Both formats display the ink patches in one or more vertical strips. Each strip is surrounded by a black line, shows the ink name under each ink patch and the page number from the ink book at the bottom of the strip.

- The **PANTONE Ink Book Format** displays ink patches to resemble a physical PANTONE ink book. Ink patches are 42 x 17 mm with 9 mm between two patches.



- The **Small Ink Book Format** display ink patches in a more compact way, using less paper. Ink patches are 30 x 7 mm with 3 mm between two patches.



7. Choose what to do with **Empty Patches**. You can either:

- select **Include, preserving ink book layout** if you want to print the ink patches in the order you see them in the ink book (one strip will be printed for each ink book column. Strips may contain empty patches).



**Attention:**

An ink book **column** is displayed as a **row** of ink patches in the **Ink Books** library.  
 PANTONE ink books have 7 ink patches per column and 1 column per page. Other ink books may have a different number of ink patches and columns per page.

- select **Skip them, minimizing paper use** if you want to only print patches containing inks (one strip may then contain patches from more than one column, if some columns had empty patches).

**Note:** Empty pages and empty columns are always skipped.

8. If desired, add some extra information to the proof:

- the **Output values** (from your color strategy) that are used by the proofer to print each ink;
- which ink patches cannot be satisfactorily simulated by the proofer (select **Mark 'out of gamut' inks** for this);

**Note:**

This is calculated by comparing the *expected Delta E* of the inks on the proof to your *Delta E* tolerance for out of *gamut* colors.

By default, the tolerance used in the one you set *in the Preferences*, but you *change it here* if desired.

- the ink book column numbers next to the page numbers, in the format `page number-column number` (select **Column and page numbers**);
- the **Expected ΔE** between the ink in your color database and the patch output on the proofer.  
 The **ΔE Formula** used for calculating this is the formula *from your color strategy*.

If you have selected **Mark 'out of gamut' inks**, you can adjust the **Tolerance** to use if desired.

**Note:** You can only add **Output values**, **Expected  $\Delta E$**  and **Mark 'out of gamut' inks** when printing with the **PANTONE Ink Book Format**.


9. In **Patches per Strip**, select how many ink patches you want to print per vertical strip: either a custom number or the value **from the ink book** (how many ink patches the ink book contains per column; for example, this is 7 for **PANTONE** ink books, and 4 for the **process** ink book).
10. Click the **Proof** button to send the ink book/ink patches to your proofer.  
If there is any feedback from your proofer, you will see it next to the **Proof** button.

### 8.6.3. Exporting Inks and Ink Books to PDF

If you want to print inks or an ink book on a device that your Color Pilot application is not connected to (or if you want to print it later), you can export those inks/that ink book as a PDF.

If a customer is hesitating between different ink sets for their job, you can simulate their job's spot colors using different color strategies (for example CMYK vs. [expanded gamut printing](#)), to help them make a decision based on both quality and cost.

1. You can either:

- select one or more inks/an ink book and click the **Print to File** tool  in the bottom tool bar,
- right-click one or more selected inks/an ink book and choose **Print to File...**
- dragging one or more inks/an ink book onto the **Print to File** tool,
- dragging one or more inks from the Picker onto the **Print to File** tool.

**Note:** You cannot print more than one ink book at once to PDF. If you have selected more than one ink book, you will see a dialog asking you to choose only one.

2. On the **PDF** tab of the **Print to File** dialog, select the **Maximum Page Width** and **Maximum Page Height** that your PDF can have.

These shouldn't be bigger than the substrate you will print your PDF onto.

3. Select the **Color Strategy** you want to use.

This can be for example:

- a proofing color strategy if you want to print the PDF on a proofer,
- a digital printing color strategy if you want to print the PDF on a digital press,
- an Equinox color strategy if you want to print the PDF on a press set up for [expanded gamut printing](#).

For more information about color strategies, see [Working with Color Strategies](#) on page 216.

4. On the **Ink Book** tab, choose if you want to **Print**:

- the **Entire Ink Book** (this is selected by default if you selected a whole ink book when opening the **Print to File** tool).

You can see all of the ink book's inks in the **Inks** list below.

**Tip:** You can see the ink book's total number of pages next to **Current Ink Book**.

- a **Page Range**; then enter the page range in the following format:

- 1, 3, 5 to print pages 1, 3 and 5,
- 1–5 to print pages 1 to 5,
- 1, 3–5 to print pages 1 and 3 to 5.

Press **Enter** or **Tab** to see the inks that will be printed in the **Inks** list.

- an **Ink Selection** (this is selected by default if you selected one or more inks when opening the **Print to File** tool).

Then use the **+** or **-** buttons to add or remove inks from the **Inks** list.

5. On the **Layout** tab, choose the **Layout Style** to use: **PANTONE Ink Book Format** or **Small Ink Book Format**.

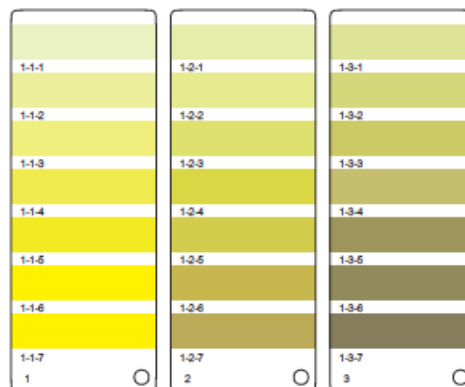
Both formats display the ink patches in one or more vertical strips. Each strip is surrounded by a black line, shows the ink name under each ink patch and the page number from the ink book at the bottom of the strip.

- The **PANTONE Ink Book Format** displays ink patches to resemble a physical PANTONE ink book. Ink patches are 42 x 17 mm with 9 mm between two patches.





- The **Small Ink Book Format** display ink patches in a more compact way, using less paper. Ink patches are 30 x 7 mm with 3 mm between two patches.



6. Choose what to do with **Empty Patches**. You can either:

- select **Include, preserving ink book layout** if you want to print the ink patches in the order you see them in the ink book (one strip will be printed for each ink book column. Strips may contain empty patches).



**Attention:**

An ink book **column** is displayed as a **row** of ink patches in the **Ink Books** library.

PANTONE ink books have 7 ink patches per column and 1 column per page. Other ink books may have a different number of ink patches and columns per page.

- select **Skip them, minimizing paper use** if you want to only print patches containing inks (one strip may then contain patches from more than one column, if some columns had empty patches).

**Note:** Empty pages and empty columns are always skipped.

7. If desired, add some extra information to the PDF:

- the **Output values** (from your color strategy) that are used to print each ink;
- which ink patches cannot be satisfactorily simulated by the color strategy (select **Mark 'out of gamut' inks** for this);

**Note:**

This is calculated by comparing the *expected Delta E* of the inks in the PDF to your *Delta E* tolerance for out of *gamut* colors.

By default, the tolerance used is the one you have set in the Preferences for the type of color strategy you are using. See:

- [Delta E tolerance for proofing color strategies](#),
- [Delta E tolerance for digital printing color strategies](#),
- [Delta E tolerance for Equinox color strategies](#).

However, you can [change it here](#) if desired.

- the ink book column numbers next to the page numbers, in the format `page number-column number` (select **Column and page numbers**);
- the **Expected ΔE** between the ink in your color database and the ink simulated by your color strategy in the PDF.


The **ΔE Formula** used for calculating this is the formula [from your color strategy](#).

If you have selected **Mark 'out of gamut' inks**, you can adjust the **Tolerance** to use if desired.

**Note:** You can only add **Output values**, **Expected ΔE** and **Mark 'out of gamut' inks** when printing with the **PANTONE Ink Book Format**.

8. In **Patches per Strip**, select how many ink patches you want to print per vertical strip: either a custom number or the value **from the ink book** (how many ink patches the ink book contains per column; for example, this is 7 for **PANTONE** ink books, and 4 for the **process** ink book).
9. Click **Save** and choose a location and name for your PDF file (by default, the name of the ink book is used).

## 8.7. Check Gamut

The **Check Gamut** tool  is available in the bottom tool bar of the **Ink Books** and **Color Strategies** libraries.

You can use it to:

- check how inks will be converted by a color strategy, and if the resulting output coordinates fall within the strategy's output profile.  
This will help you judge whether a spot color will be accurately reproduced on your digital press or proofer.
- compare the *gamuts* of a color strategy's input and output profiles, to see whether all colors in the input profile can be matched by the output profile.


1. Open the ink(s) and the color strategy you want to work with in the **Check Gamut** tool.

To do this, you can start either from the **Ink Books** library or the **Color Strategies** library:

If you are starting from...	do the following...
<b>the Ink Books library</b>	<ol style="list-style-type: none"> <li>1. Select the ink(s) or whole ink book to check.</li> <li>2. Click the <b>Check Gamut</b> tool in the bottom tool bar (or right-click the ink(s)/ink book and select <b>Gamut Check</b>).</li> <li>3. In the dialog that opens, select the color strategy or strategies to check the inks against and click <b>Select</b>.</li> </ol>
<b>the Color Strategies library</b>	<ol style="list-style-type: none"> <li>1. Select one or more color strategies to use for the check.</li> <li>2. Click the <b>Check Gamut</b> tool in the bottom tool bar (or right-click the color strategy/strategies and select <b>Gamut Check</b>).</li> <li>3. Click the <b>+</b> button at the bottom of the <b>Conversion Table</b>, select the ink(s) to check and click <b>Add</b>.</li> </ol>


This opens the **Gamut Check** dialog.

2. Check how each ink will be converted by the color strategy (see [Checking the Spot Color Conversion](#) on page 133 for details).
3. Check where the inks are in the gamut (see [Checking if the Colors are in Gamut](#) on page 134 for details).
4. Change the ink list if desired (for example to add inks from a different ink book). You can:

- click **+** to add one or more ink(s) to check (use **Shift** or **Ctrl** to select several inks),
- drag and drop one or more inks from the Picker,
- click the **More Actions** button  and select **Add all Inks from an Ink Book** then select the ink book,
- click the **More Actions** button and select **Add Inks from a PDF file...**, then browse to the (Normalized or regular) PDF, remove any inks you don't want to add and click **OK**,

**Note:**

Inks that are not present in your ink books library will appear as **<unregistered>**. This does not affect the gamut check if the PDF file contains color information for these inks.

If it doesn't, you will see a missing ink icon . You will not be able to check such inks against your color strategy/strategies.

- select an ink and click **-** to remove it (if you have many inks, you can use the **Search** field to find it),
- click the **More Actions** button and select **Clear All Inks** to remove them all.

**5.** If desired, you can add more strategies to check your inks against by either:

- clicking the **+** button at the bottom of the **Strategies** list and choosing one or more strategies in the dialog that opens (use **Shift** or **Ctrl** to select several strategies),
- clicking the **More Actions** button, selecting **Add all strategies that have a certain destination profile...** then selecting the relevant output profile in the dialog that opens. You will see the names of the color strategies with that profile in a pop-up, click **OK** to confirm.

This is useful for example if you have created several strategies from a single press or proofer profile but using different ink sets (with some strategies having some output profile inks switched off).

To remove color strategies from the list, either select them and click **-**, or click the **More Actions** button and select **Clear all strategies in the list**.

See [Checking if the Colors are in Gamut](#) on page 134 for how to check where inks fall in the different strategies' output profiles.

To help you choose the best strategy for your inks, you find extra information in the **Best Strategy** and **Separations** columns:


- The number in the **Separations** column shows how many separations from the strategy are used to print all the inks in the conversion table.
- In the **Best Strategy** column, you will find a mark next to the strategy that best fits your inks. To calculate which is the best strategy, strategies are compared as follows:
  - If there are strategies for which all inks are in gamut, the strategy with the lowest number of inks is selected.
  - If there are no strategies for which all inks are in gamut, the list is searched for a strategy that has the lowest number of inks, but without a significant increase in Delta E for any ink.

**6.** You can also save a report if you want to share the results of the gamut check with colleagues that don't have access to a Color Pilot application.

For example, you can send the report to your commercial colleagues so they can check:

- which spot colors can be reproduced accurately on your device(s),
- which ink set needs to be used to reproduce certain spot colors.

To save a report:

- a) Click the More Actions  button and select **Save Report...**
- b) Choose the name and location of the report file.

It is saved as a text file.

7. Click **Done** when you are finished checking.

## 8.7.1. Checking the Spot Color Conversion

In the **Gamut Check** view, you can check how each ink will be converted by your color strategy (if you have many inks, use the **Search** field to find a specific one).

If you selected several color strategies, highlight the one you want to see conversion details for in the **Strategies** list.

In the **Conversion Table**, you can see:

1. Color patches (next to each ink name) showing the difference between the original and the converted color visually.

**Tip:** Select an ink to view a bigger version of its color patches in the **Color Info** area at the bottom left. This also shows the Lab and LCh values of both original and converted color.

2. How each ink will be reproduced using percentages of the output inks.
3. Whether the ink is in the color strategy (as an exception/color build) or not.

For more information, see:


- [exceptions in proofing color strategies](#)
- [exceptions in digital printing color strategies](#)
- [color builds in Equinox color strategies](#)

4. The color difference between the original and the converted color (**Predicted  $\Delta E$** ).

The higher the *Delta E*, the further out of *gamut* the color is.

**Note:**

- This is calculated using the  **$\Delta E$  Formula** of the color strategy you selected (you can see this formula under the **Conversion Table**).

If you have several color strategies using different Delta E formulas in the **Strategies** list, you will see a warning icon , and the conversion table will use the Delta E formula of the first strategy you added.

- If you have refined a spot color by measuring color values, you will see the **Measured  $\Delta E$**  instead of a **Predicted  $\Delta E$** .

- a) If desired, you can adjust the Delta E **Tolerance** to use (above the **Conversion Table**).

This is the color difference under which you consider colors to be "on target" (meaning that they can be reproduced accurately).

**Note:**

By default, this is the Delta E tolerance you have set in the Preferences for the type of color strategy you are using. See:

- [Delta E tolerance for proofing color strategies](#)
- [Delta E tolerance for digital printing color strategies](#)
- [Delta E tolerance for Equinox color strategies](#)

- Predicted Delta E values lower than your tolerance are shown as `Less than` the tolerance. This is because very low theoretical Delta E values may not be achievable in a real life setup (due to device instability and/or imperfections in the color strategy's output profile).
- Predicted Delta E values higher than your tolerance will have a warning icon ⚠.

**Note:**

You will see a warning icon but no Delta E (as we can no longer calculate nor guarantee the color accuracy) for inks that:

- have been refined or stabilized in the color strategy,
- use a double strike (with the **Custom values** option in the color strategy's exceptions list),
- are extra output inks (they have the **Keep in Output** option in the color strategy's exceptions list),
- will not be output (they have the **Do Not Print/Do Not Proof** option in the exceptions list).

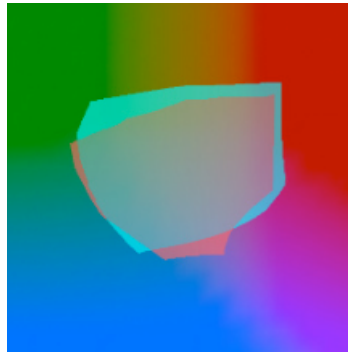
You can hover on the warning icon for more information.

- b) You can click the **Predicted ΔE** column to sort the inks by increasing or decreasing Delta E.
- c) In the **Strategies** list at the top of the window, you can see the percentage of **Inks within tolerance**, and the **Average** and **Maximum ΔE**.

### 8.7.2. Checking if the Colors are in Gamut

On the left of the **Gamut Check** dialog, you can see a *gamut* plane. The gamut plane is a 2D section of the Lab color space at a certain lightness or hue. On this gamut plane you can see a 2D section of the color strategy's source and destination profiles' gamuts.

If both source and destination profiles are identical, you will see one profile area in the gamut plane. If they are not, you will see two profile areas partially overlapping.



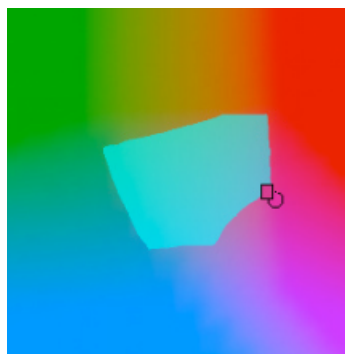
1. You can check how much of the source profile's gamut is covered by the destination profile. If the source profile's area is completely enclosed in the destination profile's area, then all colors of the source profile can be reproduced by the device corresponding to the destination profile.
2. To change the gamut plane (and the corresponding 2D section of the profiles) displayed, do the following:
  - To show a gamut plane at a certain hue, click the **lightness** link to change it to **hue**, then enter a hue value in the numeric field or use the vertical slider (the arrow on the slider shows the current position).
  - To show a gamut plane at a certain lightness, click the **hue** link to change it to **lightness**, then enter a hue value in the numeric field or use the vertical slider.

The default gamut plane has a lightness of 43.

**Tip:** You can hide the source profile's area by deselecting the **Source Profile** option at the top (or hide the destination profile's area by deselecting **Destination Profile**).

3. You can also select spot colors in the **Conversion Table** to see where they fall relative to the destination profile's gamut.

For example, the original color below (shown by a circle) falls outside the gamut, but the converted color (shown by a square) is just in the gamut.



You can also see where the converted color is in the lightness or hue range on the slider.

**Tip:**

- Click the **Options** link and then **Show labels** to show a name label for each original color.
- Drag and drop the divider between gamut plane and conversion table to the right to make the gamut plane image bigger.

4. If it is difficult to see where an original or converted color falls relative to the output profile on the current gamut plane, you can go to the gamut plane containing the color by:
  - changing the gamut plane as explained in step 2,
  - clicking the icon on the gamut plane (click the circle to see the gamut plane containing the original color or the square for the gamut plane containing the converted color),
  - right-clicking the color and selecting **Jump to Plane** (to see the gamut plane containing the converted color).

5. If you have added several color strategies you want to check the inks against (see [Check Gamut](#) on page 131), by default only the first color strategy is shown in the gamut plane.

To view where the inks fall in the different strategies:

- a) Select the strategy or strategies to check in the **Strategies** list (the selected strategies have a check mark in the **Visibility** column).

When selecting several strategies, you will see their destination profiles on top of each other in the gamut plane. Each is in a different color and you can see which strategy's destination profile is shown in which color in the **Strategies** list.

- b) Select the inks to check in the **Conversion Table**.

You can then see which color strategy will help reproduce your spot colors the best.



## 9. Working with Profiles

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### 9.1. What is a Profile?

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#### Devices and Color Spaces

Different devices (a digital camera, computer monitor, proofer, press...) display or reproduce colors in different ways.

Colors in photographs are generally defined in the **RGB** color space (Red, Green, Blue), and monitors also use RGB to display colors.

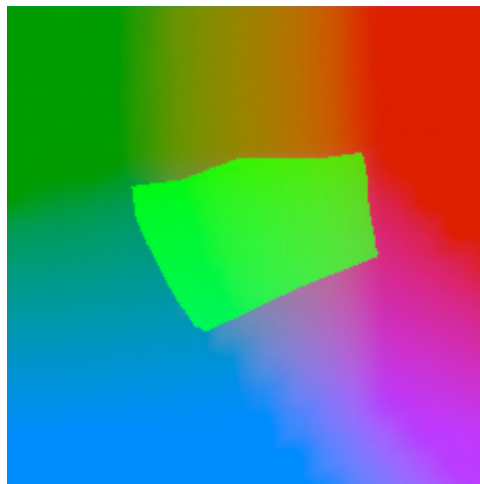
Proofers and presses use **CMYK** (Cyan, Magenta, Yellow and Black -or "Key") for printing, and sometimes additional inks (for example Orange, Green and Blue, to be able to reproduce more colors, or one or two **spot colors** -generally Pantone inks- used in a particular file).

Files coming from a graphic designer may contain CMYK, spot colors and sometimes images in RGB.

#### Devices' Profiles

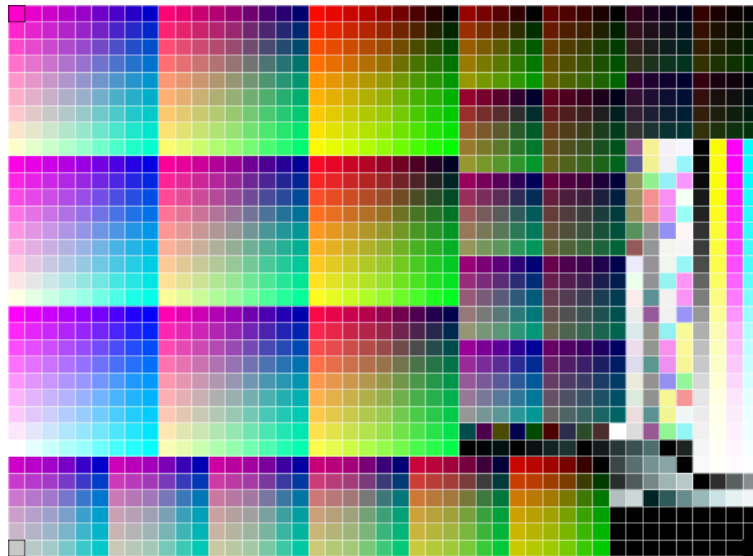
Even within one color space, different devices can reproduce colors differently. For example, two CMYK proofers from different brands may print completely differently.

A device's **gamut** is the totality of the colors that device can reproduce (for example, the area shown in light green below).



This is captured in the device's **profile**, which describes all the colors achieved when using different combinations of percentages from the base colors (RGB, CMYK, or CMYK + extra colors).

To create a profile for a press or proofer, you need to print and measure a profiling chart containing these combinations of percentages.



You can use different profiling charts **layouts**, depending on your device's ink set, your substrate size, the spectrophotometer you use to measure your chart...

For more information, see also:

- [Profiling Your Proofer](#) on page 148
- [Profiling Your Digital Press](#) on page 159
- [Profiling Your Conventional or Equinox Press](#) on page 180
- [Working with Overprint Charts](#) on page 345

## 9.2. Using Profiles for Color Management

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You need to have a profile for **each of your devices** to perform color management.

**Note:**

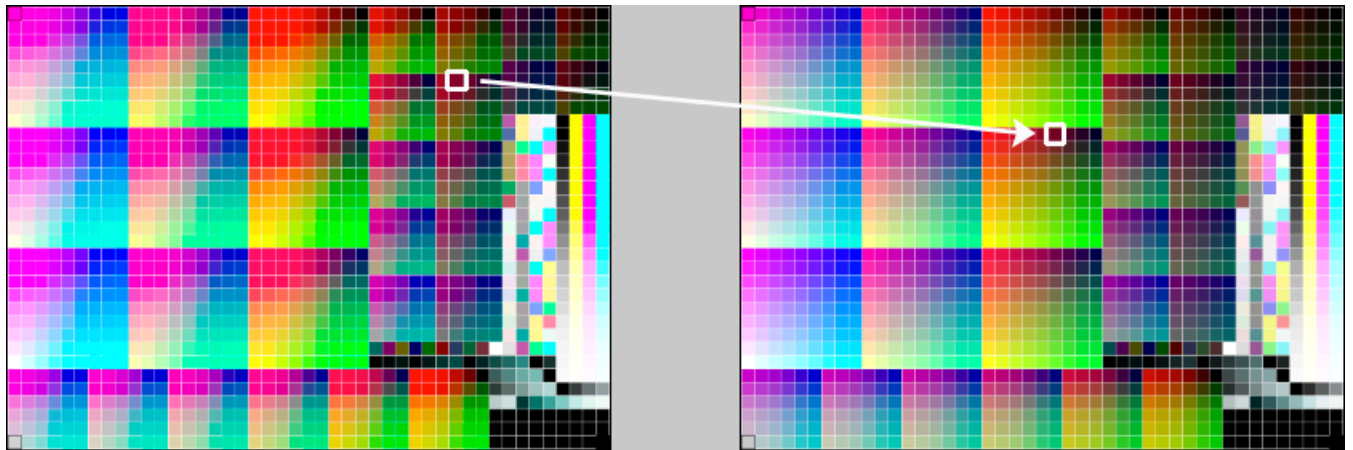
Proofers and presses' profiles need to reflect the device's exact printing characteristics (inks, substrate...).

So if for example you change your substrate, you need to make a new profile taking that substrate into account.

Once you have made the profiles, you can perform a **controlled conversion** of the colors between the different device profiles.

For example if you are printing a photograph, you need to convert its colors from the digital camera's RGB profile (the **source profile**) to the printer's CMYK profile (the **destination profile**).

This means that every color in the source profile is converted to the closest possible color that can be reproduced by the destination profile.

**Note:**

If you want to proof a file that will be printed on your press, you are trying to reproduce your **press'** colors on your **proofer**.




This means that the press profile is your **source** profile, and the proofer profile is your **destination** profile.

## 9.3. Your Profiles Library

You can see all the profiles present in your [color database](#) in Color Pilot's **Profiles Library**. It contains predefined profiles that came with your color database, and any profile you have created.

**Note:** If you are [working with a data center](#), you will need to unlock the database before making any changes to profiles. See [Making Changes to the Database](#) on page 69 for more information.

For each profile, you can see:

- an icon indicating the profile format (see [Profile Formats](#) on page 140),
- the **Profile Name**,
- whether the profile is read-only , has been edited , or is not fully set up ,
- the **Kind** of profile it is (see [Profiles for Different Kinds of Devices](#) on page 140),
- the profile's **Ink Set**,
- any **Keywords** you assigned to the profile (see [Keywords](#) on page 36).

You can sort the list of profiles by column (for example by **Ink Set**), or [search](#) for a specific profile if desired.

### Creating a Profile

Depending on your license, you can create one or more types of profiles from the **Profiles Library**. See:

- [Profiling Your Proofer](#) on page 148,


- [Profiling Your Conventional or Equinox Press](#) on page 180.
- [Profiling Your Digital Press](#) on page 159,

### Managing Your Profiles

You can right-click a profile and:

- **Open** it to see more detailed information (you can also double-click it). See [Profile Information](#) on page 141.
- **Delete** or **Rename** it.

**Note:**

- You cannot delete or rename read-only  profiles.
- If the profile has a link to another color object (for example, it is used by a color strategy), you will see a warning showing where it is being used, and you will not be able to delete or rename it.

- **Duplicate** it (this adds    (2) to the name of the duplicate but we recommend you rename it to something meaningful).
- **Export** it, or **Import** another profile into your **Profiles Library**. (See [Exporting Profiles](#) on page 211 and [Importing Profiles](#) on page 213).
- See where the profile is used (select **Show Links**).
- **Add** or **Remove Keywords**.

## 9.3.1. Types of Profiles

### Profiles for Different Kinds of Devices

By default, your color database contains:



- **Monitor Profiles** to view inks on screen,

**Note:** Even with a good monitor profile, viewing an ink on a screen can never be completely color accurate.

- **Press or Proofer Profiles** for conventional presses, digital presses or proofers.

Among those profiles, you can find industry standard press profiles, that you can use as reference profiles.


### Profile Formats

-  **ICC profiles** are written in a standard format that is OS independent, and typically created by third party applications.
-  **Esko profiles** are measured using larger charts, so they contain more detailed information than ICC profiles.

When you create a [proofing profile](#) or a [digital press profile](#) in Color Pilot, it's an Esko profile.

- **Equinox profiles** are measured using larger charts (and additional charts for multicolor profiles), and processed to improve the profile's quality (see [Overcoming the Challenges of Press Profiling](#) on page 182).

You can also create an [Equinox profile](#) for your conventional or [expanded gamut printing](#) press.

**Note:** Equinox profiles that you have started working on but not completed have an orange spanner . You need to complete these profiles before you can use them on your press.

Both ICC and Esko profiles can be RGB, CMYK, multicolor... Equinox profiles are typically multicolor, but can be made for CMYK presses as well.

### Spectral and XYZ Profiles

- **Spectral profiles** are measured with a spectrophotometer, that measures the reflection of each color in the profile for every wavelength of the visible light. This means that spectral profiles contain a lot of information about the colors the profile can reproduce.

From that information, Color Pilot can calculate [Lab values](#) for each color, for a certain illuminant and observer (typically D50 and the standard observer are used).

When you create a profile in Color Pilot, it's a spectral profile.

- **XYZ profiles** are measured using a single illuminant and observer, so they contain less information than spectral profiles.

ICC profiles and some older Esko profiles (for example monitor profiles) are in the XYZ data format.

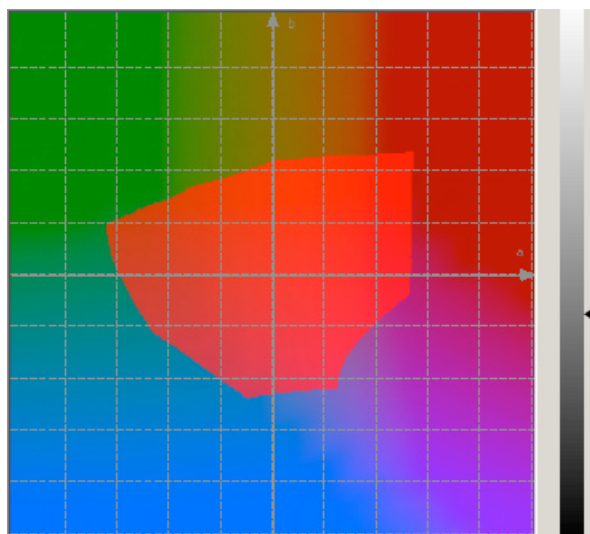
You can see whether a profile in your color database is spectral or XYZ in the [Profile Information](#) view.

## 9.3.2. Profile Information

To see more information about a specific profile:

1. Right-click it in the **Profiles Library** and select **Open** (or double-click it).
2. On the left, you can see a 2D section of the selected profile on a [gamut](#) plane.

The gamut plane is a 2D section of the Lab color space at a certain lightness or hue.



To view other 2D sections, do the following:

- To view a gamut plane at a certain hue, click the **Lightness** link to change it to **Hue**, then enter a hue value in the numeric field or use the vertical slider (the arrow on the slider shows the current position).
- To view a gamut plane at a certain lightness, click the **Hue** link to change it to **Lightness**, then enter a lightness value in the numeric field or use the vertical slider.

The default gamut plane has a lightness of 43.

3. On the right, you can see more information about the profile (some profiles may have less information):

- the profile's **Name** and **Kind (Monitor Profile or Press or Proofer Profile)**,
- when the profile was **Created** and if it was **Edited** since,
- the profile's **Ink Set**,
- its **Data Type** (this can be **Spectral** or **XYZ**, see [Spectral and XYZ Profiles](#) on page 141),
- the **Spectrophotometer** used to measure the profile,
- the **Geometry** of that spectrophotometer (the angle of the light source and the sensor in the spectrophotometer),
- the **Measurement Condition** that was set on that spectrophotometer (see [Measurement Conditions](#) on page 74),
- the **Chart** used to measure the profile,
- the **Output Device** and **Substrate** the profile was made for,
- (for proofer profiles) the **Linearization File** used (see [EPL](#)),
- (for some digital presses profiles) the **Screening** and **Ink Type** used on press when making the profile.
- (for some digital presses profiles) the **Ink Limitation Set** associated with the profile (see [Working with Ink Limitation Sets for Digital Presses](#) on page 359).

4. Under the gamut plane, you can see the **Profile's Inks**, and the **Ink Book** they come from.

5. You can also inspect the profile's measurements.



See [Viewing a Profile's Measurements](#) on page 143.

**Note:** You can view any profile's measurements except for [ICC and/or Monitor profiles](#).

6. If desired, you can edit the ink definition of one (or more) of the inks used in your profile.

See [Editing One of Your Profile's Inks](#) on page 145.

**Note:**

You can only edit inks in  Esko or  Equinox profiles that:

- are *spectral profiles*,
- are not read-only ,
- are not currently used for color management (attached to a device, used in a color strategy...).

7. To go back to the **Profiles Library**, click the **Done** button (or the **Profiles** link at the top left).

### Viewing a Profile's Measurements

To inspect your profile's measurements, click  **View Measurements** at the bottom of the *Profile Information* view.

**Note:** You can view any profile's measurements except for *ICC and/or Monitor profiles*.

In the **Measurements View**, you can:

1. Change the **View** to **Layout** or **Profile**.
  - The **Profile** view displays the patches as they are organised in the profile. This view is useful to spot inconsistencies in the profile.
  - The **Layout** view displays the patches as they have been measured on the chart. This can be useful to locate a particular patch on the chart.

**Note:**

If Color Pilot doesn't have the *layout* information for your profile (for example if the **spectrophotometer** or **chart** used to measure the profile are unknown because it was measured in a third-party application), you will get a pop-up dialog asking you to fill in the missing information.




Select **Save these settings in the profile** to always use this layout for this profile.

**Note:**

For digital press profiles, if you *printed each patch several times*, the **Profile** view shows the averaged measurements (there is one patch per ink percentage combination, which is an average of all measurements for that ink percentage combination).

The **Layout** view shows the original measurements (all the patches measured for each ink percentage combination).

As a result, Lab values for the same patch may differ between Layout and Profile view.

2. Click/hover on a color patch to see its **Lab/LCh** and **CMYK(OGV)** values.
3. Zoom in  and out  or preview the whole chart .
4. Edit the profile's white point (if you want to simulate printing on a different substrate).

See [Editing a Profile's White Point](#) on page 144.

5. Remeasure or repair a patch that looks wrong.

See [Remeasuring or Repairing a Patch](#) on page 144.

Click **Close** to go back to the **Profile Information** view (or **Save and Close** if you have made any change to the measurements).

To go back to the **Profiles Library**, click the **Profiles** link at the top of the window.

### Editing a Profile's White Point

The profile's white point (0% of all profile inks) corresponds to the color of its substrate. You can edit the profile's white point if you want to simulate printing on a different substrate.


1. In your profile's [measurements view](#), click **Edit White...**
2. In the dialog that opens, edit the white point's **Lab/LCh** values as desired.  
You can see a preview of the **Current** and **New** color, and the **Delta E** between the two.

**Note:** You can change the Lab values by a maximum of  $\pm 15$ .

3. Click **OK** when you are done.  
All of your patches values are recalculated based on your new white point.

**Note:**

You can only do this for profiles that:

- are [spectral profiles](#),
- are not read-only ,
- are not currently used for color management (attached to a device, used in a color strategy...).

4. If you are done making changes to your profile, click **Save and Close** (you can also **Revert** your changes).

In the **Profiles Library**, you will see a pencil icon  next to your profile, to indicate it has been edited.

### Remeasuring or Repairing a Patch

If needed, you can remeasure or repair a patch in your profile's [measurements view](#).

- To remeasure a patch, select it and click **Measure again....**

Then follow the instructions in the **Measure patch again** dialog.

**Tip:** This is useful you have spotted an error after completing the profiling wizard.



**Note:**

Re-measuring a patch is only useful if there has been a bad measurement:

- For errors on the printout, use the **Repair** function instead.
- For a larger number of errors, rerun the profiling wizard and re-measure the entire chart.

- To repair a patch, select it and click **Repair** (or use **Ctrl + R**).  
The correct measurement is calculated based on data from the surrounding color patches.

If you are done making changes to your profile, click **Save and Close** (you can also **Revert** your changes).

In the **Profiles Library**, you will see a pencil icon  next to your profile, to indicate it has been edited.

### Editing One of Your Profile's Inks

In certain cases, you may want to edit the ink definition of one (or more) of the inks used in your profile. For example:

- You notice that when you profiled your press, one of the inks printed a bit differently than usual, and you want your profile to reflect how your press usually prints.



**Tip:** To check this, we recommend measuring the color strips of your production jobs over a period of time, then comparing the color values you typically get with the ink's color values in your profile.


- You want to use the ink specification from your ink manufacturer in your profile instead of the ink color you measured on press.
- You are using a slightly different formulation of an ink to print on a different substrate.

**Note:** In this case, you should also [edit the profile's white point](#) (which corresponds to the substrate).

- You want to use a different ink for a specific job (for example a red instead of an orange), but you don't want to make a new profile for this.

**Note:**


You can only edit inks in  Esko or  Equinox profiles that:

- are *spectral profiles*,
- are not read-only ,
- are not currently used for color management (attached to a device, used in a color strategy...).

1. We strongly recommend you make a copy of your profile before editing any of its inks (as once you save your changes, you will not be able to revert the profile to its original state).

To do this, right-click your profile in the **Profiles Library** and select **Duplicate**.

2. Double-click your profile to open the *Profile Information* view.




3. Under **The Profile's Inks**, select the ink you want to edit and click the **Edit Ink**  button.

4. In the **Edit Ink** view, you can see:

- the **Lab/LCh** values of the your chosen profile ink,

- a patch of the solid,
- a **Preview** of the profile patches that use this ink.

**Tip:**

- Click a patch to see its **Lab/LCh** and **CMYK(OGV)** values.
- Zoom in  and out  or preview the whole profiling chart .

5. You can edit the ink definition by either:

- [Copying another ink's color values](#).
- [Measuring a printed patch of the ink solid](#).
- [Editing its Lab/LCh values manually](#).

Color Pilot recalculates all the profile patches (solid and overprints) that use that ink.

6. When you are done editing your ink, you can [inspect your changes](#).

7. If you are satisfied with your changes, click **Save and Close**.

You can also **Revert** your changes.

In the **Profiles Library**, you can see a pencil icon  next to your profile, to indicate it has been edited.

### Copying Another Ink's Values

You can [edit one of your profile's inks](#) by copying another ink's color definition.

1. In the **Edit Ink** view, select **Copy the ink definition from an existing ink**.
2. Click **Select Ink...**
3. In the dialog that opens, select the ink you want to use.

You can also use the **Search** field.

**Note:**


- If you select an ink with [measured tints](#), the tints will be also used to update your profile.
- If you select an ink measured on a different substrate than the one from your profile, that ink's color values will be recalculated for the profile's substrate.

4. The solid patch, the **Preview** and all color values are updated automatically so that you can [inspect your changes](#).

### Measuring the Ink's Solid Patch

You can [edit one of your profile's inks](#) by measuring a printed patch of the ink solid.

1. Make sure your spectrophotometer is set to the same [measurement condition](#) as the one used to measure your profile.
2. In the **Edit Ink** view, select **Measure the solid**.
3. Click **Measure...**
4. Follow the instructions from the **Measure Sample** pop-up.

**Tip:** If necessary, you can use the **More Actions** button  to reconnect or calibrate the spectrophotometer, or change its measurement condition.

After pressing the measurement button on the spectrophotometer, you can see a preview patch and the ink's Lab/LCh values.

5. If you are satisfied with the measurement, click **OK**. If not, you can remeasure your patch.
6. The solid patch, the **Preview** and all color values are updated automatically so that you can [inspect your changes](#).

### Editing the Ink's Lab/LCh Values

You can [edit one of your profile's inks](#) by editing its Lab/LCh values manually.

1. In the **Edit Ink** view, select **Change the Lab/LCh values**.
2. Then either:
  - edit the absolute **Lab** or **LCh** values using the **L, a, b**, or **L, C, h** fields (see [Lab](#) or [LCh](#) for more information about how those color spaces work),
  - select **Difference** to enter the difference between the initial values and your desired values (for example, enter 5 in the **L** field to add 5 to the lightness value, or -5 to subtract 5).

**Note:** You can change the color values by a maximum of +/- 15 Lab, and you cannot go beyond the [borders of the Lab color space](#) (for example, you cannot go under 0 L or over 100 L).

3. The solid patch under the color values and the **ΔE** between the two colors are updated automatically.
4. Click **Update Preview** when you are done editing the ink so you can [inspect your changes](#).

### Inspecting Your Changes




After [editing one of your profile's inks](#), we recommend you inspect the color changes in your profile.

- On the left pane, you can see the **Current** (existing) and **New Lab/LCh** values of your ink's solid. Select **Difference** to see the difference (for example a : -0, 7) instead of the absolute Lab/LCh values.
- You can also see the color difference visually in the solid patch below the Lab/LCh values (with the existing color on the left and the new color on the right).
- Color Pilot also displays the **ΔE** between the two colors. By default, it uses the Delta E formula you chose in the [Preferences](#), but you can select a different formula at the bottom right of the window.
- On the right pane, you can view all of the profile's color patches in the **Preview**.

You can choose to display the patches **Before**, **After** or **Before and After** editing the ink.

If you choose **Before and After**, the patches will be split diagonally, showing the existing color at the top left, and the new color at the bottom right.



You can zoom in  and out , or preview the whole profiling chart .

- You can click a patch to see more information about it:
  - its new **CMYK(OGV)** values,
  - its Lab/LCh values **Before** and **After** your changes,
  - a bigger patch with both colors side by side,
  - the **ΔE** between the two colors (you can change the **ΔE Formula** if desired).

## 9.4. Profiling Your Proofer

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You first need to set your proofer up in Fiery Command Workstation (the client application of the Esko Proof Server): set the substrate, the EPL file, and proofer-specific options... (see the Esko Proof Server documentation on the [Pack Proof product page](#) for more information). After that, you can create a profile for your proofer in Color Pilot.

You create a profile by printing a chart containing many color patches made up of different ink combinations, then measuring that printed chart with a spectrophotometer to know how your proofer printed those ink combinations.

This doesn't only tell you how your proofer prints, but also the range of colors (or gamut) you can achieve with that particular proofer and substrate.

You can either create a proofer profile:

- from the **Profiles Library** (as explained below),
- from the **Proofer** view, when setting up your proofer (see [Creating a Profile for Your Proofer](#) on page 387).


1. Go to the **Profiles Library**.

2. Click the  **New Proofer Profile** button in the bottom tool bar.

3. In the dialog that opens:

a) Select the **Proofer** you want to profile.

For each proofer, you can see:

- the **Ink Set** used on your proofer,
  - the **EPL Filename** of the [linearization file](#) it uses,
  - whether it already has an [unfinished profile](#)  (if you started making a profile earlier on but didn't complete the process).
- b) Click **Select**.


4. The **Create Profile for Proofer** wizard opens.  
It will guide you through the profile creation in three steps:
  - [Get Started](#) on page 149,
  - [Measure](#) on page 153
  - [Summary](#) on page 159
5. At any time, you can save your unfinished work and continue later. This way you can perform other tasks in the meantime, or safely close the Color Pilot and resume the session after starting up the application again later.



**Attention:**

You can only save one unfinished task per proofer, whether it is a profile, check and recalibration, or a spot color refinement.

This means that you cannot save another unfinished task before either finishing or discarding the first one.

- a) Click **Quit Now and Continue Later**. Confirm your choice by clicking **Yes**.  
The profiling wizard will close.
- b) When you are ready to resume the profiling, click  **New Proofer Profile** again and select your **Proofer** again.

You will see an orange icon  next to your **Proofer Name**, indicating that there is an unfinished profile attached to it.

**Note:** You can also see this in the [Proofers view](#).

- c) Click **Select** then choose whether you want to:
  - **Resume** the profiling wizard from the point at which you saved the unfinished profile (you cannot go back and change earlier settings),
  - discard your unfinished profile and start creating a new profile instead (click **Start New Session**).

At any point, you can click **Quit Now and Continue Later** again to save your unfinished profile in a different state (this discards the previous state of your unfinished profile).

### 9.4.1. Get Started

In the **Get Started** step of the **Create Profile** wizard, you print a profiling chart adapted to the ink set you are using (and the substrate set in Fiery Command WorkStation) on your proofer.

1. Color Pilot selects the chart best suited to your proofer settings and displays a preview.

For multi-page charts, you can use the **Page** arrows at the top to view the different pages.

**Note:**

If you have selected *Enable overprint chart selection when creating a proofer profile* in the Preferences, you can define the profiling chart to use yourself.

See *Using a Custom Profiling Chart* on page 150.

2. If desired, adjust the proof settings to change how the chart will be printed:
  - a) Click **Proof settings...** under the chart.
  - b) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
  - c) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
  - d) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
  - e) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
    - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.
    - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see feedback until the moment your chart is sent to the Proof Server, but no feedback that it has been proofed).
  - f) Click **OK**.
3. Click **Proof Chart** to send the chart to the Esko Proof Server and output it on your proofer.
4. Click **Next** to go to the **Measure** step.

### Using a Custom Profiling Chart

If you have selected *Enable overprint chart selection when creating a proofer profile* in the Preferences, you can define the chart you want to use for profiling your proofer:

1. Choose the **Chart Size** to use (**Normal** or **Large**).  
 When choosing **Large**, the chart will contain more combinations of ink percentages (this is only available when profiling a CMYK proofer).
2. In **Layout Type**, select the chart *layout* that you want to print.
  - If you want a chart generated on demand, choose **Automatic**.  
 This takes into account your ink set, your substrate width and the dimensions that your spectrophotometer can measure (if your spectrophotometer is connected).

**Note:** If your chart is much narrower than the substrate (for example if it is generated for a Barbieri Spectro Swing, that can only measure narrow sheets), your chart print out will contain extra margins and cutting lines.

When working with a chart generated on demand:

1. Select the **Patch Set** to use:

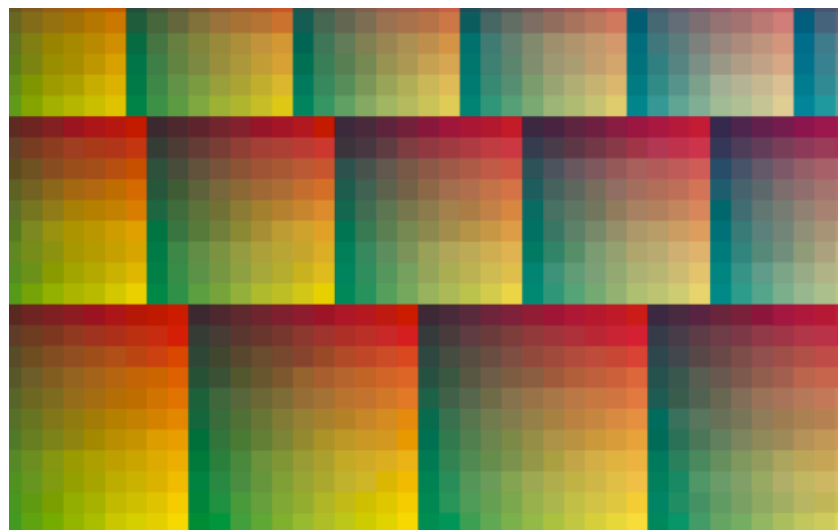
- if you are profiling a CMYK proofer, you can choose between **IT8.7/3**, **ECI 2002** and **Normal (non\_uniform, 3 inks + K)**,
  - if you are profiling a multicolor proofer, you can choose between **Normal** (a larger patch set containing more CMYK patches), **Equinox** (a smaller patch set containing slightly more extended gamut inks -for example OGV when profiling a CMYKOGV proofer) patches, or additional patch sets for certain proofers,
  - if you have created a [custom patch set](#) for your proofer's ink set, you can select it here.
- 2.** Choose how many times you want **Print Each Patch** (you can set a number from 1 to 5).

If you print each patch several times, Color Pilot can **average** the values of several measurements for each patch, to minimize the effects of potential printing problems or bad measurements.

- 3.** Select whether to **Randomize patches** when printing your chart. This will "scramble" the patches instead of printing them in the order of a gradation.

We recommend you do this if your proofer has noticeable printing variations (for example left to right, or sheet start to sheet end printing differences).

If for example you have "color jumps" near the line endings, a regular chart like the one below can concentrate all of the color jump in one area of the profile,



while a randomized chart like the one below will distribute the color jump in more of the profile (which can be partially compensated by averaging if you print your patches several times).



**Tip:** If your proofer prints very evenly (if for example it is a brand new proofer that still prints exactly as per your proofer vendor's specifications), you don't need to print each patch several times or randomize your patches.

- If you want to print an existing chart that you are used to work with, choose **Predefined (legacy)**.

**Note:** If you are working with a Barbieri Spectro Swing spectrophotometer, you can only use legacy charts when measuring a CMYK or CMYKOV profile.



**Attention:** You will only be able to measure this type of chart using the M0 *measurement condition*, as legacy charts are not adapted to support the dual measurement (measuring with and without UV filtering) required by the M1 and M2 measurement conditions.

When working with a predefined chart, choose the **Overprint Chart** to use (this determines the type of layout your chart will use).

**Note:**

You should choose your chart based on:

- The type of spectrophotometer you will be using to measure the chart.  
If the spectrophotometer is connected, only the appropriate charts are shown.
- The web width available to print the chart.
- The number of patches you want to measure.

**Note:** Charts generated on demand have corner marks, predefined charts have crosshairs.

3. You can see a **Preview** of your chosen chart and some information about it.



**Tip:**


- Click the **View Chart** link to open the chart in the default application for PDF files defined by the operating system.
- Click the **Show File Info** link to open a pop-up showing more information about the chart file (location, name...). You can also open the folder containing the chart file from this pop-up.

## 9.4.2. Measure


In the **Measure** step of the **Create Profile** wizard, you will:



- measure the chart you printed,
- check the measurements,
- name the profile,
- create color strategies outputting to your profile.

1. On the **Measure Page ...** screen you see a preview of the chart.



Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action.

As the patches are measured, you can see a diagonally split view of each patch , with the measured color at the bottom right and the expected color at the top left.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.




**Tip:**

- After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):
- Go back to the page you have just measured using the back arrow.
  - Right-click the chart preview and select **Save Page Measurements...**
  - Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
    - is of the correct page of your chart (if it has several pages),
    - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
  2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**
2. After measuring the chart, you will see the **Check Measurements** screen.  
On this screen, you can:
- a) Inspect your measured data:

- Change the view to **Layout** or **Profile**.
  - The **Layout** view displays the patches as they have been measured on the chart. This can be useful to locate a particular patch on the chart.
  - The **Profile** view displays the patches as they are organised in the profile. This view is useful to spot inconsistencies in the profile.
- Zoom in  on a chart area, zoom out  or fit the whole chart in the preview ,
- Click a patch to see its color values (in the profile's inks and in Lab).

b) Troubleshoot your measured data:

- Re-measure a patch: click a patch then click **Measure again...** Follow the instructions in the **Measure patch again** dialog.

**Note:**

Re-measuring a patch is only useful if there has been a bad measurement:

- For errors on the printout, use the **Repair** function instead.
- For a larger number of errors, re-run the profiling wizard and re-measure the entire chart.

- Repair a patch: click a patch in **Profile** view then click **Repair** (or use **Ctrl+R**). The correct measurement is calculated based on data from the surrounding color patches.
- Use **Find and Repair Bad Measurements...** to automatically detect and (optionally) repair bad patches in your chart.

See [Find and Repair Bad Measurements](#) for details.

- c) View some statistics about your proofer's stability (if you are profiling a CMYK, CMYKOG, or CMYKOGV proofer).

See [Checking Your Proofer's Stability](#) on page 157.

**Note:**

Those statistics are not available if you are using a [custom profiling chart](#) and you chose to either:

- use a [legacy chart layout](#),
- use a [normal](#) or [custom](#) patch set for your multicolor proofer,
- not [randomize](#) your chart patches.

- 3. Click **Next** when you are done checking the measurements.

4. On the **Select Profile Name** screen:

- a) Enter a **Profile Name**.

A default name based on the proofer model and inks is filled in.

- b) Enter a **Description** if desired.

- c) If you want to add keywords to find the profile more easily later, select **Add keywords** and enter your **Keywords**.

Keywords based on the proofer information (model, inks, EPL...) are filled in by default.

5. Click **Next** when you are done.

6. On the **Create Color Strategies** screen, you can create color strategies that have the profile you are creating as output profile. You can use these color strategies later to color manage files that you send to your proofer.

- a) Select the **Create color strategies** option.

By default, the wizard creates at least one color strategy, with:


- the output profile being the profile you just created,
- the input profile (**Press Profile**) being either the **<Same as Output Profile>**, or the default input profile you set [in the Preferences](#).

- b) If desired, click **+** to create more color strategies.

Select the input profile to use for each new color strategy.

If you want to delete a color strategy, select it and click **-**.

- c) Edit your new color strategies as desired:

- To rename a strategy, select it, click its name and type the new name (by default, color strategies are named using the profile name and the ink set used).
- To choose a different input profile (**Press Profile**), click **Select** and select your desired profile from the color database.
- To remove the current input profile and have it be the **<Same as Output Profile>**, click the cross .
- If your input and output profile are different, you can select a **Rendering Intent**. It will be used by the color strategy to convert out-of-gamut spot colors and the background color (see [Rendering Intent](#) on page 225 for more information).

By default, the rendering intent you set in the [Preferences](#) is selected. Click the small arrow **▼** to select another one.

7. Click **Next** to go to the **Summary** step.

You will see a pop up with a progress bar while Color Pilot creates your profile and color strategies.

## Find and Repair Bad Measurements

You can use **Find and Repair Bad Measurements...** to automatically detect (and optionally repair) bad measurements in your chart.



This detects isolated patches in your profile that differ substantially from patches with similar ink combinations, and can be attributed to spectrophotometer malfunction or misalignment, abnormal measurement conditions, or even damage to the physical print-out itself.

It is particularly useful when working with randomized charts (as the bad patches are not immediately obvious against their neighbors in **Layout View** because they have been randomized).

You can always perform additional [repairs](#) based on visual inspection of your chart.

1. Click **Find and Repair Bad Measurements...** on the **Check Measurements** page of the **Measure Profile** wizard.

If bad measurements are detected in your chart, the **Repair Bad Measurements** dialog opens.

2. In the **Repair Bad Measurements** dialog, you can cycle through bad patches by using the  and  buttons.

For each bad patch you can see:

1. The patch status. This can be **Not Repaired**, **Repaired**, or **Remeasured**.
2. The ink combination used to generate the patch.
3. The patch's **Lab** values before and after repair.
4. A small preview area showing the color difference between the Lab values before and after repair.
5. The **delta E** between the Lab values before and after repair.

**Note:** Patches with high delta E values are likely in need of repair, while patches with lower delta E values may be acceptable, particularly in darker areas of the profile, where sampling performed by the application is sparser and spotting a bad measurement can be difficult.

6. A small preview area showing the patch centered next to its neighboring patches in the profile.  
You can use this to visually verify that the patch is actually bad, and to facilitate the task of locating the patch in your profile chart.
3. For each bad patch that you inspect, you can:
  - a) Click **Repair (Ctrl+R)** to repair the patch.  
The patch is immediately repaired. The patch status changes to **Repaired**, and all preview areas are updated. The **Repair (Ctrl+R)** button changes to **Undo Repair**.
  - b) Click **Undo Repair** to revert the repair.
  - c) Click **Measure again...** to re-measure the patch.  
This opens the **Measure patch again** dialog. To re-measure the patch, follow the instructions in the dialog.
  - d) Double-click **Repair** to revert to the original measurement.  
The patch status changes to **Not Repaired**.

You can also click **Repair All (x)** to automatically repair all patches, where x is the number of bad patches detected. The **Repair All (x)** button changes to **Undo Repair All (x)**.

To accept the repairs, click **OK**. If you want to revert the repairs later, you will have to re-measure the chart.

### Checking Your Proofer's Stability

If you are profiling a CMYK, CMYKOG, or CMYKOGV proofer, you can view statistics about your proofer's stability in the **Proofer Stability** area of the **Check Measurements** screen.

These statistics will help you know what to expect of your proofing setup (proofer and spectrophotometer) in terms of color accuracy, as your best proof can only be as color accurate as your proofing setup.

They will also highlight any potential color accuracy problem with your proofer's individual inks.

To calculate these statistics, Color Pilot adds some duplicate patches in different areas of your profiling chart, and calculates the *Delta E* difference between those duplicate patches when you measure them.

It adds duplicate patches for:

- each of the profile's inks (the solid patch and at least one tint patch per ink),

- different levels of grey (using black and/or combinations of other inks),
- the substrate.

The exact set of duplicate patches (including how many times they are duplicated) depends on your proofer, chart layout and ink set.

The average values of the duplicate patches are used to calculate the profile, to make it more representative of how your proofer prints.

**Note:**

- You will see these statistics if you are using the chart that *Color Pilot generated automatically* for profiling.
- If you are using a *custom chart*, you will only see these statistics if you are using:
  - an *Automatic Layout Type* (as this layout includes stability patches),
  - an *Equinox Patch Set* (as this patch set includes stability patches),
  - *Randomize Patches* (as the additional stability patches need to be distributed across the chart to be representative of how your proofer prints).

To check your proofer's stability:

1. Select the **ΔE Formula** you want to use to calculate the color differences.  
By default, Color Pilot uses the Delta E formula you chose *in the Preferences*.
2. Check the **Average ΔE** and **Maximum ΔE** for:

<b>All Patches</b>	This gives you an idea of the general stability of your proofing setup (proofer and spectrophotometer).
The <b>Substrate</b>	This gives you an idea of your spectrophotometer's stability (as no ink is printed).
Each of your proofer's inks	This gives you an idea of how stable each ink is (as for a same proofer, some inks can be very stable and others a lot less).  For inks with higher Delta E values, we recommend you check your print head alignment (as this can in some cases be the cause of the color accuracy problem).

The **Average ΔE** is the average of the Delta E values found between all duplicates of a certain patch (for example the substrate patch), or of a group of patches (for example all duplicates of the Yellow solid and tints patches).

The **Maximum ΔE** is the maximum Delta E value found between those duplicate patches/groups of patches.

**Tip:**

If you have several proofers, you can use the stability results to decide which proofer to use for each job.

For example, if the yellow of one of your proofers has higher Delta E values, you can send jobs containing a lot of yellow to the other proofer.

### 9.4.3. Summary

On the **Summary** screen, you will see a summary mentioning the profile and any color strategy created.

1. Select **Assign this profile to proofer (your proofer name)** to automatically use your new profile when proofing with this proofer, substrate, ink set and *EPL linearization*.
2. Select **Continue to Strategy Check** if you want to check how well the color strategy/one of the color strategies you just created reproduces your press' colors on your proofer.
3. Click **Finish** to close the wizard and save the profile.
4. If you chose to **Continue to Strategy Check** and you created several color strategies, select the one you want to check in the pop-up that opens.

Color Pilot then opens the **Check Strategy** wizard. It will guide you through the strategy check in two steps:

- [Get Started](#) on page 246
- [Measure](#) on page 246

## 9.5. Profiling Your Digital Press

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**Note:**


Before you create a profile for your digital press, make sure you have done the following:

1. You have created a **configuration** for your digital press, that specifies how your digital press is set up (ink set, screening, substrate...), in your DFE Server's Configuration Tool.  
See your DFE Server manual for details.
2. You have attached that digital press configuration to your digital press in your Color Pilot.  
See [Choosing a Digital Press Configuration](#) on page 438.
3. You have created an **ink limitation set** for your digital press (if it supports ink limitation sets).  
See [Creating an Ink Limitation Set](#) on page 360.

You can either create a digital press profile:




- from the **Profiles Library** (as explained below),
- from the **Digital Presses Library**, when setting up your digital press (see [Creating a Profile for Your Digital Press Configuration](#) on page 455).

**Note:** If you are printing with different [digital press configurations](#), we recommend you make a custom profile and color strategy for each configuration (especially when using different substrates).

1. Go to the **Profiles Library**.
2. Click the  **New Digital Press Profile** button in the bottom tool bar.
3. In the dialog that opens:
  - a) Select the **Digital Press** you want to profile.

b) Select the **Configuration** to use for that digital press.

For each *digital press configuration*, you can see:

- the **Substrate** used on your press,
- the **Ink Set** used on your press,
- the **Ink Type** of the inks used on press (this can indicate if the press uses food packaging inks for example),
- the **Screening** on your press,
- whether this configuration contains an *ink limitation set*,
- whether it already contains a profile  or not  (it may also contain an unfinished profile .

The settings in your digital press configuration will be taken into account when profiling, so you can get more color accurate results when later printing with this profile and digital press configuration.

c) Click **Select**.

4. If you chose in the *Preferences* to have Color Pilot to always ask you whether to use the inline or offline spectrophotometer, select either **Inline** or **Offline** in the pop-up that opens.

**Tip:** You can select **Do not ask me again** if you want Color Pilot to remember your selection and change it in the Preferences.

5. The **Measure Profile** wizard opens.

- If you are working with an inline spectrophotometer, see *Creating a Profile with an Inline Spectrophotometer* on page 161.
- If you are working with an offline spectrophotometer, see *Creating a Profile with an Offline Spectrophotometer* on page 169.

6. At any time, you can save your unfinished work and continue later. This way you can perform other tasks in the meantime, or safely close the Color Pilot and resume the session after starting up the application again later.



**Attention:**


You can only save one unfinished task per digital press configuration, whether it is an ink limitation set, a profile, or a spot color refinement.

This means that if for example you started making an ink limitation set for your digital press configuration but didn't finish (so you have a unfinished ink limitation task saved), and you start profiling your press, you cannot save an unfinished version of your profile without discarding your unfinished ink limitation task.

In this case you should finish making your ink limitation set first before profiling your press (you will get better results when the maximum amount of ink that can be laid down on the substrate is determined before making the profile anyway).

a) Click **Quit Now and Continue Later**. Confirm your choice by clicking **Yes**.  
This closes the wizard.



- b) When you are ready to resume the profiling, click  **New Digital Press Profile** again and then select your **Digital Press** and **Configuration** again.

You will see an orange icon  next to your **Configuration**, indicating that there is an unfinished profile attached to it.

**Note:** You can also see this in the **Digital Presses** view, when selecting that **Digital Press** and **Configuration**.

- c) Click **Select** then click **Resume** to confirm that you want to resume creating your unfinished profile.

This will resume the wizard from the point you saved. However, you cannot go back and change earlier settings.

**Note:**

- At any point, you can click **Quit Now and Continue Later** again to save your unfinished profile in a different state (this discards the previous state of your unfinished profile).
- If you want to discard your unfinished profile and start creating a new profile instead, click **Start New Session**.

## 9.5.1. Creating a Profile with an Inline Spectrophotometer

The **Measure Profile** wizard will guide you through the profile creation in three steps: [Get Started](#), [Measure Profile](#) and [Finish](#).

### Get Started

In the **Get started** step of the **Measure Profile** wizard, you will choose and print a profile chart.

**Tip:**

Color Pilot can [check your digital press' stability](#) while profiling. To do this, use the following options:

- an [Equinox Patch Set](#),
- [Randomize Patches](#).

1. On the **Select Overprint Chart** screen, choose the **Chart Size** to use (**Normal** or **Large**).

When choosing **Large**, the chart will contain more combinations of ink percentages (this is only available when working with a CMYK press configuration).

2. Select the **Patch Set** to use:

- if you are profiling a CMYK press configuration, you can choose between **IT8.7/3**, **ECI 2002** and **Normal (non\_uniform, 3 inks + K)**,
- if you are profiling a multicolor press configuration, you can choose between **Normal** (a larger patch set containing more CMYK patches) and **Equinox** (a smaller patch set containing slightly more extended gamut inks -for example OGV when profiling a CMYKOGV press configuration) patches.

- If you selected **Enable custom patch sets when creating a digital printing profile** [in the Preferences](#), you can also select a custom patch set adapted to your digital press configuration's ink set.

**3.** Choose how many times you want **Print Each Patch** (you can set a number from 1 to 5).

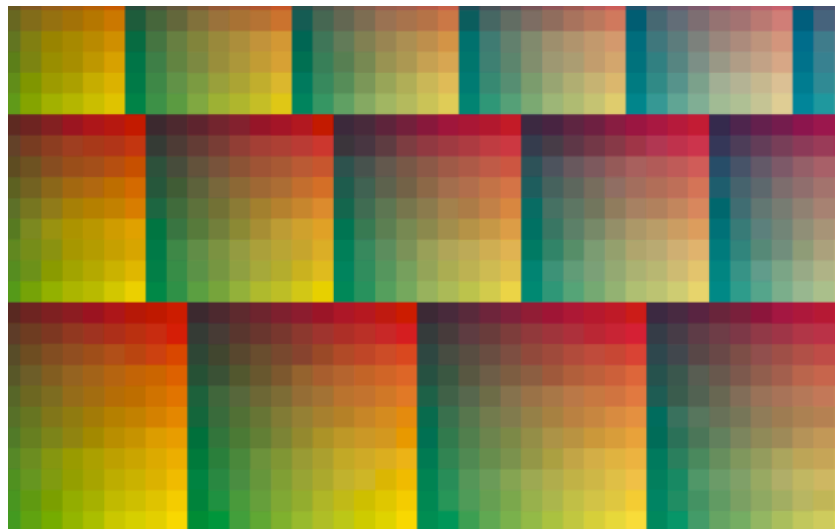
If you print each patch several times, Color Pilot can **average** the values of several measurements for each patch, to minimize the effects of potential printing problems or bad measurements.

**Note:** When measuring with an inline spectrophotometer, you can print a maximum of 10 000 patches. If printing the patches several times generates more patches than that, some patches will be printed less times to have a total of 10 000 patches.

**4.** Select whether to **Randomize patches** when printing your chart. This will "scramble" the patches instead of printing them in the order of a gradation.

We recommend you do this, especially if your press has noticeable printing variations (for example left to right, or sheet start to sheet end printing differences).

If for example you have "color jumps" near the line endings, a regular chart like the one below can concentrate all of the color jump in one area of the profile,



while a randomized chart like the one below will distribute the color jump in more of the profile, which is easier to compensate using [averaging](#) and [smoothing](#).



**Tip:**

The need for averaging, randomizing and smoothing depends on how your press prints. The more printing variations you notice, the more those options are useful to alleviate those variations.

For example, if you are working with a wide format press, you have more of a risk of having left to right printing differences.

However, if you see that your press prints very evenly (if for example it is a brand new press that still prints exactly as per your press vendor's specifications), you don't need to print each patch several times, randomize your patches or smooth your gradations.

You can see the **Number of patches** that will be printed, but you cannot see the *layout* of the chart, as it will be generated on the fly at the press side to fit the substrate and the inline spectrophotometer installed.

5. Click **Next** to go to the **Print and Measure Overprint Chart** screen.

Click **Settings...** if you want to change how the chart(s) will be printed (by default the print settings *defined for your digital press* are used).

6. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- c) Select **Generate an extra Magenta separation** if you want to generate an extra separation called `Magenta 1` in areas where Orange, Violet or Green inks overlap with Magenta.

**Note:** This option is only available if your digital press supports it.

**Important:** Remember to select this option when you intend to print production jobs that use a color strategy with `Magenta 1`.

- d) The **Layout** and **Page Range** options are not applicable when working with an inline spectrophotometer, as the chart layout is not generated by the Color Pilot, but directly by the press, to fit its substrate and inline spectrophotometer format.
- e) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- f) Click **OK**.

7. Click the **Print and Measure Overprint Chart** button to print the chart and launch the automatic measurement with your inline spectrophotometer.

If you click **Quit Now and Continue Later** before the inline measurements have been completed, you will not be able to reuse them. The next time you print and measure your chart, you will receive a warning that your existing inline measurements will be discarded.

**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the chart is printed on the first press engine to safeguard against color variation inside the color profiles.

To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE Server client.




8. Once the chart is printed and measured, click **Next** to go to the *Check Measurements* screen.

## Measure Profile

As the inline spectrophotometer measured your profiling chart automatically, the **Measure Profile** step starts with checking those measurements.

1. On the **Check Measurements** screen, you can:

- a) Inspect your measured data:

- Zoom in  on a chart area, zoom out  or fit the whole chart in the preview ,
- Click a patch to see its color values (in the profile's inks and in Lab).

- b) Troubleshoot your measured data:

- Repair a patch: click a patch in **Profile** view then click **Repair** (or use **Ctrl+R**). The correct measurement is calculated based on data from the surrounding color patches.
- Use **Find and Repair Bad Measurements...** to automatically detect and (optionally) repair bad patches in your chart.

See [Find and Repair Bad Measurements](#) for details.

**Note:** If the bad patches can be traced to printing variations of your press, you should try smoothing your profile instead.

- **Apply Smoothing** on your measurements if they still look "coarse" after re-measuring or repairing the bad patches (this is usually the case when your press has a lot of variation or noise).



Smoothing makes sure that there is a more regular progression of the ink values between neighboring patches, so that you will have more reliable color tints on press, especially when printing jobs with gradations.



We also recommend you apply smoothing if you only printed each patch one time (as Color Pilot couldn't automatically average your measurements then).

Smoothing may take a few minutes, and is reversible (click **Undo Smoothing** to get back to the unsmoothed measurements).

- c) View some statistics about your digital press' stability.

See [Checking Your Digital Press' Stability](#) on page 167.

**Note:**

Those statistics are not available if you chose to either:

- use a *normal* patch set for your multicolor digital press configuration,
- not *randomize* your chart patches.

2. Click **Next** when you are done checking the measurements.

3. On the **Select Profile Name** screen:

- a) Enter a **Profile Name**.  
A default name based on the digital press configuration's substrate and inks is filled in.
  - b) Enter a **Description** if desired.
  - c) If you want to add *keywords* to find the profile more easily later, select **Add keywords** and enter your **Keywords**.  
Keywords based on the digital press configuration are filled in by default.
4. Click **Next** when you are done.

### Find and Repair Bad Measurements



You can use **Find and Repair Bad Measurements...** to automatically detect (and optionally repair) bad measurements in your chart.

This detects isolated patches in your profile that differ substantially from patches with similar ink combinations, and can be attributed to spectrophotometer malfunction or misalignment, abnormal measurement conditions, or even damage to the physical print-out itself.

It is particularly useful when working with randomized charts that have been printed multiple times. In this case the bad patches are not immediately obvious against their neighbors in **Layout View** because they have been randomized, and they may be undetectable in **Profile View** because they have already been averaged.

You can use **Find and Repair Bad Measurements...** in combination with *smoothing*, but it is recommended that you apply **Find and Repair Bad Measurements...** first, because smoothing a profile containing bad measurements can spread the error across multiple patches.

You can always perform additional *repairs* based on visual inspection of your chart.

1. Click **Find and Repair Bad Measurements...** on the **Check Measurements** page of the **Measure Profile** wizard.  
If bad measurements are detected in your chart, the **Repair Bad Measurements** dialog opens.
2. In the **Repair Bad Measurements** dialog, you can cycle through bad patches by using the  and  buttons.

For each bad patch you can see:

1. The patch status. This can be **Not Repaired**, **Repaired**, or **Remeasured**.
2. The ink combination used to generate the patch.
3. The patch's **Lab** values before and after repair.
4. A small preview area showing the color difference between the Lab values before and after repair.
5. The **delta E** between the Lab values before and after repair.

**Note:** Patches with high delta E values are likely in need of repair, while patches with lower delta E values may be acceptable, particularly in darker areas of the profile, where sampling performed by the application is sparser and spotting a bad measurement can be difficult.

6. A small preview area showing the patch centered next to its neighboring patches in the profile.  
You can use this to visually verify that the patch is actually bad, and to facilitate the task of locating the patch in your profile chart.
3. For each bad patch that you inspect, you can:
  - a) Click **Repair (Ctrl+R)** to repair the patch.

The patch is immediately repaired. The patch status changes to **Repaired**, and all preview areas are updated. The **Repair (Ctrl+R)** button changes to **Undo Repair**.

- b) Click **Undo Repair** to revert the repair.
- c) Click **Measure again...** to re-measure the patch.

This opens the **Measure patch again** dialog. To re-measure the patch, follow the instructions in the dialog.

If the patch has been printed multiple times, select the desired patch to re-measure. After measuring, the patch status is updated to **Remeasured** and all preview areas are updated as well.

- d) Double-click **Repair** to revert to the original measurement.  
The patch status changes to **Not Repaired**.

You can also click **Repair All (x)** to automatically repair all patches, where x is the number of bad patches detected. The **Repair All (x)** button changes to **Undo Repair All (x)**.

To accept the repairs, click **OK**. If you want to revert the repairs later, you will have to re-measure the chart.

### Checking Your Digital Press' Stability

You can view statistics about your digital press' stability in the **Press Stability** area of the **Check Measurements** screen.

These statistics will help you know what to expect of your printing setup (digital press and inline spectrophotometer) in terms of color accuracy, as your best print can only be as color accurate as your printing setup.

They will also highlight any potential color accuracy problem with your digital press' individual inks.

To calculate these statistics, Color Pilot adds some duplicate patches in different areas of your profiling chart, and calculates the *Delta E* difference between those duplicate patches when you measure them.

It adds duplicate patches for:

- each of the profile's inks (the solid patch and at least one tint patch per ink),
- different levels of grey (using black and/or combinations of other inks),
- the substrate.

The exact set of duplicate patches (including how many times they are duplicated) depends on your ink set and chart layout.

The average values of the duplicate patches are used to calculate the profile, to make it more representative of how your digital press prints.

**Note:**

To see these statistics, you need to be using the following profiling options:

- an *Equinox Patch Set* (as this patch set includes stability patches),
- *Randomize Patches* (as the additional stability patches need to be distributed across the chart to be representative of how your digital press prints).

To check your digital press' stability:

1. Select the **ΔE Formula** you want to use to calculate the color differences.  
By default, Color Pilot uses the Delta E formula you chose *in the Preferences*.

2. Check the **Average ΔE** and **Maximum ΔE** for:

<b>All Patches</b>	This gives you an idea of the general stability of your printing setup (digital press and inline spectrophotometer).
The <b>Substrate</b>	This gives you an idea of your spectrophotometer's stability (as no ink is printed).
Each of your digital press inks	This gives you an idea of how stable each ink is (as for a same digital press, some inks can be very stable and others a lot less).

The **Average ΔE** is the average of the Delta E values found between all duplicates of a certain patch (for example the substrate patch), or of a group of patches (for example all duplicates of the Yellow solid and tints patches).

The **Maximum ΔE** is the maximum Delta E value found between those duplicates patches/groups of patches.

**Tip:**

If you have several digital presses, you can use the stability results to decide which digital press to use for each job.

For example, if the yellow of one of your digital presses has higher Delta E values, you can send jobs containing a lot of yellow to the other digital press.

## Finish

In the **Finish** step, you can create color strategies that have the profile you just created as output profile. You can use these color strategies later to color manage files to be printed on the press you just profiled.

You can create several color strategies with different ink sets (all of the profile's inks or a subset of them). This allows you to print with different ink sets (for example with 7 inks for higher quality/color fidelity or with fewer inks but at a lower cost/faster) after profiling the press only once.

This also means that you can refine each ink subset separately and have a different list of [exceptions](#) for each ink subset.

1. On the **Create Color Strategies** screen, select the **Create color strategies** option.

By default, the wizard creates at least one color strategy, with:



- the output profile being the profile you just created,
- the **Input Profile** being either the **<Same as Output Profile>**, or the default input profile you set [in the Preferences](#).

Depending on the ink set of the digital press configuration you profiled, you may see additional color strategies with a subset of your new profile's **Ink Set** as output profile. For example, if you profiled a CMYKOV configuration, you can also have color strategies that can be used to output to CMYK and CMYKO.

2. If desired, click **+** to create more color strategies.

If you want to delete a color strategy, select it and click **-**.



3. Edit your new color strategies as desired:
  - To rename a strategy, select it, click its name and type the new name (by default, color strategies are named using the profile name and the ink set used).
  - To choose a different **Input Profile**, click **Select** and select your desired profile from the color database.
  - To remove the current **Input Profile** and have it be the **<Same as Output Profile>**, click the cross .
  - To change the **Ink Set** of the output profile, click the small arrow  and select your desired ink set in the list.
4. If you have selected a white underprint in the **Settings...** before printing the chart, the option **Add White as an extra output ink** is automatically selected. As a result, all strategies created by the wizard will have **ClassicColors White** as an output ink.
5. Click **Next** when you are done.
6. On the **Summary** screen, you will see a summary mentioning the substrate used, and the profile and any color strategy created.

**Tip:** Leave **Assign profile to digital press configuration** selected to automatically use your new profile when printing with the digital press configuration you just profiled.

7. Click **Finish** to close the wizard.

## 9.5.2. Creating a Profile with an Offline Spectrophotometer

The **Measure Profile** wizard will guide you through the profile creation in three steps: [Get Started](#), [Measure Profile](#) and [Finish](#).

### Get Started

In the **Get started** step of the **Measure Profile** wizard, you will choose and print a profile chart.

1. On the **Select Overprint Chart** screen, choose the **Chart Size** to use (**Normal** or **Large**).

When choosing **Large**, the chart will contain more combinations of ink percentages (this is only available when working with a CMYK press configuration).

2. In **Layout Type**, select the chart *layout* that you want to print.

- If you want a chart generated on demand, choose **Automatic**.

This takes into account your ink set, your substrate width and the dimensions that your spectrophotometer can measure (if your spectrophotometer is connected).

**Note:** If your chart is much narrower than the substrate (for example if it is generated for a Barbieri Spectro Swing, that can only measure narrow sheets), your chart print out will contain extra margins and cutting lines.

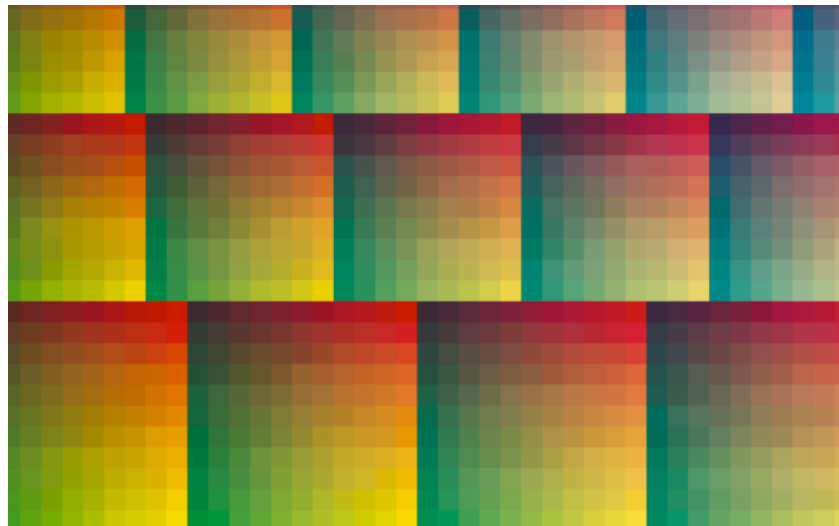
When working with a chart generated on demand:

1. Select the **Patch Set** to use:
  - if you are profiling a CMYK press configuration, you can choose between **IT8.7/3**, **ECI 2002** and **Normal (non\_uniform, 3 inks + K)**,

- if you are profiling a multicolor press configuration, you can choose between **Normal** (a larger patch set containing more CMYK patches) and **Equinox** (a smaller patch set containing slightly more extended gamut inks –for example OGV when profiling a CMYKOGV press configuration) patches.
  - If you selected **Enable custom patch sets when creating a digital printing profile** [in the Preferences](#), you can also select a custom patch set adapted to your digital press configuration's ink set.
2. Choose how many times you want **Print Each Patch** (you can set a number from 1 to 5).  
If you print each patch several times, Color Pilot can **average** the values of several measurements for each patch, to minimize the effects of potential printing problems or bad measurements.
  3. Select whether to **Randomize patches** when printing your chart. This will "scramble" the patches instead of printing them in the order of a gradation.

We recommend you do this, especially if your press has noticeable printing variations (for example left to right, or sheet start to sheet end printing differences).

If for example you have "color jumps" near the line endings, a regular chart like the one below can concentrate all of the color jump in one area of the profile,



while a randomized chart like the one below will distribute the color jump in more of the profile, which is easier to compensate using [averaging](#) and [smoothing](#).



**Tip:**

The need for averaging, randomizing and smoothing depends on how your press prints. The more printing variations you notice, the more those options are useful to alleviate those variations.

For example, if you are working with a wide format press, you have more of a risk of having left to right printing differences.

However, if you see that your press prints very evenly (if for example it is a brand new press that still prints exactly as per your press vendor's specifications), you don't need to print each patch several times, randomize your patches or smooth your gradations.

**Tip:**

Color Pilot can [check your digital press' stability](#) while profiling. To do this, use the following options:

- an [Automatic Layout Type](#),
  - an [Equinox Patch Set](#),
  - [Randomize Patches](#).
- If you want to print an existing chart layout that you are used to work with, choose **Predefined (legacy)**.

**Note:** If you are working with a Barbieri Spectro Swing spectrophotometer, you can only use legacy charts when measuring a CMYK or CMYKOV profile.



**Attention:** You will only be able to measure this type of chart using the M0 [measurement condition](#), as legacy charts are not adapted to support the dual measurement (measuring with and without UV filtering) required by the M1 and M2 measurement conditions.

When working with a predefined chart, choose the **Overprint Chart** to use (this determines the type of layout your chart will use).

**Note:**

You should choose your chart based on:

- The type of spectrophotometer you will be using to measure the chart.  
If the spectrophotometer is connected, only the appropriate charts are shown.
- The web width available to print the chart.
- The number of patches you want to measure.

**Note:** Charts generated on demand have corner marks, predefined charts have crosshairs.

3. You can see a **Preview** of your chosen chart and some information about it.

**Tip:**

- Click the **View Chart** link to open the chart in the default application for PDF files defined by the operating system.
- Click the **Show File Info** link to open a pop-up showing more information about the chart file (location, name...). You can also open the folder containing the chart file from this pop-up.

4. Click **Next** to go to the **Print Overprint Chart** screen.

Click **Settings...** if you want to change how the chart(s) will be printed (by default the print settings *defined for your digital press* are used).

5. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- c) Select **Generate an extra Magenta separation** if you want to generate an extra separation called **Magenta 1** in areas where Orange, Violet or Green inks overlap with Magenta.

**Note:** This option is only available if your digital press supports it.

**Important:** Remember to select this option when you intend to print production jobs that use a color strategy with Magenta 1.

- d) Choose how to determine your chart's **Layout**.
- Leave **Optimize the sheet layout for minimal substrate consumption** selected if you want Color Pilot to automatically calculate the best layout.
  - If you want to set the layout manually, do the following:
    1. Select **One page per sheet**.
    2. If there are enough patches to fill several pages, select the **Page Range** to print, or choose to print **All Pages**.

**Tip:**

You can separate page numbers by a comma, or use a dash to indicate a page range (for example 3, 6–9).

Use this option to reprint a page that cannot be measured anymore, because it has been damaged for instance.

3. Choose the **Rotation** to apply when printing your chart.
  - e) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined [when configuring your digital press](#)).
  - f) Click **OK**.
6. Click the **Print Overprint Chart** button to print the chart.

**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the way the chart is printed depends on the [Layout Type](#) you chose:


- A chart with an **Automatic** layout is printed on the first press engine to safeguard against color variation inside the color profiles.  
To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE Server client.
- A chart with a **Predefined (legacy)** layout is printed on the press engine available at printing time.  
Color Pilot does not add an empty page to the chart before submitting it for printing.

7. Once the chart is printed, click **Next** to go to the **Measure Profile** step.



### Measure Profile

In the **Measure Profile** step of the **Measure Profile** wizard, you will measure the chart you printed, check the measurements and name the profile.



1. On the **Measure Page ...** screen you see a preview of the chart.

Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

2. After measuring the chart, you will see the **Check Measurements** screen.

On this screen, you can:

- a) Inspect your measured data:




- Change the view to **Layout** or **Profile**.
  - The **Layout** view displays the patches as they have been measured on the chart. This can be useful to locate a particular patch on the chart.
  - The **Profile** view displays the patches as they are organised in the profile. This view is useful to spot inconsistencies in the profile.

**Note:**

If you *printed each patch several times*, the **Profile** view shows the averaged measurements (there is one patch per ink percentage combination, which is an average of all measurements for that ink percentage combination).

The **Layout** view shows the original measurements (all the patches measured for each ink percentage combination).

As a result, Lab values for the same patch may differ between Layout and Profile view.

- Zoom in  on a chart area, zoom out  or fit the whole chart in the preview ,
  - Click a patch to see its color values (in the profile's inks and in Lab).
- b) Troubleshoot your measured data:
    - Re-measure a patch: click a patch then click **Measure again...** Follow the instructions in the **Measure patch again** dialog.

**Note:**

Re-measuring a patch is only useful if there has been a bad measurement:

- For errors on the printout, use the **Repair** function instead.
- For a larger number of errors, re-run the profiling wizard and re-measure the entire chart.

**Tip:** If you *printed each patch several times*, you can choose which of these duplicate patches to remeasure: in the **Measure patch again** dialog, click **Next Patch** until your desired patch is selected.



**Attention:**

When using a Barbieri Spectro Swing spectrophotometer, you cannot measure single patches.

If you notice bad measurements, you can either **Repair** the bad patches, or go back and re-measure the whole chart (use the **Back** button at the bottom of the wizard or the back arrow at the top depending on your operating system).

- Repair a patch: click a patch in **Profile** view then click **Repair** (or use **Ctrl+R**). The correct measurement is calculated based on data from the surrounding color patches.
- Use **Find and Repair Bad Measurements...** to automatically detect and (optionally) repair bad patches in your chart.

See [Find and Repair Bad Measurements](#) for details.

**Note:** If the bad patches can be traced to printing variations of your press, you should try smoothing your profile instead.

- **Apply Smoothing** on your measurements if they still look "coarse" after re-measuring or repairing the bad patches (this is usually the case when your press has a lot of variation or noise).



Smoothing makes sure that there is a more regular progression of the ink values between neighboring patches, so that you will have more reliable color tints on press, especially when printing jobs with gradations.



We also recommend you apply smoothing if you only printed each patch one time (as Color Pilot couldn't automatically average your measurements then).

Smoothing may take a few minutes, and is reversible (click **Undo Smoothing** to get back to the unsmoothed measurements).



- c) View some statistics about your digital press' stability.

See [Checking Your Digital Press' Stability](#) on page 178.

**Note:**

Those statistics are not available if you chose to either:

- use a [legacy chart layout](#),
- use a [normal](#) patch set for your multicolor digital press configuration,
- not [randomize](#) your chart patches.

3. Click **Next** when you are done checking the measurements.
4. On the **Select Profile Name** screen:
  - a) Enter a **Profile Name**.  
A default name based on the digital press configuration's substrate and inks is filled in.
  - b) Enter a **Description** if desired.
  - c) If you want to add [keywords](#) to find the profile more easily later, select **Add keywords** and enter your **Keywords**.  
Keywords based on the digital press configuration are filled in by default.
5. Click **Next** when you are done.

### Find and Repair Bad Measurements



You can use **Find and Repair Bad Measurements...** to automatically detect (and optionally repair) bad measurements in your chart.

This detects isolated patches in your profile that differ substantially from patches with similar ink combinations, and can be attributed to spectrophotometer malfunction or misalignment, abnormal measurement conditions, or even damage to the physical print-out itself.

It is particularly useful when working with randomized charts that have been printed multiple times. In this case the bad patches are not immediately obvious against their neighbors in **Layout View** because they have been randomized, and they may be undetectable in **Profile View** because they have already been averaged.

You can use **Find and Repair Bad Measurements...** in combination with [smoothing](#), but it is recommended that you apply **Find and Repair Bad Measurements...** first, because smoothing a profile containing bad measurements can spread the error across multiple patches.

You can always perform additional [repairs](#) based on visual inspection of your chart.

1. Click **Find and Repair Bad Measurements...** on the **Check Measurements** page of the **Measure Profile** wizard.  
If bad measurements are detected in your chart, the **Repair Bad Measurements** dialog opens.
2. In the **Repair Bad Measurements** dialog, you can cycle through bad patches by using the  and  buttons.  
For each bad patch you can see:
  1. The patch status. This can be **Not Repaired**, **Repaired**, or **Remeasured**.
  2. The ink combination used to generate the patch.

3. The patch's **Lab** values before and after repair.
4. A small preview area showing the color difference between the Lab values before and after repair.
5. The **delta E** between the Lab values before and after repair.

**Note:** Patches with high delta E values are likely in need of repair, while patches with lower delta E values may be acceptable, particularly in darker areas of the profile, where sampling performed by the application is sparser and spotting a bad measurement can be difficult.

6. A small preview area showing the patch centered next to its neighboring patches in the profile.  
You can use this to visually verify that the patch is actually bad, and to facilitate the task of locating the patch in your profile chart.
3. For each bad patch that you inspect, you can:
  - a) Click **Repair (Ctrl+R)** to repair the patch.  
The patch is immediately repaired. The patch status changes to **Repaired**, and all preview areas are updated. The **Repair (Ctrl+R)** button changes to **Undo Repair**.
  - b) Click **Undo Repair** to revert the repair.
  - c) Click **Measure again...** to re-measure the patch.

This opens the **Measure patch again** dialog. To re-measure the patch, follow the instructions in the dialog.

If the patch has been printed multiple times, [select the desired patch to re-measure](#). After measuring, the patch status is updated to **Remeasured** and all preview areas are updated as well.

- d) Double-click **Repair** to revert to the original measurement.  
The patch status changes to **Not Repaired**.

You can also click **Repair All (x)** to automatically repair all patches, where x is the number of bad patches detected. The **Repair All (x)** button changes to **Undo Repair All (x)**.

To accept the repairs, click **OK**. If you want to revert the repairs later, you will have to re-measure the chart.

### Checking Your Digital Press' Stability

You can view statistics about your digital press' stability in the **Press Stability** area of the **Check Measurements** screen.

These statistics will help you know what to expect of your printing setup (digital press and spectrophotometer) in terms of color accuracy, as your best print can only be as color accurate as your printing setup.

They will also highlight any potential color accuracy problem with your digital press' individual inks.

To calculate these statistics, Color Pilot adds some duplicate patches in different areas of your profiling chart, and calculates the **Delta E** difference between those duplicate patches when you measure them.

It adds duplicate patches for:

- each of the profile's inks (the solid patch and at least one tint patch per ink),
- different levels of grey (using black and/or combinations of other inks),
- the substrate.

The exact set of duplicate patches (including how many times they are duplicated) depends on your ink set and chart layout.

The average values of the duplicate patches are used to calculate the profile, to make it more representative of how your digital press prints.

**Note:**

To see these statistics, you need to be using the following profiling options:

- an [Automatic Layout Type](#) (as this layout includes stability patches),
- an [Equinox Patch Set](#) (as this patch set includes stability patches),
- [Randomize Patches](#) (as the additional stability patches need to be distributed across the chart to be representative of how your digital press prints).

To check your digital press' stability:

1. Select the **ΔE Formula** you want to use to calculate the color differences.  
By default, Color Pilot uses the Delta E formula you chose [in the Preferences](#).
2. Check the **Average ΔE** and **Maximum ΔE** for:

<b>All Patches</b>	This gives you an idea of the general stability of your printing setup (digital press and spectrophotometer).
The <b>Substrate</b>	This gives you an idea of your spectrophotometer's stability (as no ink is printed).
Each of your digital press inks	This gives you an idea of how stable each ink is (as for a same digital press, some inks can be very stable and others a lot less).

The **Average ΔE** is the average of the Delta E values found between all duplicates of a certain patch (for example the substrate patch), or of a group of patches (for example all duplicates of the Yellow solid and tints patches).

The **Maximum ΔE** is the maximum Delta E value found between those duplicates patches/groups of patches.

**Tip:**

If you have several digital presses, you can use the stability results to decide which digital press to use for each job.

For example, if the yellow of one of your digital presses has higher Delta E values, you can send jobs containing a lot of yellow to the other digital press.

**Finish**

In the **Finish** step, you can create color strategies that have the profile you just created as output profile. You can use these color strategies later to color manage files to be printed on the press you just profiled.

You can create several color strategies with different ink sets (all of the profile's inks or a subset of them). This allows you to print with different ink sets (for example with 7 inks for higher quality/color fidelity or with fewer inks but at a lower cost/faster) after profiling the press only once.

This also means that you can refine each ink subset separately and have a different list of [exceptions](#) for each ink subset.

1. On the **Create Color Strategies** screen, select the **Create color strategies** option.

By default, the wizard creates at least one color strategy, with:


- the output profile being the profile you just created,
- the **Input Profile** being either the **<Same as Output Profile>**, or the default input profile you set [in the Preferences](#).

Depending on the ink set of the digital press configuration you profiled, you may see additional color strategies with a subset of your new profile's **Ink Set** as output profile. For example, if you profiled a CMYKOV configuration, you can also have color strategies that can be used to output to CMYK and CMYKO.

2. If desired, click **+** to create more color strategies.

If you want to delete a color strategy, select it and click **-**.

3. Edit your new color strategies as desired:

- To rename a strategy, select it, click its name and type the new name (by default, color strategies are named using the profile name and the ink set used).
- To choose a different **Input Profile**, click **Select** and select your desired profile from the color database.
- To remove the current **Input Profile** and have it be the **<Same as Output Profile>**, click the cross .
- To change the **Ink Set** of the output profile, click the small arrow **▼** and select your desired ink set in the list.

4. If you have selected a white underprint in the **Settings...** before printing the chart, the option **Add White as an extra output ink** is automatically selected. As a result, all strategies created by the wizard will have **ClassicColors White** as an output ink.

5. Click **Next** when you are done.

6. On the **Summary** screen, you will see a summary mentioning the substrate used, and the profile and any color strategy created.

**Tip:** Leave **Assign profile to digital press configuration** selected to automatically use your new profile when printing with the digital press configuration you just profiled.

7. Click **Finish** to close the wizard.

## 9.6. Profiling Your Conventional or Equinox Press

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You can use Color Pilot's state-of-the-art press profiling technology, developed for [Equinox](#), to:

- profile your press for your [expanded gamut printing](#) workflow,
- precisely profile different types of presses (offset, flexo, gravure...), even if you're not working with expanded gamut printing.

See [Overcoming the Challenges of Press Profiling](#) on page 182 to understand how the profiling wizard can help you make a better profile.

**Note:**

If you are working with a digital press, you should make a [digital press profile](#) instead.

If you are working with a proofer, you should make a [proofer profile](#) instead.

To profile your press:

1. In the **Profiles Library**, click the  **New Press Profile** button in the bottom tool bar.
2. In the **New Press Profile** dialog, enter the **Profile Name**.

As you are typing, you can see underneath a list of profiles starting with the same name that already exist in the **Profiles Library**. This helps you make sure that the name you are entering hasn't been used before, and that it conforms to any naming conventions you may use.

3. Select your press' **Ink Set**.

If you are profiling an expanded gamut printing press, use the ink set you have [selected](#) when [preparing for expanded gamut printing](#).





See [Defining your Ink Set](#) on page 182.

4. Set what you want to use as your quality target (calibration curves derived from a standard or custom calibration curves).

See [Setting your Desired Curves](#) on page 183.

5. If desired, you can add one or more keywords to your press profile: select **Add keywords** and enter your **Keywords** (separated by a comma).
6. Click **OK** to go to the **Sections** view of your press profile, which shows a list of your profile's sections, based on the ink set you chose.

A **section** is a part of the profile that describes how some of the inks print together. For example a CMYKOGV profile has the following sections:

-  CMYK,
-  OMYK (also called "the Orange section"),
-  CGYK (also called "the Green section"),
-  CMVK (also called "the Violet section").

7. **Print and measure** a profiling chart for each of the profile sections, to have information about how the press prints with the inks in that section.

You can either:

- measure your charts in Color Pilot,
- import measurement files if you have measured your charts elsewhere.

See [Printing and Measuring your Charts](#) on page 184.

8. **Process** each profile section to improve its quality, and help you get better and more consistent results with expanded gamut printing. This consists of:
  - **Inspecting** the measurement data and repairing faulty patches.

- **Averaging** several measurements of a chart to correct for variations across a sheet or across press runs.
- **Smoothing** your profile data to further compensate for press variation.
- **Synchronizing** your profile to your chosen [standard or custom target](#) so that the profile's dot gain matches the dot gain expected by the standard/target.

See [Processing your Profile Sections](#) on page 194.

9. If desired, you can derive compensation curves from your profile data to help you meet your **desired target** on your production runs.

See [Updating your RIP Curves with your Profile Data](#) on page 206.

### 9.6.1. Overcoming the Challenges of Press Profiling

When profiling a press, you may encounter the following typical problems:

- measurement errors due to bad print quality,
- measurement variations across a sheet,
- measurement variations between press runs (for instance when printing different profile sections in different runs for [expanded gamut printing](#)),
- difficulty to hit the target/match your desired quality standard.

When you profile your press with Color Pilot, you can address these problems by:

- [Inspecting](#) the measurement data and repairing faulty patches.
- [Averaging](#) several measurements of a chart to correct for variations across a sheet or across press runs.
- [Smoothing](#) your measurements to further compensate for press variation.
- [Synchronizing](#) your profile to your desired target (deriving compensation curves from your measurement data to help you meet your desired target on your production runs).

### 9.6.2. Defining your Ink Set

1. Select the **Ink Set** to use for your press profile.

If you are profiling an expanded gamut printing press, use the ink set you have [selected](#) when [preparing for expanded gamut printing](#).

You can choose to make:

- a **CMYK** profile (even if you are not using expanded gamut printing, you can take advantage of the Equinox profiling technology: the profiling wizard will help you [average](#), [smooth](#) and [synchronize](#) your measured data to ensure a high profile quality for your CMYK press).
- a 5 to 7 inks expanded gamut printing profile, by choosing **CMYK** plus any combination of **Orange/Red**, **Green** and **Violet/Blue**.

Orange/Red, Green and Violet/Blue are **expanded gamut inks** and are often indicated using their abbreviations (**O/R**, **G** and **V/B**).

The illustration at the left of the dialog shows the ink set you have chosen visually. For example:



CMYKOGV



CMYKRB

2. By default, every ink set uses CMYK inks from the **process** ink book, and expanded gamut inks from the **ClassicColors** ink book.

However, you can replace any of these inks by an ink of your choice, as long as it still matches the ink set you selected.

For example, you can replace a blue ink by another blue ink, but not by a red/violet/... ink.

To do this:

- a) Right-click the ink to replace and select **Replace Ink...**
- b) In the dialog that opens, browse to the ink of your choice (or **Search** for it in your chosen ink book) and click **Select**.

**Tip:**

You can also click on a selected ink and type the name of the ink to replace it with. Or type part of the ink name and press **Enter** to auto-complete it.

For example to replace **Red** by **PANTONE Warm Red C**, type `warm` and press **Enter**.

If the ink you selected doesn't match the original ink set, you will get a warning.

In this case, you can either select an ink that does match the ink set, or change the ink set and then replace the ink.

### 9.6.3. Setting your Desired Curves

If you have chosen a *printing target* for your press, you should indicate it when starting to make your profile, so you can later *synchronize* your profile to that target.

- If you don't have a printing target you want to match, select **Don't synchronize the profile**.
- If you want to *print to G7*, select **Synchronize CMYK to G7 and ECG colors to linear SCTV**.

In this case:

- the target dot gain for your CMYK inks is the dot gain specified by G7,
- the target dot gain for your expanded gamut inks is linear (this is measured using the *SCTV* metric).

If you are making a profile for a conventional press (that is not set up for *expanded gamut printing*), the profile will only take into account the target dot gain for your CMYK inks.

- If you want to [print to another target](#) (ISO 12647, another standard or a target of your own), select **Use desired curves from Setup in Curve Pilot Curve Set** and choose the curve set containing the dot gain targets for your inks.

**Note:**

If you cannot select this option, check that:

- You have created and saved your curve set in Curve Pilot (see the [Curve Pilot PressSync documentation](#) for more information).
- Your curves database (containing the curve set) is in the location [defined in the Preferences](#).

**Tip:**

If you are working with the ISO 12647 standard, we recommend you use a curve set made using the **cmk\_ISO\_PT1&2** template in Curve Pilot.

See [PressSync Templates Based on the ISO 12647 Standards](#) in the Curve Pilot documentation for more information.

If your curve set doesn't have a target defined for some of your inks, the target defined for "Other inks" in the curve set is used for those inks.

You can then see the **Desired Curve** for each profile ink in the table above.

### 9.6.4. Printing and Measuring your Charts

After [defining your ink set](#) and [setting your desired curves](#), you need to print and measure profiling charts to add the measurement data to your profile.

1. Select the best chart to use for your press. See [What Type of Chart Should I Use?](#) on page 185.
2. Print it using some good initial dot gain curves in the RIP. See [Making Sure your Press is Stable](#) on page 21.

**Note:** We recommend you print several charts to account for printing variation in your press. See [How Many of Each Chart Should I Print?](#) on page 186.

3. Measure your printed chart(s) using one of the [supported spectrophotometers](#).  
See [Measuring Charts for your Profile Sections](#) on page 186.
4. Once you are done printing and measuring charts for all [sections](#), you can [process your profile sections](#).

**Note:**

If you want to profile a remote press, ask your colleagues at the remote site to:

1. print your chosen chart on their press,
2. measure it in the [license-free version](#) of Color Pilot (as explained in [Measuring your Printed Charts](#) on page 353),
3. send you the measurements.

You can then [import these measurements](#) into your licensed Color Pilot and [process the profile sections](#) to make the profile.

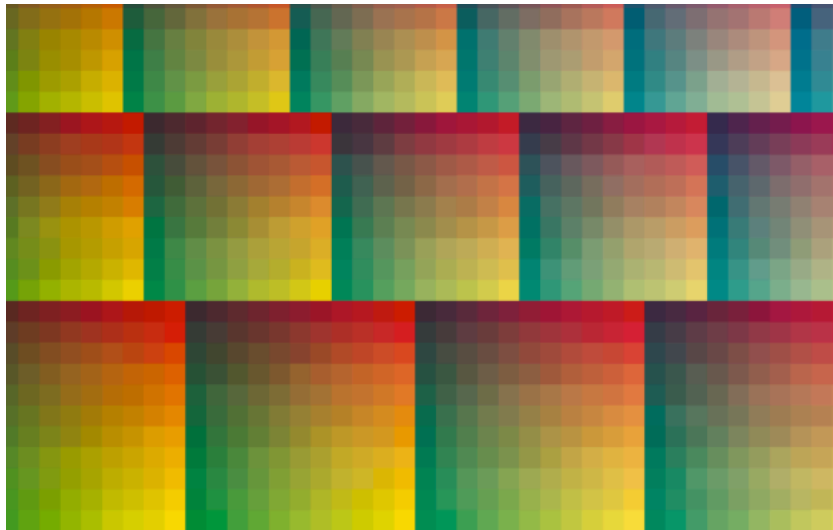


### What Type of Chart Should I Use?

You can either use standard charts or make *custom ones* (for example you can create narrow charts to profile a narrow web press).

We recommend you use randomized charts (for example the **IT8.7/4 i1i0** chart or a randomized custom chart) as those alleviate some of the printing variations in your press.

For example if you have "color jumps" near the line endings, a regular chart like the one below can concentrate all of the color jump in one area of the profile,



while a randomized chart like the one below will distribute the color jump in more of the profile, which is easier to compensate using *averaging* and *smoothing*.



### How Many of Each Chart Should I Print?

You should ask your press operator how your press drifts, in which situations it behaves differently, and ideally get charts printed in each of these situations.

For example you might want to print charts:

- first thing in the morning
- at the end of the day
- right after stabilizing your press (for example if you use a control strip for quality control)
- right before the next time you stabilize your press
- ...

This will help you have a good picture of the press behavior (as for example if you print all the profiling charts just after stabilizing your press, the profile will only be representative of the first half day of the press operation).

In each of these cases, we recommend that you include several charts on the plate, to account for left/right and sheet start/sheet end printing differences (you can also rotate some of the charts if necessary).





Your operator should then let the press pick up speed, and take a number of samples from the start, the middle and the end of the press run, before letting the press slow down again.

Also remember that the less stable your press is, the more measurements you need to make a profile that is representative of the way your press prints.

### Measuring Charts for your Profile Sections

In your profile's **Sections** view, you need to measure the profiling charts you printed on your press for each profile section.


A **section** is a part of the profile that describes how some of the inks print together. For example a CMYKOGV profile has the following sections:

-  CMYK,
-  OMYK (also called "the Orange section"),
-  CGYK (also called "the Green section"),
-  CMVK (also called "the Violet section").

You need to print and measure at least one chart per profile section, but you recommend you use more charts to get a good representation of how your press prints (see [How Many of Each Chart Should I Print?](#) on page 186).

**Note:** If you are profiling a remote press, you can import the chart measurements that the remote site sent you instead (see [Importing Chart Measurements](#) on page 192).

Do the following for each section:

1. Make sure the spectrophotometer you want to measure with is connected to your application.
2. Select the section for which you want to measure a chart (for example  CMYK), and click **Measure Chart...** under **Step 1** at right.

This opens the **Measure Chart** wizard, that will guide you through measuring your chart.

3. Select the layout of the **Overprint Chart** that you want to measure.

You can use:

- a (predefined or custom) 4 color [chart layout](#): this can be a CMYK chart layout or a chart layout made with the ink set of the section you want to measure.

If you choose a CMYK chart layout, it will be remapped automatically to use your section's inks if needed (for example, to measure an Orange section, the Cyan in the layout will be remapped to Orange to give OMYK).

- a [custom](#) chart layout made with the ink set of the full profile (in this case, the measurements you make will be automatically distributed over the different sections).

**Note:**

You can only use chart layouts made for the spectrophotometer you are measuring with.

For more information about chart layouts, see [Working with Overprint Charts](#) on page 345.

If you are not sure what to choose, see [What Type of Chart Should I Use?](#) on page 185

If needed, you can also create a custom chart by selecting **New Overprint Chart...** (see [Creating a Custom Chart Layout](#) on page 345 for details). When making a multicolor profile, you can either create a custom chart for the section you are measuring or for the full ink set.

You can see a **Preview** of the chart you selected, and some information about the chart (number of pages, dimensions...) on the right.

You can also view a higher resolution of the chart (click **View Chart**) and the chart's location on your computer (click **Show File Info**).

**Tip:**

If you haven't printed your chart yet (for example if you didn't have the right chart file), you can export your desired chart from here: click **Export to PDF for measuring...**

If another site at your company wants a press profiled and they don't have a licensed Color Pilot, you can save each section's chart as PDF, and send those PDFs to that site for printing on their press.

They can then [measure them](#) using the application's license-free mode, and send you the measurements back so that you can make their press profile.

**Note:**



You will see a warning if you are trying to measure a chart that isn't compatible with the M1 and M2 [measurement conditions](#) with a spectrophotometer set to use M1 or M2.

In this case, you can either:

- switch to using M0 and measure your chart as usual,
- keep using M1 or M2, but measure your chart [patch by patch](#).

Whether a chart layout is compatible with M1 and M2 depends on the size of its patches, among other things. You can [create charts compatible with M1 and M2](#) in Color Pilot.

4. Follow the instructions on the **Measure page ...** screen to measure your chart.



**Note:** If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer. You can also choose a different [measurement condition](#).

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").

If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.

For the next line, the spectrophotometer automatically switches back to scan mode.

- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

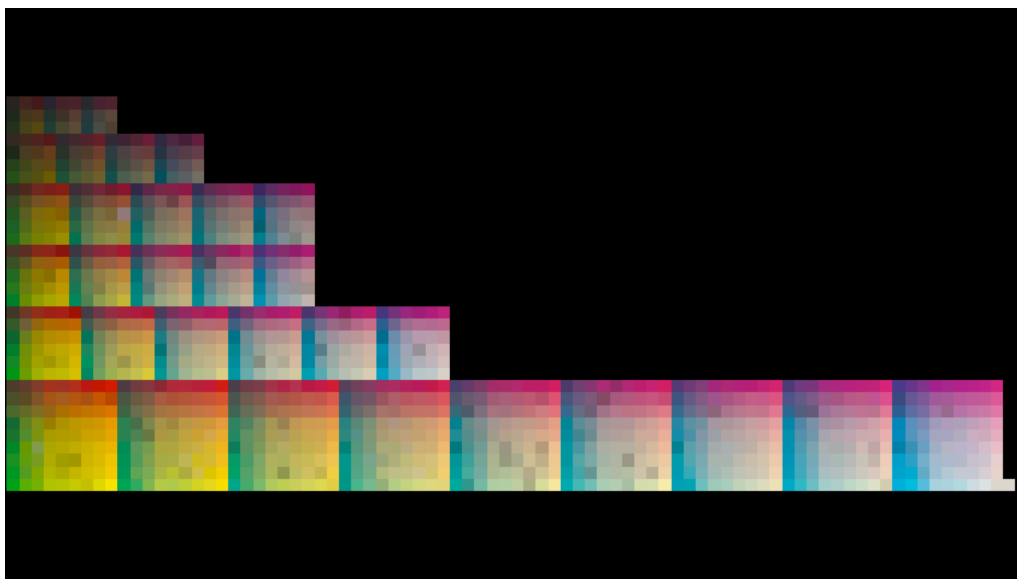
1. Make sure that your measurement file:

- is of the correct page of your chart (if it has several pages),
- is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.

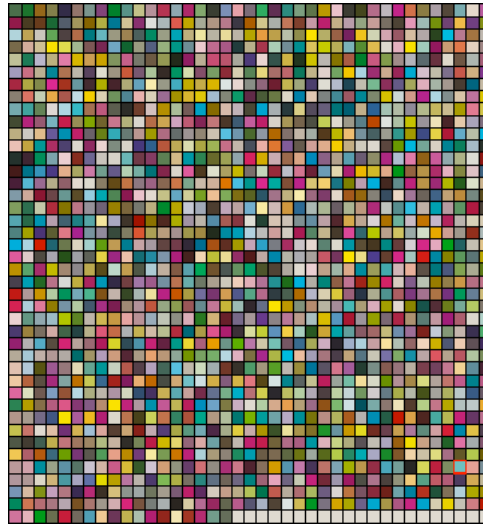
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

5. After you finished measuring, you can check your measurements:

- as they are organised in the profile in **Profile** view,



- as they have been measured on the chart in **Layout** view.



You can view each page individually, and zoom in , zoom out , or fit the zoom to the view .

- a) To inspect a single patch more in detail, select it to show its ink composition and its Lab/LCh values.
- b) To remeasure a patch that is an obvious measurement error (for example a black or white patch in the middle of a gradation), you can either:
  - select it and click **Measure Again...**
  - right-click it and select **Measure Again...**

**Note:** If you have a lot of measurement errors, we recommend you go back and remeasure the problematic page(s) completely (use the **Back** button at the bottom of the wizard or the back arrow at the top depending on your operating system).

- c) If you cannot remeasure the patch (for example if it is damaged on the chart), you can repair it by:
  - selecting it and clicking **Repair**,
  - selecting it and pressing **Ctrl+R**,
  - right-clicking it and selecting **Repair**.

Repairing a patch discards its bad color values and replaces them by a good approximation of what the color values should be, based on those of the neighboring patches.

**Note:**

Patches that look "wrong" but don't change when you remeasure them and aren't damaged on the chart are likely to be a variation or quirk in the way the press prints (especially if you find several of them in the same area of the chart).

You should not repair those patches but leave them as they are, as they are representative of how your press prints.

- d) You can also use **Find and Repair Bad Measurements...** to automatically detect and (optionally) repair bad patches in your chart.

See [Find and Repair Bad Measurements](#) on page 191 for details.

6. When you are done, enter a name for your measurements and click **Finish**.

You can also save your measurements as a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file for backup purposes.

7. In the **Sections** view, you can see some information about your measurements (the name, number of patches and whether they are **Spectral** or **Lab** measurements).

You can also see a preview of the measurements and more details below (including the [measurement condition](#) used if one was set on your spectrophotometer).

8. Click **Show larger preview and/or compare measurements...** to [inspect](#) the measurements from your file and, if you have several measurements, to [compare](#) them to each other.

### Find and Repair Bad Measurements

You can use **Find and Repair Bad Measurements...** to automatically detect (and optionally repair) bad measurements in your chart.



This detects isolated patches in your profile that differ substantially from patches with similar ink combinations, and can be attributed to spectrophotometer malfunction or misalignment, abnormal measurement conditions, or even damage to the physical print-out itself.

It is particularly useful when working with randomized charts (as the bad patches are not immediately obvious against their neighbors in **Layout View** because they have been randomized).

You can always perform additional [repairs](#) based on visual inspection of your chart.

1. Click **Find and Repair Bad Measurements...** on the **Check Measurements** page of the **Measure Data** wizard.

If bad measurements are detected in your chart, the **Repair Bad Measurements** dialog opens.

2. In the **Repair Bad Measurements** dialog, you can cycle through bad patches by using the  and  buttons.

For each bad patch you can see:

1. The patch status. This can be **Not Repaired**, **Repaired**, or **Remeasured**.
2. The ink combination used to generate the patch.
3. The patch's **Lab** values before and after repair.
4. A small preview area showing the color difference between the Lab values before and after repair.
5. The **delta E** between the Lab values before and after repair.

**Note:** Patches with high delta E values are likely in need of repair, while patches with lower delta E values may be acceptable, particularly in darker areas of the profile, where sampling performed by the application is sparser and spotting a bad measurement can be difficult.

6. A small preview area showing the patch centered next to its neighboring patches in the profile.

You can use this to visually verify that the patch is actually bad, and to facilitate the task of locating the patch in your profile chart.

3. For each bad patch that you inspect, you can:
  - a) Click **Repair (Ctrl+R)** to repair the patch.

The patch is immediately repaired. The patch status changes to **Repaired**, and all preview areas are updated. The **Repair (Ctrl+R)** button changes to **Undo Repair**.

- b) Click **Undo Repair** to revert the repair.
- c) Click **Measure again...** to re-measure the patch.

This opens the **Measure patch again** dialog. To re-measure the patch, follow the instructions in the dialog.

- d) Double-click **Repair** to revert to the original measurement.  
The patch status changes to **Not Repaired**.

You can also click **Repair All (x)** to automatically repair all patches, where  $x$  is the number of bad patches detected. The **Repair All (x)** button changes to **Undo Repair All (x)**.

To accept the repairs, click **OK**. If you want to revert the repairs later, you will have to re-measure the chart.

## Importing Chart Measurements

If you have measured your profiling charts elsewhere, and you have measurements files, you can use those to create your press profile.

For example, you can use measurements files from:

- a [license-free](#) Color Pilot,
- the Equinox Profile Creator,
- an older Color Engine Pilot version,
- a third party application like Profile Maker.

### Note:

Your measurements files must be in the **CGATS** format (Committee for Graphic Arts Technologies Standards color measurement format).

Depending on which application you used to measure your charts and export the measurement data, you may have:

- one CGATS file per [profile section](#) (if you used Color Pilot, the Equinox Profile Creator or a third party application).  
See [Importing Single Section CGATS Files](#) on page 192.
- one CGATS file containing the overprints measurements for the whole profile (if you used an older version of Color Engine Pilot).  
See [Importing Multi-Section CGATS Files](#) on page 193.

## Importing Single Section CGATS Files

If you have measured a profiling chart per section (for example a CMYK, OMYK, CGYK and CMVK chart to make a CMYKOGV profile), you can export each chart's measurements as a CGATS file.

You can do this for example in a license-free Color Pilot (see [Measuring your Printed Charts](#) on page 353) or in a third party application (see your application's documentation).

You can then import these CGATS files into your press profile:

1. Select the section for which you want to import measurements and click **Import Measurements...** under **Step 1** at right.
2. Browse to your CGATS measurements file (it should have a `.txt` or `.it8` extension) and click **Open**.



You can import several measurements files at once. Using [several measurements](#) allows you to [average](#) your measurements later, and helps the profile being more representative of how your press prints.

**Note:** Make sure you are selecting the correct measurements file for the section you are working on. If you select a measurements file for another section, the application will give you the option to import it for that other section instead.

3. You can see some information about the measurements you have added (the measurements file's name, number of patches and whether it contains **Spectral** or **Lab** measurements).

You can also see a preview of the measurements and more details below (including the [measurement condition](#) used if one was set on your spectrophotometer).

**Note:**

When using several measurements, we recommend they all have the same:

- number of patches,
- data type (**Spectral** or **Lab**),
- measurement condition.

4. Click **Show larger preview and/or compare measurements...** to [inspect](#) the measurements from your file and, if you have several measurements, to [compare](#) them to each other.

### Importing Multi-Section CGATS Files

If you have made an Equinox profile in an older version of Color Engine Pilot and you want to:

- take advantage of Color Pilot to [improve your profile's quality](#),
- update your profile by adding new measurements (and [average them](#) with the old ones) to get a more comprehensive picture of how your press prints,

... you can export your existing profile's data to a multi-section CGATS file, and import that file into a new press profile in Color Pilot.

**Tip:**

To export an Equinox profile's data to a multi-section CGATS file in an older version of Color Engine Pilot:

1. Open the (Esko or ICC) profile and go to **File > Export**.
2. Save the file as a **CGATS data file (\*.txt)**.


To import the CGATS file into your new Color Pilot's press profile:

1. Select any profile section and click **Import Measurements...** under **Step 1** at right.
2. Browse to your CGATS measurements file (it should have a `.txt` or `.it8` extension) and click **Open**.

Color Pilot will then split the measurement data it finds in the file to assign it to the different sections.

3. In the **Choose Section** pop-up, check that the right measurement data is imported into the right section (for example, the measurement data of the **OMYK** overprints will be imported into the **Orange** section).

If your CGATS file has measurements for the same inks as the ones you picked for your profile, this should all be correct automatically.

If it has measurements for different inks, you will see a warning sign . You can then choose to:

- discard the irrelevant data (if for example, the file has Green overprint data but the profile needs Violet data) by selecting **<Do Not Import>**,
- import the data in question anyway (if for example, if you are using a blueish Violet ink for your CMYKOV profile and the application identifies it as a Blue ink).

4. You can see some information about the measurements you have added (the measurements file's name, number of patches and whether it contains **Spectral** or **Lab** measurements).





**Note:** You can **Remove** a multi-section CGATS file from a certain section without removing it from the other sections.

You can also see a preview of the measurements and more details below (including the [measurement condition](#) used if one was set on your spectrophotometer).

5. Click **Show larger preview and/or compare measurements...** to [inspect](#) the measurements from your file and, if you have several measurements, to [compare](#) them to each other.

### 9.6.5. Processing your Profile Sections

A **section** is a part of the profile that describes how some of the inks print together. For example a CMYKOGV profile has the following sections:

-  CMYK,
-  OMYK (also called "the Orange section"),
-  CGYK (also called "the Green section"),
-  CMVK (also called "the Violet section").

Once you have [measured a profile section](#) or [imported a measurement file](#) for it, you can process that section to improve the quality of your profile data.

By processing your profile, you can correct or compensate for the "noise" in the profile data, and make the profile match your [desired standard](#).

1. Once you have your measurements for a section, that section has the **Ready to Process** status in the top table.

**Note:**

When making a multicolor profile, you can process any profile section for which you have measurements, but if you are [printing towards G7](#), you should process your CMYK section first.

This is because:

- first the CMYK section is synchronized to your standard (so for example the Cyan prints with the Cyan dot gain defined in the standard),
- then the C, M, Y and K inks in the other sections (for example OMYK, CGYK, CMVK) are synchronized to the processed CMYK section, to keep the profile consistent and avoid the risk of having color jumps in your jobs.

Both in the **Sections** view and when processing, you can see the profile section you are currently working with highlighted on the color wheel, for example:



CMYK section



Orange section



Green section



Violet section

2. Make sure the section you want to process is selected and click **Process Section...** under **Step 2** at right.

This opens the **Processing Section** wizard, that will guide you through the following steps.

**Note:**

If necessary, you can pause the processing at any time and finish it later:

1. Click **Quit Now and Continue Later** and confirm by clicking **Save and Quit** in the pop-up dialog.

This closes the processing wizard and shows a **1** badge next to the section you were working with in the **Sections** view.

2. When you are ready to resume processing, select your section again and click **Process Section....**

In the pop-up warning you about the unfinished processing work, click either:

- **Resume** to go to the point where you paused processing in the wizard and continue from there.
- **Discard and Restart** to discard your previous processing work and start anew.

3. First you need to inspect your measurements, and repair any patch that looks like an obvious measurement error.

See [Inspecting and Repairing your Measurement Data](#) on page 196.

**Note:** If you have several sets of measurements for a section, the inspection step is part of the averaging step.

4. If you have measured [several printouts](#) of your chart, you can average those measurements to correct for variations across the sheet or across the press run.

See [Averaging your Measurement Data](#) on page 197.

5. You can then smooth your measurements, to further compensate for press variation.

See [Smoothing your Measurement Data](#) on page 200.

6. If you are printing towards [a standard or custom target](#), you can now apply compensation on your profile data so that it matches that standard or target.

See [Synchronizing your Measurement Data to your Desired Curves](#) on page 203.

**Note:** If you have chosen not to match any standard or target, the synchronization step will be skipped automatically.

**Note:**

If necessary, you can discard the processed data for a section and re-process it: just select it and click **Process Section...** again.

If you have added or removed measurements after processing the section, you need to reprocess it.

### Inspecting and Repairing your Measurement Data

You should first have a good look at the profile data you measured, and repair any outlier (any patch that is so different from its neighbors that it is most likely to be a measurement error) if necessary.

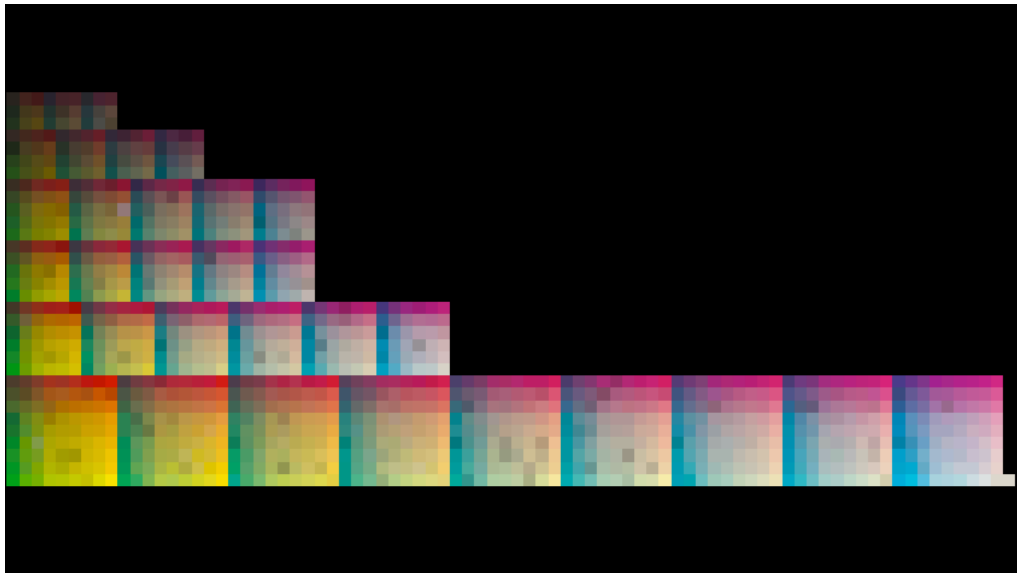
- If you only measured one chart for the profile section you are working on, you can do this in a separate step (**Inspect Data Set**) when starting the *processing wizard*.
- If you measured several charts for that section, you can do this at the start of the *averaging step*.

**Note:** You can (and should) also inspect your data in the *smoothing* and *synchronizing* steps, to make sure you are happy with the results.

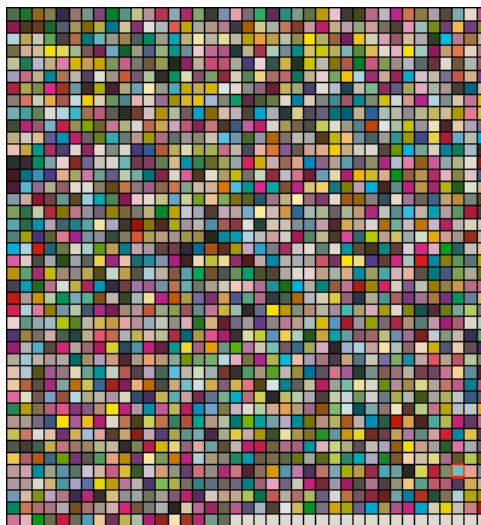
1. Inspect the profile data you measured.

You can see the measurements:

- as they are organised in the profile in **Section** view,



- as they have been measured on the chart in **Layout** view.



You can zoom in , zoom out , or fit the zoom to the view .

2. You can **Highlight** the **Substrate** patch, the **Primaries** or the **Greys** if you want to perform a visual check on those parts of your measurements.
3. To inspect a single patch more in detail, select it to show its ink composition and its Lab/LCh values in the **Patch Details** at right.
4. To repair a patch that is an obvious measurement error (for example a black or white patch in the middle of a gradation), you can either:
  - select the patch and click the **Repair selected patch** button,
  - select the patch and press **Ctrl+R**,
  - right-click the patch and select **Repair selected patch**.

**Note:**

Repairing a patch discards its bad color values and replaces them by a good approximation of what the color values should be, based on those of the neighboring patches.

We recommend you only repair patches that look like obvious measurement errors, and not patches that look more variations or quirks in the way the press prints, as those can be corrected by [averaging](#) and [smoothing](#), which don't completely discard the original data but give a better version of it.

A good rule of thumb is that isolated color jumps can be measurement errors, but if you find several of them in the same area of the chart, it's likely to just be how the press prints.



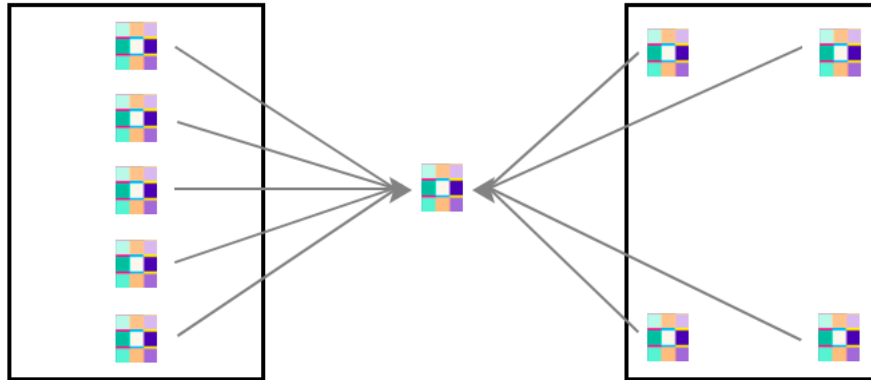
**Attention:** If you have a lot of measurement errors, we recommend you remeasure the chart completely!

## Averaging your Measurement Data

If you printed and measured your profiling chart for the section several times [as recommended](#) (with the chart placed several times on the plate, and ideally in several press runs), you can average your chart measurements.

### What is Averaging?

If you only print and measure one chart, it is printed under specific conditions (for example, near the left edge of the paper, or first thing in the morning) which are most likely not representative of how all the jobs you send to this press are printed.



By averaging several measurements, you make sure that your profile is a good representation of your press behavior in general.

### Averaging in the Processing Wizard

The wizard's **Create an Averaged Data Set** step shows all of the measurements you added, and what the profile section looks like after *averaging* those measurements.

We recommend that you:

1. First *inspect* the averaged profile section.  
It should look relatively smooth in **Section** view. If you see strong color jumps here, it is generally because one or more of your chart measurements is of bad quality.
2. Then look at each chart measurement individually: select each one in **Show** and inspect it.  
If any of the chart measurements is really jumbled or has a very high amount of noise, you should determine whether this is usual for your press or not.  
If it is an isolated problem, you should not use that chart measurement to make the averaged section: deselect it in the **Use** column.  
The average is updated automatically.
3. If you see individual patches that are obvious measurement errors (for example single black or white patches in the middle of a gradation), *repair* them.
4. To detect less obvious problems more easily, compare each chart measurement to the averaged section:
  - a) With your chart measurement selected in **Show**, select **Compare with** and choose **Average** to show the split patch view.
  - b) In the **Statistics** at right, have a look at the Delta E values to see where the differences are.

- If your **Average** Delta E is high, it may be that one of your charts is wrong (for example you accidentally measured a chart printed by a different press) or you may need to look at the rest of the statistics for more investigation.
  - If your **Maximum** Delta E is very high, it's likely that there are some measurement errors that you should repair.
  - If your **Primaries** Delta E is high, it could mean that something happened to your inks between printouts, for example:
    - the inks got diluted, or the pressure on the plates changed (in flexo printing),
    - the ink-water balance changed between prints (in offset printing),
    - you printed one of the charts with different inks, or with a different screening.
  - A high **Grey** Delta E may mean that your grey balance shifted (pay special attention to this if you are [printing towards G7](#)).
  - A high **Substrate** Delta E may mean that one of the charts was printed on a different substrate.
- c) You can also **Highlight** certain parts of your measurements to investigate problems visually.

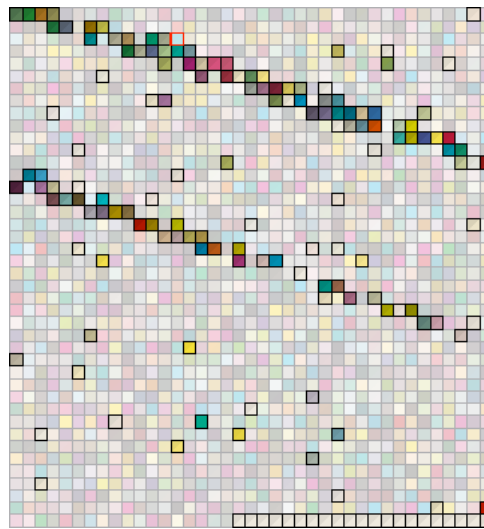
Apart from checking the **Substrate, Primaries, Greys** and **Maximum Delta E**, we recommend you pay attention to the **Patches with above average Delta E** and the **Worst 10 percent**, and look for patterns in the distribution of those patches.

- In **Section** view, you can see for example if most of the differences are clustered in one color area, which can point to a problem with one of your inks.
- In **Layout** view, you can check for patterns indicating a problem with one of the charts measured.

In the example below, highlighting the **Patches with above average Delta E** in the comparison shows that one of the charts probably has two scratches or creases, that reflected the light differently when measuring.



This is even clearer when highlighting the **Worst 10 percent**.



d) To get information about an individual patch, click it to show:

- the ink values that have been printed,
- the Lab/LCh values of this patch in both the single chart measurement and the average,
- the Delta E difference between the two.

in the **Patch Details** at right.

Based on the problems you find, you can discard other bad measurements and/or repair more patches as necessary.



**Attention:**

Do not discard too many chart measurements as this can lower the quality of your averaged section!

You need to keep enough measurements so that the average is representative of the way your press prints (we recommend you try and keep at least one chart from each *printing situation*).

Also remember that the less stable your press is, the more measurements you need to have a good average.

**Smoothing your Measurement Data**

Once you have *repaired* any bad patches and *averaged* your measurements for the profile section you are working on, you can smooth that section to further compensate for press variation.

Smoothing is especially important if:

- you are working with a press that can have a lot of variation or "noise" (for example a Flexo press),
- you couldn't average your measurements (because you could only measure one chart for that section),
- the measurements still look "coarse" after averaging (as below).





Smoothing makes sure that there is a more regular progression of the ink values between neighboring patches, so that you will have more reliable color tints on press, especially when printing jobs with gradations.



### Smoothing in the Processing Wizard

1. In the **Smooth Data** step of the wizard, select a **Smoothing Factor** and click **Apply Smoothing**.

**Note:**

Keep the following in mind when choosing a **Smoothing Factor**:

- The higher the quality of your data after inspecting/averaging, the less smoothing you need to apply.
- In general, we recommend applying the lowest smoothing factor that gives a smooth result, to preserve your measurements' dot gain and color accuracy (in most cases, the default smoothing factor of 3 is sufficient).
- The wizard remembers the last smoothing factor you used and offers it as a default when smoothing again, so when making a multicolor profile, you can easily remember how much you smoothed the last section you processed.

However, you may want to use different smoothing factors for different profile sections. For example, a Violet section typically needs more smoothing than other sections.

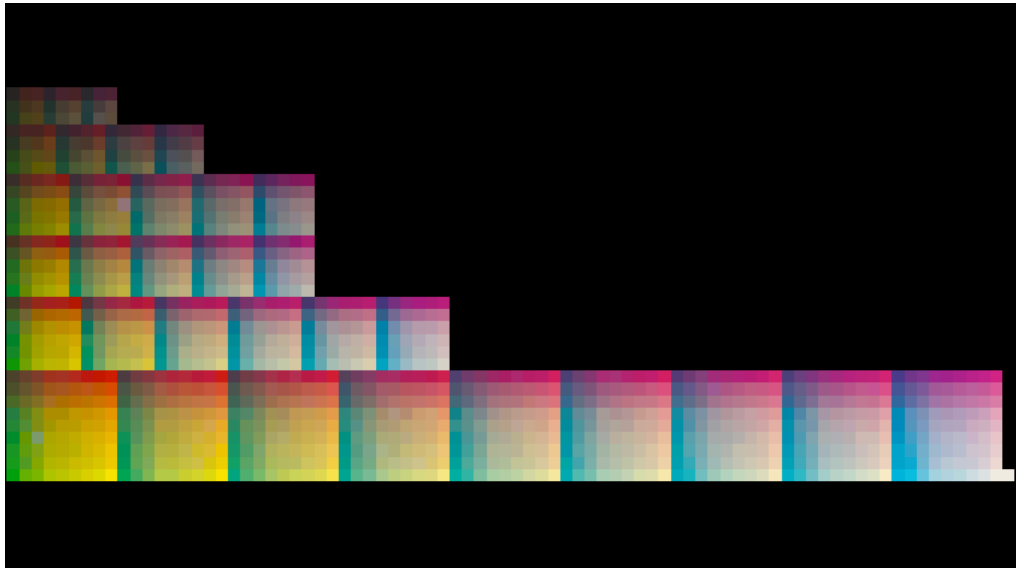
Smoothing may take a few minutes, and is reversible (click **Undo Smoothing**) so you can try several smoothing factors on your profile section.

You can see the smoothing factor used above the measurements view.

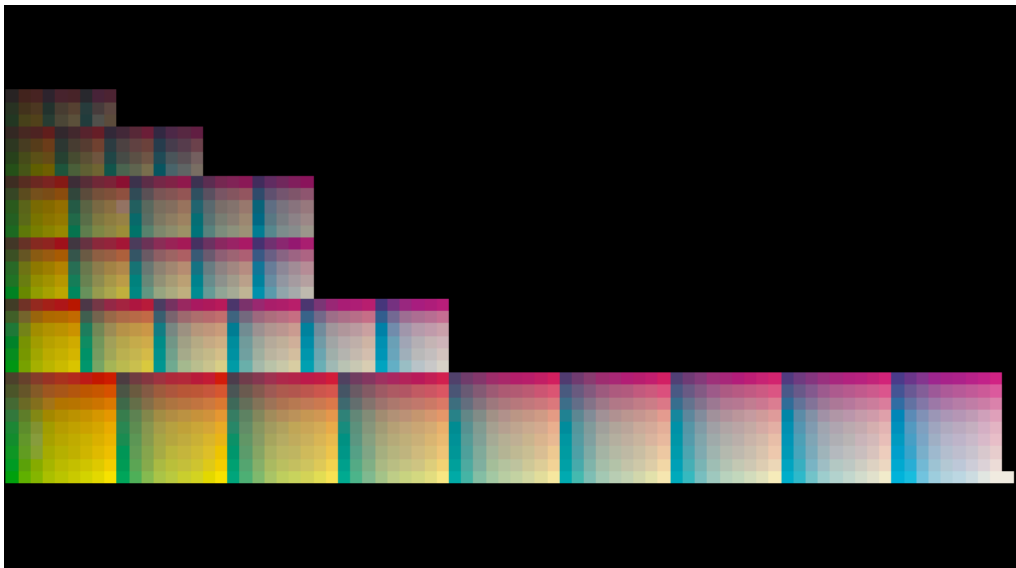
2. After applying the smoothing, you can compare the smoothed and the unsmoothed profile sections.

You can choose to have the wizard **Show**:

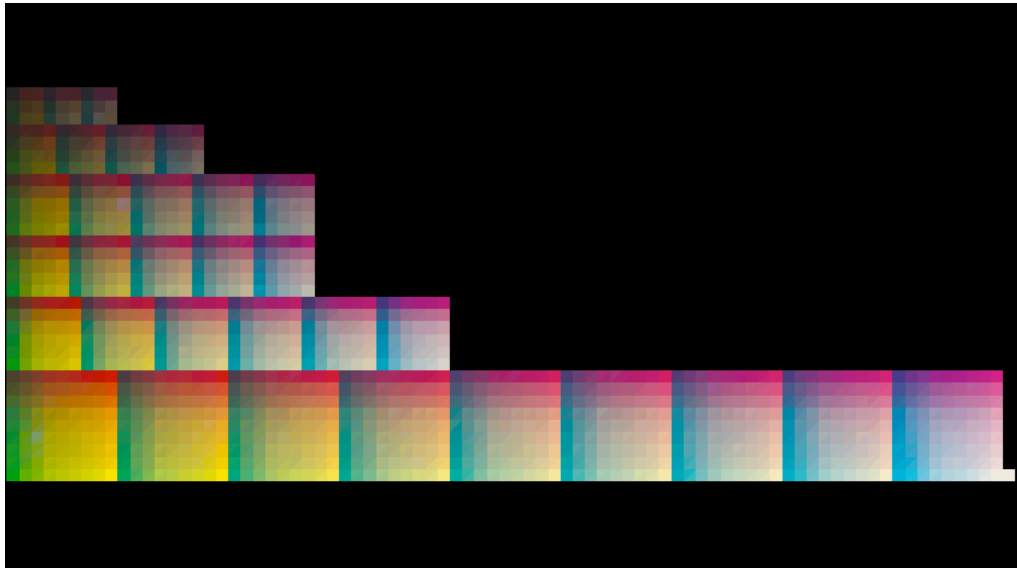
- The profile section **Before** smoothing:



- The profile section **After** smoothing:



- A comparison of the profile section **Before And After** smoothing (this shows a split patch view, with the unsmoothed data on top and the smoothed data at the bottom):



You can also [inspect](#) the profile section before and after smoothing (to see the color differences in Delta E or the worst patches - that needed the most smoothing- for example).

You can see more information about the color differences between the smoothed and unsmoothed data in the **Statistics** area at right. You can also choose the **Delta E Formula** to use to calculate the Delta E differences.

3. If necessary, you can still [repair patches](#).

**Tip:** In many cases, it is better to apply a low smoothing factor and then repair the few patches you are not happy with manually, rather than smooth too much and risk losing some of the gradations and highlights information that is specific to your press.

**Note:**

- To repair a patch in the smoothed profile section, make sure you are in the **After** or **Before And After** view.
- If you repair a patch after smoothing but then you undo the smoothing, your repair will also be undone.

### Synchronizing your Measurement Data to your Desired Curves

After repairing, averaging and smoothing your measurement data to make sure it is the best quality possible, you can now synchronize it to the target [you have chosen](#).

#### What is Synchronization?

Synchronizing a profile to a target means applying a compensation on the profile data, so that when printing with this profile, the dot gain on press will match the dot gain specified in the target.

### What about the RIP Curves?

You also need to [update your RIP curves](#) to take into account the way your press prints, as described by your profile.

You calculate your updated RIP curves based on:

- the existing RIP curves,
- your profile data,
- the printing target you want to match.

This means that the profile and the RIP curves are adapted separately to help you match your printing target.

### Using the Synchronized Profile and Updated RIP Curves in Production

Using your synchronized profile and your updated RIP curves should ensure that your output will, on average, match your target dot gain.

You may still need to tweak your RIP curves from time to time, if your press runs into specific problems (for example if some nozzles get clogged up), but you should keep using the synchronized profile to help you match your target.

### Synchronizing in the Processing Wizard

If you have [set a printing target](#) you want to match, you can [synchronize](#) your profile to that target in the wizard's **Synchronize** step.

1. Click **Apply Synchronization**.

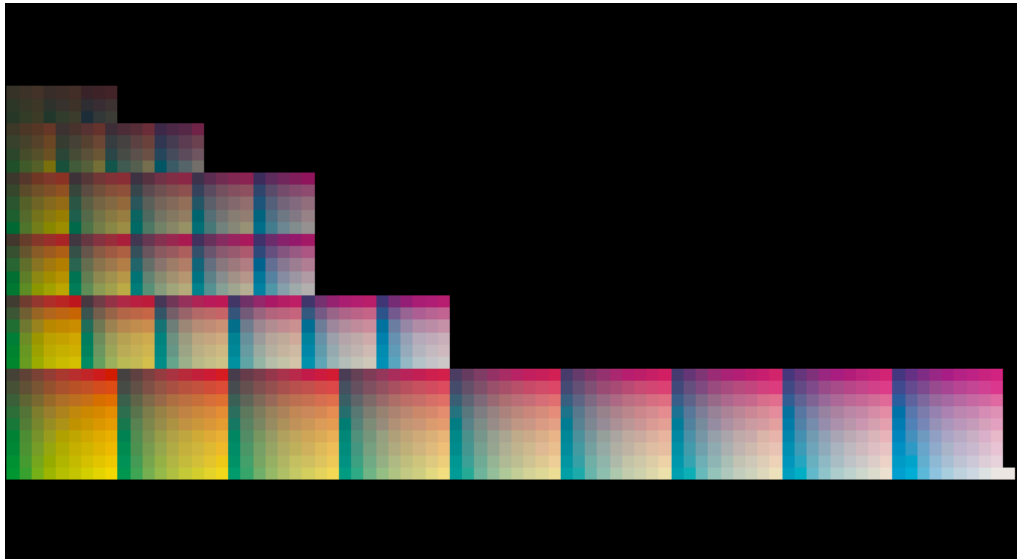
**Tip:** Above the **Apply Synchronization** button, the wizard indicates which target you are synchronizing to.

Synchronization may take a few minutes, and is reversible (click **Undo Synchronization**).

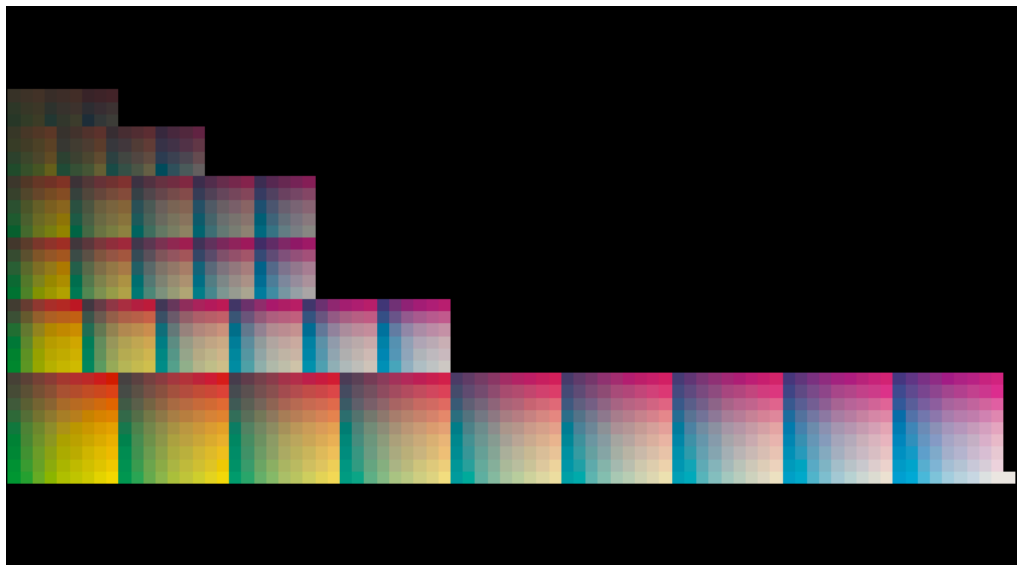
2. After applying the synchronization, you can compare the synchronized and the unsynchronized profile sections.

You can choose to have the wizard **Show**:

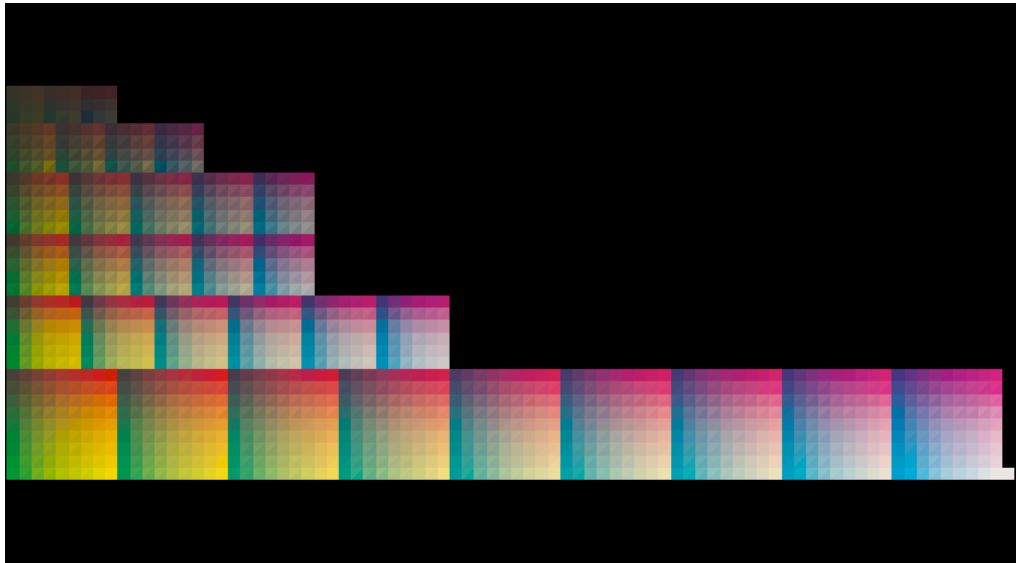
- The profile section **Before** synchronizing:



- The profile section **After** synchronizing:



- A comparison of the profile section **Before And After** synchronizing (this shows a split patch view, with the unsynchronized data on top and the synchronized data at the bottom):



You can also *inspect* the profile section **Before** and **After** synchronizing (to see which areas of the profile have been changed the most by synchronizing for example).

3. Click **Finish** to finish processing your section.

You can now process your profile's remaining sections.

### 9.6.6. Updating your RIP Curves with your Profile Data

After creating a press profile *synchronized to your target*, you also need to update your RIP curves to take into account the way your press prints.

You do this based on:

- the existing RIP curves (that you used to print your profiling charts),
- your profile data (the data that describes your press behavior, before the profile is synchronized to your printing target),
- the printing target you want to match.

This means that the profile and the RIP curves are adapted separately to help you match your printing target.


1. Export your processed profile data as it was before synchronizing:
  - a) In the **Sections** view, make sure you have *processed* all profile sections.
  - b) Click **Export Unsynchronized Data...**, and save your profile data in your chosen location.

The profile data is saved in the CGATS format.

2. Import that profile data into Curve Pilot, and calculate your new RIP curves based on the existing RIP curves, your profile data and the printing target you want to match.

See the [Curve Pilot documentation](#) for more information.

### 9.6.7. Completing an Unfinished Profile

Press profiles that you have started working on but not completed have an orange spanner . You need to complete these profiles before you can use them on your press.

To complete an unfinished profile:

1. Double-click it in the **Profiles Library** (or right-click it and select **Open**).  
In the **Profile Information** view, you see a warning icon with the message **This Profile is not fully set up**.
2. Click the **Open Sections** button at the bottom left.
3. From the **Sections** view, you can finish working on your profile from the point you left off.
4. Click **Save and Close** when you are done.


## 9.7. Comparing Profile Measurements




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You can use Color Pilot to compare two profiles, for example if:



- you just reprofiled your press and want to see how it has drifted,
- you want to compare how your press prints with inks from different ink vendors,
- you have profiles for two similar substrates and want to check if they are close enough for you to use only one profile for both.

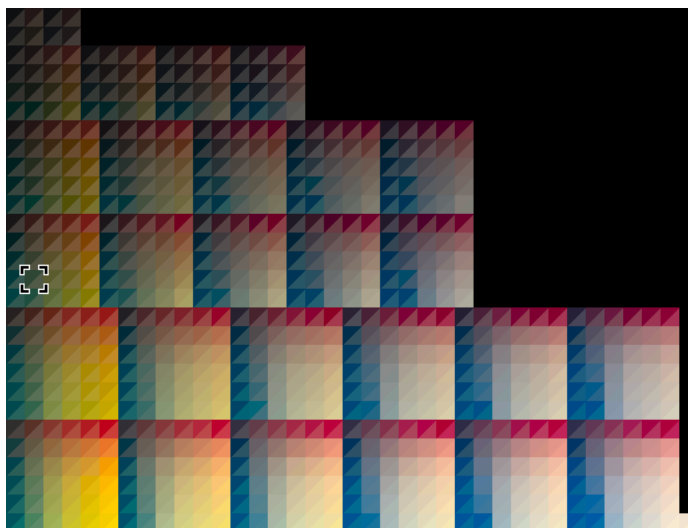
**Note:**

- You can compare two profiles that have different ink sets if desired.
- You can compare any two profiles, except for unfinished profiles (with an orange spanner icon ) or old *XYZ based* Esko profiles (like `chrom_offs` for example).

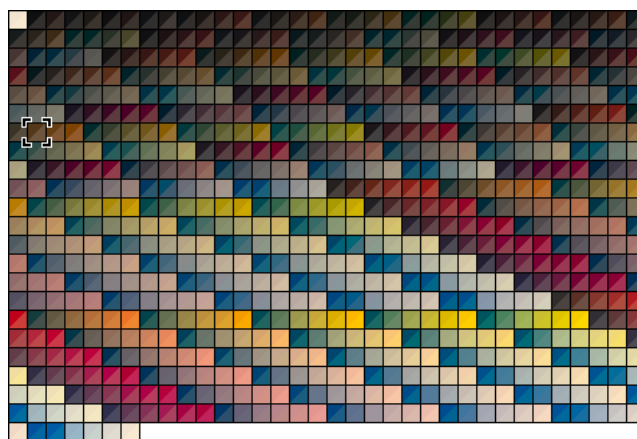
1. Select the two profiles to compare. You can either:
  - select both profiles and click the **Compare Measurements**  tool (in the **Profiles Library**'s bottom tool bar),
  - select both profiles, right-click them and select **Compare Measurements** then **New Window**,
  - click the **Compare Measurements**  tool without any profile selected, and drag and drop your profiles into the **Compare Measurements** dialog,
  - click the **Compare Measurements**  tool without any profile selected, and use the **Select** links at the top of the **Compare Measurements** dialog to select your profiles,
  - select one of the profiles, open the **Compare Measurements** dialog, and use the **Select** link in the second field to select your second profile.

**Tip:** You can click the information button  in each profile's field to see more information about this profile.

2. In the preview underneath, you can see a visual comparison of the profiles' measurements:
  - a) The preview shows split patches with both profiles' measurements. The first profile's measurements are shown at the top left of the patches , the second at the bottom right .
  - b) You can **View** the measurements either:
    - as they are organised in the profiles in **Section** view,



- as they have been measured on the chart in **Layout** view.



If the chart layout has several pages, you can view the different pages.






**Note:**

- If one of your profiles has a very small ink set (less than 3 inks), you won't see the **Section** view.
- If you compare two profiles with a different sampling (a different number of patches), you see the chart **Layout** with the most patches.  
Color Pilot calculates the "missing" patches of the profile with the least patches, based on the measurement values of their neighboring patches.
- If the profile with the most patches doesn't have a chart layout defined, you won't see the **Layout** view.

**Note:**

By default, only the profiles' channels that are considered "matching" (for example Cyan and Cyan) are compared.

You can change the comparison pairs (which 1st profile channel to compare with which 2nd profile channel) using [Select Pairs](#).

- c) You can **Highlight** specific patches, to perform a visual check on those parts of your measurements:
- the **Patches with above average  $\Delta E$**  (with a color difference above the average difference between the two profiles)
  - the **Worst 10 percent** (the 10% of the patches that have the highest Delta E values)
  - the **Substrate** (if there are several substrate measurements they will all be highlighted)
  - the **Primaries** (patches that only have one ink -except black-, whether a solid or a tint)
  - the **Greys** (all solids and gradations of black, as well as all patches with equal amounts of C, M and Y)
  - the patch with the **Maximum  $\Delta E$**
- d) You can zoom in , zoom out , or fit the zoom to the view .
3. At right, you can see some **Statistics** about the color differences between the two measurements sets.
- a) By default the  **$\Delta E$  Formula** set in the [Preferences](#) is used to calculate the color differences, but you can change it to one of the following:
- **CIELAB Delta E (Classic),**
  - **Delta E 94,**
  - **Delta E 2000,**
  - **CMC (1:1),**

- **CMC (2:1),**
  - **Delta E 2000 (2:1:1).**
- b) You can see the following statistics (the Delta E statistics are updated when you change the formula above, and *Delta H* is the difference in hue):

- **Average  $\Delta E$**
- **Maximum  $\Delta E$**
- **Maximum  $\Delta E$  best 90%**
- **Primaries  $\Delta E$**
- **Primaries  $\Delta H$**
- **Grey  $\Delta E$**
- **Substrate  $\Delta E$**

**Tip:** Use the [highlight](#) function to find the patches corresponding to these statistics in the preview.

4. To inspect a single patch more in detail, select it in the preview to show more data in the **Patch Details** at right.

You can see:

- the patch's ink composition in the profiles' channels,

**Tip:** You can change which profiles' channels are compared, see [Select Pairs](#).

- a bigger split patch,
- its Lab/LCh values,
- the  $\Delta E$  between the two profiles for this patch.

5. If desired, you can change which of the profiles' channels are compared.

In case the two profiles don't have the same ink set, you see a comparison of the matching profile channels by default.



For some profiles, this is a subset of their ink set. For example, if you compare a CMYK and a CMYK0 profile, by default only the CMYK inks are compared.

For the comparison, Blue and Violet are considered matching, as well as Red and Orange. So if you have a CMYKOGV and a CMYKRG profile, the CMYK0/RG inks are compared by default.

To change the comparison pairs (which ink to compare with which):

- a) Click **Select Pairs**.
- b) In the **Select Pairs** dialog, you can see which channels of the two profiles are compared, and if there are channels left out of the comparison.



- c) You can deselect some pairs to remove them from the comparison (for example if you want to compare only the CMY channels).
- d) You can move a channel up or down with the arrows  , to compare it to a different channel (for example if you want to compare Magenta with Red).
- e) Click **OK** to view the comparison of your new channel pairs.

**Tip:**

You can open several **Compare Measurements** dialogs to compare several profile pairs if desired. You can hide a dialog using its minimize button, and show it again by going to **Window > Compare Measurements (n)**, where **(n)** is the number of the **Compare Measurements** dialog.

## 9.8. Exporting Profiles

You can export profiles to import them later into a different Color Pilot/Color Engine Pilot application. By importing and exporting profiles, you can communicate with users who do not see the same color management database as you do, using the same international standard.

### 9.8.1. Exporting a Single Profile

1. In the **Profiles Library**, click the profile to export and select **File > Export (Ctrl+Alt+E)** on the main menu, or right-click the profile to export and select **Export...**
2. In the **Export As** dialog that opens:
  - a) browse to your desired location,
  - b) change the file name if desired,
  - c) choose the file type to use for the export,

You can export...	as...
recent Esko profiles (made in Color Pilot or a previous Color Engine Pilot version)	<ul style="list-style-type: none"> <li>• <b>Cgats</b> files (.txt or .it8)</li> <li>• <b>File Packer</b> files (.fp)</li> </ul>
legacy predefined Esko profiles in the <i>XYZ format</i>	<b>File Packer</b> files (.fp)
ICC profiles	<b>ICC Profile</b> files (.icc or .icm)

- **CGATS** files use a color measurement format from the Committee for Graphic Arts Technologies Standards. They are compatible with third party applications.
  - **File Packer** files are archives that you can use to exchange different types of color management settings (profiles, color strategies, ink books...) between different versions of Color Pilot/Color Engine Pilot.
  - **ICC** profiles are also compatible with third party applications.
- d) click **Save**.

## 9.8.2. Exporting Multiple Profiles

1. In the **Profiles Library**, select the profiles to export.

**Tip:**

To select a consecutive group of profiles, click the first profile, press and hold down the **Shift** key, and then click the last profile.

To select non-consecutive profiles, press and hold down the **Ctrl** key, and then click each profile that you want to select.

To select all profiles, press **Ctrl+A**.

2. Go to **File > Export (Ctrl+Alt+E)**, or right-click the profiles to export and select **Export...**
3. In the **Export** dialog that opens, choose how you want to export your profiles:
  - a) **Browse...** to your desired location.
  - b) Choose whether to **Export as one single archive** or not.
    - If you are exporting to a single archive, enter the **File Name** to use (or use the default `Archive.fpr`).  
The archive is a File Packer file.
    - If you are exporting the profiles individually, they will be exported under their own name by default. You can rename them by double-clicking in the **Export As** column.  
For each profile, you can choose the file type to use for the export.
      - You can export recent Esko profiles (made in Color Pilot or a previous Color Engine Pilot version) as **Cgats** files (`.txt` or `.it8`) or **File Packer** files (`.fpr`).
      - You can export legacy predefined Esko profiles in the *XYZ format* as **File Packer** files (`.fpr`).
      - You can export ICC profiles as **ICC Profile** files (`.icc` or `.icm`).

**Note:**

- **CGATS** files use a color measurement format from the Committee for Graphic Arts Technologies Standards. They are compatible with third party applications.  
By default, Color Pilot uses the `.txt` extension for CGATS files, but you can change it to `.it8` by editing the exported profile name.
- **File Packer** files are archives that you can use to exchange different types of color management settings (profiles, color strategies, ink books...) between different versions of Color Pilot/Color Engine Pilot.
- **ICC** profiles are also compatible with third party applications.

If desired, you can **Remove** profiles from the list before exporting.

4. Click **Export** when you are done.

## 9.9. Importing Profiles

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You can import profiles that were exported from a different Color Pilot/Color Engine Pilot application, or third party profiles.

By importing and exporting profiles, you can communicate with users who do not see the same color management database as you do, using the same international standard.

You can import the following *profile formats*:

- Esko profiles exported as a CGATS file (`.txt` or `.it8` files).

**CGATS** files use a color measurement format from the Committee for Graphic Arts Technologies Standards. They are compatible with third party applications.

- Esko profiles exported as a File Packer archive (`.fp` files).

**File Packer** files are archives that you can use to exchange different types of color management settings (profiles, color strategies, ink books...) between different versions of Color Pilot/Color Engine Pilot.

- ICC profiles (`.icc` or `.icm` files) for CMYK, RGB or multicolor devices.

**ICC** profiles are also compatible with third party applications.

**Note:** You can import third party ICC profiles with uncommon ink sets (for example CMY without K + OGV, or CMYK + several Green inks), but you will only be able to use them as source profiles, not as output profiles.

- Zip files containing multiple exported profile files, regardless of the zip file extension.

**Note:** Profiles using custom colors can only be imported if the custom colors are already present in the database.

1. Select the exported profile(s) to import:

a) Either:

- go to **File > Import**,

- press **Ctrl+Alt+I**,
  - right-click in the main pane of the **Profiles Library** (or any other **Library** in your application) and select **Import...**
- b) Browse to the profile(s) to import.
- You can select several profiles using the **Shift** key, or select all profiles using **Ctrl+A** (if the location you browsed to only contains profiles).

**Tip:** You can also just drag the profile to import into your Color Pilot window.

2. In the **Import** dialog that opens you can:

- a) Change the name of the file in the **Import as** column.
- b) See whether the profile is **Already Present** in your database (in the **State** column).

In this case, you will not be able to import it.

**Note:** This checks on both the name and the contents of the profile you want to import.

If the profile is not present in your database yet, you will see **Ready for Import** instead.

- c) Add more profiles by clicking **+** and selecting the desired files.
- d) Inspect the profile data in the **Details** tab.

When importing a recent Esko profile (from a CGATS file or a File Packer archive), you can see:

- the **Number of patches** measured to create the profile,
- the **Type of data** in the profile (*spectral or XYZ*),
- the **Profile Type** (see *Profiles for Different Kinds of Devices*),
- the **Profile Channels** (and the ink book containing the ink used to print each channel),
- a small preview of the profile's **Measurements**,
- a link to **Show a larger preview** of the measurements.

When importing a legacy predefined Esko profile (in the *XYZ format*), you can see:

- the **Type of data** in the profile,
- the **Profile Type**,
- the **Profile Channels**.

When importing an ICC profile, you can see:

- the **Profile Type**,
- the **Profile Channels**.

- e) For certain profiles, you can change the profile channels if desired (click the **Change** link on the **Details** tab).

This is possible when importing a recent Esko profile from a CGATS file, or an ICC profile created by Color Engine Pilot 12.X or later.

**Note:**

If the profile contains inks that are not available in the color database, you will see a warning message (Please assign inks or Please correct ink set).

The profile cannot be imported until the inks are assigned or corrected.

**3.** To complete the import, do the following:

- If you want to import **one or more** profiles, but not all items in the list, select the profiles of your choice and click **Import Selection**.
- If you want to import **all** profiles in the list, select **Import All**.

The **State** of the imported file(s) will change to **Imported**.

**4.** Click **Close** when you are done.

## 10. Working with Color Strategies

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### What is a Color Strategy?

A color strategy is a bundle of color management settings that ensures that your color reproduction is as accurate as possible.

A color strategy always contains the source and destination profiles of the devices you are using, but may also contain a number of other color management settings.

Trained Color Pilot users create these strategies, and other operators just pick one when proofing/printing. This makes life easier for operators and makes a color workflow less error prone.

#### Note:

For color accurate end results, we strongly recommend that you:

1. create a custom profile for your output device, that captures the way it prints with its current setup (ink set, substrate...),
2. use this custom profile as output profile in your color strategy.


For more information, see:

- [Profiling Your Proofer](#) on page 148
- [Profiling Your Digital Press](#) on page 159
- [Profiling Your Conventional or Equinox Press](#) on page 180

### 10.1. Your Color Strategies Library

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You can find all your color strategies in the **Color Strategies Library**. For each strategy, you can see:


- the **Color Strategy Name**.
- whether it is read-only  (in which case you cannot edit it),
- the **Kind** of color strategy it is (see [Kinds of Color Strategies](#)),
- its **Ink Set**,
- its **Input Profile Name** and its **Output Profile Name**,
- any [Keywords](#) associated with it.

You can sort the list of color strategies by column (for example by **Ink Set**), or [search](#) for a specific strategy if desired.

**Note:** If you are [working with a data center](#), you will need to unlock the database before making any changes to color strategies. See [Making Changes to the Database](#) on page 69 for more information.

#### Kinds of Color Strategies

You can work with several kinds of color strategies in Color Pilot (you may only see some of those depending on your license and the way you have [configured](#) your Color Pilot application):


-  **Proofing color strategies** are color strategies tailored to color managing your proofs. To work with these color strategies, you need to connect Color Pilot to an Esko Proof Server (in the [Proof Preferences](#)).



Proofing color strategies are optimized for the proofers tested and supported by Esko for accurate color management, and contain the latest Esko color management technology. See [this knowledge base article](#) for a list of the supported proofers.

You can use proofing color strategies in Pack Proof and other Esko applications (see [Color Management in Your Workflow](#) on page 10), but not in legacy applications such as FlexProof, or in older versions of Color Engine Pilot.

To create a proofing color strategy, see [Creating a Proofing Color Strategy](#) on page 218.


-  **Equinox color strategies** are designed for an expanded gamut printing workflow. They support Esko's award winning Equinox technology.

See [Equinox and Expanded Gamut Printing](#) on page 14 for more information about Equinox.

You can use Equinox color strategies in Automation Engine, ArtPro, and PackEdge, to convert CMYK, RGB or spot color files to expanded gamut printing.

If you already had Equinox color strategies created in the Classic Color Engine Pilot (version 10.X, 12.X or 14.X), you can keep using them in Color Pilot.

To create an Equinox color strategy, see [Creating an Equinox Color Strategy](#) on page 309.


-  **Digital Printing color strategies** are color strategies tailored to printing on digital presses. If you are working with a Digital Front End server, you should create and use digital printing color strategies.

Before you start working with digital printing color strategies, you need to:

- connect Color Pilot to your Digital Front End server (in the [Server Preferences](#)),
- make sure Color Pilot and your Digital Front End server are using the same database (select **Obtain from Esko server** in the [Database Preferences](#)).

To create a digital printing color strategy, see [Creating a Digital Printing Color Strategy](#) on page 252.

See the documentation that came with your Digital Front End server to know how to use your digital printing color strategy for color management of your digital press output.


-  **Classic color strategies** are legacy general purpose color strategies, created in the Classic Color Engine Pilot (version 10.X, 12.X or 14.X). They are available by default in Color Pilot.

If you were already working with such color strategies, you can keep using them in your workflow (for example to re-run old print jobs), but we recommend you switch to one of the new kinds of color strategies at your earliest convenience (choose the kind that is best suited to your device or workflow).

You cannot create or edit classic color strategies in Color Pilot 16.X or later. They are greyed out in the **Color Strategies Library**.

### Managing Your Color Strategies


You can right-click a color strategy and:

- **Open** it to see more detailed information or edit it (if it's not read-only .
- Select **View Strategy** to preview how it will convert your colors (if you have enabled this [in the Preferences](#)).

See [Previewing a Color Strategy's Conversion](#) on page 333.

- Select **Check Strategy...** (for proofing color strategies only) to check how well your color strategy reproduces your press' colors on your proofer.

See [Checking Your Proofing Color Strategy](#) on page 245.


- Perform a **Gamut Check** to see what colors it can accurately reproduce.  
See [Check Gamut](#) on page 131.
- **Delete** or **Rename** it (if it's not read-only .
- **Duplicate** it (this adds \_ (2) to the name of the duplicate but we recommend you rename it to something meaningful).
- **Export** it, or **Import** another color strategy into your **Color Strategies Library**.  
See [Importing a Color Strategy](#) on page 330 and [Exporting Color Strategies](#) on page 331.
- **Add** or **Remove Keywords**.

## 10.2. Creating a Proofing Color Strategy

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You can create proofing color strategies automatically after [creating a proofer profile](#) (at the [end of the wizard](#)).

You can also create a proofing color strategy the following way:

1. In the **Color Strategies Library**, click the  **New Proofing Color Strategy** button in the bottom tool bar.
2. In the **New Proofing Color Strategy** dialog:
  - a) Enter the **Color Strategy Name**.  
If you have set a default press and proofer profile [in the Preferences](#), Color Pilot suggests a default name based on those profiles' names.
  - b) Select a **Press Profile** (to use as input) and **Proofer Profile** (to use as output) for your color strategy.

If you have set a default press and proofer profile [in the Preferences](#), they will be filled in by default here.

If you want to change them, click **Select** then select your desired profile in the pop-up that opens.

- For your **Press Profile**, we recommend you use the profile that you specifically created for your press.

You can use a press profile created in the Classic Color Engine Pilot, or create a new one in Color Pilot.

- If you are working with a conventional press, see [Profiling Your Conventional or Equinox Press](#) on page 180 (to profile either a CMYK or expanded gamut press).
- If you are working with a digital press, see [Profiling Your Digital Press](#) on page 159.

However, if you want to proof files prepared for a specific printing process, you can use a **Press Profile** reflecting that process (for example, use `ISOcoated_V2_eci.icc` as **Press Profile** to help you simulate a typical offset press on your proofer).


- For your **Proofer Profile**, we recommend you use the profile that you specifically created for your proofer in Color Pilot.

Proofer profiles made in Color Pilot:

- contain the latest Esko proofing technology improving spot and process color overprints,

- are optimized for the [proofers tested and supported by Esko](#), and their matching [EPL linearization files](#), to give you the best color results.

See [Profiling Your Proofer](#) on page 148.

**Tip:** Click  to see more information about the profile you selected.

- c) Select the **Rendering Intent** to use for color conversion.

By default, this is the one you set in the [Preferences](#) (if you select a different one here, your choice will be remembered in the Preferences).

You can choose between:

**Absolute Colorimetric**

**Relative Colorimetric**

**Perceptual**

**Saturation**

**Note:**

- You can only choose a rendering intent when your [input and output profiles](#) are different (if they are the same, process colors don't need to be converted).
- You can only choose a **Perceptual** or **Saturation** rendering intent if you are working with an [ICC Proofer Profile](#).


See [Rendering Intent](#) on page 225 for more information about how different rendering intents influence color conversion.

- d) Select the **Open color strategy for editing** option if you want to edit the settings in the color strategy further.

- e) Click **OK**.

- If you have selected **Open color strategy for editing**, you can now edit other color strategy settings. See [Editing Your Proofing Color Strategy](#) on page 219 for details.
- Otherwise, the color strategy is created with only your chosen input and output profiles. You can still edit it later by double-clicking it in the **Color Strategies Library**.

## 10.3. Editing Your Proofing Color Strategy

You can edit a color strategy right after creating it or afterwards. You cannot edit read-only  color strategies.

1. To open a color strategy you created previously, you can either:

- double-click it,
- right-click it and select **Open**.

When the color strategy is open, you can choose color management settings in six tabs:



- Input**
- Map Inks**
- Simulate Dot Gain**
- Match Colors**
- Exceptions**
- Output**

The **Input** and **Output** tabs contain the same settings (both input profile and output profile settings).

2. Edit the color strategy's settings by doing the following:
  - a) Go to the **Input** tab if you want to change the input and/or output profile.  
See [Changing the Profiles](#) on page 220.
  - b) Go to the **Map Inks** tab to map inks used in the print job (or whole ink books) to other inks/ink books on your proofer.  
See [Mapping Ink Books and Inks](#) on page 221.
  - c) Go to the **Simulate Dot Gain** tab to attach dot gain curves to one or more inks.  
See [Using Dot Gain Curves](#) on page 222.
  - d) Go to the **Match Colors** tab to define general settings to convert process and spot colors.  
See [Defining Color Conversion Settings](#) on page 223.
  - e) Go to the **Exceptions** tab to tweak the conversion of specific spot colors.  
See [Exceptions](#) on page 227.
  - f) Go to the **Output** tab to if you want to use extra output inks.  
See [Choosing the Output Separations](#) on page 244.
  - g) Click **Save and Close** to go back to the **Color Strategies Library** (or **Revert** to cancel your changes).

### 10.3.1. Changing the Profiles

When editing the color strategy, you can still change the press (input) and proofer (output) profiles that you selected when creating the strategy, on the **Input** or **Output** tab.

1. Select a new **Press** or **Proofer** profile by clicking **Select** then selecting it in the pop-up that opens (or by using the [Picker](#)).
  - For your **Press Profile**, we recommend you use the profile that you specifically created for your press.  
You can use a press profile created in the Classic Color Engine Pilot, or create a new one in Color Pilot.
    - If you are working with a conventional press, see [Profiling Your Conventional or Equinox Press](#) on page 180 (to profile either a CMYK or expanded gamut press).
    - If you are working with a digital press, see [Profiling Your Digital Press](#) on page 159.


However, if you want to proof files prepared for a specific printing process, you can use a **Press Profile** reflecting that process (for example, use `ISOcoated_V2_eci.icc` as **Press Profile** to help you simulate a typical offset press on your proofer).

- For your **Proofer Profile**, we recommend you use the profile that you specifically created for your proofer in Color Pilot.

Proofer profiles made in Color Pilot:

- contain the latest Esko proofing technology improving spot and process color overprints,
- are optimized for the [proofers tested and supported by Esko](#), and their matching [EPL linearization files](#), to give you the best color results.

See [Profiling Your Proofer](#) on page 148.

**Tip:** You can click the  icon to see more information about the profile you selected.

You can see the selected profile's channels in the table underneath.

2. If you are planning to print on a different color substrate than the one defined in your **Press** profile, do the following:
  - a) Make sure your **Press** and **Proofer** profiles are different.
  - b) Make sure you have selected an **Absolute Colorimetric** rendering intent (either when [creating your color strategy](#) or in the [Match Colors tab](#)).
  - c) Under **Override Substrate Color from Press Profile** (at the bottom of the **Input** tab), click **Select** and select the ink to use as your substrate color.  
This will replace the Lab values for your white/0% point in your press profile by the Lab values of your selected ink, and calculate the conversion of all colors accordingly.


### 10.3.2. Mapping Ink Books and Inks

You can use ink mappings to replace certain inks in your input file by other inks (you can also do this with complete ink books).

For example, you can do this if you want to use your own brand colors instead of certain colors your designer used in your file. You can also use it to:

- change custom ink names (for example you can map `5th_color` to `White`),
- change references to PANTONE ink books (for example map all `PANTONE Uncoated` references to `PANTONE Coated`).

**Note:** If you map an ink to another ink that has [exception values](#) defined, those exception values will be used.

- To map an ink:
  - a) Click .
  - b) In the dialog that opens, browse to the ink to map.

**Tip:** You can also use the **Search** field.

- c) Click **Select**.
- d) Browse to the ink to map it to.

e) Click **Select**.

You can now see the ink mapping in the table.

- To map a whole ink book:

a) Click .

b) In the dialog that opens, browse to the ink book to map.

c) Click **Select**.

d) Browse to the ink book to map it to.

e) Click **Select**.

f) If desired, change part of the name of the mapped ink book's inks in the **Mapping Options** underneath (visible when the ink book mapping is selected).

You can replace the **start** and/or the **end** of the inks name.

For example if you are replacing PANTONE Uncoated with PANTONE Coated, you will replace **U** with **C** at the end of the inks name.

g) Click the **Preview** button to see how the ink names will be mapped.

To remove an ink or ink book mapping, select it in the table and click .

**Note:** When a same ink is mapped individually and as part of an ink book, the individual ink mapping is used.

### 10.3.3. Using Dot Gain Curves

If the output needs to have a different dot gain behavior than the dot gain that was included in the output profile, you can add dot gain curves to the color strategy (on the **Simulate Dot Gain** tab).

You can apply them to all the input separations or to specific input separations. By default, a linear dot gain curve is applied to all separations that have no specific curve applied.

- To apply a dot gain curve to all input separations:
  - a) Select the **<all inks>** entry in the **Dot Gain Simulation** table at the left.
  - b) Click the **Select Curve...** button on the right.
  - c) In the dialog that opens, select the curve you want to use and click **Select**.

**Tip:** You can also use the **Search** field.

The curve you selected is now applied to all inks. You can see a graphical representation of the curve and its numerical values at right.

- To apply a curve to specific input separations:
  - a) Click the **+** button under the **Dot Gain Simulation** table.
  - b) In the dialog that opens, select the ink(s) you want to assign a curve to and click **Select**.

Use the **Ctrl** or **Shift** key to select several inks.

To remove an ink from the table, select it and click **-**. You cannot remove **<all inks>**.

- c) Select one or more inks in the **Dot Gain Simulation** table (by default, the inks you just added are selected).
- d) Click the **Select Curve...** button on the right.
- e) In the dialog that opens, select the curve you want to use and click **Select**.

This applies the dot gain curve to the selected ink(s).

- If you have the Curve Pilot application installed, you can open it from Color Pilot by clicking **Open Curve Pilot** and directly edit the curve. This will automatically open the latest version of the application you have installed.

Curve Pilot makes use of the same DGC database as Color Pilot. This means that any changes you make in Curve Pilot will automatically also be reflected in Color Pilot.

**Tip:**

You can also use the Picker to drag and drop curves onto inks:

1. If you want to assign a curve to a specific ink, add it to the **Dot Gain Simulation** table as explained above.
2. Click **Show Picker**.
3. Go to the **Dot Gain Curves** tab and select the curve to use.
4. Drag and drop this curve onto the ink you added to the table (or onto **<all inks>** to assign it to all inks).

### 10.3.4. Defining Color Conversion Settings

Use the **Match Colors** tab to define general settings to convert process and spot colors.

**Tip:** If you want to tweak the conversion of specific spot colors, go to the [Exceptions tab](#).

1. Select the **Rendering Intent** to use for (process and spot) color conversion.

By default, this is the one you set in the [Preferences](#) (if you select a different one here, your choice will be remembered in the Preferences).

You can choose between:

**Absolute Colorimetric**  
**Relative Colorimetric**  
**Perceptual**  
**Saturation**

See [Rendering Intent](#) on page 225 for more information about how different rendering intents influence color conversion.

**Note:**

- You can only choose a rendering intent when your [input and output profiles](#) are different (if they are the same, process colors don't need to be converted).
- You can only choose a **Perceptual** or **Saturation** rendering intent if you are working with an [ICC Proofer Profile](#).
- If you choose an **Absolute Colorimetric** rendering intent (that simulates the substrate color/the white point of your press profile), you can replace that substrate color by the color of your choice if desired (for example if you are planning to print on a different color substrate).

See [Override Substrate Color from Press Profile](#).

2. In **Printing Technique for Spot Colors**, you can optimize how the spot color overprints will be converted when proofing for either:
  - an offset press: choose **Offset (Classic)**,
  - a flexo press: choose **Generic**,
  - a gravure press: choose **Gravure**.
3. In  **$\Delta E$  Formula for Spot Colors**, select the formula to use to calculate how well your color strategy can simulate your spot colors.

This *Delta E* formula is also used to calculate how color accurate your *exceptions* are.

By default, this is the formula defined in the *Preferences*.

4. When working with spot colors that have a different white point than your press profile (the 0%/substrate color in the ink definition has different Lab values than the 0%/substrate color in the press profile), you can tweak how these spot colors are reproduced on the proofer, so that your proof will look closer to your press run.

Your results will depend on how different your spot color substrate is to your press profile substrate, so you need to decide on a **Maximum Substrate Color Difference**.

- Below this difference (if the two substrates are more alike), the color values of the ink substrate will be adjusted to match the color values of the press profile substrate. The color values of the ink's tints and solid will not be changed.
- Above this difference (if the two substrates are more different), the color values of the ink substrate will be adjusted to match the color values of the press profile substrate, and the color values of the tints will be proportionally adjusted too (gradually less as the tints darken: for example, the 50% tint will be adjusted less than the 10% tint). The solid will not be adjusted.

Set your **Maximum Substrate Color Difference** as follows:

In **Match Colors/Simulate Inks**, select either:

- **Classic**, if you want these spot colors to be reproduced as in previous versions of the Color Pilot (up and including Color Pilot 20.0).

This will use a **Maximum Substrate Color Difference** of 10 CIELAB *Delta E* (also known as "Delta E Classic"). This is not editable (when choosing **Classic**).

- **Custom**, if you want to enter a *Delta E* threshold yourself. In this case, type in your desired *Delta E* in **Maximum Substrate Color Difference**.

The *Delta E* formula used is the one you selected in  *$\Delta E$  Formula for Spot Colors* above.

**Note:** You can change this formula if desired, but be aware that it will also affect the color accuracy calculations in general.

5. When working with unprofiled inks (inks whose ink definition only includes color values for the solid, or for the solid and the substrate), it can be difficult to accurately convert tints (any other ink percentage between 0% and 100%).

In this case, you can choose between two methods for converting tints in **Tint Behavior for Unprofiled Inks**:

- In most cases, you should choose **Spectral Interpolation** (which is the default option).

This will first calculate the color values for the tints used in your job (based on the substrate and solid values in the ink definition), then convert these tints.



- If you find that your press gives you more saturated tints than your proofer, you should choose **Interpolate Solid Conversion** (which can give you a better match for very saturated tints).  
This will first convert your ink solid, then calculate the conversion of the 50% tint from the converted solid, then calculate the other tints' conversion values.

## Rendering Intent

A **Rendering Intent** is a part of the color strategy that handles the conversion of out-of-gamut spot colors and of the background color.

Each rendering intent does this in a different way, so you should choose the one that is more adapted to the way you are printing and the result you want to achieve:

- Use the **Relative Colorimetric** rendering intent if you don't want to simulate the source background (the point that has 0% of all inks in the source profile).

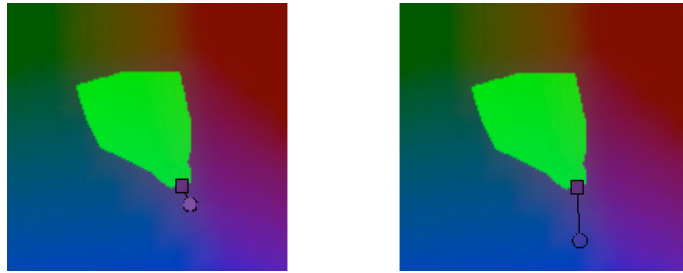
This will proof your file as if the proofer substrate was exactly the same as the substrate defined in your source profile.

For example: your press prints on cream colored card stock whereas your proofer prints on bright white paper, but you don't want to simulate the cream background on your proof.



With this rendering intent, colors from the source profile that cannot be reproduced by the proofer will be converted to the closest color(s) the proofer can reproduce.

In some cases several colors will be converted to the same color, which means that you can sometime lose some detail, especially in dark saturated areas and the dark parts of gradations.



Note that typically the proofer profile has a bigger gamut than the press profile, so there are not many colors that the proofer cannot reproduce.

- Use the **Absolute Colorimetric** rendering intent if you want to simulate the source background to get as exact a color match as possible.

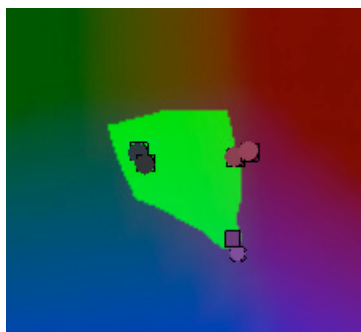
For example: you do want to simulate the cream colored card stock used on your press on your proofer substrate, to see how the final output will look like (this doesn't only affect the white but all the colors in your file).



As with the Relative Colorimetric rendering intent, colors from the source profile that cannot be reproduced by the proofer will be converted to the closest color(s) the proofer can reproduce, meaning you can sometime lose some detail, although there are typically not many press colors that a proofer cannot reproduce.

- Use the **Perceptual** rendering intent if you are not trying to get an exact color match but want the proof to look visually pleasing.

If there are colors from the source profile that cannot be reproduced by the proofer, this will shrink the source gamut to fit inside the gamut of the proofer, so that all colors are converted (even the colors already in the proofer's gamut), but the relationship between colors is kept.



This means that colors won't be really accurate, but you won't lose detail in dark saturated areas or gradations.

This rendering intent is most commonly used in commercial printing (for newspapers, magazines, posters...).

- Use the **Saturation** rendering intent if you mostly want to make sure the colors on your proof are saturated enough.

Colors from the source profile that cannot be reproduced by the proofer will be mapped onto close saturated colors that are in the proofer's gamut.

This rendering intent is most commonly used for business presentations containing graphics, or cartoons/comics.

**Note:**

- If you are working with Esko source and destination profiles, you can use the **Absolute Colorimetric** or **Relative Colorimetric** rendering intent.
- If you are working with ICC source and destination profiles, you can use any rendering intent.


### 10.3.5. Exceptions

On the **Exceptions** tab, you can define how to convert specific spot colors, for example if:

- you use certain spot colors a lot,
- you have defined specific conversion settings for these spot colors, and you find that those settings give you a better result than applying the general color strategy settings to these spot colors.

For each spot color, you will generate a **color build** (a combination of percentages of your output inks), that will be used to print the color.

**Note:** You can define exceptions by adding them here manually, but also through the **Refine Spot Colors** wizard (see [Refining Spot Colors](#) on page 419).

1. Add an ink to convert to the exceptions list by doing one of the following:
  - Typing the ink name or its abbreviation (for example `REB` for PANTONE Reflex Blue) in the **Ink** column.
  - Clicking the **+** button and selecting an ink in the dialog that opens.
  - Clicking the **More Actions** button  and selecting either **Add Ink by Name...** (and typing the name) or **Add Inks...** (and selecting it).
  - Using the Picker.

**Note:** You can also add a whole ink book to the list (click the **More Actions** button, select **Add Ink Book...** and select the ink book).

To remove one or more inks from the list, select it/them and click – (or right-click and select **Delete**).

2. By default, Color Pilot shows you how your spot color(s) will be converted to the output inks using the color strategy's regular conversion settings.

**Note:**

The output inks used to print the spot colors are the channels of the output profile, minus any output channel you disabled in the [Output tab](#).

If you have added an ink to the exceptions list with the **Keep In Output** option, you can also use it in your color builds. See [Proofing Your Colors with an Extra Ink](#) on page 244 for more information.

By default, your spot colors are converted to your output inks using the [Output Profile](#).

For each ink you added, you can see:

- a color patch showing the original and the converted color,
- the output ink percentages used to print the spot color,
- the **Predicted ΔE** between original and converted color.

**Note:**

- By default, any predicted *Delta E* value that is lower than [your chosen tolerance for proofing strategies](#) is shown as `Less than` your tolerance.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).

- The Delta E formula used to calculate how color accurate your exceptions are is the one you selected in the [Match Colors tab](#) (you can see it under the exceptions list).

3. If you are not satisfied with the default color strategy conversion, choose how to convert each ink in the **Use** column.

- Choose **Keep In Output** to not convert this ink and use it as an extra separation in the output.

**Note:**

When you add an ink to the **Extra Output Inks** list in the [Output tab](#), it is automatically added here with the **Keep In Output** conversion option.

When you add an ink here with the **Keep In Output** option, it is also added as an **Extra Output Inks** on the [Output tab](#).

- Choose **Do Not Proof** to not output the spot color at all.

For example, use this if you want to keep technical lines from being printed, without having to manipulate the original print job.

- Choose **Custom Values** to change the color build used to print the spot color. When you select this, you can edit the ink percentages manually.

**Tip:**

Do this if you already know the exact percentages you want to use.

If you don't, but want to tweak the conversion values manually, we recommend you use the [Quick Refine tool](#) instead, as you will see the result of your changes against both the target spot color and the previous conversion values (visually and using Lab/LCh values).

If you also want to manually refine spot colors that are not yet in your **Exceptions** list, you can use the [Refine Spot Colors wizard](#) to [refine colors manually](#).

**Note:** If you change the percentages used in the color build drastically (for example if you replace 50% Black by 100% Cyan), you will get a warning that you chose an unexpected combination of ink percentages that may result in bad printability and loss in overprint and tint accuracy.

- Choose **Output Profile** to convert the spot color to the output inks using the output profile.

**Note:**

This is the default option and does not change the color build used to print the spot color.

However, you can use this to quickly check the output percentages of a particular ink.

The color patch of the converted color, the **Conversion Values** and the **Predicted  $\Delta E$**  are updated automatically to reflect your changes.

**Note:** If you have [refined](#) a spot color by measuring color values, you will see the **Measured  $\Delta E$**  instead.

**Tip:**

- You can also refine the way certain spot colors are simulated on your proofer. See [Refining Exceptions](#) on page 231 and [Tweaking Your Conversion Values Manually](#) on page 243.
- You can also import exceptions from another color strategy (for example from one of your [classic color strategies](#)). See [Importing Exceptions from Another Strategy](#) on page 229.


### Importing Exceptions from Another Strategy

If you were previously working with a Classic Color Engine Pilot, your existing color strategies are still present in your [color database](#) as [classic color strategies](#).

When creating a proofing color strategy in Color Pilot, you can import the exceptions you had in the classic color strategy you were previously using for proofing, so you don't have to define them all over again.

You can also import exceptions from another proofing color strategy if desired.

**Important:** For better color accuracy, we recommend you only import exceptions from color strategies with the same output profile, made using the same [EPL linearization file](#), as your new proofing strategy's output profile.

1. Click the **More Actions** button  and select **Import Exceptions from Another Strategy...**
2. In the **Import Exceptions from Another Strategy** dialog, select the color strategy you want to import exceptions from:
  - a) Click **Select** next to **Source Strategy**.
  - b) In the dialog that opens, select your desired color strategy.

**Note:** This must be either a **Classic** or **Proofing Color Strategy**, with the same **Ink Set** as the color strategy you want to import the exceptions into.

**Tip:** You can sort the list of color strategies by **Kind** or **Ink Set**, or **Search** for the strategy you want to use.

3. The **Import Exceptions from Another Strategy** dialog lists the exceptions in your selected color strategy.

You can see details of how the exception inks are converted by the color strategy you selected:

- a color patch showing the original and the converted color,
- the output ink percentages used to print the spot color,
- the **Predicted  $\Delta E$**  between original and converted color.

**Note:**

By default, any predicted *Delta E* value that is lower than *your chosen tolerance for proofing strategies* is shown as `Less than` your tolerance.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail *in the Preferences*.

- a) Choose the exceptions to import.

You can select or deselect individual exceptions, **Select All** or **Select None**. If you have a lot of exceptions, you can use the **Search** field to find a specific one.

If an exception for a specific ink already exists in your proofing color strategy, choose whether to **Overwrite** it or not.

**Note:**

- When importing exceptions from a classic color strategy made with options not applicable to a proofing color strategy:
  - some exceptions cannot be imported (you will not see them),
  - others will be set to **Use Custom Values** in your proofing strategy (while keeping the ink percentages from your original exceptions).
- When importing exceptions made for another output profile with the **Use Output Profile** option, they will also be set to **Use Custom Values** in your proofing strategy.

- b) Click **OK** to import your selected exceptions into your proofing color strategy.

4. If desired, you can import exceptions from more colors strategies.

## Refining Exceptions


You can refine the spot color conversion values in your list of exceptions to further improve your color match. Refining spot colors fine-tunes the reproduction of both solid and tints.

**Note:**

- If the inks you are refining are *profiled* (defined from several measurements), the refinement will be applied on the existing measured tints, giving you a more color accurate result (for example in gradients).
- For inks where only the solid is defined, the refined tints will be derived from the solid refinement (for example the refined 50% will be 50% of the refined solid).  
This means that your spot colors' tints may not be reproduced as accurately as their solids (as some inks can have hue or density shifts within their color range).


We recommend you work with profiled inks whenever possible.

You can refine your spot colors either:

- from your color strategy (as explained below),
  - from the proofer you will use to proof files containing those spot colors (see [Refining Spot Colors](#) on page 419).
1. Select the spot color(s) you would like to refine in your **Exceptions** list, then click the **More Actions** button  and select **Refine....**
  2. In the dialog that opens, select the **Proofer** to use and click **Select**.

**Note:**

- By default, you can only see proofers whose profile is the same as the color strategy's proofer profile.  
You can see your other proofers if you deselect **Hide proofers that do not match the color strategy profile**, but for color accuracy, we recommend you don't use one of those to refine your spot colors.
- You can see additional information about your proofer(s), including their *status* and date of last *recalibration*.

Make sure that your proofer is correctly set up (with a green status ) before starting refining spot colors. See [Your Proofing Device\(s\)](#) on page 386 for more information.

This opens the **Refine Spot Colors** wizard.

3. In the **Get Started** step of the **Refine Spot Colors** wizard, you can add more spot colors to the refinement.  
See [Get Started](#) on page 232.
4. In the **Refine Cycles** step, you perform the spot color refinement. You can do as many refinement cycles as is necessary.  
See [Refine Cycles](#) on page 232.
5. The **Finish** step confirms that the color strategy was updated with the refined values. You can now close the wizard.

See [Finish](#) on page 242.

**Note:** Your choice of [output separations](#) will be taken into account when you refine spot colors.

### Get Started

In the **Get Started** step of the **Refine Spot Colors** wizard, you can add more spot colors to refine.

On the **Select Spot Colors** screen, you can add colors to refine by:

- Clicking **+** and selecting the ink(s) to add in the dialog that opens.

**Tip:**

- Use the **Shift** or **Ctrl** key to select several inks, or **Ctrl+A** to select all inks in an ink book.
- You can also use the **Search** field.
- Clicking **Add Inks from a PDF file...** to select one or more (Normalized or regular PDFs) file(s), and adding some or all of the spot colors contained in these files to the list.

Use this if you have trouble getting a good match for one or more particular spot color(s) in one of your files.

**Note:**

- For regular PDFs, Color Pilot will first look for the inks in the predefined books (such as process and PANTONE ink books), and then in the preferred **Ink Book** (defined in the [Preferences](#)) before checking other ink books you created.
- If the inks found in the file(s) are not present in the database, they will be greyed out with **<unregistered>** shown as their ink book, and you will see a warning that some of the inks in the selected PDF(s) are unregistered.  
  
Unregistered inks are not added to the ink selection as they don't contain enough information to make a useful refinement.

To remove an ink from the list, select it and click the **-** button.

Click **Next** when you are done.

### Refine Cycles

In the **Refine Cycles** step of the **Refine Spot Colors** wizard, you select a spot color refinement method and carry out the refinement. You can do several refinement cycles, using one or more methods.

1. On the **Select spot colors and refining method** screen, choose the spot color refinement method to use:
  - Choose **Visually, by proofing a number of variations** to print a variations chart for each color on your proofer, then visually select the right patch from the printed output.
  - **Automatically, by measuring a proofed sample** to measure a sample that was proofed with your color strategy and automatically correct the color deviation.




- **Automatically, by measuring test chart iterations** to proof a number of variations of each spot color in a spectrophotometer layout and measure it so the best conversion values can be calculated automatically.
- **Manually** to edit the spot colors conversion values manually.

**Note:** If you choose a method involving measurements, make sure that the [measurement condition](#) selected on your spectrophotometer matches the one used to measure your strategy's output profile.

**2. Decide which spot colors you want to refine in this cycle.**

By default, all spot colors you added in the **Get Started** step are selected. For each spot color, you can see:

- the conversion values before refinement (calculated using the color strategy or the result of any previous refinement cycle),

**Note:** If you have already performed a refinement cycle, the color values that were changed are indicated by a pencil icon .

- whether the spot color is already saved as an exception **In the Color Strategy**,
- the **Predicted  $\Delta E$**  between the spot color and the conversion values before refinement.

**Note:**

- This is calculated using the [Delta E formula of your color strategy](#).
- By default, any predicted [Delta E](#) value that is lower than [your chosen tolerance for proofing strategies](#) is shown as **Less than** your tolerance.  
This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).  
However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).
- If you have already refined a spot color using the **Automatically, by measuring test chart iterations** method, the measured Delta E is shown in blue.

You can sort the spot colors by any column in the table.

Deselect the colors you don't want to refine.

**Tip:**

- You can perform different refinement cycles on different spot colors (for example, if you have printed samples for some of the colors, but want to refine the other ones using test charts).
- To only select a few of the colors, click the top check box to deselect them all, then only select the colors to refine in this cycle.

**3. Click Next.**

**4. Carry out the refinement cycle as explained in one of the following:**

- [Refine Colors Visually, by Proofing a Number of Variations](#) on page 235,

- [Refine Colors Automatically, by Measuring a Proofed Sample](#) on page 237,
- [Refine Colors Automatically, by Measuring Test Chart Iterations](#) on page 238,
- [Refine Colors Manually](#) on page 242

(depending on the method you chose).

5. At any time, you can pause the refinement process and save your unfinished refinement for that proofer and color strategy.

This way you can perform other tasks in Color Pilot, then resume working on your spot colors refinement later.



**Attention:**

You can only save one unfinished task per proofer, whether it is a profile, check and recalibration, or a spot color refinement.

This means that you cannot save another unfinished task before either finishing or discarding the first one.

- a) Click the **Quit Now and Continue Later** button. Confirm your choice by clicking **Save and Quit** in the pop-up dialog.

This closes the wizard and shows a badge next to the press name:

- : indicates that the refinement is unfinished.
- : indicates that an error has occurred, or that the refinement was cancelled on the proofer.

You can also see the badge on the **Refine Spot Colors** button in the bottom tool bar when you select the proofer for which you started the refinement process.

- b) When you are ready to resume the refinement, select your proofer and click the **Refine Spot Color** button in the bottom tool bar again.

You will see a pop-up warning you about the unfinished refinement. Click **Resume**. This will open the **Refine Spot Colors** wizard at the point where you paused the refinement. You can then continue your refinement.

**Note:**

- To start a new refining session instead, click **Start new session** in the pop-up. Completing the new session (or saving another unfinished refinement) will discard the unfinished refinement.
- To discard the unfinished refinement at any time, right-click your proofer and select **Remove Unfinished Task**.

6. If necessary, click **Next** and repeat steps 1 to 4 to do another refinement cycle.  
You can use a different refinement method, and you can do as many cycles as you want.
7. Click **Finish** when you are done refining your inks.

**Refine Colors Visually, by Proofing a Number of Variations**

Use this method to proof a variations chart for each color, then visually select the best patch from the proofer's output. The variations charts contain patches with different ink combinations that vary around the existing conversion values.

1. For each spot color, do the following:
  - a) Choose the **Patch Size** to use for the variations chart (**Small, Medium** or **Large**).
  - b) Choose up to three inks to print the chart.

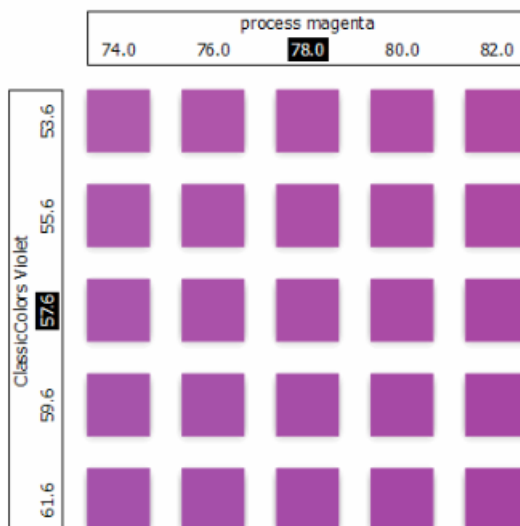
For each **Ink**, define:

- The difference in ink percentage for each variation (**Step**).
- The number of steps **Up** and **Down**.

The starting value is the percentage of that ink in the conversion values (from the color strategy, or any previous refinement cycle). You can see those conversion values, along with a patch of the spot color, at the top of the dialog.

For example, you are refining PANTONE Purple C, whose conversion values in the color strategy are 57.6% cyan and 78% magenta. For both the cyan and the magenta ink, you choose a **Step** of 2.0%, 2 steps **Up** and 2 steps **Down**.





For each ink, the variation chart will use the color strategy value and other values around it defined by the steps you chose. So the magenta percentages used here will be 74%, 76%, 78% (color strategy value), 80% and 82%.



You can see a preview of your variations chart on the right, showing the ink percentages.

**Tip:** If you hover on a color patch, a tool tip will display the percentages of that patch.

**Note:** If an ink percentage is near 100%, the number of **Steps Up** will be limited to not go over 100%. For example with a starting percentage of 98% and a step of 2%, you can only have one step up (100%).

- c) If you are using three inks, you will get several grids in your variations chart (each grid with a different percentage of the third ink). You can choose to **Align** them **Horizontally** or **Vertically**.  
For example, if you have four or more grids aligned horizontally and you see a message warning you that the chart's dimensions are too large for your press, try to align them vertically.  
If you still see the warning after changing the alignment, you need to remove some steps in the third ink to have fewer grids. If necessary, you can print the other steps in another refinement cycle.
  - d) You can use the view buttons to get a better view of all the grids:
    - **Pan mode** : When this view mode is selected, the cursor changes into a open hand. By clicking the chart and dragging you can move the chart around.
    - **Zoom in mode** : When this view mode is selected, the cursor changes into a magnifying glass. Clicking anywhere will zoom in the chart on that position. By clicking and dragging the mouse, you can also select an area in the chart you want to zoom in on.
    - **Zoom out mode** : This view mode is the reverse of **Zoom in mode**.
    - **Reset zoom** : Click to reset the chart so it fits in the view.
  - e) Click **Next**.  
Repeat this for each spot color to refine and click **Next** when you are done.
- 2.** In the next screen, you can see the variations chart(s) you just defined.  
Click **Proof settings...** if you want to change how the chart(s) will be printed.
- a) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
  - b) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
  - c) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
  - d) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
    - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.
    - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see feedback until the moment your chart is sent to the Proof Server, but no feedback that it has been proofed).
  - e) Click **OK**.

3. Click **Proof Variations Charts** to send the variations charts as a PDF to your Esko Proof Server and print this PDF on your proofer.

**Note:** Grid charts that are too big to fit on a proofer sheet will automatically be split up into multiple sheets, making optimal use of the available substrate material.

4. Look at the printed output and decide which patch is the best match for each spot color.
5. Click **Next** in the **Refine Spot Colors** wizard and click the best match patch on the variations chart for the first spot color.

Click **Next** and do the same for the next spot color... until you have picked a best match for all spot colors you refined.

6. Click **Next** to see the refined values (ink percentages) and the Delta E between original and refined colors.

The values with a pencil icon are the values that were changed by (one of) the refinement cycle(s) you just did.

7. If you are satisfied with the refined values, click **Finish**.

This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.

If you are not satisfied, you can click **Next** and do another refinement.

#### **Refine Colors Automatically, by Measuring a Proofed Sample**

Use this method if you want to match the color of a physical sample rather than the corresponding spot color in your color database (for example a color from a previous proofing job, a spot color in a PANTONE book, a sample you got from a customer...).


You will measure the Lab values of that sample, and Color Pilot will generate a color build to match those values as accurately as possible, and save that color build as an exception in your color strategy.

This is faster than proofing a new chart then [choosing the best match visually](#) or [measuring a proofed chart](#).

1. After selecting **Automatically, by measuring a proofed sample** and clicking **Next**, Color Pilot will detect the connected spectrophotometer (and ask you to calibrate it if necessary), then show the **Measure Sample** dialog.

Measure the proofed sample with your spectrophotometer then click **OK**.

**Note:**

- If necessary, you can use the **More Actions** button  to reconnect or calibrate the spectrophotometer, or change its [measurement condition](#).
- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.

The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.

2. Repeat this for each proofed sample of a spot color you want to correct.
3. The next screen shows the refined spot color conversion values calculated from the samples' Lab values.

Select a spot color in the table at the left to see its refined conversion values. The values with a pencil icon are the values changed by the refinement.

If you are not satisfied with a measurement, you can redo it (click **Remasure Original Sample**). You can also **Reset to Original Values**.

4. When you are satisfied with the refined values, click **Finish**.

This saves the refined conversion values for the spot colors as **Refined Output Profile Values** in the color strategy.

If you are not satisfied, you can click **Next** and do another refinement.

### Refine Colors Automatically, by Measuring Test Chart Iterations

Use this method to print a number of variations of each spot color in a spectrophotometer layout and measure it so the best conversion values can be calculated automatically.

You can use this to refine whole ink books at once if desired.

1. On the **Select out of gamut spot colors to refine** screen, select which out of *gamut* colors you want to refine.

Spot colors are considered "in gamut" when they can be reproduced by your proofer within a specified *Delta E* tolerance (the one you set in the *Preferences*).

Spot colors with a Delta E a bit above this tolerance can typically benefit from refinement.

However, spot colors with a Delta E far above this tolerance may just not be accurately reproducible by your proofer. In this case, you may want to remove those spot colors from the refinement, to save yourself time and effort.

The Delta E is calculated using the *Delta E formula of your color strategy* (you can see it at the bottom of the spot colors list).

**Tip:**

- Click the **ΔE** column to sort the spot colors by increasing or decreasing Delta E, and see more easily which colors need refinement if you have a lot of spot colors.
- To select or deselect all inks, click the check box at the top of the inks list.

2. In the next screen, select the **Number of color patches** you want to print per spot color (as a minimum).

The default setting is 10 patches per color, but you can go as high as 100. If you print more color patches in the first cycle, you may need to do fewer refinement cycles (and vice-versa).

The screen indicates how many pages will need to be printed.

If the number of spot colors to refine is low, you can select **Add extra patches to fill page**, to use as many patches as is required to fill a full proofer sheet.

**Note:** If you are using an M1 or M2 *measurement condition*, the chart will be automatically adapted to support the dual measurement (measuring with and without UV filtering) required by these measurement conditions (the patches will be slightly bigger and there will be slightly more white space in between lines of patches).

3. The next screen shows the chart with all the spot color patches (if there are several pages, you can click the arrows next to the **Page** field at the top right to view other pages).


Click **Proof settings...** if you want to change how the chart(s) will be printed.

- a) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
- b) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
- c) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
- d) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:



- **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.
- **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see feedback until the moment your chart is sent to the Proof Server, but no feedback that is has been proofed).

- e) Click **OK**.



4. Click **Proof Test Chart** to send the test chart as a PDF to your Esko Proof Server and print this PDF on your proofer.

5. Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.


Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

- After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):
- Go back to the page you have just measured using the back arrow.
  - Right-click the chart preview and select **Save Page Measurements...**
  - Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
    - is of the correct page of your chart (if it has several pages),
    - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
  2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**
6. After you finished measuring, you will see a list of the spot colors on the **result of measuring test chart** screen with:
- A warning sign  if the color is still out of **Gamut**,



- The new **ΔE** after refinement,
- The **State** of the conversion values (**On target**, **Could be improved** or **Could not improve further**).

To view the measured chart, select **Measurements** in the **View** field at the top of the screen.

At the bottom of the screen, you can see the total number of spot colors as well as the average Delta E before and after the refinement.

If you select a spot color in the list or in the measured chart, you can see more information at the bottom right, including the new conversion values and the target and measured Lab values and color patches.

**7.** If you want to do another iteration of this refinement cycle, do the following:

- a) Click **Next**.

The wizard will generate a new chart to print, using only the spot colors that had the **Could be improved** state after the last iteration. If all your spot colors have the **Could not improve further** state, the wizard will not generate a new chart.

**Note:** This chart will use as many patches per spot colors as is necessary for the refinement. Depending on the spot color, this could be more or less than the number of color patches you chose before the first iteration.

- b) Print the new test chart.  
c) Measure the new test chart.

On the **result of measuring test chart** screen, you will see the updated results for the refined spot colors. You will see a **ΔE** column for each iteration, and a new **average measured ΔE**.

**Note:** If a patch measured in the new iteration is worse than what was found in the previous iteration, the previous iteration's result will be used.

You can do more iterations as long as you have colors with the **Could be improved** state.

**8.** After each refinement iteration, you can pause spot colors to define which colors will go through the next run of refinement. Paused colors will not be part of the next iteration.

**Tip:** This is useful if there are spot colors that have a high Delta E after the first iteration and you think that further iterations will not improve the spot color match.

- a) To pause a spot color, right-click it on the **result of measuring test chart** screen and select **Pause refining**.

**Note:** If there are no spot colors in the **Could be improved** state (for example, all spot color are **Paused**), you cannot start a new iteration.

- b) If you want to unpaue a spot color, select the paused color, right-click it and choose **Continue refining**. The color will then get the **Could be improved** status.

**9.** Once you are satisfied with the results, click **Finish Cycle**.

You can then **save a report** about the refinement (if you have set this in the [Preferences](#)). This is a text file that you can save in the location of your choice.

After this, you can do another refinement cycle using another refinement method, or click **Finish**.

This saves the refined conversion values for your spot colors as **Refined Output Profile Values** in the color strategy.

### Refine Colors Manually

Use this method if you want to edit the output ink percentages used to reproduce the spot colors manually.



**Attention:** Make sure that your monitor is calibrated before refining spot colors manually. However, please be aware that viewing an ink on a screen can never be completely color accurate.

1. On the **Refine manually** screen, select the first spot color you want to refine.

On the right hand side, you can see its conversion values and the **Predicted ΔE** between the spot color and the conversion values.

**Note:**

- The *Delta E* is calculated using the *Delta E formula of your color strategy* (you can see it underneath).
- By default, any predicted Delta E value that is lower than *your chosen tolerance for proofing strategies* is shown as `Less than` your tolerance.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail *in the Preferences*.

2. In the **New Values** row, click the output ink percentage(s) to edit and enter the percentage(s) you want to use or click the arrows to increase or decrease the value(s).

At the bottom, you can see color patches and Lab/LCh values for the **Target** spot color, the **Original** converted color (from the color strategy or a previous refinement cycle) and the **New** converted color (using the percentages you just entered).

You can also see the Delta E between **Target** and **Original** converted color, and between **Target** and **New** converted color.

Use this to help you find the best percentages for your spot color.

**Note:** If you are not satisfied with your new color conversion, you can click **Reset to Original Values** to start over.

3. Do this for every spot color in your list.
4. If you are not satisfied with the refined values, you can click **Next** and do another refinement.

When you are satisfied, click **Finish**.

This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.

### Finish

After clicking **Finish** after one or more refinement cycles, you will see the **Summary** screen, and a message stating that:

- your spot colors were refined successfully,
- the color strategy was updated (the refinement values are stored in the color strategy's **Exceptions** list).


Click **Finish** again to close the wizard.

## Tweaking Your Conversion Values Manually

If you want to manually edit the conversion values for a spot color, while seeing the result of your changes against both the target spot color and the previous conversion values, you can use the **Quick Refine** tool.



**Attention:** Make sure that your monitor is calibrated before refining spot colors manually. However, please be aware that viewing an ink on a screen can never be completely color accurate.

1. Select the spot color(s) you would like to refine in your **Exceptions** list, then click the **More Actions** button  and select **Quick Refine...**
2. In the **Refine Spot Colors** dialog that opens, select a spot color in the list at left to see its **Original (Conversion) Values** at right.

You can also see the **Predicted  $\Delta E$**  between the spot color and the conversion values (calculated using the  **$\Delta E$  Formula** of your color strategy).

**Note:**

By default, any predicted *Delta E* value that is lower than *your chosen tolerance for proofing strategies* is shown as *Less than* your tolerance.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail *in the Preferences*.

3. In the **New Values** row, click the output ink percentage(s) to edit and enter the percentage(s) you want to use or click the arrows to increase or decrease the value(s).

At the bottom, you can see a color preview and Lab/LCH values for the **Target** spot color, the **Original** converted color (from the color strategy or a previous refinement cycle) and the **New** converted color (using the percentages you just entered).



You can also see the Delta E between **Target** and **Original** converted color, and between **Target** and **New** converted color.


Use this to help you find the best percentages for your spot color.

**Note:** If you are not satisfied with your new color conversion, you can click **Reset to Original Values** to start over.

4. Do this for every spot color in your list.
5. When you are satisfied, click **OK**.

This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.

### Proofing Your Colors with an Extra Ink

- If you want to use custom percentages of a special ink to proof your file's separations:
  - a) In the [Exceptions list](#), add the ink you want to use as extra separation with the **Keep In Output** option.  
If you added it as extra output ink in the [Output tab](#), this is already done automatically.
  - b) Click the **More Actions** button  and select **Columns** then the extra separation's name.  
This adds the extra separation to the available output separations (you will see an extra column for this separation). At this point, all color builds will have 0.0% of this separation.
  - c) For the inks you want to print using this separation, select the **Custom Values** option and enter your desired percentages manually.

**Note:** The exceptions list does not show a Delta E value for color builds using a percentage of the extra separation, as it is not possible to accurately predict the color difference in this case.

For example, you can add silver as an extra separation, then print a gold ink using percentages of silver and yellow.

**Note:** The extra separation can also be used as part of the color build when [refining exceptions](#) or [tweaking the conversion values](#).

## 10.3.6. Choosing the Output Separations

If desired, you can add extra output inks (for example if your proofer supports white).

**Important:** Make sure you use the same ink and ink book names in both your color strategy and your production jobs.

To add some **Extra Output Inks**:

- a) Click **+** under the **Extra Output Inks** table.
- b) In the dialog that opens, select the ink to add.

**Tip:** You can also use the **Search** field.

- c) Click **Select**.

The ink is added to the **Extra Output Inks** table. Repeat this if you want to add more extra output inks.

**Tip:** Alternatively, you can also click **Show Picker** and drag extra output inks from the Picker to the **Extra Output Inks** table.

The extra output inks you add here will automatically be added as **Keep in Output** in the [Exceptions list](#). This means that they will not be converted to the channels of the output profile.

They can also be [used as extra separations](#) to print other exceptions inks (that will be printed using percentages of the regular output inks and of your extra output inks).

## 10.4. Checking Your Proofing Color Strategy

Once you have made a [profile](#) and a [color strategy](#) for your proofer, you can check how well your color strategy reproduces your press' colors on your proofer using the **Check Strategy** tool.



You can do this either:

- [when profiling your proofer](#),
- from the **Proofers View** (see [Checking Your Color Strategy](#) on page 399),
- from the **Color Strategies Library** (as explained below).

**Note:** Before you start, make sure that the [measurement condition](#) selected on your spectrophotometer matches the one used to measure your strategy's output profile.

1. Select the proofing color strategy you want to check.

You can either:

- Select the strategy to check and click the  **Check Strategy** button.
- Right-click the strategy to check and select **Check Strategy...**
- Click the  **Check Strategy** button then select the strategy to check in the pop-up that opens.

If you have selected several proofing strategies, you will need to select one of them in a pop-up before you can proceed.


**Note:** You can only run a strategy check on proofing color strategies.

2. Select your proofer.

By default, you can only see proofers that:

- have the same ink set as your color strategy's output profile's,

**Note:**

If some proofers have the same ink set but not the same profile as your color strategy's output profile, you will see a warning icon .

We recommend you don't use one of those.

- have the same [EPL linearization file](#) attached that the one used to create your color strategy's output profile (you can attach an EPL file to your proofer in Command WorkStation, the client application of the Esko Proof Server, see [this knowledge base article](#) for more information).

**Note:**

It is possible to use a different proofer: deselect **Hide proofers that do not match the color strategy EPL** to show all proofers whose ink set matches your color strategy's output profile.

However, we recommend you don't do this as this will not give you an accurate picture of how your color strategy manages your colors since it was made for different proofing conditions.

3. The **Check Strategy** wizard opens.  
It will guide you through the strategy check in two steps:
  - [Get Started](#)
  - [Measure](#)

### 10.4.1. Get Started

In the **Get Started** step of the **Check Strategy** wizard, you print a test chart (whose patches have been converted through your chosen color strategy) on your proofer.

1. Color Pilot displays a preview of the test chart.

This chart is based on the ISO 12642-2 chart, and contains a randomized subset of your strategy's input profile patches.

If you are working with a multicolor profile, the ISO 12642-2 chart is extended with patches that include the multicolor inks.


You can use the **Page** arrows at the top to view the different pages.

2. If desired, adjust the proof settings to change how the chart will be printed:
  - a) Click **Proof settings...** under the chart.
  - b) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
  - c) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
  - d) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
  - e) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
    - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.
    - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see feedback until the moment your chart is sent to the Proof Server, but no feedback that it has been proofed).
  - f) Click **OK**.
3. Click **Proof Chart** to send the chart to the Esko Proof Server and output it on your proofer.
4. Click **Next** to go to the **Measure** step.


### 10.4.2. Measure



In the **Measure** step of the **Check Strategy** wizard, you will measure the chart you printed and check the measurements.

1. On the **Measure Page ...** screen you see a preview of the chart.

Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action.

As the patches are measured, you can see a diagonally split view of each patch , with the measured color at the bottom right and the expected color at the top left.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.



The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.

- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").

If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.

For the next line, the spectrophotometer automatically switches back to scan mode.

- You can also switch to scan mode or patch mode manually:

1. click the action button  and select **Stop Spectrophotometer**,
2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**


2. When you are done measuring the chart, you can inspect the results in detail in the **Check Measurements** screen.

See [Checking Your Measurements' Results](#) on page 248 for more information.

3. When you are done inspecting, click **Finish** to close the **Check Strategy** wizard.

### Checking Your Measurements' Results

When you are done measuring your Strategy Check chart, you can inspect the results on the **Check Measurements** screen.

1. For each patch in your chart, you can see:
  - a patch number,
  - the expected and measured patch color ,
  - the expected color's composition in the input profile's inks,

**Tip:** You can check this to see if there are specific areas of the input profile that your proofer has trouble reproducing (for example, if all the colors containing 100% black fail, your proofer may not be able to reproduce your darkest colors accurately).

- the **Predicted  $\Delta E$**  between the input color and the output color calculated by the color strategy,

**Note:**

- By default, any predicted *Delta E* value that is lower than [your chosen tolerance for proofing strategies](#) is shown as `Less than your tolerance`.  
This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).  
However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).
- The Delta E formula used to calculate the **Predicted  $\Delta E$**  and the **Measured  $\Delta E$**  is the one [from your chosen color strategy](#) (you can see it at the bottom of the screen).



- the **Measured  $\Delta E$**  between the input color and the output color measured on the proof,



**Tip:**

Click the arrow in the column header to see other color difference measurements, (**Measured  $\Delta H$ , Measured  $\Delta Ch$  or Measured  $\% \Delta T$** ).

See [Other Color Difference Indicators](#) on page 31 for more information.

- whether the measured color values pass all your relevant [tolerances](#)  or fail one or more of them .

**Note:** If you have [disabled some tolerances](#) and there is no tolerance relevant for a particular patch (for example the **Substrate** tolerance for the substrate patch), this patch won't have a **Status** icon.

**Tip:** Hover on a fail status icon to see which tolerance(s) the patch didn't meet.

You can sort the patches by any of those columns.



2. To view the measured chart (with split patches), select **Measurements** in the **View** field at the top of the screen.

**Tip:** Hover on a patch to see its composition in the input profile's inks.

3. In both the **Samples** and the **Measurements View**, you can see information for / **Highlight** different sets of patches (at the top right):
  - **All** patches
  - the **Patches with above average  $\Delta E$**
  - the **Substrate** patch
  - the **Primaries** patches
  - the **Process Solids** patches
  - the **Control Strip** patches
  - the **CMY Neutrals** patches
  - the patch with the **Maximum  $\Delta E$**
  - the **Worst 5 Percent** patches
  - the **Outer Gamut** patches
  - the **CMYK** patches (if you are working with a multicolor input profile)
4. If you select a patch in the samples list or the measured chart, you can see more information at the bottom left, including:
  - the **Lab** and **LCh** values of the **Target** and **Measured** colors,

- all the color difference statistics for this patch (**Predicted  $\Delta E$** , **Measured  $\Delta E$** , **Measured  $\Delta H$** , **Measured  $\Delta Ch$**  and **Measured  $\% \Delta T$** ).
- 5. If you are checking a color strategy that uses a *relative colorimetric rendering intent* (that doesn't simulate your press' substrate color on your proofer), you can choose to adjust your target color values to what you can reproduce on your proofer paper without simulating the press substrate. To do this, select **Adjust target Lab for proofing paper color**. This recalculates all target Lab/LCh values and color difference values.
- 6. You can also see the  **$\Delta E$  Formula** used for the Delta E calculations. This is the one *set in your tolerances*.
- 7. At the bottom right of the screen, you can see statistics for different sets of patches, and whether they pass your tolerances or not.

- The **Strategy Statistics** tab displays:
  - the **Average** Delta E
  - the **Maximum** Delta E
  - the **Maximum** Delta E of the **Best 95 %** of the patches (everything except the worst 5%)
- The **Statistics per Ink** tab displays the  **$\Delta E$** ,  **$\Delta H$**  and  **$\% \Delta T$**  values for your input profile's CMYK channels.
- The **Other Statistics** tab displays:
  - the **Substrate** Delta E
  - the **Average** Delta E of the **Control Strip** patches
  - the **Maximum** Delta E of the **Control Strip** patches
  - the **Average** Delta E of the **Outer Gamut** patches
  - the **Average** Delta H of the **CMY Neutral** patches
  - the **Average** Delta Ch of the **CMY Neutral** patches
  - the **Maximum** Delta Ch of the **CMY Neutral** patches

Next to each statistic, you can see your corresponding tolerance in brackets, and the pass  or fail  status (unless *you disabled* the corresponding tolerance).

You can also see a general pass or fail status for each statistics tab (the status shows fail if one of the statistics didn't meet its corresponding tolerance).

- 8. To view or change the tolerances used for the Strategy Check, click **Set Tolerances**.

By default, the tolerances you set in the *Preferences* are used here, but you can edit them as desired.

In the **Set Tolerances** pop-up, you can:

- select what kind of tolerances you want to use: **ISO 12647-7:2016 Contract Proof**, **ISO 12647-7:2007 Contract Proof**, or **Custom** ones,
- define individual tolerances, and enable/disable them as desired (when choosing **Custom**),
- choose the  **$\Delta E$  Formula** to use for calculating Delta E values (you can choose a Delta E formula or use the one *from the color strategy* you are checking),

- save your settings to the [Preferences](#) to use the same tolerances and Delta E formula next time you do a Strategy Check.
9. You can see a general pass or fail status icon at the bottom of the **Check Measurements** screen.



10. If desired, you can **Save a report** containing the result of your Strategy Check (including the detailed information you can see on the screen).
- Click **Save report** at the bottom of the screen.
  - Browse to your desired location.
  - In **Save as type**, select either **PDF Files (\*.pdf)** or **Text Files (\*.txt)** depending on which file format you want the report in.  
For example, you may want a text file to send to an MIS system, but a PDF report to show to a colleague or customer.
  - Click **Save**.

If your Strategy Check failed, see [If the Strategy Check Fails](#) on page 251 for troubleshooting tips.

## If the Strategy Check Fails

If your strategy check *fails*, you can investigate the cause of the failure and in some cases correct it.

### Different Gamut Sizes

If your color strategy is trying to reproduce the output of a press that has a large *gamut* using a proofer with a smaller gamut, some of your press' colors will not be reproducible by your proofer.

To check whether this is the cause of the problem, you can perform a *gamut check*.

If it does turn out that your proofer's gamut is too small to reproduce all of your press' colors, trying using a different proofer with a wider gamut (you will need to make a *proofer profile* and a *color strategy* outputting to that proofer profile).

### Outdated Proofer Profile

If your proofer profile is older than 2 weeks, it may not reflect how the proofer prints as accurately as when you created it. In this case, we recommend you *check and recalibrate* your proofer profile.

If your strategy still fails after this, you should *create a new profile* for your proofer (and *update your color strategy*).

### Failure in Different Areas

The *type of patches* that causes your strategy to fail can also indicate what the problem might be.

- If the gray patches (**CMY Neutrals**) are failing, it may mean that your proofer is unstable.  
Try comparing colors on proofs generated at different times (for example first thing after turning the proofer on, and after it has run for a while), and if needed contact your proofer vendor for assistance.
- If the failing patches are mostly in the shadows, your proofer profile resolution may not be high enough.

You should *inspect* the dark areas of your profile, and if needed *create a new profile* for your proofer (and *update your color strategy*).

- If single channels patches (**Primaries**) are failing, it may mean that your proofer has mechanical stability issues (typically with the paper feed, paper tension or print head alignment). Contact your proofer vendor for assistance if needed.

If those patches still fail after correcting the mechanical issues (especially the yellow patches), try using a *Delta E formula* other than **CIELAB Delta E (Classic)** (as color differences in the yellow areas seems larger when using this formula than what they appear to the human eye).

## 10.5. Creating a Digital Printing Color Strategy

You can create digital printing color strategies automatically after *creating a digital press profile* (at the end of the wizard).

You can also create a digital printing color strategy the following way:

1. In the **Color Strategies Library**, click the  **New Digital Printing Color Strategy** button in the bottom tool bar.

2. In the **New Digital Printing Color Strategy** dialog:



- a) Enter the **Color Strategy Name**.


If you have set a default input and output profile *in the Preferences*, Color Pilot suggests a default name based on those profiles' names.


- b) Select the **Input Profile** and **Output Profile** to use in your color strategy.

- If you have set a default input and output profile *in the Preferences*, they will be filled in by default here.

If you want to change them, click **Select** then select your desired profile in the pop-up that opens.

**Note:** If the **Input Profile** and **Output Profile** are the same, they will be linked . If you don't want to use the same profile for both, click the link icon so it is crossed out , then select your profiles individually.


**Tip:** Click  to see more information about the profile you selected.

- If you haven't set default profiles, you will see that the **Input Profile** is set to **<Same as Output Profile>** (and they are linked ). This will give you a "linear" color strategy, that you can use in most cases.

However, if you are working with files that were prepared for a different printing process, you should use:

- a profile representing that printing process as **Input Profile** (for example, if your files were prepared for offset, select `ISOcoated_V2_eci.icc` to help you simulate a typical offset press on your digital press),

- the profile you made for your digital press as **Output Profile**.

In this case, click the link icon so it is crossed out , then select your profiles individually.

**Tip:**

If you want to create an Enhanced Productivity Mode (EPM) color strategy, and you have a license for it, you can select:


- any CMYK or CMYK + White profile as **Input Profile**,
- **HplndigoGlossEXP05\_EPMv1.icc**, or any CMYK or multicolor profile as **Output Profile**.

When selecting a CMYK or multicolor profile, you will need to *turn off* the black (and any other extra) output channels.

See [Enhanced Productivity Mode \(EPM\)](#) for more information about EPM.

- c) Select the **Open color strategy for editing** option if you want to edit the settings in the color strategy further.
- d) Click **OK**.
- If you have selected **Open color strategy for editing**, you can now edit other color strategy settings. See [Editing Your Digital Printing Color Strategy](#) on page 253 for details.
- Otherwise, the color strategy is created with only your chosen input and output profiles. You can still edit it later by double-clicking it in the **Color Strategies Library**.

## 10.6. Editing Your Digital Printing Color Strategy

You can edit a color strategy right after creating it or afterwards. You cannot edit read-only  color strategies.

1. To open a color strategy you created previously, you can either:
  - double-click it,
  - right-click it and select **Open**.

**Tip:** You can also right-click a digital press in the **Digital Presses** library and select **Open Color Strategy...** then double-click the color strategy to edit (or select it and click **Select**) in the dialog that opens.

When the color strategy is open, you can choose color management settings in six tabs:



**Input**



**Map Inks**  
**Simulate Dot Gain**  
**Convert Process Inks**  
**Convert Spot Colors**  
**Output**


The **Input** and **Output** tabs contain the same settings (both input profile and output profile settings).

2. Edit the color strategy's settings by doing the following:
  - a) Go to the **Input** tab if you want to change the input and/or output profile.  
See [Changing the Profiles](#) on page 254.
  - b) Go to the **Map Inks** tab to map inks used in the print job (or whole ink books) to other inks/ink books on press.  
See [Mapping Ink Books and Inks](#) on page 255.
  - c) Go to the **Simulate Dot Gain** tab to attach dot gain curves to one or more inks.  
See [Using Dot Gain Curves](#) on page 222.
  - d) Go to the **Convert Process Inks** tab to define settings to convert process colors.  
See [Defining CMYK Conversion Settings](#) on page 257.
  - e) Go to the **Convert Spot Colors** tab to define settings to convert spot colors.  
See [Defining Spot Color Conversion Settings](#) on page 261.
  - f) Go to the **Output** tab to fine-tune which output profile channels you want to use.  
See [Choosing the Output Separations](#) on page 293.
  - g) Click **Save and Close** to go back to the **Color Strategies Library** (or **Revert** to cancel your changes).

### 10.6.1. Changing the Profiles

When editing the color strategy, you can still change the input and output profiles that you selected when creating the strategy, on the **Input** or **Output** tab.

1. If the **Input Profile** and **Output Profile** are the same, they are linked .  
If you want to only change one of them, you need to first unlink them by clicking the link icon so it is crossed out .
2. Select a new input or output profile by clicking **Select** then selecting it in the pop-up that opens (or by using the [Picker](#)).  
You can see the selected profile's channels in the table underneath.

**Tip:** You can click the  icon to see more information about the profile you selected.

**Tip:**

If you want to create an Enhanced Productivity Mode (EPM) color strategy, and you have a license for it, you can select:

- any CMYK or CMYK + White profile as **Input Profile**,
- **HplIndigoGlossEXP05\_EPMv1.icc**, or any CMYK or multicolor profile as **Output Profile**.

When selecting a CMYK or multicolor profile, you will need to *turn off* the black (and any other extra) output channels.

See [Enhanced Productivity Mode \(EPM\)](#) for more information about EPM.


## 10.6.2. Mapping Ink Books and Inks

You can use ink mappings to replace certain inks in your input file by other inks (you can also do this with complete ink books).

For example, you can do this if you want to use your own brand colors instead of certain colors your designer used in your file. You can also use it to:

- change custom ink names (for example you can map 5th color to White),
- change references to PANTONE ink books (for example map all PANTONE Uncoated references to PANTONE Coated).


**Note:** If you map an ink to another ink that has *exception values* defined, those exception values will be used.

- To map an ink:
  - a) Click .
  - b) In the dialog that opens, browse to the ink to map.

**Tip:** You can also use the **Search** field.

- c) Click **Select**.
- d) Browse to the ink to map it to.
- e) Click **Select**.

You can now see the ink mapping in the table.

- To map a whole ink book:
  - a) Click .
  - b) In the dialog that opens, browse to the ink book to map.
  - c) Click **Select**.
  - d) Browse to the ink book to map it to.
  - e) Click **Select**.
  - f) If desired, change part of the name of the mapped ink book's inks in the **Mapping Options** underneath (visible when the ink book mapping is selected).

You can replace the **start** and/or the **end** of the inks name.

For example if you are replacing PANTONE Uncoated with PANTONE Coated, you will replace u with c at the end of the inks name.

- g) Click the **Preview** button to see how the ink names will be mapped.

To remove an ink or ink book mapping, select it in the table and click .

**Note:** When a same ink is mapped individually and as part of an ink book, the individual ink mapping is used.

### 10.6.3. Using Dot Gain Curves

If the output needs to have a different dot gain behavior than the dot gain that was included in the output profile, you can add dot gain curves to the color strategy (on the **Simulate Dot Gain** tab).

You can apply them to all the input separations or to specific input separations. By default, a linear dot gain curve is applied to all separations that have no specific curve applied.

- To apply a dot gain curve to all input separations:
  - a) Select the **<all inks>** entry in the **Dot Gain Simulation** table at the left.
  - b) Click the **Select Curve...** button on the right.
  - c) In the dialog that opens, select the curve you want to use and click **Select**.

**Tip:** You can also use the **Search** field.

The curve you selected is now applied to all inks. You can see a graphical representation of the curve and its numerical values at right.

- To apply a curve to specific input separations:
  - a) Click the **+** button under the **Dot Gain Simulation** table.
  - b) In the dialog that opens, select the ink(s) you want to assign a curve to and click **Select**.

Use the **Ctrl** or **Shift** key to select several inks.

To remove an ink from the table, select it and click **-**. You cannot remove **<all inks>**.

- c) Select one or more inks in the **Dot Gain Simulation** table (by default, the inks you just added are selected).
- d) Click the **Select Curve...** button on the right.
- e) In the dialog that opens, select the curve you want to use and click **Select**.

This applies the dot gain curve to the selected ink(s).

- If you have the Curve Pilot application installed, you can open it from Color Pilot by clicking **Open Curve Pilot** and directly edit the curve. This will automatically open the latest version of the application you have installed.

Curve Pilot makes use of the same DGC database as Color Pilot. This means that any changes you make in Curve Pilot will automatically also be reflected in Color Pilot.



**Tip:**

You can also use the Picker to drag and drop curves onto inks:

1. If you want to assign a curve to a specific ink, add it to the **Dot Gain Simulation** table as explained above.
2. Click **Show Picker**.
3. Go to the **Dot Gain Curves** tab and select the curve to use.
4. Drag and drop this curve onto the ink you added to the table (or onto **<all inks>** to assign it to all inks).

### 10.6.4. Defining CMYK Conversion Settings

Use the **Convert Process Inks** tab to define how to handle CMYK colors when converting colors with your color strategy.

Your input profile's CMYK channels are always converted using the output profile's CMYK channels (never using additional output profile channels or spot colors), but you can refine this conversion using the settings below.

**Note:** You can only define settings here if your color strategy is *not linear* (if your input profile is different from your output profile).

1. In certain cases, you have the option to select a **Black Generation** mode for process colors conversion.

Black generation determines the level of Black versus CMY used when converting colors through your color strategy.

This is the case when you have upgraded from a Classic Color Engine Pilot application and your color database contained black generation presets.

**Note:**

- Black generation is not available if your destination profile is a CMY profile (for a CMY or EPM (Enhanced Productivity Mode) color strategy).
- If you are working with an ICC destination profile, your color strategy will always use that profile's B2A tag for color conversion (so you will not be able to choose a black generation mode).

You can select:

- one of your old black generation presets,

**Note:**

- You may see **Custom Values** instead of a preset name if you are editing an *imported* digital printing color strategy that had a black generation preset with the same name as another preset in your color database.
- Your preset's **Single Color Black** setting will be overruled by how you choose to handle the black input channel in your color strategy (see *Pure Colors*).

For more information about legacy black generation presets settings, please see the *Classic Color Engine Pilot documentation*.

- the default black generation mode, which is:
  - **Default (Single Color Black)** if you are *keeping black pure*,  
**Single Color Black** preserves both the black separation and the color accuracy.
    - It maps the black channel of the source profile onto the black channel of the destination profile, so black objects stay only black.
    - In the rest of the color space, it converts the colors as needed to preserve the color accuracy. This provides a better conversion of CMY+K overprints.

- **Default (No Black Mapping)** if you are not keeping black pure.

**No Black Mapping** uses the same amount of black in the target as in the source profile, wherever possible.

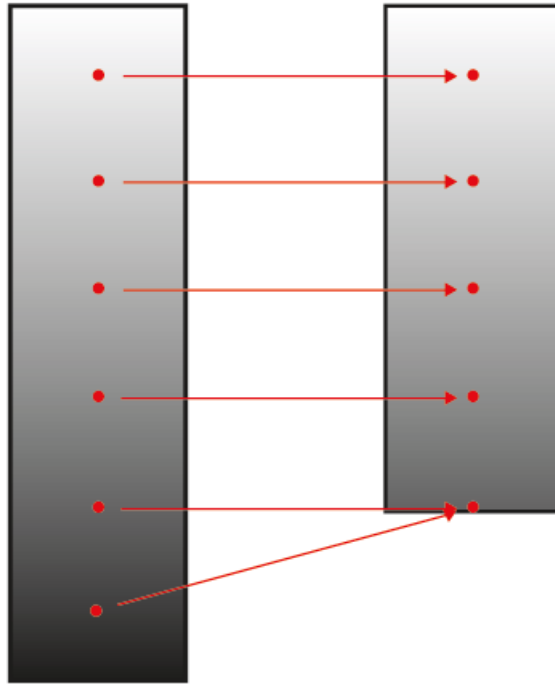
This keeps the general level of black, but black objects may contain some CMY after conversion (and vice-versa), to preserve the accuracy of the final colors.

**Note:** The black generation mode you set *in the Preferences* is selected by default.

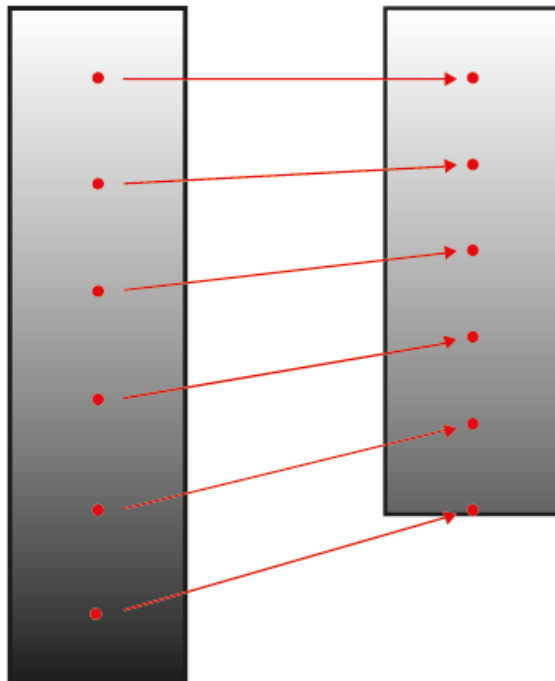
2. If you experience issues with the shadow areas of your printed jobs (loss of details and/or inversion in the darkest shadows), select **Use Black Point Compensation**.

Those issues typically occur when your digital press cannot reproduce the same range of black as the source profile you are trying to emulate (that can be a conventional press or a printing standard). This can be the case for example when reprinting a job from a conventional press on a digital press.

Without black point compensation, some of the details in the darkest areas can get lost.



Black point compensation shrinks the whole black range proportionally, so that both the shadows details and the relationships between different tints of black are kept.



**Note:**

- Black point compensation is only available when using a different input and output profile (since when using the same profile, it can reproduce the same range of black).
- It is always used when you have a CMY output profile (to improve the shadows quality without the use of black).
- Digital printing color strategies using black point compensation are compatible with Color Pilot 18.0.1 and later.

**3.** Select the color(s) you want to keep pure.

Keeping a color pure means that the conversion will not use other inks to reproduce that color.

So for example a 100% yellow object will be converted to the percentage of the output yellow that gives the closest color on print, but will never be made of 97% yellow and 3% magenta.

This helps you avoid unwanted printing effects, like having small dark dots in an otherwise smooth color patch (also called "contamination").



Removing those small dots increases the color difference slightly but avoids graininess on print.

You can choose to keep **Primary Colors (Cyan, Magenta, Yellow, Black)** and/or **Secondary Colors (Red, Green, Blue)** pure. Secondary colors are made of a combination of primary colors (for example green is a combination of cyan and yellow).

You may want to keep certain colors pure and not others depending on the results you get with your particular job or press.

- When you keep a primary color pure, all tints of that color are kept pure (so an object that is 50% yellow will stay only yellow). Objects that are already multicolor (for example 50% yellow + 15% magenta) will be converted as usual.
- When you keep a secondary color pure, all tints made of equal amounts of primary colors are kept pure (so for example 50% cyan + 50% yellow is kept pure, but 50% cyan + 60% yellow is not).

**Note:**

- **Black** is kept pure by default (to print black text using only black, for example), but you can change this if desired (for example if you prefer to have a rich black even in text areas, or if you have issues with missing black pixels due to clogged ink nozzles - they will be less visible if black is printed with a combination of other output inks).
- If you are working with an ICC output profile, you cannot keep **Black** pure (the color strategy converts your colors using the output profile's B2A tag).
- You can only select **Secondary Colors** if the output ink set does not contain an ink that can reproduce that secondary color.

For example, when working with a CMYKG output profile (CMYK + Green), you cannot select to keep **green (cyan + yellow)** (the combination of cyan and yellow that makes green) pure, as green colors will be reproduced with the Green output ink.

This does not apply if you have selected to **Generate only CMYK** in *Output Channels*, because in this case only the CMYK part of the output profile is used to reproduce colors, so green colors will be reproduced using Cyan and Yellow (so you can choose to keep **green (cyan + yellow)** pure).

**Note:**

- Color strategies where black is **not** kept pure are not compatible with versions of Color Pilot/ Color Engine Pilot older than 18.0 (except for colors strategies using an ICC output profile).  
This means that you will not be able to import them into an older application version, or use them when looking at your color database with an older application version.
- Color strategies using pure colors are not compatible with certain older versions of Color Engine Pilot (13.0, 12.X or 14.X). This means that you cannot import such color strategies into these Color Engine Pilot versions.

## 10.6.5. Defining Spot Color Conversion Settings

On the **Convert Spot Colors** tab, you define:

- general rules for converting spot colors (see *Conversion Settings* on page 261),
- exceptions for specific spot colors (see *Exceptions* on page 271).

Spot colors can be PANTONE colors or custom inks.

### Conversion Settings

On the **Conversion Settings** tab, define general rules for converting spot colors:

1. Select the **Black Generation** method to use for spot color conversion.

Black generation determines the level of Black versus CMY used when converting colors through your color strategy.

You can choose either:

- **Minimal Black** (this is the default for a multicolor output profile),
- **Maximal Black** (this is the default for a CMYK output profile),
- **Legacy Behavior** (this is only available if you have upgraded from an older Color Engine Pilot application).

See [Black Generation](#) on page 263 for more information about the different black generation modes.

See [Working with Black Generation Settings](#) on page 265 for more information about importing color strategies from/to older Color Engine Pilot applications (version 13.4 or older).

2. In  **$\Delta E$  Formula**, select the formula to use to calculate how well your color strategy can simulate your spot colors.

This *Delta E* formula is also used to calculate how color accurate your *exceptions* are.

By default, this is the formula defined in the [Preferences](#).

**Note:**

In versions of Color Pilot/Color Engine Pilot older than 18.1, digital printing color strategies always used the **CIELab Delta E (Classic)** formula.

Color strategies using a different formula are only compatible with Esko applications (including Color Pilot) with version 18.1 or later.

If you are working with a Digital Front End server, you can only use these strategies if your DFE server comes with Color Pilot 18.1 or later.

3. If the output profile is a multicolor profile, select what **Output Channels** to use for spot color simulation:

- Select **Generate all channels** to use the output profile's full *color gamut* (except any output channel you disable in the [Output tab](#)). Spot colors will be simulated using three colors (two neighboring colors and black).
- Select **Generate only CMYK** to simulate spot colors with CMYK only (not using the output profile's other channels).
- Select **Generate preferably CMYK** to simulate spot colors with CMYK only if the color deviation is not bigger than a certain tolerance.

Specify this **Tolerance** in  $\Delta E$ . If the deviation is bigger than the specified tolerance, Color Pilot will use all available output channels.

**Note:**

- Your choice of **Output Channels** will be taken into account when you [refine spot colors](#):
  - If you chose **Generate only CMYK**, then OGV inks will not be used during refinement iterations.
  - If you chose **Generate preferably CMYK**, then OGV inks can be used during refinement iterations, if they are present in the original color build.
- The strategy's **Conversion Settings** will always be used as a starting point for the refinement. This may overrule existing exception values (for example, when the exception doesn't make use of all the output channels that are currently used by the strategy).

4. If you sometimes have unwanted printing effects on the press (for example with small dots of a dark ink being visible, or moiré), you can set rules to tweak how spot colors are reproduced.

Select **Stabilize color builds**, click **Edit Rules...**, and set rules to avoid your particular problem.

See [Avoiding Unwanted Printing Effects](#) on page 265 and [Defining Stabilizing Rules](#) on page 266 for more information.

5. Choose which methods to use to convert commonly used spot colors (inks from the **PANTONE+ Solid Coated** and **PANTONE GoeGuide Coated** ink books).

See [Conversion Methods for PANTONE Inks](#) on page 268 for more information.

## Black Generation

Depending on the characteristics of your output device, the same color can be printed with different combinations of ink percentages. For example, you may be able to reproduce a medium black spot color with either CMYK {0%, 0%, 0%, 100%} or CMYK {90%, 90%, 100%, 0%}.

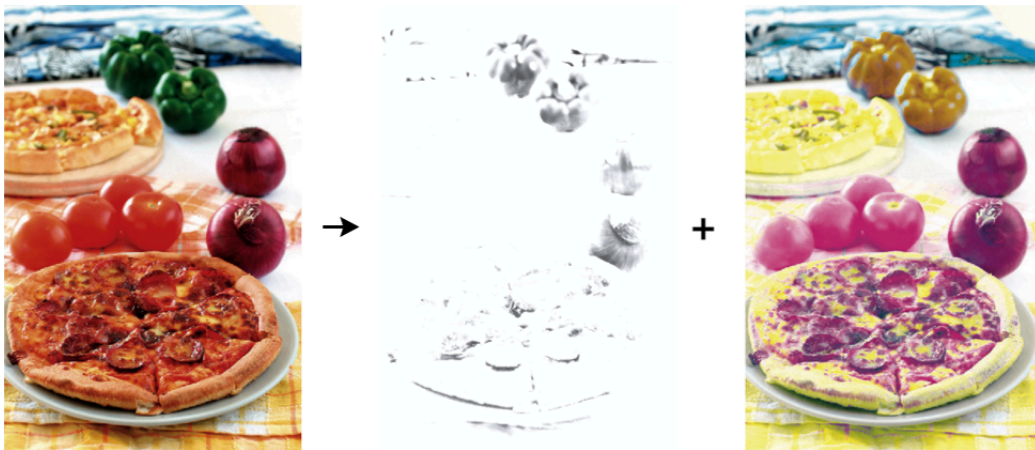
You can choose a **black generation** mode to define the level of black you want to use in those combinations of ink percentages.

Black generation determines the level of Black versus CMY used when converting colors through your color strategy.

When converting spot colors, you can choose from the following black generation modes:

**Minimal Black** generates the lowest possible amount of black, so black is used only in the shadows. It is sometimes also called "skeleton black" or a "chromatic color build".

In the example below, you can see that very little black is used to reproduce the file's colors, which are made mostly of CMY.



**Note:**

We recommend that you:

- use **Minimal Black** if you are printing mostly light colors, so that there is no graininess or "peppering", for example in skin tones (as black is only used in the shadows).
- don't use **Minimal Black** if you are printing mostly dark colors, especially when printing on a substrate that can't support the large amounts of inks needed for printing dark colors with for example CMY.



**Attention:** Make sure your inks are stable when using **Minimal Black**, as a shift in your inks may cause color casts (for example if you get a new batch of Cyan ink that has much stronger pigments than the previous batch, there can be a Cyan color cast when printing with **Minimal Black**).

**Maximal Black** generates the highest possible amount of black. More black and less of other inks are used to reproduce the file's colors. This is sometimes called an "achromatic color build".



This avoids color casts, and can help avoid the Total Area Coverage being too high.


**Legacy Behavior** attempts to balance the level of Black against CMY.



## Working with Black Generation Settings

### Importing From an Older Color Engine Pilot Application

When you import a color strategy containing a *spectral* CMYK output profile generated with an older Color Engine Pilot application (version 13.4 or older), **Legacy Behavior** is shown in the **Black Generation** list and selected by default.

**Tip:** To find out whether your profile is spectral, select it in the **Profiles** library and click the **Info** button  in the bottom tool bar. See also [Profile Information](#) on page 141.

You will not be able to keep the **Legacy Behavior** if you make the following changes to your imported color strategy:

- you use a non-spectral CMYK output profile (ICC, multicolor, Esko non-spectral, etc.),
- you use either **Minimal Black** or **Maximal Black**.

When you attempt to save your changes, you will be warned that you won't be able to revert to **Legacy Behavior** after that (after saving, **Legacy Behavior** is no longer an option in the **Black Generation** list).

### Importing Into an Older Color Engine Pilot Application

You will not be able to import your color strategy into an older Color Engine Pilot application (version 13.4 or older) if your color strategy contains a Black Generation method not supported in that version. More specifically, you will not be able to import color strategies containing:

- A non-spectral CMYK output profile (such as `crom_offs`) with **Maximal Black**.
- A spectral CMYK output profile with either **Maximal Black** or **Minimal Black**.
- A multicolor output profile with all extended gamut inks switched off and **Maximal Black**.
- A multicolor output profile with one or more extended gamut inks switched on and **Minimal Black**.

### Importing from Classic Color Engine Pilot

When importing color strategies from classic Color Engine Pilot versions 12.2 or 14.1, you will in general be able to keep the same Black Generation settings for spot colors, except when the original color strategies use black generation presets.

## Avoiding Unwanted Printing Effects

### Unwanted Printing Effects

When using CMYK or a multicolor ink set to reproduce spot colors on press, you may sometimes have unwanted printing effects, due to the way different ink angles interact with each other (moiré), but also sometimes due to specific ink percentages.

In fact, using very low or very high percentages of one of the inks can cause the resulting color to not have a smooth appearance, and even sometimes to have visible dots or visible holes.

This can be especially problematic when reproducing skin tones: using a low percentage of black in the color build can sometimes cause "peppering" of the skin tone.

### Avoiding these Effects by Stabilizing Color Builds


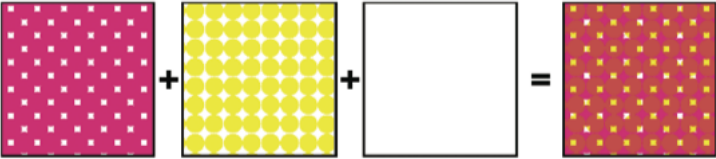
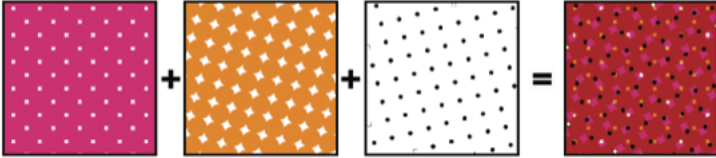
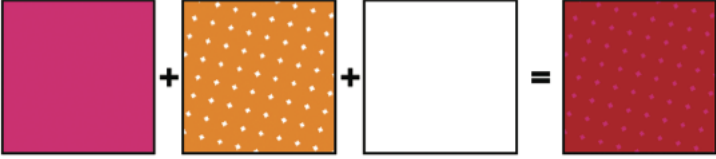
To avoid such problems, you can tweak the color builds used to reproduce spot colors, using settings to "stabilize" them. You can for example:

- Remove an ink with a very low percentage (close to 0%) from color builds, to avoid small dots.
- Make an ink with a very high percentage (close to 100%) solid, to avoid small holes.
- Avoid combining two particular inks, to avoid moiré.

The application then recalculates the color builds, taking those settings into account.

In the example below, you can see that while it is a lot better than printing with CMYK, the best CMYKOGV color match for the Pantone color (the color build with the lowest Delta E) doesn't give the best result on press (especially for flexo printing).

In this case, you can get a much better printed result by making the separation with the highest percentage (Magenta) solid, and eliminating the separation with the lowest percentage (Black).

Spot color to reproduce	Possible color builds
	 <p>CMYK color build (89% Magenta, 81% Yellow and 0% Black) Delta E = 10.6</p>
	 <p>Best color match with CMYKOGV (98% Magenta, 84% Orange and 3% Black) Delta E = 2.3</p>
	 <p>Best printable match with CMYKOGV (100% Magenta, 96% Orange and 0% Black) Delta E = 3.1</p>

### Defining Stabilizing Rules

To avoid *unwanted printing effects* when reproducing your spot colors, you can define *stabilizing rules* for your color builds:

1. In the **Convert Spot Colors > Conversion Settings** tab of your color strategy:

- a) Select **Stabilize Color Builds**.
- b) Click **Edit Rules...**

You can define your stabilizing rules in the dialog that opens.

2. If desired, restrict the color build to a certain number of inks (for example if you find that printing a color with too many inks causes registration problems or reduces the quality).

Select **Maximum number of inks** and specify the maximum number of inks to use in the color builds (that maximum number can be between 2 and 4).

3. In the **Drop/Force to solid** table, you can specify rules for the inks that may be used in your color builds:

- a) Click **+** to open the **Add Rule** window, in which you can define a rule.
- b) In **Ink Name**, choose which ink from your output profile (used to make color builds) you want to apply your rule to.

This can be a single ink, or all **Other Inks** that don't already have a rule defined.

For example, if you want to drop all the very low percentages to counter dot gain, but you know that Black is more affected than the other inks, you can have:

- a rule to drop a certain percentage of Black (for example anything under 4%),
- a rule to drop a lower percentage of all other inks (for example anything under 2%).

c) If desired, remove the chosen ink from the color build when a very low percentage of this ink is used (to avoid small dots).

Select **Drop values smaller than** and enter the percentage under which you want to remove this ink (by default, this is 2%).

d) If desired, make this ink solid when a very high percentage of it is used in the color build (to avoid small holes).

Select **Force values to become solid of higher than** and enter the percentage over which you want to make this ink solid (by default, this is 98%).

e) Click **OK**.

Your rule is now visible in the **Drop/Force to solid** table.

f) Repeat the steps above to make rules for more inks if desired.

4. You can edit the rules in the **Drop/Force to solid** table as follows:

- To make a rule inactive (so it is not applied to color builds anymore), deselect the check box in front of the rule.
- To delete a rule, select it and click **-**.
- To edit a rule, select it and click **Edit**.

**Tip:** You can also double-click the part of the rule you wish to change (for example the percentage under which the ink should be dropped) and edit it.

5. In the **Never combine the following inks** table, you can specify rules to avoid combining certain inks, to avoid moiré:


- a) Click **+** to open the **Add Rule** window, in which you can define a rule.
- b) Select the two inks you don't want to use together in a color build.
- c) In **Range**, enter between which percentages to apply this rule.


For example, enter between 2% and 98% if you don't want to use these inks together if either is between 2% and 98%.

- d) Click **OK**.  
Your rule is now visible in the **Never combine the following inks** table.
  - e) Repeat the steps above to make rules for more ink combinations if desired.
- 6.** You can modify your ink combination rules in the same way as the rules in the **Drop/Force to solid** table.
- 7.** Click **OK** when you are finished defining rules.  
Your (active) rules will now be used to stabilize the color builds.



**Attention:**

If, after defining rules for certain inks, you change the output profile or the output inks so that those inks are no longer available, you will see a warning  in the **Show Rules** dialog.

For example, if you have set a rule to drop Violet when there is less than 2% of it, and you [turn off the Violet output ink](#) (or change the output profile to one without Violet), then you will see a warning  next to your Violet rule (but the rule will not be deleted).

**Note:**

If you had already defined [conversion exceptions](#) for certain inks, adding or changing stabilizing rules will not affect the way those exceptions are converted.

However, you can recalculate these exceptions to apply the stabilizing rules to them too. See [Recalculating Exceptions](#) on page 274.

**Conversion Methods for PANTONE Inks**

You can choose to convert spot colors in the **PANTONE+ Solid Coated** and **PANTONE GoeGuide Coated** ink books using either:

- the output profile,
- standard conversion tables.

**Note:** You can always convert using the output profile, but the conversion tables available depend on the number of colors in your output profile (3, 4, 6 or 7).

**Converting PANTONE Inks Using the Output Profile**

To get the most color accuracy, we recommend that you convert your spot colors through the output profile you made for your press.

This is because this profile characterizes the way your press prints your specific inks on your specific substrate.

Using the output profile for conversion takes into account how your specific substrate interacts with your inks, and the individual press parameters.

Using a custom output profile is even more important if you print with custom blended inks.

**Tip:**

We recommend the following general workflow for best color results:

1. Make a custom profile for your press, with the specific inks and substrate that you want to use.  
See [Creating a Profile for Your Digital Press Configuration](#) on page 455.
2. Create a custom color strategy using that profile as output profile.  
See [Creating a Digital Printing Color Strategy](#) on page 252 (or select **Create color strategies** at the end of the **Measure Profile** wizard).
3. In your color strategy (here), select to convert spot colors (the **PANTONE+ Solid Coated** and **PANTONE GoeGuide Coated** ink books) through your output profile.
4. If there are specific spot colors that you know you will be using, you can get an even more accurate result by:
  - a. adding them to your color strategy's **Exceptions** list,
  - b. refining them automatically (by printing them using your color strategy settings and measuring them).See [Exceptions](#) on page 271 and [Refining Exceptions](#) on page 275.

**Note:**

If you are converting your spot colors to a multicolor output profile, they will be converted to the [output channels](#) you chose.

So if for example you chose to **Generate only CMYK**, the spot colors will be converted to the CMYK part of the output profile.

### Converting PANTONE Inks Using Standard Conversion Tables

If you...

- don't have the time and/or color knowledge to make your own profiles and color strategies,
- are using a new press and new inks (your printing process doesn't have a lot of quirks yet),
- want to start production immediately,

... then using standard conversion tables is a good option. Color Pilot offers tables to convert **PANTONE + Solid Coated** and **PANTONE GoeGuide Coated** inks.

When converting spot colors with standard conversion tables, the output values on the press offer an acceptable quality for a broad range of substrates.

**Note:**

If you are using one specific substrate, we recommend that you check whether there is a [default color strategy](#) made for it.

If there is (or one made for a very similar substrate that has less than 2 Delta E color difference with yours), you should use that color strategy instead of standard conversion tables.

A default color strategy converts spot colors using its output profile, which is more accurate because that output profile was made on a specific substrate, and contains substrate specific information (that standard conversion tables don't have).

If the output profile in the color strategy has more colors than you need (for example it has CMYKOV and you need CMYKV), you can [disable](#) some of them.

Conversion Tables for PANTONE+ Solid Coated Inks

When outputting to:	You can use the following conversion table(s):
<b>CMY</b>	the <b>HP EPM CMY emulation 1.0</b> conversion table (for Enhanced Productivity Mode).
<b>CMYK</b>	<ul style="list-style-type: none"> <li>the <b>HP Indigo CMYK 1.0</b> conversion table.</li> <li>the <b>HP Indigo CMYK 1.1</b> conversion table.</li> <li>the <b>PANTONE+ Color Bridge Coated</b> conversion table.</li> <li>the <b>HP EPM CMY emulation</b> conversion table (even though the output inks are CMYK, it is possible to convert your PANTONE+ Solid Coated spot colors to CMY only, if desired; this can be especially beneficial for light colors like skin tones).</li> </ul>
<b>6 colors</b> For example: PANTONE Hexachrome (CMYKOG), HP IndiChrome (CMYKOV), or any 6 color Esko profile	<ul style="list-style-type: none"> <li>the <b>PANTONE Hexachrome</b> conversion table.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><b>Note:</b> This is only available when working with an Hexachrome output profile.</p> </div> <ul style="list-style-type: none"> <li>the <b>HP Indigo CMYKOG 1.1</b> conversion table.</li> <li>the <b>HP IndiChrome 1.1</b> conversion table.</li> <li>the <b>HP IndiChrome 1.0</b> conversion table.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><b>Note:</b> The <b>HP IndiChrome 1.1</b> and <b>HP IndiChrome 1.0</b> tables are only available when working with an IndiChrome output profile.</p> </div>
<b>7 colors</b> For example: Kodak Approval (CMYKOGB), HP Indigo (CMYKOGV), HP IndiChrome Plus, or any 7 color Esko profile	<ul style="list-style-type: none"> <li>the <b>HP IndiChrome Plus 1.1</b> conversion table.</li> <li>the <b>HP IndiChrome Plus 1.0</b> conversion table.</li> </ul> <div style="border: 1px solid black; padding: 5px; margin: 5px 0;"> <p><b>Note:</b> The <b>HP IndiChrome Plus 1.1</b> and <b>HP IndiChrome Plus 1.0</b> tables are only available when working with an IndiChrome output profile.</p> </div>

Conversion Tables for PANTONE GoeGuide Coated Inks

When outputting to:	You can use the following conversion table(s):
<b>CMY</b>	the <b>HP EPM CMY Goe emulation 1.0</b> conversion table (for Enhanced Productivity Mode).
<b>CMYK</b>	<ul style="list-style-type: none"> <li>the <b>HP Indigo CMYK Goe emulation</b> conversion table.</li> <li>the <b>HP EPM CMY Goe emulation 1.0</b> conversion table (even though the output inks are CMYK, it is possible to convert your PANTONE GoeGuide Coated spot colors to CMY only, if desired; this can be especially beneficial for light colors like skin tones).</li> </ul>

When outputting to:	You can use the following conversion table(s):
<p><b>6 colors</b></p> <p>For example: PANTONE Hexachrome (CMYKOG), HP IndiChrome (CMYKOV), or any 6 color Esko profile</p>	<p>the <b>HP Indigo CMYK Goe emulation</b> conversion table.</p>
<p><b>7 colors</b></p> <p>For example: Kodak Approval (CMYKOGB), HP Indigo (CMYKOGV), HP IndiChrome Plus, or any 7 color Esko profile</p>	<p>the <b>HP Indigo CMYK Goe emulation</b> conversion table.</p>

### Exceptions


On the **Exceptions** tab, you can define how to convert specific spot colors, for example if:

- you use certain spot colors a lot,
- you have defined specific conversion settings for these spot colors, and you find that those settings give you a better result than applying the general color strategy settings to these spot colors.

For each spot color, you will generate a **color build** (a combination of percentages of your output inks), that will be used to print the color.

**Note:** You can define exceptions by adding them here manually, but also through the **Refine Spot Colors** wizard (see [Refining Spot Colors](#) on page 489).

1. Add an ink to convert to the exceptions list by doing one of the following:

- Typing the ink name or its abbreviation (for example `REB` for PANTONE Reflex Blue) in the **Ink** column.
- Clicking the **+** button and selecting an ink in the dialog that opens.
- Clicking the **More Actions** button  and selecting either **Add Ink by Name...** (and typing the name) or **Add Inks...** (and selecting it).
- Using the Picker.

**Note:** You can also add a whole ink book to the list (click the **More Actions** button, select **Add Ink Book...** and select the ink book).

To remove one or more inks from the list, select it/them and click **-** (or right-click and select **Delete**).

2. By default, Color Pilot shows you how your spot color(s) will be converted to the output inks using the color strategy's regular conversion settings.

**Note:**

The output inks used to print the spot colors are the channels of the output profile, minus any output channel you disabled in the [Output tab](#).

You can also use any ink added to the exceptions list with the [Keep In Output](#) option as an extra output ink (see [Using an Extra Separation to Print Special Inks](#) on page 292 for details).

By default, your spot colors are converted to your output inks using either:

- the **Output Profile**,
- a standard **Conversion Table** (only for **PANTONE+ Solid Coated** and **PANTONE GoeGuide Coated** inks, if they are set to be converted with a [conversion table](#) on the [Conversion Settings tab](#)).

For each ink you added, you can see:

- a color patch showing the original and the converted color,
- the output ink percentages used to print the spot color,
- the **Predicted ΔE** between original and converted color.

**Note:**

- By default, any predicted [Delta E](#) value that is lower than [your chosen tolerance for digital printing strategies](#) is shown as `Less than` your tolerance.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to digital press instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).

- The Delta E formula used to calculate how color accurate your exceptions are is the one you selected in the [Conversion Settings tab](#) (you can see it under the exceptions list).

**3.** If you are not satisfied with the default color strategy conversion, choose how to convert each ink in the **Use** column.






- Choose **Stabilized Color Build** to apply the [stabilizing rules](#) you defined to the color build used to convert the spot color.

If spot colors that would have otherwise been converted using the [Output Profile](#) fall within the conditions of any stabilizing rule you defined, their color builds will be changed to stabilized color builds, and they will show **Stabilized Color Build** in the **Use** column.

For example:

- When converting PANTONE 146 M to CMYK with the **Output Profile** option in your color strategy, you get a color build using the 4 output inks

(  5.9  56.5  100  44.7).

- In your stabilizing rules, you have defined that a color build can have a maximum of 3 inks.
- When stabilizing the color build for PANTONE 146 M, you get a new color build using 3 output inks (  0.0  55.0  100  47.8).



**Note:**

- Inks that you have chosen to [Keep In Output](#), [Do Not Print](#), or convert using [Custom Values](#) or a [Conversion Table](#) will never be stabilized.
- You can still change a **Stabilized Color Build** to any of the other options of the **Use** column.

If you had already defined your exceptions and you add or change stabilizing rules afterwards, the exceptions will not be automatically changed.

However, for exceptions set to use the **Output Profile** and that could now be stabilized, the **Stabilized Color Build** option is available in the **Use** column, so you can apply stabilization manually.

You can also recalculate all exceptions, so that the ones that could now be stabilized, will be. See [Recalculating Exceptions](#) on page 274.

- Choose **Keep In Output** to not convert this ink and use it as an extra separation in the output.

**Note:**

When you add an ink to the **Extra Output Inks** list in the [Output tab](#), it is automatically added here with the **Keep In Output** conversion option.

When you add an ink here with the **Keep In Output** option, it is also added as an **Extra Output Inks** on the **Output** tab.

- Choose **Do Not Print** to not output the spot color at all.  
For example, use this if you want to keep technical lines from being printed, without having to manipulate the original print job.
- Choose **Custom Values** to change the color build used to print the spot color. When you select this, you can edit the ink percentages manually.

**Tip:**

Do this if you already know the exact percentages you want to use.

If you don't, but want to tweak the conversion values manually, we recommend you use the [Quick Refine tool](#) instead, as you will see the result of your changes against both the target spot color and the previous conversion values (visually and using Lab/LCh values).

If you also want to manually refine spot colors that are not yet in your **Exceptions** list, you can use the [Refine Spot Colors wizard](#) to [refine colors manually](#).



**Attention:**

When using custom values, it is possible to enter values over 100%. This will result in a second separation, also called double-strike.

A double-strike increases the color range of the press by printing a separation more than once. For example, when simulating a saturated Orange color, it is possible to print Orange two times (200%) on the press.

However, for custom values higher than 100% for an exception ink, we can no longer calculate nor guarantee the color accuracy. A warning sign and the message *Double Strike* will appear in the Delta E column.

- Choose **Conversion Table** to convert the spot color using a predefined conversion table.

**Note:** This is only available for **PANTONE+ Solid Coated** and **PANTONE GoeGuide Coated** inks.

See [Conversion Tables for PANTONE+ Solid Coated Inks](#) on page 270 and [Conversion Tables for PANTONE GoeGuide Coated Inks](#) on page 270 for a list of the conversion tables available.

- Choose **Output Profile** to convert the spot color to the output inks using the output profile.

**Note:**

This is the default option and does not change the color build used to print the spot color (except for **PANTONE+ Solid Coated** and **PANTONE GoeGuide Coated** inks, if they are set to be converted with a [standard conversion table](#) on the **Conversion Settings** tab).

However, you can use this to quickly check the output percentages of a particular ink.

- Spot Colors indicated as **Refined On Press** have been refined using a refinement process of the press manufacturer. Changing the Use for such an exception discards the refinement. The delta E for **Refined On Press** exceptions is in blue, indicating that they correspond to actual measurements.


The color patch of the converted color, the **Conversion Values** and the **Predicted ΔE** are updated automatically to reflect your changes.

**Note:** If you have [refined](#) a spot color by measuring color values, you will see the **Measured ΔE** instead.

**Recalculating Exceptions**

The exceptions you defined in the [Exceptions tab](#) are kept intact, even if you make further changes to the color strategy. However you can recalculate them if needed. This is useful for example after you [changed the output inks](#), or the [general conversion settings](#).

To recalculate exceptions, you can either:

- Select the color build(s) to recalculate, right-click and select **Recalculate Conversion Values**. This recalculates all selected color builds (except those set to **Keep In Output** or **Do Not Print**), and sets them to **Use** the **Output Profile**. You can still choose another option for individual exceptions.
- Click the **More Actions** button , select **Recalculate** then select either:

- **All 'Output Profile' and 'Stabilized' Exceptions** to recalculate all color builds using the **Output Profile** or **Stabilized Color Build** option in the exceptions list.
- **All Exceptions with Conversion Values** to recalculate all color builds in the exceptions list (except those set to **Keep In Output** or **Do Not Print**).

**Note:**

- If you change the output profile to a profile with more channels, or if you (re)enable channels in the output profile, you will be asked if you want to **Recalculate** the exceptions, as some exceptions' color builds could use the extra channels. This recalculates all exceptions with conversion values (not those set to **Keep In Output** or **Do Not Print**).


If you choose **Don't Recalculate**, the exceptions will still use the previous ink set (with fewer channels).

- If you change the output profile to a profile with the same channels, you will also be asked if you want to **Recalculate** the exceptions (as the output color space will be somewhat different).
- If you change the output profile to a profile with fewer channels, or if you disable channels in the output profile, exceptions must be recalculated as some of them may use the channel(s) that are not available anymore. Click **Continue** to recalculate the exceptions automatically.


If you click **Cancel**, your changes to the profile or output channels will be reverted.

### Refining Exceptions

You can also refine the spot color conversion values in your list of exceptions to further improve your color match. You can do this the following way:

1. Select the spot color(s) you would like to refine in your **Exceptions** list, then click the **More Actions** button  and select **Refine....**
2. In the dialog that opens, select your **Digital Press**, the **Configuration** to use, and click **Select**.

**Note:**

- You can identify your **Digital Press** both by its press name and its DFE server name.
- Make sure you select a digital press configuration that has a valid profile (this is indicated by a green check .
- By default, you can only see digital press configurations whose profile is the same as the color strategy's output profile.

You can see your other configurations if you deselect **Hide configurations which do not match the color strategy profile**, but for color accuracy, we recommend you don't use one of those to refine your spot colors.

This opens the **Refine Spot Colors** wizard. You can see the **Digital Press**, **Configuration** and **Color Strategy** you are using at the bottom left of the wizard.

3. In the **Get Started** step of the **Refine Spot Colors** wizard, you can add more spot colors to the refinement.

See [Get Started](#) on page 276.

4. In the **Refine Cycles** step, you perform the spot color refinement. You can do as many refinement cycles as is necessary.

See [Refine Cycles](#) on page 277.

5. The **Finish** step confirms that the color strategy was updated with the refined values. You can now close the wizard.

See [Finish](#) on page 242.

**Note:**

- Your choice of [Output Channels](#) will be taken into account when you refine spot colors:
  - If you chose **Generate only CMYK**, then OGV inks will not be used during refinement iterations.
  - If you chose **Generate preferably CMYK**, then OGV inks can be used during refinement iterations, if they are present in the original color build.
- The strategy's [Conversion Settings](#) will always be used as a starting point for the refinement. This may overrule existing exception values (for example, when the exception doesn't make use of all the output channels that are currently used by the strategy).

**Get Started**

In the **Get Started** step of the **Refine Spot Colors** wizard, you can add more spot colors to refine.

1. On the **Select Spot Colors** screen, you can add colors to refine by:
  - Clicking **+** and selecting the ink(s) to add in the dialog that opens.

**Tip:**

- Use the **Shift** or **Ctrl** key to select several inks, or **Ctrl+A** to select all inks in an ink book.
- You can also use the **Search** field.
- Clicking **Add Inks from a PDF file...** to select one or more (Normalized or regular PDFs) file(s), and adding some or all of the spot colors contained in these files to the list.

Use this if you have trouble getting a good match for one or more particular spot color(s) in one of your files.

**Note:**

- For regular PDFs, Color Pilot will first look for the inks in the predefined books (such as process and PANTONE ink books), and then in the preferred **Ink Book** (defined in the [Preferences](#)) before checking other ink books you created.
- If the inks found in the file(s) are not present in the database, they will be greyed out with **<unregistered>** shown as their ink book, and you will see a warning that some of the inks in the selected PDF(s) are unregistered.  
  
Unregistered inks are not added to the ink selection as they don't contain enough information to make a useful refinement.

To remove an ink from the list, select it and click the **-** button.

Click **Next** when you are done.

2. On the **Select a Color Strategy** screen, your color strategy is already defined.

You can see your color strategy's **Ink Set** below. If some of the output profile's inks were turned off in the strategy (see [Choosing the Output Separations](#) on page 293), they will appear greyed out here.

**Tip:** From this screen, you can also see information about your color strategy: click **Show Color Strategy Info...** to view the information in a pop-up.

Click **Next** when you are done.

### Refine Cycles

In the **Refine Cycles** step of the **Refine Spot Colors** wizard, you select a spot color refinement method and carry out the refinement. You can do several refinement cycles, using one or more methods.


1. On the **Select spot colors and refining method** screen, choose the spot color refinement method to use:
  - Choose **Visually, by printing a number of variations** to print a variations chart for each color, then visually select the right patch from the printed output.
  - **Automatically, by measuring a printed sample** to measure a sample that was printed with your color strategy and automatically correct the color deviation.
  - **Automatically, by measuring test chart iterations** to print a number of variations of each spot color in a spectrophotometer layout and measure it so the best conversion values can be calculated automatically.
  - **Manually** to edit the spot colors conversion values manually.

**Note:** If you choose a method involving measurements, make sure that the [measurement condition](#) selected on your spectrophotometer matches the one used to measure your strategy's output profile.

2. Decide **which spot colors you want to refine in this cycle**.

By default, all spot colors you added in the **Get Started** step are selected. For each spot color, you can see:

- the conversion values before refinement (calculated using the color strategy or the result of any previous refinement cycle),

**Note:** If you have already performed a refinement cycle, the color values that were changed are indicated by a pencil icon .

- whether the spot color is already saved as an exception **In the Color Strategy**,
- the **Predicted  $\Delta E$**  between the spot color and the conversion values before refinement.

**Note:**

- This is calculated using the [Delta E formula of your color strategy](#).
- By default, any predicted [Delta E](#) value that is lower than [your chosen tolerance for digital printing strategies](#) is shown as `Less` than your tolerance.  
This is because very low theoretical Delta E values may not be achievable in a real life setup (due to digital press instability and/or imperfections in the profile).  
However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).
- If you have already refined a spot color using the **Automatically, by measuring test chart iterations** method, the measured Delta E is shown in blue.

You can sort the spot colors by any column in the table.

Deselect the colors you don't want to refine.

**Tip:**

- You can perform different refinement cycles on different spot colors (for example, if you have printed samples for some of the colors, but want to refine the other ones using test charts).
- To only select a few of the colors, click the top check box to deselect them all, then only select the colors to refine in this cycle.

If you added an extra output ink [as extra separation](#) in the color strategy, it will be shown here too.

**3. Click Next.**

**4. Carry out the refinement cycle as explained in one of the following:**

- [Refine Colors Visually, by Printing a Number of Variations](#) on page 279,
- [Refine Colors Automatically, by Measuring a Printed Sample](#) on page 282,
- [Refine Colors Automatically, by Measuring Test Chart Iterations](#) on page 283,
- [Refine Colors Manually](#) on page 288


(depending on the method you chose).



**5. At any time, you can pause the refinement process and save your unfinished refinement for that press and configuration.**

This way you can perform other tasks in Color Pilot, then resume working on your spot colors refinement later.

- a) Click the **Quit Now and Continue Later** button. Confirm your choice by clicking **Save and Quit** in the pop-up dialog.

This closes the wizard and shows a badge next to the press name:

- : indicates that the refinement is unfinished.

- : indicates that the refinement is waiting for the measurements from the inline spectrophotometer on the press (when working with an inline spectrophotometer).
- : indicates that an error has occurred, or that the refinement job was cancelled on the press.

You can also see the badge on the **Refine Spot Colors** button in the bottom tool bar when you select the digital press and configuration for which you started the refinement process.

- b) When you are ready to resume the refinement, select your digital press (with the relevant configuration) and click the **Refine Spot Color** button in the bottom tool bar again.

You will see a pop-up warning you about the unfinished refinement. Click **Resume**. This will open the **Refine Spot Colors** wizard at the point where you paused the refinement. You can then continue your refinement (but not go back and for example change the inks).

**Note:**

- To start a new refining session instead, click **Start new session** in the pop-up. Completing the new session (or saving another unfinished refinement) will discard the unfinished refinement.
- To discard the unfinished refinement at any time, right-click your digital press and select **Clear Unfinished Refinement**.

6. If necessary, click **Next** and repeat steps 1 to 4 to do another refinement cycle.  
You can use a different refinement method, and you can do as many cycles as you want.
7. Click **Finish** when you are done refining your inks.

**Refine Colors Visually, by Printing a Number of Variations**

Use this method to print a variations chart for each color, then visually select the best patch from the printed output. The variations charts contain patches with different ink combinations that vary around the existing conversion values.

1. For each spot color, do the following:
  - a) Choose the **Patch Size** to use for the variations chart (**Small, Medium** or **Large**).
  - b) Choose to **Allow values over 100%** if you want a higher percentage (for instance 120% or double strike) to print the variations chart.

This increases the color range of the press and produces more saturated colors by printing a separation more than once.

The visual spot color refinement allows you to find out how much of this extra separation is needed to achieve the desired color.

- c) Choose up to three inks to print the chart.

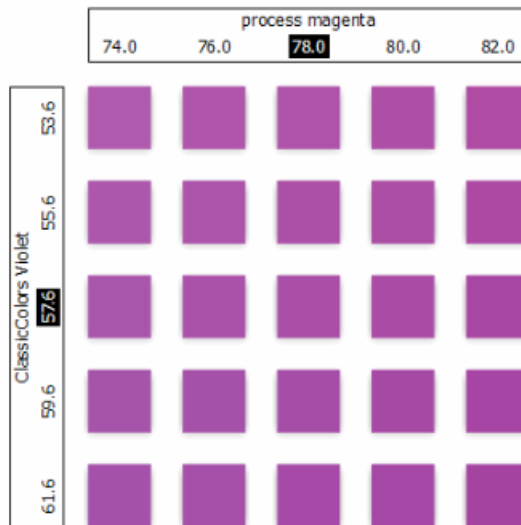
For each **Ink**, define:

- The difference in ink percentage for each variation (**Step**).
- The number of steps **Up** and **Down**.

The starting value is the percentage of that ink in the conversion values (from the color strategy, or the previous refinement cycle if you have already done at least one). You can see those conversion values, along with a patch of the spot color, at the top of the dialog.

For example, you are refining PANTONE Purple C, whose conversion values in the color strategy are 57.6% cyan and 78% magenta. For both the cyan and the magenta ink, you choose a **Step** of 2.0%, 2 steps **Up** and 2 steps **Down**.

For each ink, the variation chart will use the color strategy value and other values around it defined by the steps you chose. So the magenta percentages used here will be 74%, 76%, 78% (color strategy value), 80% and 82%.



You can see a preview of your variations chart on the right, showing the ink percentages.

**Tip:** If you hover your cursor over a color patch, a tool tip will display the percentages of that patch.

**Note:** If an ink percentage is near 100% and you did not select the **Allow values over 100%** option, the number of **Steps Up** will be limited to not go over 100%. For example with a starting percentage of 98% and a step of 2%, you can only have one step up (100%).




- d) If you are using three inks, you will get several grids in your variations chart (each grid with a different percentage of the third ink). You can choose to **Align** them **Horizontally** or **Vertically**.

For example, if you have four or more grids aligned horizontally and you see a message warning you that the chart's dimensions are too large for your press, try to align them vertically.

If you still see the warning after changing the alignment, you need to remove some steps in the third ink to have fewer grids. If necessary, you can print the other steps in another refinement cycle.

- e) You can use the view mode buttons to get a better view of all the grids:
  - **Pan mode** : When this view mode is selected, the cursor changes into a open hand. By clicking the chart and dragging you can move the chart around.



- **Zoom in mode** : When this view mode is selected, the cursor changes into a magnifying glass. Clicking anywhere will zoom in the chart on that position. By clicking and dragging the mouse, you can also select an area in the chart you want to zoom in on.
  - **Zoom out mode** : This view mode is the reverse of **Zoom in mode**.
  - **Reset zoom** : Click to reset the chart so it fits in the view.
- f) Click **Next**.  
Repeat this for each spot color to refine and click **Next** when you are done.
2. In the next screen, you can see the variations chart(s) you just defined.  
Click **Print Settings...** if you want to change how the chart(s) will be printed (by default the print settings *defined for your digital press* are used). In the **Print Settings** dialog that opens:
- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**  
This option is only available if your digital press supports it.  
Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**  
This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- c) Select **Generate an extra Magenta separation** if you want to generate an extra separation called *Magenta 1* in areas where Orange, Violet or Green inks overlap with Magenta.

**Note:** This option is only available if your digital press supports it.

**Important:** Remember to select this option when you intend to print production jobs that use a color strategy with *Magenta 1*.

- d) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- e) Click **OK**.

3. Click **Print Variations Charts** to send the variations charts as a PDF to your DFE Server and print this PDF on your digital press.

**Note:** Grid charts that are too big to fit on a press sheet will automatically be split up into multiple sheets, making optimal use of the available substrate material.

**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the chart is printed on the first press engine to safeguard against color variation inside the color profiles.

To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE Server client.

4. Look at the printed output and decide which patch is the best match for each spot color.
5. Click **Next** in the **Refine Spot Colors** wizard and click the best match patch on the variations chart for the first spot color.  
Click **Next** and do the same for the next spot color... until you have picked a best match for all spot colors you refined.
6. Click **Next** to see the refined values (ink percentages) and the Delta E between original and refined colors.  
The values with a pencil icon are the values that were changed by (one of) the refinement cycle(s) you just did.
7. If you are satisfied with the refined values, click **Finish**.  
This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.  
If you are not satisfied, you can click **Next** and do another refinement.

**Refine Colors Automatically, by Measuring a Printed Sample**


Use this method if you want to match the color of a physical sample rather than the corresponding spot color in your color database (for example a color from a previous job, a spot color in a PANTONE book, a sample you got from a customer...).

You will measure the Lab values of that sample, and Color Pilot will generate a color build to match those values as accurately as possible, and save that color build as an exception in your color strategy.

This is faster than printing a new chart then [choosing the best match visually](#) or [measuring a printed chart](#).

1. After selecting **Automatically, by measuring a printed sample** and clicking **Next**, Color Pilot will detect the connected spectrophotometer (and ask you to calibrate it if necessary), then show the **Measure Sample** dialog.  
Measure the printed sample with your spectrophotometer then click **OK**.

**Note:**

- If necessary, you can use the **More Actions** button  to reconnect or calibrate the spectrophotometer, or change its [measurement condition](#).
- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- You cannot use a Barbieri Spectro Swing spectrophotometer for this, as it cannot take single measurements.

2. Repeat this for each printed sample of a spot color you want to correct.
3. The next screen shows the refined spot color conversion values calculated from the samples' Lab values.

Select a spot color in the table at the left to see its refined conversion values. The values with a pencil icon are the values changed by the refinement.

If you are not satisfied with a measurement, you can redo it (click **Remasure Original Sample**). You can also **Reset to Original Values**.

4. When you are satisfied with the refined values, click **Finish**.

This saves the refined conversion values for the spot colors as **Refined Output Profile Values** in the color strategy.

If you are not satisfied, you can click **Next** and do another refinement.

### Refine Colors Automatically, by Measuring Test Chart Iterations

Use this method to print a number of variations of each spot color in a spectrophotometer layout and measure it so the best conversion values can be calculated automatically.

You can use this to refine whole ink books at once if desired.

1. If you chose in the [Preferences](#) to have Color Pilot to always ask you whether to use the inline or offline spectrophotometer, select either **Inline** or **Offline** in the pop-up that opens.

**Tip:** You can select **Do not ask me again** if you want Color Pilot to remember your selection and change it in the Preferences.

2. On the **Select out of gamut spot colors to refine** screen, select which out of [gamut](#) colors you want to refine.

Spot colors are considered "in gamut" when they can be reproduced by your digital press within a specified [Delta E](#) tolerance (the one you set in the [Preferences](#)).

Spot colors with a Delta E a bit above this tolerance can typically benefit from refinement.

However, spot colors with a Delta E far above this tolerance may just not be reproducible by your digital press. In this case, you may want to remove those spot colors from the refinement, to save yourself time and effort.

The Delta E is calculated using the [Delta E formula of your color strategy](#) (you can see it at the bottom of the spot colors list).

**Tip:**

- Click the **ΔE** column to sort the spot colors by increasing or decreasing Delta E, and see more easily which colors need refinement if you have a lot of spot colors.
- To select or deselect all inks, click the check box at the top of the inks list.

3. In the **Cycle 1: Refine automatically by measuring test chart iterations (Iteration 1)** screen, select the **Number of color patches** you want to print per spot color (as a minimum).

The default setting is 10 patches per color, but you can go as high as 100. If you print more color patches in the first cycle, you may need to do fewer refinement cycles (and vice-versa).

The screen indicates how many pages will need to be printed.

**Note:**

- If you are using an inline spectrophotometer, you will only see the total number of patches and not the number of sheets or pages, as this is determined later at the press.
- If you work with an i1i0 or a Barbieri Spectro Swing and the number of spot colors is low, the wizard will automatically use as many patches as is required to fill a full i1i0 sheet.
- If you are using an M1 or M2 *measurement condition*, the chart will be automatically adapted to support the dual measurement (measuring with and without UV filtering) required by these measurement conditions (the patches will be slightly bigger and there will be slightly more white space in between lines of patches).

4. If you are using...

- an offline spectrophotometer, the next screen shows the chart with all the spot color patches (if there are several pages, you can click the arrows next to the **Page** field at the top right to view other pages);
- an inline spectrophotometer, the next screen shows the number of spot colors to be refined and the number of patches that will be printed.

Click **Settings...** if you want to change how the chart(s) will be printed (by default the print settings *defined for your digital press* are used).

5. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- c) Select **Generate an extra Magenta separation** if you want to generate an extra separation called *Magenta 1* in areas where Orange, Violet or Green inks overlap with Magenta.

**Note:** This option is only available if your digital press supports it.

**Important:** Remember to select this option when you intend to print production jobs that use a color strategy with *Magenta 1*.

- d) If you are using an offline spectrophotometer, choose how to determine your chart's **Layout**.

- Leave **Optimize the sheet layout for minimal substrate consumption** selected if you want Color Pilot to automatically calculate the best layout.

- If you want to set the layout manually, do the following:

1. Select **One page per sheet**.
2. If there are enough patches to fill several pages, select the **Page Range** to print, or choose to print **All Pages**.

**Tip:**

You can separate page numbers by a comma, or use a dash to indicate a page range (for example 3, 6–9).

Use this option to reprint a page that cannot be measured anymore, because it has been damaged for instance.

3. Choose the **Rotation** to apply when printing your chart.

**Note:** When working with an inline spectrophotometer, the chart layout is not generated by Color Pilot, but directly by the press, to fit its substrate and inline spectrophotometer format.

- e) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined [when configuring your digital press](#)).
  - f) Click **OK**.
6. If you are using an inline spectrophotometer, click the **Print and Measure Test Chart** button to print the chart and launch the automatic measurement with your inline spectrophotometer.
- A message will notify you if there is an error or the job is cancelled on the press, and you can restart the process by clicking the **Print and Measure Test Chart** again.

At the end of the measurement, the wizard will automatically switch to the **Result of measuring test chart** screen explained below.

7. If you are using an offline spectrophotometer, click **Print Test Chart** to:
  - a) Send the chart as a PDF to your Digital Front End Server,
  - b) Have your Digital Front End Server process the job (RIP it, generate a preview...),


**Note:** Charts automatically make optimum use of the substrate so that no material is wasted. If the size of the substrate permits, several charts will be rotated, reduced or merged to fill up a sheet.

- c) Print this PDF on your digital press.



**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the chart is printed on the first press engine to safeguard against color variation inside the color profiles.



To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE server client.

8. Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1i0 spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1i0 will use your chosen mode until the end of the current page.

**Tip:**

- After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):
- Go back to the page you have just measured using the back arrow.
  - Right-click the chart preview and select **Save Page Measurements...**
  - Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

- Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.
1. Make sure that your measurement file:
    - is of the correct page of your chart (if it has several pages),
    - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
  2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

9. After you finished measuring, you will see a list of the spot colors on the **result of measuring test chart** screen with:
- A warning sign ⚠ if the color is still out of **Gamut**,
  - The new **ΔE** after refinement,
  - The **State** of the conversion values (**On target**, **Could be improved** or **Could not improve further**).

To view the measured chart, select **Measurements** in the **View** field at the top of the screen.

At the bottom of the screen, you can see the total number of spot colors as well as the average Delta E before and after the refinement.

If you select a spot color in the list or in the measured chart, you can see more information at the bottom right, including the new conversion values and the target and measured Lab values and color patches.

10. If you want to do another iteration of this refinement cycle, do the following:

- a) Click **Next**.

The wizard will generate a new chart to print, using only the spot colors that had the **Could be improved** state after the last iteration. If all your spot colors have the **Could not improve further** state, the wizard will not generate a new chart.

**Note:** This chart will use as many patches per spot colors as is necessary for the refinement. Depending on the spot color, this could be more or less than the number of color patches you chose before the first iteration.

- b) Print the new test chart.  
c) Measure the new test chart.

On the **result of measuring test chart** screen, you will see the updated results for the refined spot colors. You will see a **ΔE** column for each iteration, and a new **average measured ΔE**.

**Note:** If a patch measured in the new iteration is worse than what was found in the previous iteration, the previous iteration's result will be used.

You can do more iterations as long as you have colors with the **Could be improved** state.

11. After each refinement iteration, you can pause spot colors to define which colors will go through the next run of refinement. Paused colors will not be part of the next iteration.

**Tip:** This is useful if there are spot colors that have a high Delta E after the first iteration and you think that further iterations will not improve the spot color match.

- a) To pause a spot color, right-click it on the **result of measuring test chart** screen and select **Pause refining**.

**Note:** If there are no spot colors in the **Could be improved** state (for example, all spot color are **Paused**), you cannot start a new iteration.

- b) If you want to unpause a spot color, select the paused color, right-click it and choose **Continue refining**. The color will then get the **Could be improved** status.

12. Once you are satisfied with the results, click **Finish Cycle**.

You can then **save a report** about the refinement (if you have set this in the [Preferences](#)). This is a text file that you can save in the location of your choice.

After this, you can do another refinement cycle using another refinement method, or click **Finish**.

This saves the refined conversion values for your spot colors as **Refined Output Profile Values** in the color strategy.

### Refine Colors Manually

Use this method if you want to edit the output ink percentages used to reproduce the spot colors manually.



**Attention:** Make sure that your monitor is calibrated before refining spot colors manually. However, please be aware that viewing an ink on a screen can never be completely color accurate.

1. On the **Refine manually** screen, select the first spot color you want to refine.

On the right hand side, you can see its conversion values and the **Predicted ΔE** between the spot color and the conversion values.

**Note:**

- The *Delta E* is calculated using the [Delta E formula of your color strategy](#) (you can see it underneath).
- By default, any predicted Delta E value that is lower than [your chosen tolerance for digital printing strategies](#) is shown as `Less than` your tolerance.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to digital press instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).

2. In the **New Values** row, click the output ink percentage(s) to edit and enter the percentage(s) you want to use or click the arrows to increase or decrease the value(s).

At the bottom, you can see color patches and Lab/LCh values for the **Target** spot color, the **Original** converted color (from the color strategy or a previous refinement cycle) and the **New** converted color (using the percentages you just entered).

You can also see the Delta E between **Target** and **Original** converted color, and between **Target** and **New** converted color.

Use this to help you find the best percentages for your spot color.

**Note:** If you are not satisfied with your new color conversion, you can click **Reset to Original Values** to start over.

3. Do this for every spot color in your list.
4. If you are not satisfied with the refined values, you can click **Next** and do another refinement.

When you are satisfied, click **Finish**.

This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.



### Finish

After clicking **Finish** after one or more refinement cycles, you will see the **Summary** screen, and a message stating that:

- your spot colors were refined successfully,
- the color strategy was updated (the refinement values are stored in the color strategy's **Exceptions** list).


Click **Finish** again to close the wizard.

### Tweaking Your Conversion Values Manually

If you want to manually edit the conversion values for a spot color, while seeing the result of your changes against both the target spot color and the previous conversion values, you can use the **Quick Refine** tool.



**Attention:** Make sure that your monitor is calibrated before refining spot colors manually. However, please be aware that viewing an ink on a screen can never be completely color accurate.

1. Select the spot color(s) you would like to refine in your **Exceptions** list, then click the **More Actions** button  and select **Quick Refine...**
2. In the **Refine Spot Colors** dialog that opens, select a spot color in the list at left to see its **Original (Conversion) Values** at right.

You can also see the **Predicted  $\Delta E$**  between the spot color and the conversion values (calculated using the  **$\Delta E$  Formula** of your color strategy).

#### Note:

By default, any predicted *Delta E* value that is lower than *your chosen tolerance for digital printing strategies* is shown as *Less than your tolerance*.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to digital press instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail *in the Preferences*.

3. In the **New Values** row, click the output ink percentage(s) to edit and enter the percentage(s) you want to use or click the arrows to increase or decrease the value(s).

At the bottom, you can see a color preview and Lab/LCH values for the **Target** spot color, the **Original** converted color (from the color strategy or a previous refinement cycle) and the **New** converted color (using the percentages you just entered).



You can also see the Delta E between **Target** and **Original** converted color, and between **Target** and **New** converted color.

Use this to help you find the best percentages for your spot color.


**Note:** If you are not satisfied with your new color conversion, you can click **Reset to Original Values** to start over.

4. Do this for every spot color in your list.
5. When you are satisfied, click **OK**.

This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.

### Exporting Your Color Strategy Data to CSV

If desired, you can export your color strategy's information to a CSV (comma separated values) file, compatible with Microsoft Excel. This can be useful if your workflow is integrated with a third-party MIS system, and you want to use information about color conversion in this system.

1. Click the **More Actions** button  and select **Export to CSV...**
2. In the dialog that opens, choose where to save your CSV file and what to call it (by default, it takes the name of the color strategy), then click **Save**.

The CSV file contains:

- the color strategy name,
- the Delta E formula used,
- the output profile used,
- all the exception inks defined in the strategy and how the strategy handles them (for example `Keep In Output, Do Not Print, Use Output Profile...`), including their Lab and output color space conversion values, and the Delta E if applicable.

### Exporting Your Exceptions


If you are working with the Dynamic Workflow, you can automatically refine the conversion of the spot colors you use the most in Color Pilot, to improve the color match on these colors. You can do this from your color strategy's **Exceptions** (see [Refining Exceptions](#) on page 275).

If you are mostly working with the Classic Workflow, you cannot do this from your Classic Color Engine Pilot, but you can:

1. refine your spot colors exceptions in the Dynamic Workflow (in a digital printing color strategy in Color Pilot),
2. export those refined exceptions to the CGATS format (a color measurement format from the Committee for Graphic Arts Technologies Standards),
3. import the refined exceptions into a color strategy in your Classic Color Engine Pilot.

You will then be able to use the refined conversion values when converting your spot colors with your Classic Workflow's color strategy.


You can do this the following way:

- To export your refined spot colors exceptions from Color Pilot:
  - a) Open the digital printing color strategy that has the refined exceptions you want to use, go to **Convert Spot Colors** and select the **Exceptions** tab.
  - b) Click the **More Actions** button  and select **Export to CGATS...**

- c) In the dialog that opens, choose where to save your CGATS file and what to call it (by default, it takes the name of the color strategy), then click **Save**.
- To import your refined spot colors exceptions into your Classic Color Engine Pilot:
  - a) Open the color strategy you want to add your refined exceptions to, and go to **Convert Special Inks...**



**Attention:** Make sure this color strategy has the same output ink set as the color strategy you exported the exceptions from!

- b) Click the **More Actions** button  above the **Exceptions** table and select **Import Exceptions...**
- c) Browse to the CGATS file you saved (make sure to view **All files (\*.\*)** in the browser dialog) and click **Open**.
- d) In the **Import Exceptions** dialog that opens, choose how to handle the inks that you are adding as refined exceptions:
  - Choose what ink book(s) they should be in: either the ink books mentioned in the CGATS file (the ink books they belonged to in your Dynamic Workflow's color database), or an ink book that you select here.
  - Choose what to do if an ink is not found in the chosen ink book (in your Classic Workflow's color database). Either:
    - Add it to the ink book**
    - Search for it in other ink books**
    - Don't add the ink to the exceptions list**
  - If you are importing exceptions for Pantone inks, and you want to make sure these exceptions will be applied when processing a job containing those Pantone inks with your color strategy, select **Map Pantone inks to the selected ink book**.

**Note:** If one of the inks already had an exceptions in your Classic Color Engine Pilot's color strategy, it will not be imported. If you want to import it, delete the original color build and import the CGATS file again.

All exceptions you imported are set to **Custom Values** in your color strategy (except for inks that were set to **Keep in output** or **Do Not Print**).

**Note:** Exceptions containing a double strike (more than 100% of one of the output inks) are not supported. The double strike percentage will be brought back to 100%.

### Adding Exceptions to an Ink Book


Once your *exceptions* are exactly how you want them to be, you can add them to an ink book if desired.

**Tip:**

You can do this to create a "dependant standard", for example an ink book describing how the PANTONE Solid Coated inks print on your digital press.

You can then use that dependant standard in your proofing setup, by creating a *proofing color strategy* that *maps inks* from the PANTONE Solid Coated book to your dependant standard book.

This ensures that your proofing setup handles your spot colors similarly to your digital press.


1. Select your desired exception(s) in the [Exceptions](#) list, then click the **More Actions** button  and select **Add Exceptions to Ink Book...**

**Note:**

You can only add exceptions with output values (not **Keep in Output** or **Do Not Print** exceptions) to an ink book.

You cannot add exceptions made for [PantoneLIVE inks](#) to an ink book.

2. In the dialog that opens, choose whether to add your exception(s) to **an existing ink book** or to **a new ink book**.
  - If you are adding them to an existing ink book, select that ink book in the list or use the **Search** field to find it.

You cannot add exceptions to a read-only  ink book.

**Note:** In case your ink book already contains inks with the same name, choose whether you want to **Overwrite Existing Inks** or not.

- If you are adding them to a new ink book, enter the name you want to give your new ink book.

As you type, you will see other ink book names containing the same letters, to help you avoid choosing a duplicate name.


**Note:** Depending on what you selected in the [Preferences](#), your new ink book will have either the [legacy format](#) or the [new format](#).

3. Your exceptions are saved to your ink book with:
  - the same name as the original spot colors,
  - Lab or spectral values corresponding to the output values of your exception (spectral values if the output profile is spectral, Lab values if the output profile is XYZ - see [Spectral and XYZ Profiles](#) on page 141 for more information),
  - the [measurement condition](#) used to measure your strategy's output profile (if you are saving the ink to a [new format ink book](#)).

### Using an Extra Separation to Print Special Inks

You can use an extra separation on press to help you print special inks more accurately, using custom percentages to get the perfect color.

For example, you can use a percentage of a white ink to create special effects on a transparent substrate, add a white underprint under a specific spot color, or use metallic colors.

- If you want to use custom percentages of a special ink:
  - a) In the [Exceptions list](#), add the ink you want to use as extra separation with the **Keep In Output** option.  
If you added it as extra output ink in the [Output tab](#), this is already done automatically.
  - b) Click the **More Actions** button  and select **Columns** then the extra separation's name.  
This adds the extra separation to the available output separations (you will see an extra column for this separation). At this point, all color builds will have 0.0% of this separation.

- c) For the inks you want to print using this separation, select the **Custom Values** option and enter your desired percentages manually.

**Note:** The exceptions list does not show a Delta E value for color builds using a percentage of the extra separation, as it is not possible to accurately predict the color difference in this case.

For example, you can add silver as an extra separation, then print a gold ink using percentages of silver and yellow.

**Note:** The extra separation will also be used as part of the color build when *refining exceptions* or *tweaking the conversion values*.

- If you want to use the white in your files as white underprint:
  - a) Check whether the white ink in your file is **White** from the **ClassicColors** ink book. If it isn't, do the following:
    1. Add the white separation used in your files to an ink book of your choice.  
See *Adding an Ink to an Ink Book* on page 93.
    2. In your color strategy, map this white ink to the **White** ink from the **ClassicColors** ink book.  
See *Mapping Ink Books and Inks* on page 255.
  - b) Add the **ClassicColors White** ink as extra output ink in your color strategy.

See *Choosing the Output Separations* on page 293.

It is now marked as **Keep In Output** in the exceptions list, and will not be color managed but used as it is for white underprint.

### 10.6.6. Choosing the Output Separations

If desired, you can change the output inks by disabling some of the output profile's channels and/or adding extra output inks.

Extra output inks are special inks you can use on press (for example white, metallics or varnish). Add them here if you work with print jobs containing them.

**Important:** Remember to use the correct **Name** and **Ink Book**. For example, for **White (ClassicColors)** to be correctly interpreted you have to make sure to use **White (ClassicColors)** in both the color strategy and your production jobs.

1. To disable some of the profile's output channels:
  - a) Click **Select Output Channels**.
  - b) In the **Select Output Channels** dialog, deselect the output channels you don't want to use (they are all selected by default).

For example, if you are working with CMY or Enhanced Productivity Mode (EPM), deselect the black channel (for a multicolor profile, this automatically also deselects any extra separations, so nothing other than Cyan, Magenta and Yellow is used).

**Note:**

- To compensate for the difference in gamut (especially the potential loss of detail in dark areas since very dark colors are not obtainable with just CMY), the color strategy will automatically use *black point compensation*.
- You will only be able to use an EPM color strategy on devices supporting EPM. If you have no such device connected to your Color Pilot, you will see a warning ⚠ in the **Select Output Channels** dialog.

c) Click **OK**.

**Note:**

If you have *exceptions* set to be printed with a percentage of the ink you disabled, you will see a warning that exceptions that contain that ink will be recalculated. Click **Continue**.

If you select that ink again, you will be asked if you want to recalculate the conversion values for those exceptions.

The channels you deselected are greyed out in the table.

They will not be used to calculate *spot color conversion values*. For example, if you are using a **CMYKOV** profile and deselected **Violet** here, then spot colors will be converted to a mix of C, M, Y, K and Orange.

They will also not be taken into account when you are *checking if the colors are in gamut*.

2. To add some **Extra Output Inks**:

- Click **+** under the **Extra Output Inks** table.
- In the dialog that opens, select the ink to add.

**Tip:** You can also use the **Search** field.

c) Click **Select**.

The ink is added to the **Extra Output Inks** table. Repeat this if you want to add more extra output inks.

**Tip:** Alternatively, you can also click **Show Picker** and drag extra output inks from the Picker to the **Extra Output Inks** table.

The extra output inks you add here will automatically be added as **Keep in Output Exceptions** to the **Convert Spot Colors** tab. This means that they will not be converted to the channels of the output profile.

They can also be *used as extra separations* to print other exceptions inks (that will be printed using percentages of the regular output inks and of your extra output inks).

## 10.7. Checking Your Digital Printing Color Strategy



Once you have made a *profile* and a *color strategy* for your digital press, you can check how well your color strategy produces the desired colors on your digital press using the **Check Strategy** tool.

You can do this either:

- [when profiling your digital press](#),
- from the **Digital Presses View** (see [Checking Your Color Strategy](#)),
- from the **Color Strategies Library** (as explained below).

1. Select the digital printing color strategy you want to check.

You can either:

- Select the strategy to check and click the  **Check Strategy** button.
- Right-click the strategy to check and select **Check Strategy...**
- Click the  **Check Strategy** button, then select the strategy to check in the pop-up that opens.

If you have selected several strategies, you will need to select one of them in a pop-up before you can proceed.

**Note:**

- You can only run a strategy check on proofing and digital printing color strategies. For checking a proofing color strategy, see [Checking Your Proofing Color Strategy](#).
- You can also use the **Check Strategy** tool using one of the predefined digital printing strategies. However, for optimal results we recommend using your own profile and color strategy, which have been tailored to your press.

2. Select your digital press configuration.

By default, you can only see digital press configurations that have the same profile as the strategy's output profile.

**Note:** It is possible to use a different digital press configuration: deselect **Hide configurations which do not match the color strategy profile** to show all configurations that have the same ink set as, or a larger ink set than your color strategy's output profile.

3. The **Check Strategy** wizard opens.

It will guide you through the strategy check in two steps:

- [Get Started](#)
- [Measure](#)

## 10.7.1. Get Started

In the **Get Started** step of the **Check Strategy** wizard, you print a test chart (whose patches have been converted through your chosen color strategy) on your digital press.

1. Color Pilot displays a preview of the test chart.

This chart can contain one or two sets of patches, which are randomized and mixed to produce the most accurate and reliable results:

- A set of patches to measure the stability of the press. This patch set contains a randomized subset of your strategy's input profile patches.

The measurements of these patches will be compared to the strategy's input profile to determine if your digital press is still printing under the same conditions as when the profile was created.

- A set of patches to measure the quality and accuracy of the color conversion. This chart is based on the ISO 12642-2 chart.

This patch set is only included if your strategy converts the process colors. Your strategy converts process colors if its input and output profiles are different, or if the black channel is switched off in the output, causing black to be converted to CMY.

If your strategy has a multicolor input profile, the ISO 12642-2 chart is extended with patches that include the multicolor inks.

You can use the **Page** arrows at the top to view the different pages.

2. If desired, adjust the print settings to change how the chart will be printed:

- a) Click **Print settings...** under the chart.
- b) In the **Print settings** dialog, select **Mirror Image** if you want your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- c) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- d) Choose how to determine your chart's **Layout**.

- Leave **Optimize the sheet layout for minimal substrate consumption** selected if you want Color Pilot to automatically calculate the best layout.

- If you want to set the layout manually, do the following:

1. Select **One page per sheet**.
2. If there are enough patches to fill several pages, select the **Page Range** to print, or choose to print **All Pages**.

**Tip:**

You can separate page numbers by a comma, or use a dash to indicate a page range (for example 3, 6-9).

Use this option to reprint a page that cannot be measured anymore, because it has been damaged for instance.

3. Choose the **Rotation** to apply when printing your chart.



- e) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
  - f) Click **OK**.
3. Click **Print Chart** to send the variations charts as a PDF to your DFE Server and print this PDF on your digital press.


**Note:** Strategy Check charts that are too big to fit on a press sheet will automatically be split up into multiple sheets, making optimal use of the available substrate material.

4. Click **Next** to go to the **Measure** step.


## 10.7.2. Measure



In the **Measure** step of the **Check Strategy** wizard, you will measure the chart you printed and check the measurements.

1. On the **Measure Page ...** screen you see a preview of the chart.

Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action.

As the patches are measured, you can see a diagonally split view of each patch , with the measured color at the bottom right and the expected color at the top left.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

### Note:

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1i0 spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

2. When you are done measuring the chart, you can inspect the results in detail in the **Check Measurements** screen.

See [Checking Your Measurements' Results](#) on page 298 for more information.

3. When you are done inspecting, click **Finish** to close the **Check Strategy** wizard.

## Checking Your Measurements' Results

When you are done measuring your Strategy Check chart, you can inspect the results on the **Check Measurements** screen, which consists of two tabs:

- **Stability Patches**
- **Conversion Patches**

**Note:** If your chart doesn't contain a separate set of patches for checking the accuracy of the color conversion (see [Get Started](#)), there are no tabs, and only the stability patches are shown.


1. [Check the Stability Patches.](#)
2. [Check the Conversion Patches.](#)
3. If desired, you can [save a report](#) containing the results of your Strategy Check.

If your Strategy Check failed for either patch set, see [If the Strategy Check Fails](#) for troubleshooting tips.

## Checking Stability Patches

When you are done measuring your Strategy Check chart, you can inspect the results on the **Stability Patches** tab of the **Check Measurements** screen.

1. For each patch in your chart, you can see:

- a patch number,
- the expected and measured patch color ,
- the expected color's composition in the input profile's inks,



**Tip:** You can check this to see if there are specific areas of the input profile that your press has trouble reproducing (for example, if all the colors containing high percentages of black fail, your digital press may have a problem printing the black ink correctly).

- the **Measured  $\Delta E$**  between the input color and the output color measured on the print,

**Tip:**

Click the arrow in the column header to see other color difference measurements, (**Measured  $\Delta H$** , **Measured  $\Delta Ch$**  or **Measured  $\% \Delta T$** ).

See [Other Color Difference Indicators](#) on page 31 for more information.

- whether the measured color values pass all your relevant [tolerances](#)  or fail one or more of them .

**Tip:** Hover on a fail status icon to see which tolerance(s) the patch didn't meet.

You can sort the patches by any of those columns.



2. To view the measured chart (with split patches), select **Measurements** in the **View** field at the top of the screen.

**Tip:** Hover on a patch to see its composition in the input profile's inks.

3. In both the **Samples** and the **Measurements View**, you can see information for / **Highlight** different sets of patches (at the top right):
  - **All** patches
  - the **Patches with above average  $\Delta E$**
  - the **Substrate** patch
  - the **Primaries** patches
  - the **Primary Solids** patches
  - the patch with the **Maximum  $\Delta E$**
  - the **Worst 5 Percent** patches
4. If you select a patch in the samples list or the measured chart, you can see more information at the bottom left, including:
  - the **Lab** and **LCh** values of the **Target** and **Measured** colors,

- all the color difference statistics for this patch (**Predicted  $\Delta E$** , **Measured  $\Delta E$** , **Measured  $\Delta H$** , **Measured  $\Delta Ch$**  and **Measured  $\% \Delta T$** ).
5. You can also see the  **$\Delta E$  Formula** used for the Delta E calculations. This is the one [set in your tolerances](#).
  6. At the bottom right of the screen, you can see statistics for different sets of patches, and whether they pass your tolerances or not.
    - The **Strategy Statistics** tab displays:
      - the **Average** Delta E
      - the **Maximum** Delta E
      - the **Maximum** Delta E of the **Best 95 %** of the patches (everything except the worst 5%)
      - the **Substrate** Delta E

- The **Statistics per Ink** tab displays the  **$\Delta E$** ,  **$\Delta H$**  and  **$\% \Delta T$**  values for your input profile's CMYK channels.

Next to each statistic, you can see your corresponding tolerance in brackets, and the pass  or fail  status.

You can also see a general pass or fail status for each statistics tab (the status shows fail if one of the statistics didn't meet its corresponding tolerance).

The tolerances you set in the [Preferences](#) are used here.


7. You can see a general pass or fail status icon for all stability patches at the bottom of the **Check Measurements** screen.



### Checking Conversion Patches

When you are done measuring your Strategy Check chart, you can inspect the results on the **Conversion Patches** tab of the **Check Measurements** screen.

**Note:** This tab is only available if your chart contains a separate set of patches for checking the accuracy of the color conversion (see [Get Started](#)).

1. For each patch in your chart, you can see:
  - a patch number,
  - the expected and measured patch color ,
  - the expected color's composition in the input profile's inks,

**Tip:** You can check this to see if there are specific areas of the input profile that your press has trouble reproducing (for example, if all the colors containing 100% black fail, your press may not be able to reproduce your darkest colors accurately).

- the **Predicted  $\Delta E$**  between the input color and the output color calculated by the color strategy,

**Note:** By default, any predicted *Delta E* value that is lower than 2 ΔE is shown as `Less than 2.0`. You can [customize this](#).

- the **Measured ΔE** between the input color and the output color measured on the print,

**Tip:**

Click the arrow in the column header to see other color difference measurements, (**Measured ΔH**, **Measured ΔCh** or **Measured %ΔT**).

See [Other Color Difference Indicators](#) on page 31 for more information.

- whether the measured color values pass all your relevant [tolerances](#) ✓ or fail one or more of them ✗.

**Tip:** Hover on a fail status icon to see which tolerance(s) the patch didn't meet.

You can sort the patches by any of those columns.

2. To view the measured chart (with split patches), select **Measurements** in the **View** field at the top of the screen.

**Tip:** Hover on a patch to see its composition in the input profile's inks.

3. In both the **Samples** and the **Measurements View**, you can see information for / **Highlight** different sets of patches (at the top right):

- **All** patches
- the **Patches with above average ΔE**
- the **Substrate** patch
- the **Primaries** patches
- the **Primary Solids** patches
- the **CMY Neutrals** patches
- the patch with the **Maximum ΔE**
- the **Worst 5 Percent** patches
- the **Outer Gamut** patches
- the **CMYK** patches (if you are working with a multicolor input profile)

4. If you select a patch in the samples list or the measured chart, you can see more information at the bottom left, including:

- the **Lab** and **LCh** values of the **Target** and **Measured** colors,
- all the color difference statistics for this patch (**Predicted ΔE**, **Measured ΔE**, **Measured ΔH**, **Measured ΔCh** and **Measured %ΔT**).

5. You can choose to adjust your target color values to what you can reproduce on your digital press substrate without simulating the reference or standard substrate color.

To do this, select **Adjust target Lab for printing substrate color**. This recalculates all target Lab/LCh values and color difference values. This setting is selected by default.

6. You can also see the **ΔE Formula** used for the Delta E calculations. This is the one [set in your tolerances](#).
7. At the bottom right of the screen, you can see statistics for different sets of patches, and whether they pass your tolerances or not.

- The **Strategy Statistics** tab displays:

- the **Average** Delta E

- the **Maximum** Delta E

- the **Maximum** Delta E of the **Best 95 %** of the patches (everything except the worst 5%)

- The **Statistics per Ink** tab displays the **ΔE**, **ΔH** and **%ΔT** values for your input profile's CMYK channels.

- The **Other Statistics** tab displays:



- the **Substrate** Delta E

- the **Average** Delta E of the **Outer Gamut** patches

- the **Average** Delta H of the **CMY Neutral** patches

- the **Average** Delta Ch of the **CMY Neutral** patches

- the **Maximum** Delta Ch of the **CMY Neutral** patches

Next to each statistic, you can see your corresponding tolerance in brackets, and the pass  or fail  status.

You can also see a general pass or fail status for each statistics tab (the status shows fail if one of the statistics didn't meet its corresponding tolerance).

The tolerances you set in the [Preferences](#) are used here.

8. You can see a general pass or fail status icon at the bottom of the **Check Measurements** screen.



### Saving a Report

If desired, you can save a report containing the result of your Strategy Check (including the detailed information you can see on the screen).

1. Click **Save report** at the bottom of the screen.
2. Click the **Browse...** button next to the **File Name** field to change the location where your report will be saved.
3. Enter a file name for the report.  
By default the application will suggest the name of the strategy, appended with the date and time.
4. If desired, you can change the banner that is shown at the top of the first page of the report, for example to use the logo and brand colors of your company.

You can use common image formats such as JPG, PNG, GIF or BMP.

5. If desired, in **Description** you can enter any extra information about this strategy check that is not added to the report by default.
6. Finally, decide what information you want to add to the report.

The report will always contain the following information:

- The name of the color strategy
- The name of the digital press configuration
- The  $\Delta E$  Formula used for the  $\Delta E$  calculations
- The date of the report
- The overall status of the stability patches (pass or fail)

If your strategy check includes color conversion patches (see [Get Started](#)), the report will also contain:

- The overall status of the color conversion patches (pass or fail)

You can add more information by selecting the following options:

Selecting...	will add...
<b>Stability Statistics</b>	one additional page containing the measured $\Delta E$ , $\Delta H$ or $\% \Delta T$ value, tolerance and pass/fail icon for every statistic that is measured for the stability patches.
<b>Stability Details</b>	pages containing the output values, measured and target LabCh, measured $\Delta E$ , $\Delta H$ , $\Delta Ch$ and $\% \Delta T$ and pass/fail status for all stability patches.  <b>Note:</b> Checking this setting will add many pages to your report. While this information can provide a useful reference for tracking the stability of your press, you may want to deselect this option if you want to print the report or share the information with third parties.
<b>Conversion Statistics</b>	one additional page containing the measured $\Delta E$ , $\Delta H$ or $\% \Delta T$ value, tolerance and pass/fail icon for every statistic that is measured for the conversion patches.  <b>Note:</b> This setting is only available if your strategy check includes color conversion patches (see <a href="#">Get Started</a> ).
<b>Conversion Details</b>	pages containing the input values, measured and target LabCh, measured $\Delta E$ , $\Delta H$ , $\Delta Ch$

Selecting...	will add...
	<p>and %ΔT and pass/fail status for all color conversion patches.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>This setting is only available if your strategy check includes color conversion patches (see <a href="#">Get Started</a>).</li> <li>Selecting this setting will add many pages to your report. While this information can provide a useful reference for tracking the quality of your color conversion, you may want to deselect this option if you want to print the report or share the information with third parties.</li> </ul>

7. Click **Save** to write a PDF report.

### If the Strategy Check Fails

If your strategy check fails for [Stability Patches](#) or [Conversion Patches](#), you can investigate the cause of the failure and in some cases correct it.

#### Different Gamut Sizes

If your color strategy is trying to reproduce a standard or conventional press with a large [gamut](#) using a digital press with a smaller gamut, some of your press' colors will not be reproducible by your digital press.

This will typically cause a fail status in the **Conversion Patches** tab on one or more Primary patches and/or saturated patches (these are patches with values of 100% for some of the input inks).

To check whether this is the cause of the problem, you can perform a [gamut check](#).

If it does turn out that the press gamut is too small to reproduce all of your input profile's colors, try using a different substrate or digital press with a wider gamut (you will need to make a [profile](#) and a [color strategy](#) outputting to that digital press profile).

#### Outdated Press Profile

If your digital press is older than two weeks, it may not reflect how the digital press prints as accurately as when you created it. In this case, we recommend you recalibrate the press using the press software.

If your strategy still fails after this, you should [create a new profile](#) for your digital press (and [update your color strategy](#)).

#### Failure in Different Areas

The [type of patches](#) that causes your strategy to fail can also indicate what the problem might be.

- If the gray patches (**CMY Neutrals**) are failing, it may mean that your digital press is unstable.

Try comparing colors on prints generated at different times (for example the first few samples of a press run, and after it has run for a while), and if needed contact your press vendor for assistance.



- If the failing patches are mostly in the shadows, your press profile resolution may not be high enough.  
You should *inspect* the dark areas of your profile, and if needed *create a new profile* for your digital press (and *update your color strategy*).
- If single channels patches (**Primaries**) are failing in the **Stability Patches** tab, it may mean that your press has mechanical stability issues or problems with the ink formulation. Investigate this problem using the tools provided by the press vendor. Contact your press vendor for assistance if needed.  
If those patches still fail after correcting the mechanical issues (especially the yellow patches), try using a *Delta E formula* other than **CIELAB Delta E (Classic)** (as color differences in the yellow areas seems larger when using this formula than what they appear to the human eye).

## 10.8. Default Digital Printing Color Strategies

Color Pilot comes with the following default digital printing color strategies:

Color Strategy Name	For Substrate...	For Ink Set...	Extra Output Ink
HPI-BRIGHT-SILV-PAPER-CMYK	Wausau Coated Metalized Bright Silver Paper	CMYK	<b>White</b> is set as extra output ink. The name of the white ink must be <b>White</b> (from the <b>ClassicColors</b> ink book).
HPI-BRIGHT-SILV-PAPER-CMYKOV	Wausau Coated Metalized Bright Silver Paper	CMYKOV	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-CREAM-ANTIQ-CMYK	Fasson Cream Antique TOP	CMYK	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-CREAM-ANTIQ-CMYKOGV	Fasson Cream Antique TOP	CMYKOGV	/
HPI-CREAM-ANTIQ-CMYKOV	Fasson Cream Antique TOP	CMYKOV	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-EST-8-CMYK	Wausau Coated Estate #8 with Wet Strength	CMYK	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-EST-8-CMYKOGV	Wausau Coated Estate #8 with Wet Strength	CMYKOGV	/
HPI-EST-8-CMYKOV	Wausau Coated Estate #8 with Wet Strength	CMYKOV	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-PE-TRANS-CMYK	Fasson PE85 Transparent TOP	CMYK	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-PE-TRANS-CMYKOV	Fasson PE85 Transparent TOP	CMYKOV	<b>White</b> (from the <b>ClassicColors</b> ink book)

Color Strategy Name	For Substrate...	For Ink Set...	Extra Output Ink
HPI-PE-WHITE-CMYK	Fasson PE85 white TOP	CMYK	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-PE-WHITE-CMYKOGV	Fasson PE85 white TOP	CMYKOGV	/
HPI-PE-WHITE-CMYKOV	Fasson PE85 white TOP	CMYKOV	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-PP-WHITE-CMYK	Wausau Coated 2.3 mil White Polypropylene	CMYK	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-PP-WHITE-CMYKOGV	Wausau Coated 2.3 mil White Polypropylene	CMYKOGV	/
HPI-PP-WHITE-CMYKOV	Wausau Coated 2.3 mil White Polypropylene	CMYKOV	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-SILV-PAPER-CMYK	Fasson Metalized Silver TOP Paper	CMYK	<b>White</b> (from the <b>ClassicColors</b> ink book)
HPI-SILV-PAPER-CMYKOV	Fasson Metalized Silver TOP Paper	CMYKOV	<b>White</b> (from the <b>ClassicColors</b> ink book)

**Note:**

All of the default color strategies handle spot colors as follows:

1. They map all **PANTONE+ Solid Uncoated** inks onto the equivalent **PANTONE+ Solid Coated** inks (see [Mapping Ink Books and Inks](#) on page 255 for more information).
2. They convert **PANTONE+ Solid Coated** and **PANTONE GoeGuide Coated** inks using the **Output Profile** with a refinement (see [Converting PANTONE Inks Using the Output Profile](#) on page 268 for more information).

**Important:** To print with the **White** extra output ink, make sure that your job contains the **White** ink from the **ClassicColors** ink book!

### 10.8.1. Enhanced Productivity Mode (EPM) Default Color Strategies

Enhanced Productivity Mode (EPM) is an option available on certain digital presses. It eliminates the black separation from CMYK jobs, thus printing in CMY only and increasing press production throughput.

Please see your DFE Server documentation for more information about EPM.

If your digital press supports EPM and you have a license for it on your DFE Server, you can use one of the default EPM color strategies that come with Color Pilot for color managing it.

Color Strategy Name	CMY destination profile	Press LUT emulation	Extra Output Ink
HPI-EPM-050	HplIndigoGlossEXP05_EPMv1.icc	Exp_05	White (from the <b>ClassicColors</b> ink book)
HPI-EPM-075	HplIndigoGlossEXP05_EPMv1.icc	Exp_075	White (from the <b>ClassicColors</b> ink book)
HPI-EPM-CRO	HplIndigoGlossEXP05_EPMv1.icc	Cromalin	White (from the <b>ClassicColors</b> ink book)

## 10.9. Converting Classic Strategies to Digital Printing Strategies

Classic strategies can be converted to digital printing strategies:

1. Start the conversion tool by selecting one or more classic strategies and:

- double-clicking it/them,
- right-clicking it/them and selecting **Convert to Digital Strategy**,
- going to **File > Convert to Digital Strategy**.

In the **Convert to Digital Printing Color Strategy** dialog, you can see:

- the strategies you selected,
- their names after conversion (by default, this is the classic strategy name with the suffix `_Digital` appended),
- compatibility remarks.

If you want to remove a strategy from the list, select it and click -.

2. If desired, edit the names that will be given to the digital printing strategies by either:



- double-clicking in the **Name after Conversion** column and entering the new name,
- selecting the strategy to rename and entering the new name in the **Name after Conversion** field of the **Conversion Options** tab.

**Note:** Classic strategies and digital printing strategies cannot have the same name. You should use a meaningful name as on the DFE Server side, you will only be able to see the color strategies' names (and not if they are classic strategies or digital printing strategies).

**Tip:**

To change the default suffix for all converted strategies, click the **Conversion Preferences...** button at the bottom left of the dialog and enter the new suffix in the **Suffix Name** field. Then click the **Apply to All** button.

In the **Conversion Preferences...**, you can also choose to **Keep (the original) Classic Color Strategy** or not. We recommend you keep the original strategies.

3. Review any compatibility issues  and/or remarks  in the **Compatibility** tab.  
See [Compatibility Between Classic and Digital Printing Strategies](#) on page 308 for details.
4. When you are ready to convert, click **Convert All**.

### 10.9.1. Compatibility Between Classic and Digital Printing Strategies

Some of the classic strategies features are not supported in digital printing strategies. Here is an overview of the features and how they are handled by the conversion:


Setting before conversion	Warning in the Compatibility tab	Behavior after conversion
Overrule substrate color	The classic color strategy overrules substrate color.	The converted color strategy will no longer specify its own substrate color.
Ink Refinement	Ink refinements are removed and the values are fixed to custom values.	The converted color strategy will no longer contain ink refinement. The refined values will be stored as custom values for the following inks : [ink names].
Convert process inks	The classic color strategy converts some process inks.	The device link for process inks will be recalculated. The default settings for device links are : Relative colorimetric, Closest Color, Only CMYK.
Match inks	The classic strategy uses match inks.	The converted strategy will use match solids.
Maximum coverage for saturated colors	The maximum coverage for saturated color is limited to 300%.	The maximum coverage for saturated colors will be set to 400%.
Optimized conversion for profiled inks	The classic color strategy uses an optimized conversion for profiled inks.	The converted strategy will not use an optimized curve for profiled inks.
Tuning curves	Tuning curves are switched off.	The tuning curves will be removed from the converted strategy
Illuminant	The illuminant is set to D50.	The converted strategy will use the default Illuminant : D50.
Unsupported rendering intent	The classic color strategy has a non-relative rendering intent.	The rendering intent will be set to relative colorimetric.
Unsupported Black generation	The classic color strategy uses unsupported black generation.	The following black generation settings will be used: <ul style="list-style-type: none"> <li>• ICC profiles will use B2A tables,</li> <li>• Esko CMYK destination profiles will use Single Color Black,</li> </ul>

Setting before conversion	Warning in the Compatibility tab	Behavior after conversion
		<ul style="list-style-type: none"> <li>Esko multicolor destination profiles will use Minimal Black.</li> </ul> <p>When converting a classic strategy with a black generation preset using Single Color Black or No Black Mapping, the preset will be kept as it is.</p> <p>If the preset uses another type of black generation, it will be changed to use Single Color Black, and the strategy's underlying device link will be recalculated.</p>
Constant Hue Gamut mapping	The classic color strategy uses Constant Hue gamut mapping.	The default gamut mapping (Closest Color) will be used.
Output channels for CMYK input with multicolor profiles	The classic color strategy uses an unsupported output channels setting for process inks.	The converted color strategy will use the setting Generate only CMYK.
Device Link refinement	The classic color strategy has device link refinement.	The refinement will be removed.

## 10.10. Creating an Equinox Color Strategy


If you are working with [Equinox](#) (you have a license to use the Equinox functionality), you can create an Equinox color strategy in Color Pilot.



**Note:** If you had created Equinox color strategies in a previous version of Color Engine Pilot, they will still be available in your [color database](#), and you can keep using them as before.

1. In the **Color Strategies Library**, click the  **New Equinox Color Strategy** button in the bottom tool bar.
2. In the **New Equinox Color Strategy** dialog:
  - a) Enter the **Color Strategy Name**.  
If you have set a default input and output profile [in the Preferences](#), Color Pilot suggests a default name based on those profiles' names.
  - b) Select the **Input Profile** and **Output Profile** to use in your color strategy.  
The **Output Profile** should be the [Equinox profile you made](#) for your press.  
The **Input Profile** can either be:
    - the same as the output profile (this will give you a "linear" color strategy, that you can use in many cases),

- if your files were prepared for a specific printing process, a profile representing that printing process (for example, use ISOcoated\_v2\_eci.icc if your files were prepared for an ISO standard press).


**Note:**

The default input and output profiles you selected *in the Preferences* are filled in by default here. To change them, click **Select** then select your desired profile in the pop-up that opens. You can click  to see more information about the profile you selected.

If the **Input Profile** and **Output Profile** are the same, they will be linked . If you don't want to use the same profile for both, click the link icon so it is crossed out , then select your profiles individually.

- c) Select the **Open color strategy for editing** option if you want to edit the settings in the color strategy further.
  - d) Click **OK**.
- If you have selected **Open color strategy for editing**, you can now edit other color strategy settings. See *Editing Your Equinox Color Strategy* on page 310 for details.
  - Otherwise, the color strategy is created with only your chosen input and output profiles. You can still edit it later by double-clicking it in the **Color Strategies Library**.

## 10.11. Editing Your Equinox Color Strategy

You can edit a color strategy right after creating it or afterwards. You cannot edit read-only  color strategies.

1. To open a color strategy you created previously, you can either:
  - double-click it,
  - right-click it and select **Open**.

When the color strategy is open, you can choose color management settings in four tabs:



- Input**
- Convert Process Inks**
- Convert Spot Colors**
- Output**



The **Input** and **Output** tabs contain the same settings (both input profile and output profile settings).


2. Edit the color strategy's settings by doing the following:

- a) Go to the **Input** tab if you want to change the input and/or output profile.  
See [Changing the Profiles](#) on page 311.
- b) Go to the **Convert Process Inks** tab to define settings to convert process colors.  
See [Defining CMYK Conversion Settings](#) on page 311.
- c) Go to the **Convert Spot Colors** tab to define settings to convert spot colors.  
See [Defining Spot Color Conversion Settings](#) on page 315.
- d) Go to the **Output** tab if you want to use extra output inks.  
See [Choosing the Output Separations](#) on page 329.
- e) Click **Save and Close** to go back to the **Color Strategies Library** (or **Revert** to cancel your changes).

### 10.11.1. Changing the Profiles

When editing the color strategy, you can still change the input and output profiles that you selected when creating the strategy, on the **Input** or **Output** tab.

1. If the **Input Profile** and **Output Profile** are the same, they are linked .  
If you want to only change one of them, you need to first unlink them by clicking the link icon so it is crossed out .
2. Select a new input or output profile by clicking **Select** then selecting it in the pop-up that opens (or by using the [Picker](#)).  
You can see the selected profile's channels in the table underneath.

**Tip:** You can click the  icon to see more information about the profile you selected.

### 10.11.2. Defining CMYK Conversion Settings

Depending on whether your Equinox color strategy is linear (its input and output profile are the same) or not, you will see different settings to fill in here. See:

- [When Using the Same Input and Output Profile](#) on page 311,
- [When Using Different Input and Output Profiles](#) on page 312.

#### When Using the Same Input and Output Profile

If you chose to use the same profile as both *input and output profile*, your process colors don't need to be converted.

However, if you are working with the **Equinox plug-in** for Photoshop to boost your colors (to take advantage of expanded gamut printing to get more vivid colors on press than you could get with CMYK), and you have created a **Gamut boost device link** for your press profile, you can select it here.

**Note:**

If your gamut boost device link is not available here, check that:

- You have created it for the press profile that you are using as input and output profile in your Equinox color strategy.
- Your Equinox plug-in uses the same [color database](#) as Color Pilot.

See the [Equinox documentation](#) for more information about boosting your colors and creating a device link.

### When Using Different Input and Output Profiles

If your color strategy's [input and output profile](#) are different, your process colors will typically need to be converted.

**Note:**

- When using an ICC profile as output profile, your color strategy uses that profile's B2A tag for color conversion, and the following conversion settings are not available.

We recommend you use an [Equinox profile you made for your press](#) rather than an ICC profile.

- When editing an older color strategy (made in the Classic Color Engine Pilot) that uses a device link, you will see the device link here.

You can either:

- keep using the color strategy as it is (without editing the CMYK conversion settings),
- update its CMYK conversion settings (this will delete your device link, as device links are not needed in Color Pilot).

1. If some colors from the input profile fall outside the output profile's [gamut](#), choose your preferred way to reproduce them in **Gamut Mapping**.

See [Gamut Mapping](#) on page 313 for more information.

2. Use the **Output Channels** option to define how to simulate the CMYK of the input profile using the output profile.

- Choose **Generate only CMYK** to simulate the CMYK of the input profile with CMYK only. Spot colors will still be converted using all of the available channels.

- Choose **Generate all channels** to use all of the available channels of your output profile to simulate the source CMYK (if you are using a multicolor output profile).

For example a color made of Magenta, Yellow and Black in the input profile could be reproduced by Orange and Black in the output profile.

The original colors will typically be reproduced using 3 colors (2 neighboring colors + black).

3. When reproducing the source CMYK with CMYK (using **Generate only CMYK**), choose the **Black Generation** mode to use.

Black generation determines the level of Black versus CMY used when converting colors through your color strategy.

When working with an Equinox output profile, you can choose either **Minimal Black** or **Single Color Black**.



See [Black Generation](#) on page 314 for more information about the different black generation modes.

**Note:**

If you are editing an older color strategy (made in the Classic Color Engine Pilot), it may have a black generation mode that is deprecated in Color Pilot (for example a custom preset).

You can still use that color strategy as it is, with the same functionality. However:

- if you change the black generation mode, you will not be able to go back to your old black generation mode,
- if you change the input or output profile, your black generation mode will automatically be updated and you will not be able to go back to your old black generation mode.



**Attention:** Non-linear Equinox color strategies created in Color Pilot cannot be used in older Color Engine Pilot versions, or in versions of your Esko applications older than 16.X.

**Gamut Mapping**

When using different profiles as your color strategy's input and output profiles, some colors from the input profile may fall outside the output profile's *gamut*. This means that you will not be able to reproduce them exactly as they are with your output profile.

In this case, you can choose your preferred method for reproducing those out-of-gamut colors.

- Choose **Closest Color** to map every out-of-gamut color to the closest color in the output profile's gamut.

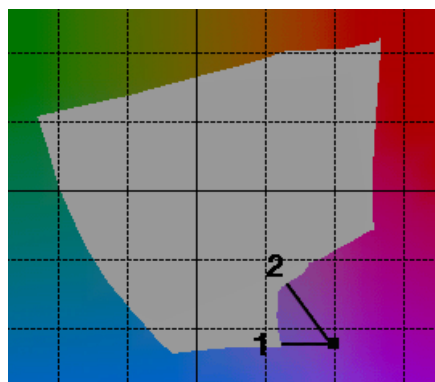
This gives you the smallest *Delta E* difference, but can in certain cases introduce hue shifts.

- Choose **Constant Hue** to map out-of-gamut colors to a color with the same hue on the border of the output profile's gamut.

This can give you a better result visually for certain colors (as there is no hue shift) but increases the Delta E.

We recommend that you use **Closest Color** in general, except if you notice hue shifts on your print (in this case you should use **Constant Hue**).

For example, the purple color in the example below falls outside the output profile's gamut (shown in gray).



- Reproducing it with the **Closest Color** method (1) causes the color to shift to a blue-ish color.
- Using the **Constant Hue** method (2) reproduces the original color as a less saturated purple, with a higher Delta E but visually closer to the original.

**Black Generation**

Depending on the characteristics of your output device, the same color can be printed with different combinations of ink percentages. For example, you may be able to reproduce a medium black spot color with either CMYK {0%, 0%, 0%, 100%} or CMYK {90%, 90%, 100%, 0%}.

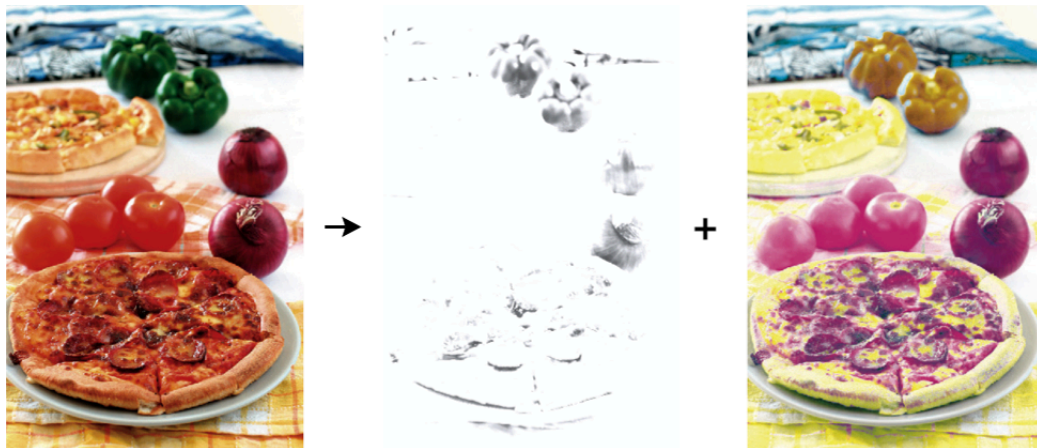
You can choose a **black generation** mode to define the level of black you want to use in those combinations of ink percentages.

Black generation determines the level of Black versus CMY used when converting colors through your color strategy.

When converting process colors, you can choose from the following black generation modes:

**Minimal Black** generates the lowest possible amount of black, so black is used only in the shadows. It is sometimes also called "skeleton black" or a "chromatic color build".

In the example below, you can see that very little black is used to reproduce the file's colors, which are made mostly of CMY.



**Note:**

We recommend that you:

- use **Minimal Black** if you are printing mostly light colors, so that there is no graininess or "peppering", for example in skin tones (as black is only used in the shadows).
- don't use **Minimal Black** if you are printing mostly dark colors, especially when printing on a substrate that can't support the large amounts of inks needed for printing dark colors with for example CMY.



**Attention:** Make sure your inks are stable when using **Minimal Black**, as a shift in your inks may cause color casts (for example if you get a new batch of Cyan ink that has much stronger pigments than the previous batch, there can be a Cyan color cast when printing with **Minimal Black**).

**Single Color Black** preserves both the black separation and the color accuracy.

- It maps the black channel of the source profile onto the black channel of the destination profile, so black objects stay only black.

- In the rest of the color space, it converts the colors as needed to preserve the color accuracy. This provides a better conversion of CMY+K overprints.

**Use B2A Tag** is only available when using an ICC destination profile. It converts your file's separations according to the information in the destination profile's B2A tag.

The B2A tag is the part of the ICC profile used to convert data from a device-independent color space into a device-dependent color space.

### 10.11.3. Defining Spot Color Conversion Settings

On the **Convert Spot Colors** tab, you define:

- general rules for converting spot colors (see [Conversion Settings](#)),
- color builds for specific spot colors (see [Color Builds](#)).

Spot colors can be PANTONE colors or custom inks.

#### Conversion Settings

On the **Conversion Settings** tab, define general rules for converting spot colors:

1. Select the **Black Generation** mode to use for spot color conversion.

Black generation determines the level of Black versus CMY used when converting colors through your color strategy.

You can choose either:

- **Minimal Black**,
- **Maximal Black**,
- **Legacy Behavior** (this is only available if you have upgraded from an older Color Engine Pilot application).

See [Black Generation](#) on page 263 for more information about the different black generation modes.

**Note:**

If you are using a multicolor ICC profile as output profile, you cannot select a black generation mode.

We recommend you use an [Equinox profile you made for your press](#) rather than a multicolor ICC profile.

2. Select the **ΔE Formula** to use to calculate how well your color strategy can simulate your spot colors.

This formula is also used to calculate how color accurate your [color builds](#) are.

By default, this is the formula defined in the [Preferences](#).

3. If you sometimes have unwanted printing effects on the press (for example with small dots of a dark ink being visible, or moiré), you can set rules to tweak how spot colors are reproduced.

Select **Stabilize Color Builds**, click **Edit Rules...**, and set rules to avoid your particular problem.

See [Avoiding Unwanted Printing Effects](#) on page 265 and [Defining Stabilizing Rules](#) on page 319 for more information.

**Note:**

When you change the **Black Generation** mode, **ΔE Formula** and/or **Stabilizing Rules**, your changes are applied to any new color build you make.

If your color strategy already contained color builds, those will not be changed, unless you chose to [recalculate](#) them using your new settings.

4. Select **Linearize Tints Using SCTV** if you are not satisfied with how your spot color gradations are reproduced by your color builds (for example the mid-tones are too light or too dark).

This uses the [Spot Color Tone Value](#) formula to calculate the tints of your color builds, and make sure that tints have an even progression throughout the color range.

**Note:** You will typically not need to use this if you have a well linearized output profile (made with good dot gain curves in the RIP).

5. Choose what to do when the **PDF Files** you are converting contain certain types of inks.

- Choose whether to **Convert Unregistered Inks** or not.

Unregistered inks are inks that are not present in your [color database](#). This means that there is no information about these inks apart from their RGB values in the input file, so they cannot be color managed accurately.

You can choose to convert them anyway, or to keep them as spot colors in the output.

- Choose whether to **Convert Opaque Inks** or not.

If you are using technical inks, white underprint or metallic inks, which are typically opaque, you can use this option to keep them as spot colors instead of converting them with your color strategy.

### Black Generation

Depending on the characteristics of your output device, the same color can be printed with different combinations of ink percentages. For example, you may be able to reproduce a medium black spot color with either CMYK {0%, 0%, 0%, 100%} or CMYK {90%, 90%, 100%, 0%}.

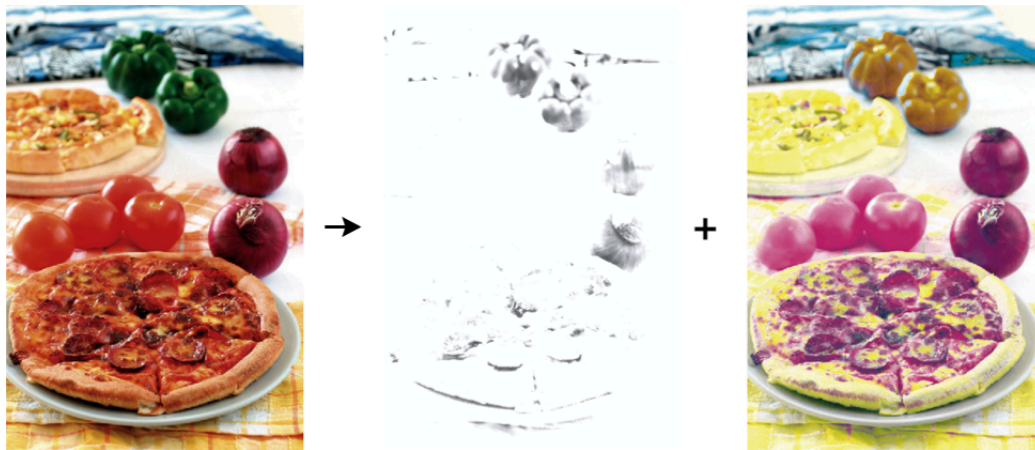
You can choose a **black generation** mode to define the level of black you want to use in those combinations of ink percentages.

Black generation determines the level of Black versus CMY used when converting colors through your color strategy.

When converting spot colors, you can choose from the following black generation modes:

**Minimal Black** generates the lowest possible amount of black, so black is used only in the shadows. It is sometimes also called "skeleton black" or a "chromatic color build".

In the example below, you can see that very little black is used to reproduce the file's colors, which are made mostly of CMY.



**Note:**

We recommend that you:

- use **Minimal Black** if you are printing mostly light colors, so that there is no graininess or "peppering", for example in skin tones (as black is only used in the shadows).
- don't use **Minimal Black** if you are printing mostly dark colors, especially when printing on a substrate that can't support the large amounts of inks needed for printing dark colors with for example CMY.



**Attention:** Make sure your inks are stable when using **Minimal Black**, as a shift in your inks may cause color casts (for example if you get a new batch of Cyan ink that has much stronger pigments than the previous batch, there can be a Cyan color cast when printing with **Minimal Black**).

**Maximal Black** generates the highest possible amount of black. More black and less of other inks are used to reproduce the file's colors. This is sometimes called an "achromatic color build".



This avoids color casts, and can help avoid the Total Area Coverage being too high.

**Legacy Behavior** attempts to balance the level of Black against CMY.

**Avoiding Unwanted Printing Effects**

**Unwanted Printing Effects**

When using CMYK or a multicolor ink set to reproduce spot colors on press, you may sometimes have unwanted printing effects, due to the way different ink angles interact with each other (moiré), but also sometimes due to specific ink percentages.

In fact, using very low or very high percentages of one of the inks can cause the resulting color to not have a smooth appearance, and even sometimes to have visible dots or visible holes.

This can be especially problematic when reproducing skin tones: using a low percentage of black in the color build can sometimes cause "peppering" of the skin tone.

**Avoiding these Effects by Stabilizing Color Builds**

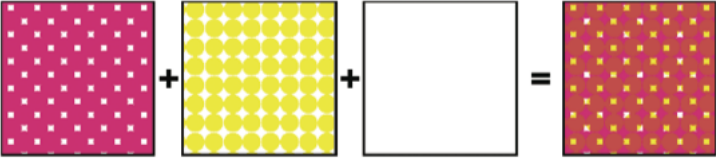
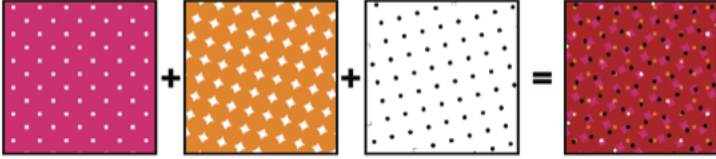
To avoid such problems, you can tweak the color builds used to reproduce spot colors, using settings to "stabilize" them. You can for example:


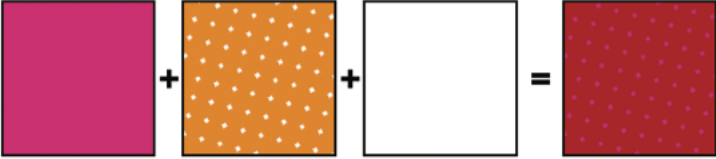
- Remove an ink with a very low percentage (close to 0%) from color builds, to avoid small dots.
- Make an ink with a very high percentage (close to 100%) solid, to avoid small holes.
- Avoid combining two particular inks, to avoid moiré.

The application then recalculates the color builds, taking those settings into account.

In the example below, you can see that while it is a lot better than printing with CMYK, the best CMYKOGV color match for the Pantone color (the color build with the lowest Delta E) doesn't give the best result on press (especially for flexo printing).

In this case, you can get a much better printed result by making the separation with the highest percentage (Magenta) solid, and eliminating the separation with the lowest percentage (Black).

Spot color to reproduce	Possible color builds
	 <p>CMYK color build (89% Magenta, 81% Yellow and 0% Black) Delta E = 10.6</p>
	 <p>Best color match with CMYKOGV (98% Magenta, 84% Orange and 3% Black)</p>

Spot color to reproduce	Possible color builds
	<p>Delta E = 2.3</p> <div style="text-align: center;">  </div> <p>Best printable match with CMYKOGV (100% Magenta, 96% Orange and 0% Black)</p> <p>Delta E = 3.1</p>

### Defining Stabilizing Rules

To avoid *unwanted printing effects* when reproducing your spot colors, you can define *stabilizing rules* for your *color builds*:

1. In the **Convert Spot Colors > Conversion Settings** tab of your color strategy:

- a) Select **Stabilize Color Builds**.
- b) Click **Edit Rules...**

You can define your stabilizing rules in the dialog that opens.

2. In **Total color difference should be less than**, set the maximum color difference (in Delta E) between the original color and the color build generated by your color strategy.

After applying all the stabilizing rules, the color difference should be less than the one you specify here.

**Note:**

If Color Pilot can't apply all of the stabilizing rules without going over the **Total color difference**, it will apply some of the rules, as long as the resulting Delta E is:

- within the **Total color difference**,
- within the **Color difference** defined for each rule applied.

3. If desired, restrict the color build to a certain number of inks (for example if you find that printing a color with too many inks causes registration problems or reduces the quality).

Select **Maximum number of inks** and specify the maximum number of inks to use in the color builds (that maximum number can be between 2 and 4).

**Note:**

When using only **2 inks**:

- You need to specify a **Delta E** tolerance.
- You can only use the **Force to solid** option, not **Drop Black** or **Drop Minimum**.

4. Select **Force to solid when** to make the separation with the highest percentage solid (100%), so as to avoid visible white dots on the print, if either:
  - The **color difference** (between the original color and the color build) after applying this option is **less than** the **Delta E** value you enter.
  - The highest **Ink value** of the color build is **higher than** the percentage you enter.

**Note:** This never makes the Black separation solid.

5. Select **Drop Black when** to set the Black separation to 0%, so as to avoid visible black dots on the print, if either:
  - The **Color difference** after applying this option is **less than** the **Delta E** value you enter.
  - The Black **Ink value** of the color build is **lower than** the percentage you enter.
6. Select **Drop Minimum when** to set the separation with the lowest percentage to 0%, so as to avoid visible small colored dots on the print, if either:
  - The **Color difference** after applying this option is **less than** the **Delta E** value you enter.
  - The lowest **Ink value** of the color build is **lower than** the percentage you enter.

**Note:** This never sets the Black separation to 0%. If you want to do that, use the **Drop Black when** option.

7. Select **Avoid combinations of Blue and Black if both inks are between** to avoid moiré effects on your print caused by the combination of Blue and Black inks (because of conflicting screen angles).

Set the percentage limits within which either Blue or Black should be removed from a color build (the color build is then recalculated to get the lowest possible Delta E without using both Blue and Black).

For example, you can set the limits to between 2% and 98% so that if a color build contains between 2% and 98% of Blue and between 2% and 98% of Black, it will be automatically recalculated and changed.



**Tip:**

You should choose the limits so that:

- If either of the inks is **outside** the limits you specified here, no conflict will occur (as there are too few or too many dots to cause a moiré effect).
- If the two inks are **between** the limits you specified, the stabilization will make sure that one of the two inks is removed from the color build.

8. Click **OK** when you are finished defining rules.

Color Pilot will check every new color build you add to your color strategy, and recalculate it according to your rules if applicable.

**Note:**

If you had already defined color builds previously, adding or changing stabilizing rules will not affect the way those color builds are converted.

However, you can recalculate them to apply your stabilizing rules. See [Recalculating Color Builds](#) on page 324.

**Note:**

These settings are applied differently to in-gamut and out-of-gamut colors.

- For in-gamut colors, the settings will only be applied if the resulting **Delta E** is under the number you specify.
- For out-of-gamut colors, the **Delta E** tolerance will be loosened gradually as the color gets away from the gamut.

When a color is very far away from the gamut, the stabilize settings will always be applied regardless of the **Delta E** tolerance (if you chose to stabilize your color builds).


## Color Builds

On the **Color Builds** tab, you can define how to convert specific spot colors, for example if:

- you use certain spot colors a lot,
- you have defined specific conversion settings for these spot colors, and you find that those settings give you a better result than applying the general color strategy settings to these spot colors.

For each spot color, you will generate a **color build** (a combination of percentages of your output inks), that will be used to print the color.

1. Add an ink to convert to the **Color Builds** list by doing one of the following:

- Typing the ink name or its abbreviation (for example `REB` for PANTONE Reflex Blue) in the **Ink** column.
- Clicking the **+** button and selecting an ink in the dialog that opens.
- Clicking the **More Actions** button  and selecting either **Add Ink by Name...** (and typing the name) or **Add Inks...** (and selecting it).
- Using the Picker.

**Note:** You can also add a whole ink book to the list (click the **More Actions** button, select **Add Ink Book...** and select the ink book).

To remove one or more inks from the list, select it/them and click - (or right-click and select **Delete**).

- By default, Color Pilot shows you how your spot color(s) will be converted to the output inks using the color strategy's regular conversion settings.

**Note:**

The output inks used to print the spot colors are the channels of the output profile, minus any output channel you disabled in the [Output tab](#).

If you have added an ink to the color builds list with the **Keep In Output** option, you can also use it in your color builds. See [Using an Extra Separation to Print Special Inks](#) on page 328 for more information.

By default, your spot colors are converted to your output inks using the [Best Match](#) option (choosing the color build with the lowest possible [Delta E](#)).

For each ink you added, you can see:

- a color patch showing the original and the converted color,
- the output ink percentages used to print the spot color,
- the **Predicted ΔE** between original and converted color.

**Note:**

- By default, any predicted Delta E value that is lower than [your chosen tolerance for Equinox strategies](#) is shown as **Less than your tolerance**.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).


- The Delta E formula used to calculate how color accurate your exceptions are is the one you selected in the [Conversion Settings tab](#) (you can see it under the color builds list).

- If you are not satisfied with the default color strategy conversion, choose how to convert each ink in the **Use** column.

- Choose **Stabilized Color Build** to apply the [stabilizing rules](#) you defined to the color build used to convert the spot color.

If inks that would have otherwise been converted using [Best Match](#) fall within the conditions of any stabilizing rule you defined, their color builds will automatically be changed to stabilized color builds, and they will show **Stabilized Color Build** in the **Use** column.

For example:

- When converting  PANTONE 7731 C to CMYK0GB with the **Best Match** option in your color strategy, you get a color build using 4 output inks (0.6% Cyan, 26.8% Yellow, 39.6% Black and 72.9% Green).

- In your stabilizing rules, you have defined that a color build can have a maximum of 3 inks.
- When stabilizing the color build for PANTONE 7731 C, you get a new color build using 3 output inks (26.5% Yellow, 39.6% Black and 73.1% Green).

**Note:**

- Inks that you have chosen to *Keep In Output* or convert using *Custom Values* will never be stabilized.
- You can still change a **Stabilized Color Build** to any of the other options of the **Use** column.

If you had already defined your color builds and you add or change stabilizing rules afterwards, the color builds will not be automatically changed.

However, for color builds set to use **Best Match** that could now be stabilized, the **Stabilized Color Build** option is available in the **Use** column, so you can apply stabilization manually.

You can also recalculate all color builds, so that the ones that could now be stabilized, will be. See *Recalculating Color Builds* on page 324.

- Choose **Custom Values** to change the color build used to print the spot color. When you select this, you can edit the ink percentages manually.

**Tip:**

Do this if you already know the exact percentages you want to use.

If you don't, but want to tweak the conversion values manually, we recommend you use the *Quick Refine tool* instead, as you will see the result of your changes against both the target spot color and the previous conversion values (visually and using Lab/LCh values).

- Choose **Keep In Output** to not convert this ink and use it as an extra separation in the output.

**Note:**

When you add an ink to the **Extra Output Inks** list in the *Output tab*, it is automatically added here with the **Keep In Output** conversion option.

When you add an ink here with the **Keep In Output** option, it is also added as an **Extra Output Inks** on the **Output** tab.

- Choose **Best Match** to use the color build with the lowest possible delta E.

**Note:** This is the default option and does not change the color build used to print the spot color.


The color patch of the converted color, the **Conversion Values** and the **Predicted ΔE** are updated automatically to reflect your changes.

**Tip:** You can also refine the way certain spot colors are printed. See *Tweaking Your Conversion Values Manually* on page 324.

### Recalculating Color Builds

The *color builds* you defined are kept intact, even if you make further changes to the color strategy. However you can recalculate them if needed. This is useful for example after you *changed the output inks*, or the *general conversion settings*.

To recalculate color builds, you can either:

- Select the color build(s) to recalculate, right-click and select **Recalculate Conversion Values**. This recalculates all selected color builds (except those set to **Keep In Output**), and sets them to **Use** the **Best Match** conversion option. You can still choose another option for individual color builds.
- Click the **More Actions** button , select **Recalculate** then select either:
  - **All 'Best Match' and 'Stabilized' Color Builds** to recalculate all color builds using the **Best Match** or **Stabilized Color Build** option.
  - **All Color Builds with Conversion Values** to recalculate all color builds in your color strategy (except those set to **Keep In Output**).

**Note:**


- If you change the output profile to a profile with more channels, or if you (re)enable channels in the output profile, you will be asked if you want to **Recalculate** the color builds, as some color builds could use the extra channels. This recalculates all color builds with conversion values (not those set to **Keep In Output**).  
If you choose **Don't Recalculate**, the color builds will still use the previous ink set (with fewer channels).
- If you change the output profile to a profile with the same channels, you will also be asked if you want to **Recalculate** the color builds (as the output color space will be somewhat different).
- If you change the output profile to a profile with fewer channels, or if you disable channels in the output profile, color builds must be recalculated as some of them may use the channel(s) that are not available anymore. Click **Continue** to recalculate the color builds automatically.  
If you click **Cancel**, your changes to the profile or output channels will be reverted.

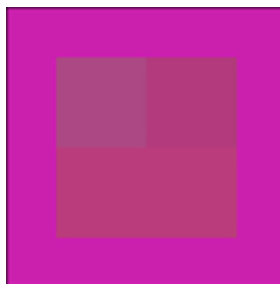
### Tweaking Your Conversion Values Manually

If you want to manually edit the conversion values for a spot color, while seeing the result of your changes against both the target spot color and the previous conversion values, you can use the **Quick Refine** tool.



**Attention:** Make sure that your monitor is calibrated before refining spot colors manually. However, please be aware that viewing an ink on a screen can never be completely color accurate.

1. Select the spot color(s) you would like to refine in your **Color Builds** list, then click the **More Actions** button  and select **Quick Refine...**
2. In the **Refine Spot Colors** dialog that opens, select the spot color you want to refine first.  
At left, you can see a preview showing:



- the  **Spot Color** to convert,
- the  **Best Match** color build (the color build with the lowest possible delta E),
- the  **Previous** color build saved in your color strategy (depending on what you have set in the [Color Builds](#) list, this can be the **Best Match**, a **Stabilized Color Build**, **Custom Values...**).
- the  **New** color build after refining it (before you start refining, it also shows the **Previous** color build values).

Under the preview, you can see the output values of those color builds, the **Predicted  $\Delta E$**  differences with the original color, and the [Lab/LCh values](#) of the original spot color and the different color builds.

**Note:**


- The [Delta E](#) is calculated using the [Delta E formula of your color strategy](#).
- By default, any predicted [Delta E](#) value that is lower than [your chosen tolerance for Equinox strategies](#) is shown as **Less than your tolerance**.  
This is because very low theoretical Delta E values may not be achievable in a real life setup (due to press instability and/or imperfections in the profile).  
However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).

3. Enter your desired values in the **New** row (or use the arrows next to the value you're editing).  
When you change a value, Color Pilot recalculates the other values in the color build to give the best Delta E possible with your custom value.  
It also locks the value(s) you have edited, so that if you change more values, it only recalculates the values that you didn't edit.  
You can also **Lock** more values, or **All** values if you wish.
4. If you are not satisfied with the result, you can revert your changes. You can either:
  - **Reset to Best Match.**
  - **Reset to Stabilized and Lock** (this is only available if the color build was stabilized).
  - **Reset to Previous.**
5. Do this for every color build that you want to refine.

6. When you are satisfied with the result, click **OK**.  
The new color builds are saved in your color strategy with the **Custom Values** option.

### Exporting Your Color Strategy Data to CSV

If desired, you can export your color strategy's information to a CSV (comma separated values) file, compatible with Microsoft Excel. This can be useful if your workflow is integrated with a third-party MIS system, and you want to use information about color conversion in this system.

1. Click the **More Actions** button  and select **Export to CSV...**
2. In the dialog that opens, choose where to save your CSV file and what to call it (by default, it takes the name of the color strategy), then click **Save**.

The CSV file contains:


- the color strategy name,
- the Delta E formula used,
- the output profile used,
- all the color builds defined in the strategy and how the strategy handles them (for example *Best Match*, *Stabilized Color Build*, *Keep in Output...*), including their Lab and output color space conversion values, and the Delta E if applicable.

### Exporting Your Color Builds

In some very specific cases, you may want to export the color builds you created for your Equinox color strategy in Color Pilot, and import them into an older Color Engine Pilot version.


**Note:** If you are using the same *color database* for Color Pilot and your classic Color Engine Pilot, this is not necessary as you will be able to access the same data from both applications.

You can do this using the CGATS format (a color measurement format from the Committee for Graphic Arts Technologies Standards), as explained below:

- To export your color builds from Color Pilot:
  - a) At the bottom of your Equinox color strategy's *color builds* list, click the **More Actions** button  and select **Export to CGATS...**
  - b) In the dialog that opens, choose where to save your CGATS file and what to call it (by default, it takes the name of the color strategy), then click **Save**.
- To import your color builds into your classic Color Engine Pilot application:
  - a) Open the color strategy you want to add your color builds to, and go to **Settings for Spot Color Linework...**



**Attention:** Make sure this color strategy has the same output ink set as the color strategy you exported the exceptions from!

- b) Click the **More Actions** button  above the **Color Builds** table and select **Import Color Builds...**
- c) Browse to the CGATS file you saved (make sure to view **All files (\*.\*)** in the browser dialog) and click **Open**.
- d) In the dialog that opens, choose how to handle the inks for which you are adding color builds:
  - Choose what **Ink Book(s)** they should be in: either the ink books mentioned in the CGATS file (the ink books they belonged to in your Color Pilot's color database), or an ink book that you select here.

- Choose what to do if an ink is not found in your chosen ink book (in your classic Color Engine Pilot's color database). Either:

**Add it to the ink book**

**Search for it in other ink books**

**Don't add the ink to the exceptions list**

**Note:** If one of the inks already had a color build in your classic Color Engine Pilot's color strategy, it will not be imported. If you want to import it, delete the original color build and import the CGATS file again.

All color builds you imported are set to **Custom Values** in your color strategy (except for inks that were set to **Keep in Output**).

### Adding Color Builds to an Ink Book

Once your *color builds* are exactly how you want them to be, you can add them to an ink book if desired.

**Tip:**

You can do this to create a "dependent standard", for example an ink book describing how the PANTONE Solid Coated inks print on your Equinox press.

You can then use that dependent standard in your proofing setup, by creating a *proofing color strategy* that *maps inks* from the PANTONE Solid Coated book to your dependant standard book.

This ensures that your proofing setup handles your spot colors similarly to your Equinox press.

- Select your desired color build(s) in the *Color Builds* list, then click the **More Actions** button  and select **Add Color Builds to Ink Book...**

You can also right-click your color build (or selection of color builds) and select **Add Color Builds to Ink Book...**


**Note:**

You can only add color builds with output values (not **Keep in Output** color builds) to an ink book.

You cannot add color builds made for *PantoneLIVE inks* to an ink book.

- In the dialog that opens, choose whether to add your color build(s) to **an existing ink book** or to a **new ink book**.

- If you are adding them to an existing ink book, select that ink book in the list or use the **Search** field to find it.

You cannot add color builds to a read-only  ink book.

**Note:** In case your ink book already contains inks with the same name, choose whether you want to **Overwrite Existing Inks** or not.

- If you are adding them to a new ink book, enter the name you want to give your new ink book.

As you type, you will see other ink book names containing the same letters, to help you avoid choosing a duplicate name.

**Note:** Depending on what you selected in the [Preferences](#), your new ink book will have either the [legacy format](#) or the [new format](#).

**3.** Your color builds are saved to your ink book with:

- the same name as the original spot colors,
- Lab or spectral values corresponding to the output values of your color build (spectral values if the output profile is spectral, Lab values if the output profile is XYZ - see [Spectral and XYZ Profiles](#) on page 141 for more information),
- the [measurement condition](#) used to measure your strategy's output profile (if you are saving the ink to a [new format ink book](#)).

**Using an Extra Separation to Print Special Inks**


You can use an extra separation on press to help you print special inks more accurately, using custom percentages to get the perfect color.

For example, you can use a percentage of a white ink to create special effects on a transparent substrate, add a white underprint under a specific spot color, or use metallic colors.

- To print the white separation in your files as white underprint, you need to set your color strategy to output is as it is (without color management), by either:
  - adding it as an [extra output ink](#),
  - adding it as a [color build](#) with the **Keep In Output** option.

**Note:** Make sure to use the same ink and ink book names as in your files.

Your white separation will then be printed using only the white ink on your press.

- If you want to use custom percentages of a special ink:
  - a) In the [color builds list](#), add the ink you want to use as extra separation with the **Keep In Output** option.  
If you added it as extra output ink in the [Output tab](#), this is already done automatically.
  - b) Click the **More Actions** button  and select **Columns** then the extra separation's name.  
This adds the extra separation to the available output separations (you will see an extra column for this separation). At this point, all color builds will have 0 . 0% of this separation.
  - c) For the inks you want to print using this separation, select the **Custom Values** option and enter your desired percentages manually.

**Note:** The exceptions list does not show a Delta E value for color builds using a percentage of the extra separation, as it is not possible to accurately predict the color difference in this case.

For example, you can add silver as an extra separation, then print a gold ink using percentages of silver and yellow.



**Note:** The extra separation can also be used as part of the color build when *tweaking the conversion values*.

## 10.11.4. Choosing the Output Separations

If desired, you can change the output inks by disabling some of the output profile's channels and/or adding extra output inks.

Extra output inks are special inks you can use on press (for example white, metallics or varnish). Add them here if you work with print jobs containing them.

**Important:** Remember to use the correct **Name** and **Ink Book**. For example, for **White (ClassicColors)** to be correctly interpreted you have to make sure to use **White (ClassicColors)** in both the color strategy and your production jobs.

1. To disable some of the profile's output channels:
  - a) Click **Select Output Channels**.
  - b) In the **Select Output Channels** dialog, deselect the output channels you don't want to use (they are all selected by default).

**Note:** You can disable one or more of the *expanded gamut inks*, but not your CMYK inks.

- c) Click **OK**.

**Note:**

If you have *color builds* that include a percentage of the ink you disabled, you will see a warning that color builds that contain that ink will be recalculated. Click **Continue**.

If you select that ink again, you will be asked if you want to recalculate the conversion values for those color builds.

The channels you deselected are greyed out in the table.

They will not be used to calculate *spot color conversion values*. For example, if you are using a **CMYKOV** profile and deselected **Violet** here, then spot colors will be converted to a mix of C, M, Y, K and Orange.

They will also not be taken into account when you are *checking if the colors are in gamut*.

2. To add some **Extra Output Inks**:
  - a) Click **+** under the **Extra Output Inks** table.
  - b) In the dialog that opens, select the ink to add.

**Tip:** You can also use the **Search** field.

- c) Click **Select**.

The ink is added to the **Extra Output Inks** table. Repeat this if you want to add more extra output inks.

**Tip:** Alternatively, you can also click **Show Picker** and drag extra output inks from the Picker to the **Extra Output Inks** table.

The extra output inks you add here will automatically be added as **Keep in Output** *color builds* on the **Convert Spot Colors** tab. This means that they will not be converted to the channels of the output profile.

They can also be *used as extra separations* in other color builds (that will be printed using percentages of the regular output inks and of your extra output inks).

## 10.12. Importing a Color Strategy

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You can import color strategies that have previously been *exported* as a File Packer archive (.fp file) by your or another Color Pilot/Color Engine Pilot application.

You can also import color strategies from zip files (regardless of the zip file extension) containing multiple .fp archives. In this case, individual .fp archives will be extracted from the zip file automatically.

The file you import contains all of the settings used in the color strategy (profiles, ink mappings, dot gain curves...).

### Note:

- You can also import File Packer archives containing other kinds of color settings (for example if you have exported your whole Color Pilot library).
- If you import a Classic color strategy (created in Color Engine Pilot 14.X, 12.X, or earlier versions), you will need to convert it to a Digital Printing color strategy before you can edit it. The application will propose this automatically.
- If you import a read-only color strategy, you will not be able to rename it, and it will overwrite any existing color strategy with the same name.

### 1. Either:

- Choose **File > Import...**
- Press **Ctrl+Alt+I**.
- Right-click in the main pane (in the **Color Strategies** library) and select **Import...**

### 2. Browse to the file and click **Open**.

You can select more than one color strategy archive using the **Shift** key, or select all color strategy archives using **Ctrl+A** (if the location you browsed to only contains archives).

### Tip:

If you have the location of the color strategy file(s) already open, you can also:

- Drag the color strategy file(s) onto the Color Pilot shortcut on the desktop.
- Drag the color strategy file(s) into the Color Pilot application window.

### 3. In the **Import** dialog that opens, you will see that the color strategies have the state *Ready for import*.

You can see the selected color strategies' content on the **Details** tab at the bottom of the **Import** dialog. A color strategy can contain profiles, inks, dot gain curves...

If an item contained in the color strategy is already in the color database, you will see the message `Already exists in database` next to the item in the details tab, and the item will not be imported.

**Note:** If you import a digital printing color strategy that contains a [black generation preset](#) with the same name as one in your database, but the presets are actually different, your imported color strategy will keep the settings of its original preset, but they will be marked as **Custom Values** instead of the preset name.

**Tip:** You can add or remove color strategies to import using the **+** or **-** buttons. You can also add other `.fp` file(s) to import, for example ink book archives.

4. If desired, you can rename the color strategies by clicking in the **Import as** column and entering a new name.

**Note:** If a color strategy with the same name already exists in the color database, the default name of the imported strategy will be `[color strategy name]_(2)`.

5. Import the color strategies by either:

- Selecting the color strategy or strategies to import (using **Shift** to select several strategies) and clicking **Import Selection** at the bottom right.
- Clicking **Import All** to import all color strategies in the dialog.

You will see a progress bar, and import details in the **Logging** tab at the bottom of the dialog.

Once the color strategies are imported, they will have the `Imported` state. You can then **Close** the **Import** dialog.

6. If you have imported one or more classic strategies, the **Convert to Digital Printing Color Strategy** dialog will open automatically. Use it to convert your classic strategies to digital printing strategies (see [Converting Classic Strategies to Digital Printing Strategies](#) on page 307 for details).

**Note:** However, if you have imported an entire Library archive (see [Exporting the Library](#) on page 39) containing one or more classic strategies, you will be asked first if you wish to convert.

## 10.13. Exporting Color Strategies

You can export a single color strategy or multiple color strategies. Each exported color strategy contains all the settings used in the color strategy (profiles, ink mappings, dot gain curves, etc.).

You can export read-only color strategies as well.



**Attention:** You can export any [kind of color strategy](#), but if you are also working with the Classic Color Engine Pilot, you will only be able to import Classic color strategies into it.

**Note:**

You can also:

- export a color strategy's general information and *exceptions values* to a comma separated values file (compatible with Microsoft Excel), for example to provide color conversion information to a third-party MIS system (see *Exporting Your Color Strategy Data to CSV* on page 290),
- export a color strategy's exception values only, for example if you have automatically refined spot color conversions in a digital printing color strategy and want to import them into a classic color strategy (see *Exporting Your Exceptions* on page 290).

### 10.13.1. Exporting a Single Color Strategy

1. In the **Color Strategies Library**, click the color strategy to export and select **File > Export (Ctrl+Alt+E)** on the main menu, or right-click the color strategy to export and select **Export...**
2. In the **Export As** dialog that opens, browse to a location, enter an appropriate file name, and click **Save**.  
The color strategy is exported in the File Packer (.fp) format.

### 10.13.2. Exporting Multiple Color Strategies

1. In the **Color Strategies Library**, select the color strategies to export.

**Tip:**

To select a consecutive group of color strategies, click the first color strategy, press and hold down the **Shift** key, and then click the last color strategy.

To select non-consecutive color strategies, press and hold down the **Ctrl** key, and then click each color strategy that you want to select.

To select all color strategies, press **Ctrl+A**.

2. Go to **File > Export (Ctrl+Alt+E)**, or right-click the color strategies to export and select **Export...**
3. In the **Export** dialog that opens, choose how you want to export your color strategies:
  - a) **Browse...** to your desired location.
  - b) Choose whether to **Export as one single archive** or not.
    - If you are exporting to a single archive, enter the **File Name** to use (or use the default *Archive.fp*).
    - If you are exporting the color strategies individually, they will be exported under their own name by default. You can rename them by double-clicking in the **Export As** column.  
You can also **Remove** color strategies from the list before exporting.
4. Click **Export** when you are done.  
The color strategies are exported in the File Packer (.fp) format.

## 10.14. Previewing a Color Strategy's Conversion

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If you have set this in the [Preferences](#), you can use an additional tool to preview how a color strategy will convert your colors.

You can use it with [any kind of color strategy](#), and it takes into account of all your color strategy settings ([exceptions](#), [stabilizing rules](#), etc.).

**Note:** This is an advanced tool used mostly for troubleshooting purposes. You typically only need to use it in specific cases, when your Esko Customer Support contact instructs you to do so.

1. In the **Color Strategies Library**, select your color strategy and click the **View Strategy**  button in the bottom tool bar.

**Note:** This button is only visible if you have selected **Strategy and Ink Limitation Viewer** in the [Preferences](#).

You can also drag-and-drop your desired strategy onto the **View Strategy**  button.

If you click this button without having selected a strategy (or with multiple strategies selected), you will see a dialog in which you can select a (single) strategy to view. You can filter the strategies list on **Recently Used** strategies, or **Search** on strategy name.

2. On the **View '[Strategy Name]'** screen, you can see how your color strategy would convert a specific color, or a gradient of your input inks.

See:


- [Previewing a Color Conversion](#) on page 333
- [Previewing a Gradient Conversion](#) on page 334


### 10.14.1. Previewing a Color Conversion



To preview how your selected color strategy will convert a specific color in the **View Strategy** tool, do the following:

1. Choose to **Convert a Single Color**.
2. In the **Input** table, you can see the inks used in the color strategy's input profile.

You can either:

- Define what percentages of the input profile's ink make up the color you want to convert (click a percentage to edit it).
- Add  a spot color you want to convert (you can also drag one from the [Picker](#)).
- Define a color made of percentages of your input inks and of one or more spot colors.

You can remove  spot colors you have added but not input profile inks (except in proofing color strategies).

**Note:** When working with a proofing color strategy, you can also reorder the input profile inks and any spot color(s) you added using arrows  .

3. In the **Output** table, you can see how your color will be converted (what percentages of the output profile inks will be used to print it).
4. In the area underneath, you can compare your original color and how it will be reproduced through your color strategy.
  - a) Select the **Delta E Formula** to use when calculating the color difference.  
By default, Color Pilot uses the Delta E formula you set in the [Preferences](#).
  - b) You can see the original and converted color patches and their **Lab/LCh** values side by side, and the **Delta E** difference between the two.

**Note:**

In some cases, Color Pilot cannot calculate a Delta E value (and the Lab/LCh values are approximated). This is the case when:

- your color contains percentages of both the input profile inks and spot colors,
- there are [extra output inks](#) added to your output profile,
- your color contains a percentage of a [refined spot color](#),
- the converted color uses a double strike (more than 100% of one of the output inks).

- c) If your input and output profile were made using different substrates, choose whether you want to simulate the source substrate when calculating the converted color.
  - Select **Show Background** to simulate the source substrate (using the absolute colorimetric rendering intent).
  - Deselect it to ignore the substrate differences (using a relative colorimetric rendering intent).

By default, this reflects the rendering intent you have set in your color strategy. See [Rendering Intent](#) on page 225 for more information.

### 10.14.2. Previewing a Gradient Conversion

You can also preview how your selected color strategy will convert a gradient of your input inks (to troubleshoot any banding or inversion issues you may have).

You can also use this to test how your gradients will be converted with different [black generation](#) options in your color strategy.



1. In **Convert**, choose **Section**.
2. Under the **Input** table, select the inks you want to use in your gradient in the **Ink 1** and **Ink 2** lists.

You will see a combination of 0% to 100% of both inks (including overprints).



You can also add percentages of other inks (your input profile inks and/or additional spot colors) to add a flat color under your gradient.



**Note:** When working with a proofing color strategy, you can reorder the inks making up your flat color using arrows  .

Use the check boxes in the **Output** list to show or hide certain inks in the preview (this is only for preview purposes and doesn't affect the color statistics).

3. You can hover on a point of the preview to see more information under the **Input** and **Output** tables:
  - color patches showing the original and the converted colors,
  - those color's **Lab/LCh** values,
  - the **Delta E** difference between the two (select the **Delta E Formula** to use, or leave the default one taken from the [Preferences](#)).

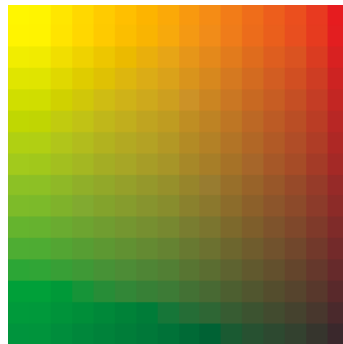
If your input and output profile were made using different substrates, choose whether you want to simulate the source substrate when calculating the converted colors.

- Select **Show Background** to simulate the source substrate (using the absolute colorimetric rendering intent).
- Deselect it to ignore the substrate differences (using a relative colorimetric rendering intent).

By default, this reflects the rendering intent you have set in your color strategy. See [Rendering Intent](#) on page 225 for more information.

4. If desired, you can inspect the conversion in more detail using the options under the preview area.

a) Choose to use a **Low** or **High Resolution** for the preview.




Low resolution



High resolution

b) Choose to **Show** either:

- the **Input** gradient,
- that gradient converted to the **Output** profile,
- both **Input And Output** at low resolution (if there is a color difference between input and output you will see split patches ,
- the **Delta E** between input and output (see [more details](#) below),
- a specific **Separation** of your gradient (see [more details](#) below).

c) If you are working with very bright out of gamut colors (that cannot be displayed by your monitor), select **Desaturate display** to make all the colors darker, so you can more easily check the transition to those out of gamut colors.

d) When viewing the **Delta E** between input and output, you can also:

- See the Delta E values of the gradient as a **Color Map**. You can choose to display it:

**White to Black** (where white is the lowest Delta E and black the highest),

**White to Red,**

**Black to White,**

**Black to Red,**

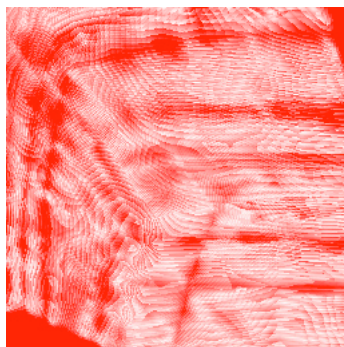
as a **Rainbow** gradation (where the lowest to highest Delta E areas are indicated in the following order: black, blue, green, red, white).

- Adjust the **Scale** slider to highlight different levels of Delta E.

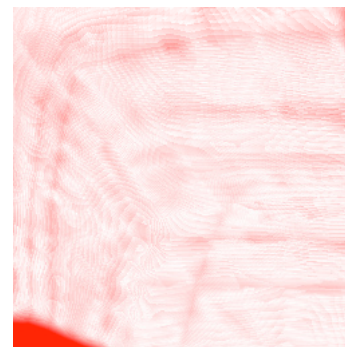
The **Maximum** number you pick on the scale (and any Delta E value above that) is shown with the "highest Delta E" color.

For example the color map will look different if you choose a maximum Delta of 0.5 or 2 (shown below from **White to Red**).



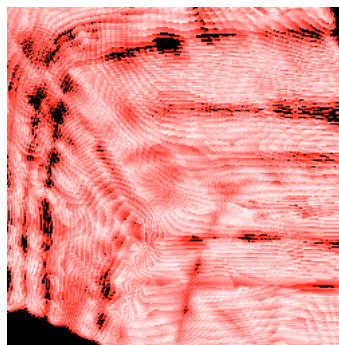


Maximum Delta E = 0.5



Maximum Delta E = 2

- Select **Highlight values above maximum** to show the areas with a Delta E above your selected maximum value in a different color (for example black in a **White to Red** color map).



e) When viewing a **Separation**:

- Choose the **Separation** to view.
- Choose what kind of **Color Map** to use to display it:
  - White to Black,**
  - White to Red,**
  - Black to White,**
  - Black to Red,**
  - Rainbow.**

For example, you can view a Cyan separation as a **White to Red** map (where red is where the most Cyan is).



- Adjust the **Scale** slider to highlight different levels of your selected separation.  
 The **Maximum** percentage you pick on the scale (and any percentage above that) is shown with the "highest" color.  
 For example the color map will look different if you choose to highlight anything above 5% Cyan or anything above 50% Cyan.



5% Cyan and above




50% Cyan and above

- Select **Highlight values above maximum** to show the areas above your selected maximum percentage in a different color.



## 10.15. Check Gamut

The **Check Gamut** tool  is available in the bottom tool bar of the **Ink Books** and **Color Strategies** libraries.

You can use it to:

- check how inks will be converted by a color strategy, and if the resulting output coordinates fall within the strategy's output profile.

This will help you judge whether a spot color will be accurately reproduced on your digital press or proofer.


- compare the *gamuts* of a color strategy's input and output profiles, to see whether all colors in the input profile can be matched by the output profile.

1. Open the ink(s) and the color strategy you want to work with in the **Check Gamut** tool.

To do this, you can start either from the **Ink Books** library or the **Color Strategies** library:

If you are starting from...	do the following...
<p><b>the Ink Books library</b></p>	<ol style="list-style-type: none"> <li>1. Select the ink(s) or whole ink book to check.</li> <li>2. Click the <b>Check Gamut</b> tool in the bottom tool bar (or right-click the ink(s)/ink book and select <b>Gamut Check</b>).</li> <li>3. In the dialog that opens, select the color strategy or strategies to check the inks against and click <b>Select</b>.</li> </ol>
<p><b>the Color Strategies library</b></p>	<ol style="list-style-type: none"> <li>1. Select one or more color strategies to use for the check.</li> <li>2. Click the <b>Check Gamut</b> tool in the bottom tool bar (or right-click the color strategy/strategies and select <b>Gamut Check</b>).</li> <li>3. Click the <b>+</b> button at the bottom of the <b>Conversion Table</b>, select the ink(s) to check and click <b>Add</b>.</li> </ol>


This opens the **Gamut Check** dialog.

2. Check how each ink will be converted by the color strategy (see [Checking the Spot Color Conversion](#) on page 133 for details).
3. Check where the inks are in the gamut (see [Checking if the Colors are in Gamut](#) on page 134 for details).
4. Change the ink list if desired (for example to add inks from a different ink book). You can:
  - click **+** to add one or more ink(s) to check (use **Shift** or **Ctrl** to select several inks),
  - drag and drop one or more inks from the Picker,
  - click the **More Actions** button  and select **Add all Inks from an Ink Book** then select the ink book,

- click the **More Actions** button and select **Add Inks from a PDF file...**, then browse to the (Normalized or regular) PDF, remove any inks you don't want to add and click **OK**,

**Note:**

Inks that are not present in your ink books library will appear as **<unregistered>**. This does not affect the gamut check if the PDF file contains color information for these inks.

If it doesn't, you will see a missing ink icon . You will not be able to check such inks against your color strategy/strategies.

- select an ink and click - to remove it (if you have many inks, you can use the **Search** field to find it),
- click the **More Actions** button and select **Clear All Inks** to remove them all.

**5.** If desired, you can add more strategies to check your inks against by either:

- clicking the + button at the bottom of the **Strategies** list and choosing one or more strategies in the dialog that opens (use **Shift** or **Ctrl** to select several strategies),
- clicking the **More Actions** button, selecting **Add all strategies that have a certain destination profile...** then selecting the relevant output profile in the dialog that opens. You will see the names of the color strategies with that profile in a pop-up, click **OK** to confirm.

This is useful for example if you have created several strategies from a single press or proofer profile but using different ink sets (with some strategies having some output profile inks switched off).

To remove color strategies from the list, either select them and click -, or click the **More Actions** button and select **Clear all strategies in the list**.

See [Checking if the Colors are in Gamut](#) on page 134 for how to check where inks fall in the different strategies' output profiles.

To help you choose the best strategy for your inks, you find extra information in the **Best Strategy** and **Separations** columns:


- The number in the **Separations** column shows how many separations from the strategy are used to print all the inks in the conversion table.
- In the **Best Strategy** column, you will find a mark next to the strategy that best fits your inks. To calculate which is the best strategy, strategies are compared as follows:
  - If there are strategies for which all inks are in gamut, the strategy with the lowest number of inks is selected.
  - If there are no strategies for which all inks are in gamut, the list is searched for a strategy that has the lowest number of inks, but without a significant increase in Delta E for any ink.

**6.** You can also save a report if you want to share the results of the gamut check with colleagues that don't have access to a Color Pilot application.

For example, you can send the report to your commercial colleagues so they can check:

- which spot colors can be reproduced accurately on your device(s),
- which ink set needs to be used to reproduce certain spot colors.

To save a report:

- a) Click the More Actions  button and select **Save Report...**

- b) Choose the name and location of the report file.  
It is saved as a text file.
7. Click **Done** when you are finished checking.

### 10.15.1. Checking the Spot Color Conversion

In the **Gamut Check** view, you can check how each ink will be converted by your color strategy (if you have many inks, use the **Search** field to find a specific one).

If you selected several color strategies, highlight the one you want to see conversion details for in the **Strategies** list.

In the **Conversion Table**, you can see:

1. Color patches (next to each ink name) showing the difference between the original and the converted color visually.

**Tip:** Select an ink to view a bigger version of its color patches in the **Color Info** area at the bottom left. This also shows the Lab and LCh values of both original and converted color.

2. How each ink will be reproduced using percentages of the output inks.
3. Whether the ink is in the color strategy (as an exception/color build) or not.

For more information, see:

- [exceptions in proofing color strategies](#)
- [exceptions in digital printing color strategies](#)
- [color builds in Equinox color strategies](#)

4. The color difference between the original and the converted color (**Predicted  $\Delta E$** ).

The higher the *Delta E*, the further out of *gamut* the color is.

**Note:**

- This is calculated using the  **$\Delta E$  Formula** of the color strategy you selected (you can see this formula under the **Conversion Table**).

If you have several color strategies using different Delta E formulas in the **Strategies** list, you will see a warning icon ⚠, and the conversion table will use the Delta E formula of the first strategy you added.

- If you have refined a spot color by measuring color values, you will see the **Measured  $\Delta E$**  instead of a **Predicted  $\Delta E$** .

- a) If desired, you can adjust the Delta E **Tolerance** to use (above the **Conversion Table**).

This is the color difference under which you consider colors to be "on target" (meaning that they can be reproduced accurately).

**Note:**

By default, this is the Delta E tolerance you have set in the Preferences for the type of color strategy you are using. See:

- [Delta E tolerance for proofing color strategies](#)
- [Delta E tolerance for digital printing color strategies](#)
- [Delta E tolerance for Equinox color strategies](#)

- Predicted Delta E values lower than your tolerance are shown as *Less than* the tolerance. This is because very low theoretical Delta E values may not be achievable in a real life setup (due to device instability and/or imperfections in the color strategy's output profile).
- Predicted Delta E values higher than your tolerance will have a warning icon ⚠.

**Note:**

You will see a warning icon but no Delta E (as we can no longer calculate nor guarantee the color accuracy) for inks that:

- have been refined or stabilized in the color strategy,
- use a double strike (with the **Custom values** option in the color strategy's exceptions list),
- are extra output inks (they have the **Keep in Output** option in the color strategy's exceptions list),
- will not be output (they have the **Do Not Print/Do Not Proof** option in the exceptions list).

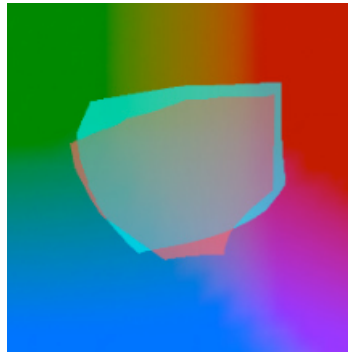
You can hover on the warning icon for more information.

- b) You can click the **Predicted  $\Delta E$**  column to sort the inks by increasing or decreasing Delta E.
- c) In the **Strategies** list at the top of the window, you can see the percentage of **Inks within tolerance**, and the **Average** and **Maximum  $\Delta E$** .

## 10.15.2. Checking if the Colors are in Gamut

On the left of the **Gamut Check** dialog, you can see a *gamut* plane. The gamut plane is a 2D section of the Lab color space at a certain lightness or hue. On this gamut plane you can see a 2D section of the color strategy's source and destination profiles' gamuts.

If both source and destination profiles are identical, you will see one profile area in the gamut plane. If they are not, you will see two profile areas partially overlapping.



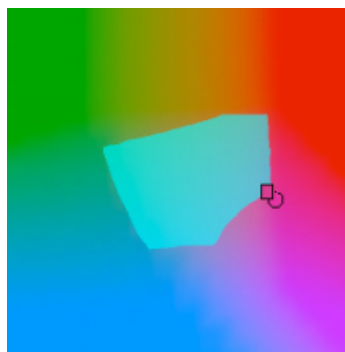
1. You can check how much of the source profile's gamut is covered by the destination profile. If the source profile's area is completely enclosed in the destination profile's area, then all colors of the source profile can be reproduced by the device corresponding to the destination profile.
2. To change the gamut plane (and the corresponding 2D section of the profiles) displayed, do the following:
  - To show a gamut plane at a certain hue, click the **lightness** link to change it to **hue**, then enter a hue value in the numeric field or use the vertical slider (the arrow on the slider shows the current position).
  - To show a gamut plane at a certain lightness, click the **hue** link to change it to **lightness**, then enter a hue value in the numeric field or use the vertical slider.

The default gamut plane has a lightness of 43.

**Tip:** You can hide the source profile's area by deselecting the **Source Profile** option at the top (or hide the destination profile's area by deselecting **Destination Profile**).

3. You can also select spot colors in the **Conversion Table** to see where they fall relative to the destination profile's gamut.

For example, the original color below (shown by a circle) falls outside the gamut, but the converted color (shown by a square) is just in the gamut.



You can also see where the converted color is in the lightness or hue range on the slider.

**Tip:**

- Click the **Options** link and then **Show labels** to show a name label for each original color.
- Drag and drop the divider between gamut plane and conversion table to the right to make the gamut plane image bigger.

4. If it is difficult to see where an original or converted color falls relative to the output profile on the current gamut plane, you can go to the gamut plane containing the color by:
  - changing the gamut plane as explained in step 2,
  - clicking the icon on the gamut plane (click the circle to see the gamut plane containing the original color or the square for the gamut plane containing the converted color),
  - right-clicking the color and selecting **Jump to Plane** (to see the gamut plane containing the converted color).

5. If you have added several color strategies you want to check the inks against (see [Check Gamut](#) on page 131), by default only the first color strategy is shown in the gamut plane.

To view where the inks fall in the different strategies:

- a) Select the strategy or strategies to check in the **Strategies** list (the selected strategies have a check mark in the **Visibility** column).

When selecting several strategies, you will see their destination profiles on top of each other in the gamut plane. Each is in a different color and you can see which strategy's destination profile is shown in which color in the **Strategies** list.

- b) Select the inks to check in the **Conversion Table**.

You can then see which color strategy will help reproduce your spot colors the best.



# 11. Working with Overprint Charts

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## The Overprint Charts Library


The **Overprint Charts Library** is available in both licensed and license free mode (see [Licensed and License-free Modes](#) on page 17 for more information).

It lists all the charts in your [color database](#) (both predefined chart [layouts](#), and chart layouts you [have created](#)).

**Note:** If you are [working with a data center](#) (in licensed mode), you will need to unlock the database before making any changes to overprint charts. See [Making Changes to the Database](#) on page 69 for more information.

For each chart, you can see:

- which **Spectrophotometer** you can use to read the chart (as each chart layout is optimized for a certain spectrophotometer),
- the **Chart Name**,
- the **Ink Set** the chart uses,
- its number of **Pages**,
- its number of **Patches**,
- its **Dimensions**,
- whether it can be measured by a spectrophotometer using the M1 or M2 [measurement condition](#) (**M1/M2 Compatible**),
- any **Keywords** associated with the chart.

You can rename, duplicate or delete your custom charts, whereas predefined charts are read-only .

When selecting a chart, you can see a small preview of it at the bottom left of the application window (under **Selected Item**). You can see a bigger preview when measuring the chart.

## Using Overprints Charts to Profile Your Press

If you have a full license, see [Profiling Your Conventional or Equinox Press](#) on page 180 to know how to profile your press.

If you are working in [license-free mode](#), you cannot profile a press, but you can:

1. [create a custom profiling chart](#) if needed,
2. [measure the chart your press printed](#),
3. [import the measurements file](#) into a licensed Color Pilot to create a profile for your press.


## 11.1. Creating a Custom Chart Layout

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Color Pilot offers a number of predefined overprint chart [layouts](#), with different sizes and numbers of samples.

However, presses supports many different substrate formats, so if you are using a specific substrate that can't fit any of the predefined chart layouts, you can create your own layout (based on a predefined one).

In the **Overprint Charts Library**:

1. Click **New Overprint Chart**  to start creating a custom overprint chart layout.
2. Enter the **Chart Name** you want to use.

We recommend you use a brief but unique description of the layout as your chart name, to make it easy to choose between layouts when measuring your chart/creating a profile.

The chart name will be displayed on the chart itself.

**Tip:** As you are typing, you can see underneath a list of charts starting with the same name that already exist in the **Overprint Charts Library**. This helps you make sure that the name you are entering hasn't been used before, and that it conforms to any naming conventions you may use.

3. Select the **Spectrophotometer** you want to use for measuring your chart.  
By default, the spectrophotometer connected to your application is selected, but you can choose to use another [supported spectrophotometer](#).
4. Select the **Ink Set** to use.

You can choose between CMYK or a multicolor ink set (CMYK plus any combination of Orange, Green and Violet).

**Tip:**

When [profiling a multicolor press](#), using one multicolor chart containing all of your [profile sections](#) patches has advantages over using a CMYK chart plus separate charts for your profile sections:

- When using a chart per section (for example CMYK, OMYK and CGYK charts to make a CMYKOG profile), you would typically place the charts beside each other on the sheet when using a single print run for profiling.

In this case, all patches for a section are in the same location (for example all the CMYK patches are in the top left corner, all the patches for the orange section are in the top right...).

This means that localized press variations can affect the patches of a certain section disproportionately, making the profile less representative of how your press prints.

- When using a multicolor chart, this is not the case: the patches are spread out over the entire sheet (or over all sheets, if multiple sheets are needed).

This helps make sure that your profile is a good representation of your press behavior in general.

5. Choose which standard set of patches you want to use in **Patch Set**.

For example, you would like to use an IT8/7.4 chart, but you don't have the space for it on your substrate. In this case, you should choose the **IT8/7.4 Patch Set**, then adapt the [patch size](#) and [chart size](#), so that your final layout does fit on your substrate.

**Note:**

The **Patch Set** you choose influences the quality of your future profile. Some patch sets contain more patches than others, ranging from several hundred to several thousand patches. Using more patches will result in more accurate colors.

However, if the press itself is unstable, printing more patches may not give better results, because press variation has a lot more impact on your printed result than how accurate your profile is. In this case, we recommend you take a smaller patch size and make more printouts.

In most cases, the **ECI2002** and **IT8/7.4** patch sets offer a good trade-off between the press space needed and the resulting profile quality.

If you are using a [multicolor ink set](#), your chosen patch set will be used for each section. For example when choosing a **CMYKO** ink set and the **ECI2002** patch set, your chart will include both:

- a CMYK ECI2002 patch set,
- an OMYK ECI2002 patch set (where Cyan is remapped to Orange).

However, patches that would appear in both patch sets (for example 100%M 50%Y) are only included once to save space.

You can see the number of patches present in the patch set you selected, and a preview of your chart at right.

6. Select **Randomize** to place the chart's patches in a random order, so that asymmetries in printing (the press printing differently on different parts of the sheet) are more evenly distributed.

Profiles measured from [randomized charts](#) are generally more representative of how your press prints.

**Note:** When using a [multicolor ink set](#), the patches of all the profile sections are randomized together, to distribute printing variations across all sections.

7. Select **Add Cutting Line** to add a cutting line around your chart.

This indicates where you should cut around your printed chart before measuring it. Using the cutting line rather than cutting around the edge of the patches makes sure that your spectrophotometer has enough white space before and after the chart to start and finish measuring each line properly.

This is especially important when measuring with the M1 or M2 measurement condition.

8. If you are planning to measure your chart using your spectrophotometer's M1 or M2 [measurement condition](#), select **M1/M2 Compatible**.

When you choose this:

- Color Pilot always adds a **Cutting Line**,
- the **Patch Width** and **Patch Height** are adjusted if necessary, to be readable with the M1 or M2 measurement condition.

For example, if you [chose to use](#) an X-Rite i1iO, the patches are 7 mm wide by default, but if you need them to be compatible with M1/M2, they are changed to 8 mm wide.

- if you are using an X-Rite i1iO and [randomizing your patches](#), the black or white gaps between the patches are removed.

This is option not available if you have chosen to use a Barbieri Spectro Swing, as this spectrophotometer doesn't support the M1 or M2 measurement conditions.

9. Color Pilot will suggest a default **Patch Width** and **Patch Height**. However, when printing in lower quality (Flexo, low resolution...) you may want to increase the patch size to improve your results.
10. Define your **Chart size**, using either a number of **rows and columns** or a **page size (width and height)**.

By default, Color Pilot suggests the largest chart size that can be measured on the **Spectrophotometer** you chose. However, you may want to reduce the chart size to fit the chart on your press or proofer.

You can see how many pages and how many patches per page are in your chart at the bottom of the window. If you want your chart to have less pages, try reducing the size of the patches and/or increasing the chart size.

The preview at right reflects your layout changes. You can see how each page of your chart will look (when showing the **Chart Preview**) and how a profile measured from your chart would look like (when showing the **Overprints**).

11. When you are done, **Save** your chart to add it to the **Overprint Charts Library**.

- When working in license free mode, your chart is saved to a small local database.

If you later get a license for Color Pilot, all the overprints charts that you created in license-free mode will be imported automatically to the [full color database](#) that you will choose (so they will still be available in the **Overprint Charts Library**).

- When working in licensed mode, your chart is saved directly to your full color database.

See [Licensed and License-free Modes](#) on page 17 for more information.

You can now export your chart to PDF (click **Export to PDF for measuring** ) , print it on your press and [measure it](#).

## 11.2. Creating a Custom Patch Set for Your Charts

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If you have set this in the [Preferences](#), you can create a custom set of color patches, that you can use when [defining the chart to use](#) when profiling your proofer.



### Attention:

This is only meant for advanced users and/or very specific use cases (for example if you experience an issue and your Esko Customer Support contact instructs you to do this).

It is **not recommended** in most cases as Esko's profiling technology is optimized for profiles measured from certain standard sets of patches.

1. Click the **New Patch Set**  button in the bottom tool bar.  
This button is only visible if you have selected **Enable patch set creator** in the [Preferences](#).
2. In the dialog that opens, select:

- The **Ink Set** you want to use for your color patches (this should be the ink set of the proofer you will profile with the chart you will make with this patch set).
- The general **Layout** you want to arrange the patches in. You start from a standard layout that you can tweak as desired.

The layouts available depend on your chosen ink set. For example, for CMYK you can choose between:

- IT8.7/3**
- ECI 2002**
- Normal (non\_uniform, 3 inks +K)**
- Hi-Res CMYK**
- Hi-Res CMYK v2.0**

**3.** In the **Create Patch Set** dialog that opens:

- Enter a **Name** for your custom patch set.
- Choose the **Section** to make the patch set for (if you have chosen a multicolor ink set).

A section combines some of the inks in your ink set. There are several sections (with different ink combinations) for a good coverage of your proofer's *gamut*, and each section contains black.

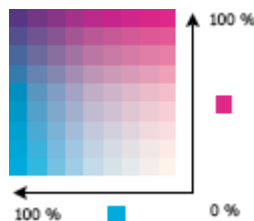
For example, if your ink set is CMYK Green, you will have the following sections: CMYK, CMK, MYK, YKG, CKG, CYK 100% G, CMYKG.

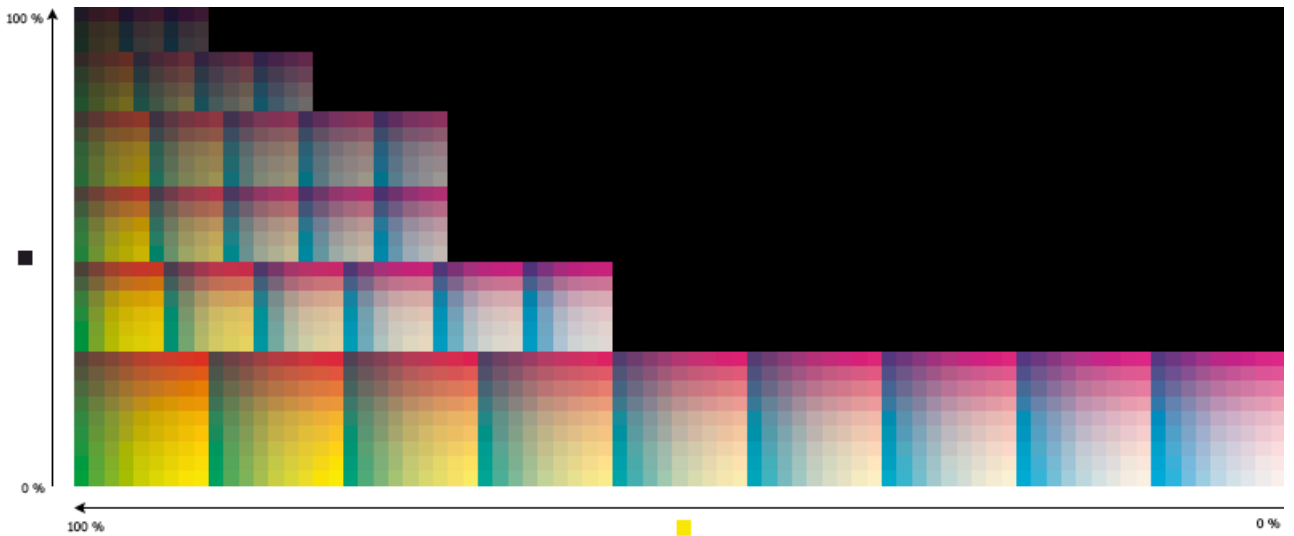
**4.** Build a custom patch set for your chosen section by defining the sampling you want to use.

The sampling is how many percentages and which percentages you want to use for each ink.

Percentages of different inks are combined into patches, and those patches are arranged into a grid chart, whose size depends on the number of inks on your section and on your sampling.

For example, a typical CMYK chart is arranged like this:





Measuring the resulting chart gives you information on how different percentages of your proofer's inks overprint.

a) The **Black Levels** column shows the percentage of black for each row of your custom patch set.

The initial percentages are evenly distributed (for example, if there are 6 rows they will have 0%, 20%, 40%, 60%, 80% and 100% of black).

You can add  or remove  percentages (except 0% or 100%), and use the arrows next to each percentage to edit it.

When adding a percentage, it is the average of the two neighbouring percentages by default (for example if you add a percentage between 40%, 60%, it will be 50% by default).

Adding or removing percentages doesn't change the existing percentages.

b) The **Other Inks Levels** (for example **CMY Levels**) rows show the sampling of the other output inks in your section, for each black percentage.

- The sampling is the same for all remaining output inks of the current section. For example, when defining a **CMY** sampling, that sampling is used for Cyan, Magenta and Yellow.
- You can edit the percentages as desired, but you cannot remove 0% or 100%.
- When adding a row (with a different black percentage), the sampling for the other inks is copied from the previous row by default.

5. If you are making a patch set for a multicolor ink set, define the sampling to use for the other sections too.

**Tip:**

You can copy the sampling of a section to another section (for example from CKG to YKG for a CMYKG ink set):

1. When looking at the section whose sampling you want to copy, click **More Actions**  then **Copy**,
2. Go to the section you want to reuse the sampling for and click **More Actions**  then **Paste**.

6. If desired, you can save your custom patch set as a template, to reuse it later to create other similar custom patch sets.
  - a) Click the **More Actions** button and select **Save Template**.
  - b) Browse to your desired location and save the template (it is saved as a **Patch Set (\*.pts)** file).

To reuse your template later, you can:

1. click the **More Actions** button and select **Load Template**,
2. browse to your template location and open your patch set template.

This replaces the values in the **Create Patch Set** dialog by the values of your selected template.

7. Click **Save** to save your custom patch set (not as a template) to be able to use it when *profiling a proofer* with a matching ink set.

## 11.3. Exchanging Charts Between Sites

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If your press operator (or an Esko solution architect) already created a custom chart *layout* that fits perfectly on your press, and you want to measure charts printed using that layout, do the following:

1. Ask your press operator/solution architect to *export* that chart layout using his/her copy of Color Pilot (in either license-free or licensed mode).

This will result in a File Packer archive, with the extension `.fp`.

2. *Import* that archive into your own Color Pilot.
3. *Measure* the printed charts using that chart layout.

### 11.3.1. Exporting a Chart

1. In the **Overprint Charts** library:
  - select one or more chart *layouts* to export and choose **File > Export...** or press **Ctrl+Alt+E**,
  - right-click the chart layout(s) to export and select **Export...**

**Tip:** Use the **Shift** key to select several chart layouts, or **Ctrl+A** to select all chart layouts.

**Note:** You cannot export read-only layouts.

2. If you selected...
  - a single chart layout, browse to a location, enter an appropriate file name and click **Save**.
  - several or all chart layouts, you will see the **Export** dialog.
    1. Select **Export as one single archive** if you want to export all chart layouts to the same archive, and enter a **File Name** for the archive.
    2. Click **Browse** to select a location.
    3. If desired, remove chart layouts from the export using the **Remove** button.
    4. If desired, rename chart layouts by clicking in the **Export As** column and typing the new name (do this for example if you see a warning ⚠ that a file of the same name already exists in that location).
    5. Click **Export**.

Color Pilot generates a File Packer archive (with the extension `.fp`) containing your exported chart layout(s).

### 11.3.2. Importing a Chart

You can import chart *layouts* made in another copy of Color Pilot or in the Equinox Profile Creator (both either licensed or license-free).

If you have several sites and are working with a mix of Color Pilot and Equinox Profile Creator applications, we recommend you use Color Pilot at your main site to benefit from Esko's latest color technology.

1. Either:

- choose **File > Import...**
- press **Ctrl+Alt+I**
- right-click in the main pane (in the **Overprint Charts** library) and select **Import...**


2. Browse to the `.fp` file to import and click **Open**.

You can select more than one packed chart layout using the **Shift** key, or select all chart layouts using **Ctrl+A** (if the location you browsed to only contains chart layouts).

**Tip:**

If you have the location of the `.fp` file(s) already open, you can also:

- Drag the `.fp` file(s) onto the Color Pilot shortcut on the desktop.
- Drag the `.fp` file(s) into the Color Pilot application window.

3. In the **Import** dialog that opens, you will see that the chart layouts have the state  `Ready for import`.

On the **Details** tab at the bottom of the **Import** dialog, you can see a preview of the selected chart layout and some information about the layout (compatible spectrophotometer, ink set, number of patches, dimensions...).

**Tip:** You can add or remove chart layouts to import using the **+** or **-** buttons.


4. If desired, you can rename the chart layouts by clicking in the **Import as** column and entering a new name.

**Note:** If a chart layout with the same name already exists in the color database, the default name of the imported layout will be `[chart layout name]_(2)`.

5. Import the chart layouts by either:

- selecting the chart layout(s) to import (using **Shift** to select several chart layouts) and clicking **Import Selection**,
- clicking **Import All** to import all chart layouts in the dialog.

You will see a progress bar, and import details on the **Logging** tab at the bottom of the dialog.

Once the chart layouts are imported, they will have the  `Imported` state. You can then **Close** the **Import** dialog.




## 11.4. Measuring your Printed Charts

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If you are working with a Color Pilot application in *license-free mode*, you cannot profile a press, but you can:

1. [create a custom profiling chart](#) if needed,
2. measure the chart your press printed (as explained below),
3. [import the measurements file](#) into a licensed Color Pilot to create a profile for your press.

If you have an application license, we recommend you use the press profiling wizard instead. See [Profiling Your Conventional or Equinox Press](#) on page 180.

1. Select the chart *layout* corresponding to your printed chart in the **Overprint Charts Library** and click **Measure Overprint Chart**  (or double-click your chart layout).

You can use a predefined chart layout or a custom chart layout that you [created](#).

**Note:** Make sure that the spectrophotometer connected to your application matches the one the chart layout was made for.

This opens the **Measure Overprint Chart** wizard, that will guide you through measuring your chart.

2. You can see a **Preview** of the overprint chart you selected, and some information about the chart (number of pages, dimensions...).
- a) If you selected a CMYK chart, the chart layout is shown in CMYK by default.  
However, if you are profiling a multicolor press and you have printed additional charts for your [profile sections](#), you can select another **Section** to measure if desired.  
The **Preview** then shows your chosen section.
- b) If desired, you can view a higher resolution of the chart (click **View Chart**) and the chart's location on your computer (click **Show File Info**).
- c) If you haven't printed your chart yet (for example if you didn't have a chart file for the chart you want to print and measure), you can **Export to PDF for measuring...** and use that PDF file to print the chart that you will measure.

**Note:**



You will see a warning if you are trying to measure a chart that isn't compatible with the M1 and M2 [measurement conditions](#) with a spectrophotometer set to use M1 or M2.

In this case, you can either:



- switch to using M0 and measure your chart as usual,
- keep using M1 or M2, but measure your chart [patch by patch](#).

Whether a chart layout is compatible with M1 and M2 depends on the size of its patches, among other things. You can [create charts compatible with M1 and M2](#) in Color Pilot.

3. Follow the instructions on the **Measure ...** screen to measure your chart.

**Note:** If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer. You can also choose a different [measurement condition](#).

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.
 Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

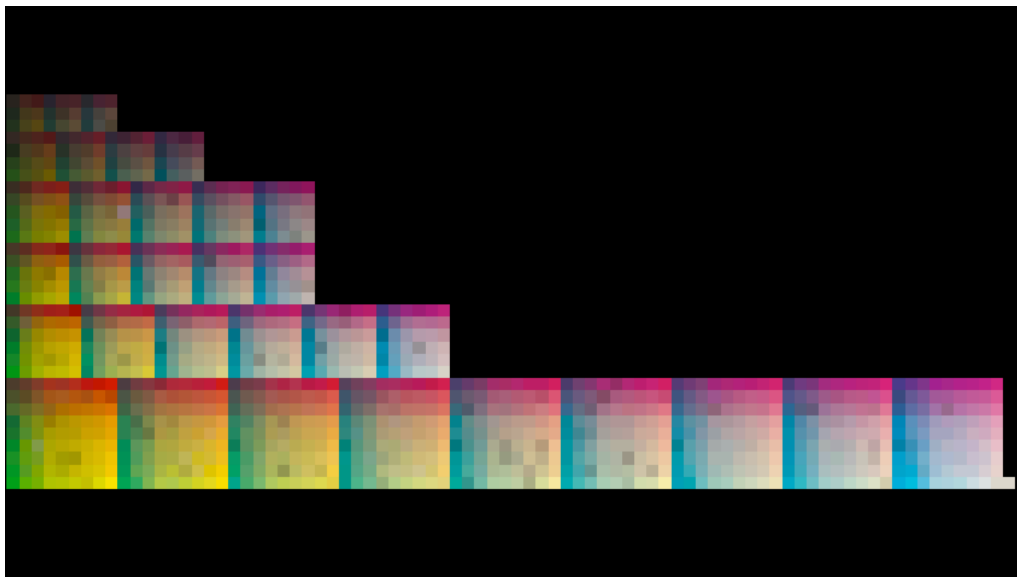
**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

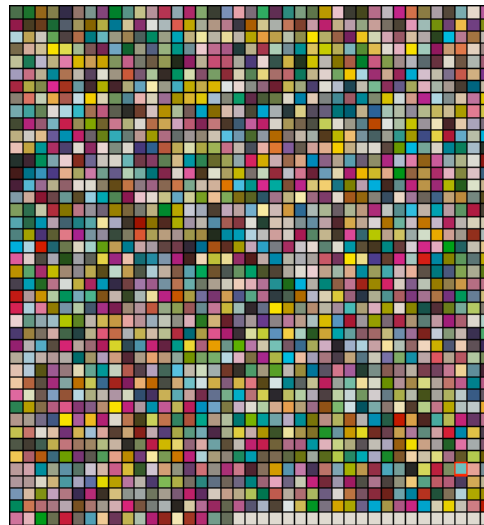
1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**


4. After you finished measuring, you can check your measurements:

- as they are organised in the profile in **Profile** view,



- as they have been measured on the chart in **Layout** view.



You can view each page individually, and zoom in , zoom out , or fit the zoom to the view .

- a) To inspect a single patch more in detail, select it to show its ink composition and its Lab/LCh values.
- b) To remeasure a patch that is an obvious measurement error (for example a black or white patch in the middle of a gradation), you can either:
  - select it and click **Measure Again...**
  - right-click it and select **Measure Again...**

**Note:** If you have a lot of measurement errors, we recommend you go back and remeasure the problematic page(s) completely (use the **Back** button at the bottom of the wizard or the back arrow at the top depending on your operating system).

- c) If you cannot remeasure the patch (for example if it is damaged on the chart), you can repair it by:
  - selecting it and clicking **Repair**,
  - selecting it and pressing **Ctrl+R**,
  - right-clicking it and selecting **Repair**.

Repairing a patch discards its bad color values and replaces them by a good approximation of what the color values should be, based on those of the neighboring patches.

**Note:**

Patches that look "wrong" but don't change when you remeasure them and aren't damaged on the chart are likely to be a variation or quirk in the way the press prints (especially if you find several of them in the same area of the chart).

You should not repair those patches but leave them as they are, as they are representative of how your press prints.

d) You can also use **Find and Repair Bad Measurements...** to automatically detect and (optionally) repair bad patches in your chart.

See [Find and Repair Bad Measurements](#) on page 357 for details.

5. When you are done, click **Save Measurements...** to save your measurements as a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file.

You can then [import](#) this CGATS measurements file into a licensed Color Pilot to help create a profile for your press.

### 11.4.1. Find and Repair Bad Measurements

You can use **Find and Repair Bad Measurements...** to automatically detect (and optionally repair) bad measurements in your chart.



This detects isolated patches in your profile that differ substantially from patches with similar ink combinations, and can be attributed to spectrophotometer malfunction or misalignment, abnormal measurement conditions, or even damage to the physical print-out itself.

It is particularly useful when working with randomized charts (as the bad patches are not immediately obvious against their neighbors in **Layout View** because they have been randomized).

You can always perform additional [repairs](#) based on visual inspection of your chart.

1. Click **Find and Repair Bad Measurements...** on the **Check Measurements** page of the **Measure Data** wizard.

If bad measurements are detected in your chart, the **Repair Bad Measurements** dialog opens.

2. In the **Repair Bad Measurements** dialog, you can cycle through bad patches by using the  and  buttons.

For each bad patch you can see:

1. The patch status. This can be **Not Repaired**, **Repaired**, or **Remeasured**.
2. The ink combination used to generate the patch.
3. The patch's **Lab** values before and after repair.
4. A small preview area showing the color difference between the Lab values before and after repair.
5. The **delta E** between the Lab values before and after repair.

**Note:** Patches with high delta E values are likely in need of repair, while patches with lower delta E values may be acceptable, particularly in darker areas of the profile, where sampling performed by the application is sparser and spotting a bad measurement can be difficult.

6. A small preview area showing the patch centered next to its neighboring patches in the profile.

You can use this to visually verify that the patch is actually bad, and to facilitate the task of locating the patch in your profile chart.

3. For each bad patch that you inspect, you can:

- a) Click **Repair (Ctrl+R)** to repair the patch.

The patch is immediately repaired. The patch status changes to **Repaired**, and all preview areas are updated. The **Repair (Ctrl+R)** button changes to **Undo Repair**.

- b) Click **Undo Repair** to revert the repair.
- c) Click **Measure again...** to re-measure the patch.

This opens the **Measure patch again** dialog. To re-measure the patch, follow the instructions in the dialog.

- d) Double-click **Repair** to revert to the original measurement.  
The patch status changes to **Not Repaired**.

You can also click **Repair All (x)** to automatically repair all patches, where  $x$  is the number of bad patches detected. The **Repair All (x)** button changes to **Undo Repair All (x)**.

To accept the repairs, click **OK**. If you want to revert the repairs later, you will have to re-measure the chart.

# 12. Working with Ink Limitation Sets for Digital Presses



**Attention:** If you are connected to an [Automation Engine server in a data center](#), you cannot connect to the DFE Server driving your digital press at the same time (so you cannot work with digital presses and ink limitation sets for digital presses).

### Why Limit the Amount of Ink Printed?

In some cases, you may need to limit how much ink is printed on your substrate. This may be because:

- depending on the press speed, only a certain amount of ink may have time to dry before the next ink layer (more ink can cause smudges or an uneven ink distribution),
- having too much ink on your substrate can cause the ink to run off the substrate, or your substrate distorting or even tearing,
- in highly saturated areas, ink colors can sometimes be unstable (for example a blue may turn purplish), making color matching difficult,
- unnecessary ink consumption can weigh on your budget.

To avoid these issues, you can limit both the **amount of each ink** printed, and the **total amount of ink** printed.

### How to Limit the Amount of Ink Printed?

In Color Pilot, you can use a wizard to determine the maximum quantity of each ink, and of all inks, that you should print for your particular combination of press, inks and substrate.

Using these maximum quantities still lets you achieve the maximum [color gamut](#) on your press, but avoids the negative effects of using too much ink.

At the end of this wizard you will have created an **ink limitation set**, which you can add to your [digital press configuration](#), so that your ink limits are always taken into account when printing with this configuration.

We recommend you make an ink limitation set for each digital press configuration, as different substrates or different ink sets need different ink limits.

**Note:** You may also have received ready made ink limitation sets from your digital press vendor. You can use these ink limitation sets in Color Pilot.

### Your Ink Limitation Sets


You can see any ink limitation set that you have already created in the **Ink Limitation Sets Library**, accessible from the navigation pane.

You can also see extra information about those ink limitation sets (when the ink limitation set was created and/or modified, for which ink set, any [keywords](#) assigned to it...).

From the **Ink Limitation Sets Library**, you can:

Create an ink limitation set.	See <a href="#">Creating an Ink Limitation Set</a> on page 360.
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View more details about an ink limitation set.	See <a href="#">Ink Limitation Set Information</a> on page 375.
Make changes to an ink limitation set.	Right-click it, select <b>Edit...</b> and change it as desired (see also <a href="#">Editing an Existing Ink Limitation Set</a> on page 377).
Delete an ink limitation set.	Right-click it and select <b>Delete</b> (or press the <b>Delete</b> key) and click <b>Yes</b> to confirm.
Rename an ink limitation set.	Right-click it and select <b>Rename</b> (or select it then click its name), then enter a new name and click <b>Enter</b> .
Duplicate an ink limitation set.	Right-click it and select <b>Duplicate</b> , then enter a new name for the duplicate and click <b>Enter</b> .
Export an ink limitation set for use at another site.	See <a href="#">Exporting an Ink Limitation Set</a> on page 378.
Import an ink limitation set exported from another site.	See <a href="#">Importing an Ink Limitation Set</a> on page 379.
See where an ink limitation set is used.	Right-click it and select <b>Show Links</b> to see which digital press configurations, profiles and/or color strategies use it.
Add (or remove) keywords to find your ink limitation set more easily.	See <a href="#">Keywords</a> on page 36.


**Note:** If the ink limitation set is read-only , or if it is used in a profile or a digital press configuration, you cannot rename or delete it.

## 12.1. Creating an Ink Limitation Set

**Note:** We recommend you create an ink limitation set after [setting your digital press configuration](#), but before [creating your digital press profile](#).

You can create an ink limitation set either from the **Ink Limitation Sets Library**, or [from your digital press configuration](#).




To create an ink limitation set from the **Ink Limitation Sets Library**:

1. Click  **New Ink Limitation Set**.
2. Select the **Digital Press** and digital press **Configuration** you want to use to print test charts. These test charts will be used to calculate your [ink limits](#).

For each digital press configuration, you can see:

- the **Substrate** used,
- the **Ink Set** used,



- whether this configuration already contains an **Ink Limitation Set**,
- whether it contains a profile  or not  (it may also contain an unfinished profile .

The configuration currently attached to your digital press is selected by default.



**Attention:**

If you made a digital press configuration for a CMYKO, CMYKV or CMYKG ink set, you will not be able to create an ink limitation set for that configuration.

In that case, [choose another digital press configuration](#) (one made for CMYK, CMYKOG, CMYKOV or CMYKOGV, depending on your press and the jobs you typically print).

3. In the **Set Ink Limits for Press ...** wizard, you can determine the best ink limits to use for your particular combination of press, inks and substrate.

To do this, the wizard guides you through four steps:

**Step 1: Set Ink Limit per Ink** (see [Defining Ink Limits for Individual Inks](#) on page 361)

**Step 2: Linearization** (see [Linearization](#) on page 369)

**Step 3: Set Total Ink Limit** (see [Defining the Total Ink Limit](#) on page 372)

**Step 4: Summary** (see [Evaluating and Saving your Ink Limits](#) on page 374)

4. At any time, you can save your unfinished work and continue later. This way you can perform other tasks in the meantime, or safely close the Color Pilot and resume the session after starting up the application again later.

- a) Click **Quit Now and Continue Later**. Confirm your choice by clicking **Yes**.

This closes the wizard.

- b) When you are ready to resume working on your ink limits, click  **New Ink Limitation Set** again and then select your **Digital Press** and **Configuration** again.

You will see an orange icon  next to your **Configuration**, indicating that there is an unfinished task attached to it.

**Note:** You can also see this in the **Digital Presses** view, when selecting that **Digital Press** and **Configuration**.

- c) Click **Select** then click **Resume** to confirm that you want to resume creating your unfinished ink limitation set.

**Tip:** If you want to discard your unfinished ink limitation set and start creating a new one instead, click **Start New Session**.

This will resume the wizard from the point you saved. However, you cannot go back and change earlier settings.

### 12.1.1. Defining Ink Limits for Individual Inks

The **Set Ink Limit per Ink** step of the **Set Ink Limits for Press ...** wizard helps you determine the maximum amount of each ink that can be printed.

1. If your digital press supports white underprint, set the **Ink Limit for White** first.

The white ink limit you set here will be applied to any file containing the **ClassicColors White** ink (when printing your files using this ink limitation set and a color strategy *with white as an extra output ink*).

**Note:** Ink limitation sets that contain an ink limit for the white ink cannot be used in a "classic" Color Engine Pilot (version 14.X or 12.X)..

2. Decide how you want to determine the ink limits for the other inks:
  - Choose **With a visual test chart** if you want to print a chart with gradations of each ink, and assess visually up to which ink percentages you get a satisfactory printing quality.  
See *With a Visual Test Chart* on page 362.
  - Choose **By measuring a test chart** if you want to print a chart with gradations of each ink, measure those gradations with a spectrophotometer, and have the wizard calculate the best ink limits based on those measurements (you will still be able to evaluate and change the percentages as desired).  
See *By Measuring a Test Chart* on page 363.
  - Choose **Manually** if you already know from experience how much ink can be printed on your particular substrate and just want to enter the maximum percentages.  
See *Manually* on page 369.

### With a Visual Test Chart

If you want to decide what ink limitation percentages to use by looking at a printed chart, do the following:

1. The wizard displays the chart that will be printed. This chart contains a set of patches of different percentages (between 65% and 100%), for all output inks of your press.  
Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings *defined for your digital press* are used).
2. In the **Print Settings** dialog that opens:
  - a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.

- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
  - d) Click **OK**.
3. Click **Print Chart** to send the chart to the digital press for printing.
  4. Once the chart is printed, find the best percentage to use as ink limit for each ink: this is the first percentage that gives you the maximum saturation you can print.



5. Go back to the wizard and enter the percentages that you found (they must be between 50% and 100%).

**Note:** By default, the black ink limit is set to 100% (as solid black is important for text). If you want to change it, you need to first deselect the **Set ink limit of black to 100%** option.

6. When you are finished setting ink limits for individual inks, go to the *Linearization step*.

### By Measuring a Test Chart

If you want to print a chart with gradations and measure those gradations to calculate the best ink limits automatically, do the following:

1. The wizard displays the chart that will be printed. This chart contains a set of patches of different percentages, for all output inks of your press.

**Note:** If you are using an M1 or M2 *measurement condition*, the chart will be automatically adapted to support the dual measurement (measuring with and without UV filtering) required by these measurement conditions (the patches will be slightly bigger and there will be slightly more white space in between lines of patches).

Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings *defined for your digital press* are used).

2. In the **Print Settings** dialog that opens:
  - a) Select **Mirror Image** if you want your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.


- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**



This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).



**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.

- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
  - d) Click **OK**.
3. Click **Print Chart** to send the chart to the digital press for printing.
  4. Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1i0 spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1i0 will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

5. The next screen shows the ink limits calculated by the wizard based on your measurements.

You can evaluate these inks limits using:

- a measurements table,
- a set of curves,
- a color wheel.

You can change the ink limits as desired in each of these tools, and your changes will be reflected in all of them.

- a) The measurements table shows the proposed maximum percentages and the measurement data. For each output ink, you can see:

- The **Ink Limit** percentage that gives you the maximum saturation without causing *negative printing effects*.

You can change the percentages manually if desired.

**Note:** By default, the black ink limit is set to 100% (as solid black is important for text). If you want to change it, you need to first deselect the **Set ink limit of black to 100%** option.

If you are not happy with your changes, you can get back to the ink limits calculated by the wizard by clicking **Reset to Measured**.

- The **Lab** and **LCh** values for that ink limit percentage.

Those values are updated automatically if you change the **Ink Limit** percentage.

**Tip:** If you are trying to match a standard, you can change the ink limits so that the **Lab** and **LCh** values match the ones given in the standard.

- The **Density** value for that percentage.

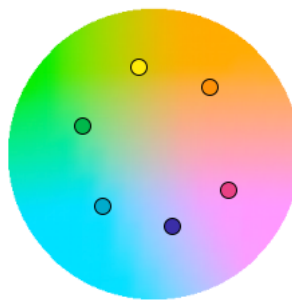
The **Density** is calculated using the **Density Formula** shown above (by default, this is the one you chose *in the Preferences*, but you can change it here as desired).

The **Density** value is updated automatically if you change the **Ink Limit** percentage.

**Tip:** If you are trying to match a standard, you can change the ink limits so that the **Density** values match the ones given in the standard.

- The **Ink Trap** percentage for secondary colors (for some digital press types).

Secondary colors are colors that can be printed using two output inks. These output inks must be next to each other on the color wheel.



For example:

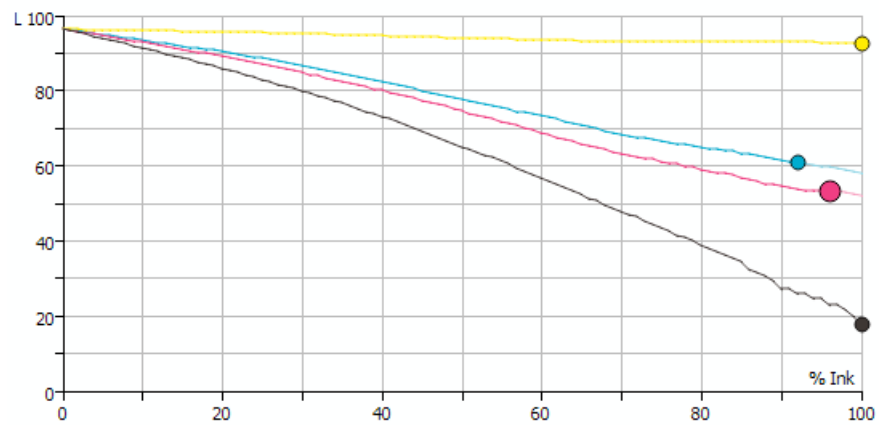
- You can print Orange/Red using Yellow and Magenta,
- You can print Blue/Violet using Magenta and Cyan,
- You can print Green using Cyan and Yellow.

You cannot make secondary colors using Black (adding another color to Black just makes a richer Black).

When printing with a multicolor ink set, only colors that are not part of the ink set can be considered secondary colors. For example, when printing with CMYKOG, Blue/Violet is a secondary color, but Orange and Green are not.

The **Ink Trap** percentage measures how well two output inks print together to make a secondary color. For best results, the density of the sum of the two output inks and the density of the secondary color should be similar, and the **Ink Trap** percentage should be close to 100%.

- b) The curves show the lightness values across the whole printing range (0-100%) for each output ink.



The ink limits are indicated by dots ●. You can drag a dot further along the curve (closer to 100%) to increase the ink limit, or drag it back to decrease it.

**Tip:**

The curves should look relatively linear.

If you see the lightness decreasing sharply at the end of a curve, it typically means that from this point on, adding more ink doesn't increase the chroma of the ink but only makes it darker (you can check this using the **LCh** values in the measurements table).

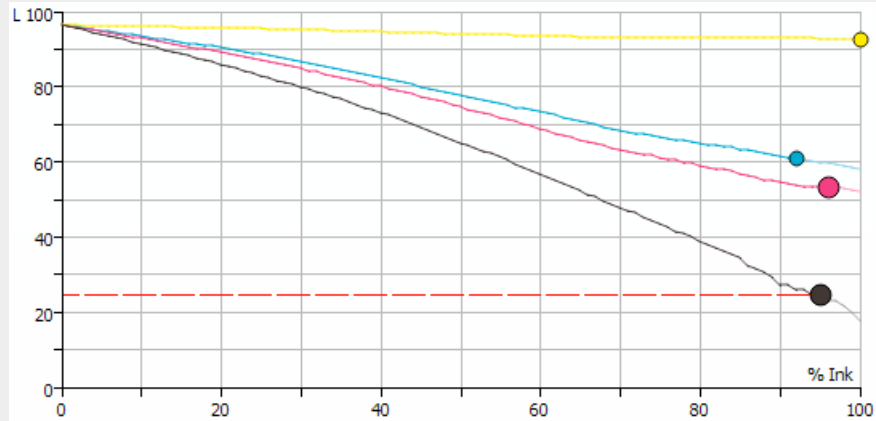


In this case, you should place the ink limit just before the sharp decrease.

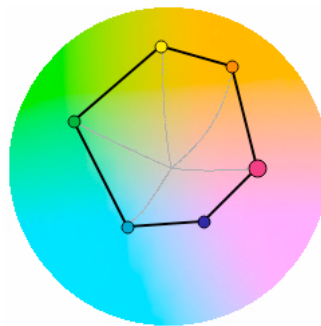
You can only move the black dot if you have deselected **Set ink limit of black to 100%**.



**Attention:** When limiting the amount of black, make sure the lightness for the maximum black percentage is not too high, as this would cause a loss of details in the shadows.



c) The color wheel shows you the press gamut (the colors you can reproduce) when working within your ink limits.



To increase an ink limit, drag the dot towards the outside of the color wheel, or drag it towards the inside to decrease it.

The point where the curves of each color meet in the center is the white point.

**Note:**

You cannot change the ink limits of your secondary colors. They depend on the limits of the inks used to print those colors.





**Tip:**

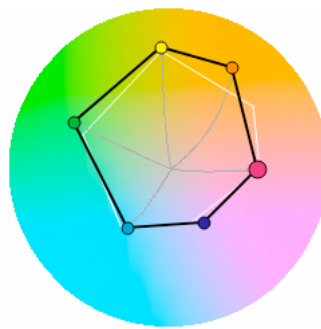
If you see one of the curves making a hook at the end, it typically signals a hue shift in the shadows for that ink (you can check this using the **LCh** values in the measurements table).



In this case, you should place the ink limit just before the hook.

- d) If you are trying to match a standard or another press, select the profile you want to match in **Reference Profile**.

You can then see the *gamut* of that profile outlined in white on the color wheel, and you can compare it with the gamut you can achieve with your current ink limits.



You can then adjust the ink limits to match the profile if desired.

6. When you are finished setting ink limits for individual inks, go to the [Linearization step](#).

**Manually**

If you already know how much ink can be printed on your substrate, do the following:

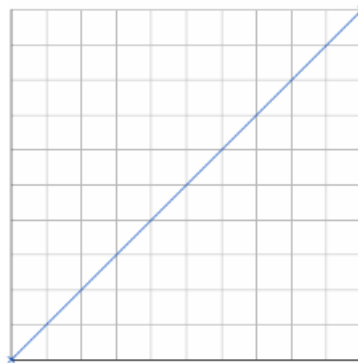
1. Enter the maximum percentages to use for each ink (they must be between 50% and 100%).

**Note:** By default, the black ink limit is set to 100% (as solid black is important for text). If you want to change it, you need to first deselect the **Set ink limit of black to 100%** option.

2. When you are finished setting ink limits for individual inks, go to the [Linearization step](#).

**12.1.2. Linearization**

The wizard's **Linearization** step helps you automatically adjust your digital press' dot gain (to make it linear), so that color reproduction is more consistent.



When calculating the adjustment needed for each output ink, the wizard will take into account the *ink limit you just set* for that ink.

1. Choose whether to linearize your digital press.
  - If you are linearizing your press another way (for example through good dot gain curves in your RIP), select **No** to skip the linearization and go directly to the *Set Total Ink Limit* step.
  - If not, select **Yes** to print and measure a linearization chart as explained below.
2. The wizard displays the chart that will be printed. This chart contains a set of patches of different percentages (between 0% and 100%), for all output inks of your press.

Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings *defined for your digital press* are used).

3. In the **Print Settings** dialog that opens:
  - a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**  
 This option is only available if your digital press supports it.  
 Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.


- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**  
 This option is only available if:



- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.



- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
  - d) Click **OK**.
4. Click **Print Chart** to send the chart to the digital press for printing.

5. Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

6. You can check the results of the linearization in the next screen.
  - a) By default, you can see the **Linearization Curves** that will be applied to your press' output inks.
 

To display the curves one by one, deselect **Show All Curves** and select one of the output inks. This also shows the **Curve Values** (what will be printed for each input percentage) for that ink at right.
  - b) To see the measured data curves instead of the linearization curves, choose to **Show** the **Measured Tone Value** (this also shows the tone values measured for each percentage at right).
 

This uses the **Tone Metric** you chose *in the Preferences* by default, but you can change it here as desired (the curves and the tone values are updated automatically).

The linearization curves will be stored in your ink limitation set, so that when you attach the ink limitation set to your digital press, the linearization curves will be applied as well.
7. When you are done, go to the [Set Total Ink Limit](#) step.

### 12.1.3. Defining the Total Ink Limit

The wizard's **Set Total Ink Limit** step helps you determine the maximum amount of ink that can be printed on your substrate.

Decide how you want to determine the total ink limit:

- Choose **With a visual test chart** if you want to print a chart with gradations of each ink, and assess visually up to which ink percentages you get a satisfactory printing quality.
 

See [With a Visual Test Chart](#) on page 372.
- Choose **Manually** if you already know from experience how much ink can be printed on your particular substrate and just want to enter the maximum percentages.
 

See [Manually](#) on page 373.

#### With a Visual Test Chart

If you want to decide what total ink limit percentage to use by looking at a printed chart, do the following:

1. The wizard displays the chart that will be printed.
 

This chart contains:

- overprints of all of your press' output inks, adding up to different total ink percentages (150% to 400%),
- overprints of ink pairs used to print *secondary colors*, in different percentages (100% to 200%)(if your digital press supports this).

Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings *defined for your digital press* are used).

2. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.

- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- d) Click **OK**.

3. Click **Print Chart** to send the chart to the digital press for printing.

4. Once the chart is printed, find the best percentages to use as:

- **Ink Limit for Secondaries** (if your digital press supports this)
- **Total Ink Limit**

**Note:** The **Total Ink Limit** percentage can be less than the sum of all *single ink limits*, as most colors are not printed using all inks on press.

Those are the percentages that already give you the best total ink coverage but that don't cause any *negative printing effects* yet.

Enter them in the wizard.

### Manually

If you already know how much ink can be printed on your substrate, do the following (depending on your digital press type):

- Enter the maximum percentage to use as **Ink Limit for Secondaries**.  
This must be between 100% and 200%, and cannot be more than the **Total Ink Limit** percentage.
- Enter the Desired **Total Ink Limit** (it must be between 100% and 400%).

**Note:** The Actual **Total Ink Limit** can be different because of *single ink limits* and linearization curves. It is displayed below the Desired Total Ink Limit.

You should enter the percentages that already give you the best total ink coverage but that don't cause any *negative printing effects* yet.

### 12.1.4. Evaluating and Saving your Ink Limits

In the wizard's **Summary** step, you can print a chart to evaluate the ink limits you just set, then save your ink limitation set when you are satisfied.

1. The wizard displays the evaluation chart that will be printed.

This chart is the same as the *total ink limit chart*, but with your finished ink limitation set (containing your *ink limits per ink*, *linearization curves* and *total ink limit*) applied to it.

When working with CMYKOG, the chart also contains images and other elements to help you better evaluate your ink limitation set's effects.

Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings *defined for your digital press* are used).

2. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.

- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- d) Click **OK**.

3. Click **Print Chart** to send the chart to the digital press for printing.

4. Once the chart is printed, check that you are satisfied with the effects of your ink limitation set.  
If needed, you can still go back and tweak your ink limitation set (use the **Back** button at the bottom of the wizard or the back arrow at the top depending on your operating system).
5. Once you are satisfied with the results:
  - a) Enter an **Ink Limitation Set Name**.  
A default name based on your substrate and ink set is filled in.
  - b) Enter a **Description** if desired.
  - c) If you want to add [keywords](#) to find the ink limitation set more easily later, select **Add keywords** and enter your **Keywords**.  
Keywords based on the digital press configuration are filled in by default.
6. Select whether you want to **Assign this ink limitation set to press configuration ...** (so it will always be applied when printing with that digital press configuration).  
Click **Finish**.

You can now see your ink limitation set listed in the **Ink Limitation Sets Library**.

## 12.2. Ink Limitation Set Information

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1. To see more information about an ink limitation set, you can either:
  - double-click it in the **Ink Limitation Sets Library**,
  - right-click it in the **Ink Limitation Sets Library** and select **Open**.
2. On the **Ink Limitation Set Information** screen, you can see:
  - the output **Ink Set** you made the ink limitation set for,
  - the **Ink Limit** for each ink (if those limits were adjusted when [linearizing](#) your press, you can see both the initial ink limits and the ink limits after linearization),
  - the Desired and Actual **Total Ink Limit** as well as the Ink Limit for Secondaries (if applicable for your digital press) of that ink set,
  - the **Version** of the ink limitation set (the version number depends on when the ink limitation set was created, and what kind of ink limits it contains).
3. If you [linearized](#) your digital press when making the ink limitation set, you can also see the relevant **Curves** and **Curve Values**.
  - a) By default, you see the **Linearization curves** that are applied to your press' output inks as part of the ink limitation set, and the **Curves Values** show what the press will print for each input percentage after linearization.

To see the measured data curves instead of the linearization curves, choose to **Show** the **Measured Tone Value**. The **Curves Values** then show the tone values measured for each percentage before linearization.

**Note:** For older ink limitation sets, this data may not be available.

This uses the **Tone Metric** you chose [in the Preferences](#) by default, but you can change it here as desired (the curves and the tone values are updated automatically).


b) To display the curves one by one, deselect **Show All Curves** and select one of the output inks.

4. If you measured charts when making your ink limitation set, you can click  **View Measurements** to see the ink percentages measured on those charts.

You can see the charts for **Single Ink Limits**, **Linearization** and **Total Ink Limit** (and **Secondaries** if applicable to your digital press).

Move the cursor over a patch to show the measured values (in percentages of the output inks and Lab/LCh values).

To go back to the **Ink Limitation Set Information**, click **Done**, or click the ink limitation set name at the top of the window.

5. If you measured a chart when [setting your single ink limits](#), you can click  **View Gamut** to display more details about your measurements and ink limits.

a) The measurements table shows the maximum ink percentages and the measurement data. For each output ink, you can see:


- The **Ink Limit** percentage that gives you the maximum saturation without causing [negative printing effects](#).
- The **Lab** and **LCh** values for that ink limit percentage.
- The **Density** value for that percentage.

The **Density** is calculated using the **Density Formula** shown above (by default, this is the one you chose [in the Preferences](#), but you can change it here as desired).

For secondary colors, you can also see the **Ink Trap** percentage (for certain presses).

The **Ink Trap** percentage measures how well two output inks print together to make a secondary color. For best results, the density of the sum of the two output inks and the density of the secondary color should be similar, and the **Ink Trap** percentage should be close to 100%.

b) The curves show the lightness values across the whole printing range (0-100%) for each output ink (except for inks that are very light even at high percentages, like Yellow).

The ink limits are indicated by dots .

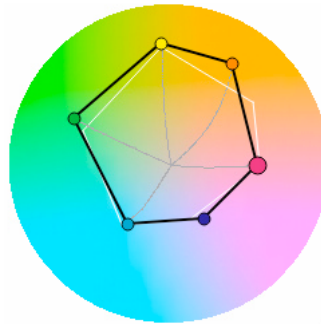
c) The color wheel shows you the colors you can reproduce when working within your ink limits.


The point where the curves of each color meet in the center is the white point.

d) You can also see if your ink limitation set is trying to match a **Reference Profile**.


In this case, you can see the [gamut](#) of that profile outlined in white on the color wheel, and whether you can match it with the gamut you can achieve with your ink limits.






6. If desired, you can also make adjustments to your ink limitation set (click  **Edit Ink Limitation Set**).
- See [Editing an Existing Ink Limitation Set](#) on page 377.
7. Click **Done** (or **All Ink Limitation Sets** at the top) to return to the **Ink Limitation Sets Library**.

## 12.3. Editing an Existing Ink Limitation Set



You can only edit ink limitation sets that are not read-only , or that have not *been used to create a digital press profile*.

If you applied your ink limitation set on a digital press configuration (but didn't use it to create the digital press profile), you can still edit it.

**Note:**

- When editing an ink limitation set, you won't be able to change its name. To do that, you should either *rename or duplicate it*.
- If you started making an ink limitation set in the Classic Color Engine Pilot (version 12.X, 10.X or earlier) but didn't finish it, you will see it here with an unfinished icon . In this case, you need to go back to the Classic Color Engine Pilot to finish it before you can use it here.

1. To open an ink limitation set for editing:

From...	do the following:
the <b>Ink Limitation Sets Library</b>	right-click your ink limitation set and select <b>Edit...</b>
the <b>Ink Limitation Set Information</b> view	click  <b>Edit Ink Limitation Set</b>
the <b>Digital Presses Library</b>	<ol style="list-style-type: none"> <li>1. select your digital press configuration</li> <li>2. click  <b>Set Ink Limits</b></li> <li>3. select <b>Edit the currently used ink limitation set</b></li> </ol>

2. You can choose to start editing your ink limitation set from either:

- the *Ink Limits per Ink* step,
- the *Linearization* step,
- the *Total Ink Limit* step.

If for example you want to redo the linearization, do not select the **Ink Limits per Ink** step to not lose the measurements of this step.

3. Make your desired changes (including any necessary measurements), then advance to the **Summary** step and click **Finish**, to save your updated ink limitation set.

**Note:**

If your changes require remeasuring in the next step(s), you need to do that before you can save the updated ink limitation set.

For example if you change the ink limits per inks, you will need to also remeasure the linearization chart and update the total ink limit.

4. If you want to change the ink limitation set's name, you can do it from the **Ink Limitation Sets Library**: right-click the ink limitation set and select **Rename**, then enter a new name and click **Enter**.

## 12.4. Exporting an Ink Limitation Set

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1. In the **Ink Limitation Sets Library**, either:

- select the ink limitation set(s) to export and choose **File > Export...** (or **Ctrl+Alt+E**),
- right-click the ink limitation set(s) to export and select **Export...**

**Tip:** Use the **Shift** key to select several ink limitation sets, or **Ctrl+A** to select all ink limitation sets.

**Note:** You cannot export read-only  or unfinished ink limitation sets.

2. If you selected...

- a single ink limitation set, browse to a location, enter an appropriate file name and click **Save**.
- several or all ink limitation sets, you will see the **Export** dialog.

Click **Browse...** to select a location, select the ink limitation set(s) to export, then click **Export**.

**Note:**

- You can **Remove** ink limitation sets to export.
- If desired, you can rename the ink limitation sets by clicking in the **Export As** column and typing the new name.

This will result in a .fp (File Packer) file for each exported ink limitation set, which can be sent to a remote site, and *imported* into that site's Color Pilot/Color Engine Pilot application (even if it is a different application version).

## 12.5. Importing an Ink Limitation Set

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You can import ink limitation sets that have previously been [exported](#) as a File Packer archive (.fp file) by your or another Color Pilot application.

1. Either:
  - Choose **File > Import...**
  - Right-click in the main pane (in the **Ink Limitation Sets** library) and select **Import...**
  - Press **Ctrl+Alt+I**.
2. Browse to the .fp file and click **Open**.

You can select more than one packed ink limitation set using the **Shift** key, or select all ink limitation sets using **Ctrl+A** (if the location you browsed to only contains ink limitation sets).

**Tip:**

If you have the location of the .fp file(s) already open, you can also:

- Drag the .fp file(s) onto the Color Pilot shortcut on the desktop.
- Drag the .fp file(s) into the Color Pilot application window.

3. In the **Import** dialog that opens, you will see that the ink limitation set(s) have the state *Ready for import*.

You can add or remove ink limitation sets to import using the **+** or **-** buttons. You can also add other .fp file(s) to import, for example color strategies.

4. If desired, you can rename the ink limitation sets by clicking in the **Import as** column and typing the new name.
5. Import the ink limitation set(s) by either:
  - Selecting the ink limitation set(s) to import (using **Shift** to select several ink limitation sets) and clicking **Import Selection** at the bottom right.
  - Clicking **Import All** to import all ink limitation sets in the dialog.

You will see a progress bar, and import details on the **Logging** tab at the bottom of the dialog.

Once the ink limitation sets are imported, they will have the *Imported* state. If you select an imported ink limitation set, you can see its contents on the **Details** tab at the bottom of the **Import** dialog.


When you are done, **Close** the **Import** dialog.

## 12.6. Previewing your Colors' Conversion with an Ink Limitation Set


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If you have set this in the [Preferences](#), you can use an additional tool to preview how your colors will be converted when applying an ink limitation set.

**Note:** This is an advanced tool used mostly for troubleshooting purposes. You typically only need to use it in specific cases, when your Esko Customer Support contact instructs you to do so.

1. In the **Ink Limitation Sets Library**, select your ink limitation set and click the **View Ink Limitation Set**  button in the bottom tool bar.

**Note:** This button is only visible if you have selected **Strategy and Ink Limitation Viewer** in the [Preferences](#).

You can also drag-and-drop your desired ink limitation set onto the **View Ink Limitation Set**  button.

If you click this button without having selected an ink limitation set (or with multiple ink limitation sets selected), you will see a dialog in which you can select a (single) ink limitation set to view. You can filter the ink limitation sets list on **Recently Used** ink limitation sets, or **Search** on ink limitation set name.

2. On the **View [Ink Limitation Set Name]** screen, you can see how a specific color, or a gradient of your input inks would be converted when using your ink limitation set.

See:

- [Previewing a Color Conversion](#) on page 380
- [Previewing a Gradient Conversion](#) on page 380

### 12.6.1. Previewing a Color Conversion

To preview how a specific color will be converted when using your selected ink limitation set, do the following in the **View Ink Limitation Set** tool:

1. Choose to **Convert a Single Color**.  
In the **Input** and **Output** tables, you can see the inks used on the digital press you made your ink limitation set for.
2. In the **Input** table, define what ink percentages make up the color you want to convert (click a percentage to edit it).  
Those should be the ink percentages you get in your print ready file (after the RIP phase).
3. In the **Output** table, you can see how your color will be converted after applying your ink limitation set (what percentages of the inks on press will be used to print it).  
You can also see the total area coverage (**TAC**) for your input and output colors. The total area coverage for your output color is never more than your [total ink limit](#).
4. In the area underneath, you can see color patches for your original color and how it will be reproduced on press.

### 12.6.2. Previewing a Gradient Conversion

You can also preview how a gradient of your input inks will be converted when using your ink limitation set. This is typically useful when troubleshooting any banding or inversion issues (for example hard edges in the highlights or shadows).

1. In **Convert**, choose **Section**.
2. Under the **Input** table, select the inks you want to use in your gradient in the **Ink 1** and **Ink 2** lists.  
You will see a combination of 0% to 100% of both inks (including overprints).

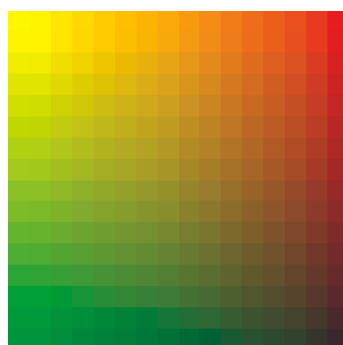


You can also add percentages of other inks to add a flat color under your gradient.




Use the check boxes in the **Output** list to show or hide certain inks in the preview.

3. You can hover on a point of the preview to see the color patches showing the original and the converted colors for that point under the **Input** and **Output** tables.  
This takes into account all the input/output inks used, even if you have hidden some of them for the preview.
4. If desired, you can inspect the conversion in more detail using the options under the preview area.
  - a) Choose to use a **Low** or **High Resolution** for the preview.



Low resolution

High resolution

- b) Choose to **Show** either:
- the **Input** gradient,
  - the **Output** gradient as it will look on press (with your ink limitation),
  - both **Input And Output** at low resolution (if there is a color difference between input and output you will see split patches ,),
  - a specific **Separation** of your gradient (see [more details](#) below).
- c) If you are working with very bright out of gamut colors (that cannot be displayed by your monitor), select **Desaturate display** to make all the colors darker, so you can more easily check the transition to those out of gamut colors.
- d) When viewing a **Separation**, you can:
- Choose the **Separation** to view.
  - See the separation as a **Color Map**. You can choose to display it:
    - White to Black** (where white has the lowest percentage of that separation and black the highest),
    - White to Red,**
    - Black to White,**
    - Black to Red,**
 as a **Rainbow** gradation (where the lowest to highest separation percentages are indicated in the following order: black, blue, green, red, white).

For example, you can view a Cyan separation as a **White to Red** map (where red is where the most Cyan is).



- Adjust the **Scale** slider to highlight different levels of your selected separation. The **Maximum** percentage you pick on the scale (and any percentage above that) is shown with the "highest" color.
- For example the color map will look different if you choose to highlight anything above 5% Cyan or anything above 50% Cyan (shown below from **White to Red**).



5% Cyan and above



50% Cyan and above

- Select **Highlight values above maximum** to show the areas above your selected maximum percentage in a different color (for example black in a **White to Red** color map).



## 13. Working with Screens and Curves

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If you have a license to make printing conditions, you will see a **Screens and Curves** library in the [navigation pane](#), containing three categories:

- Screens.
- Curves.
- Printing Conditions.

You can learn more about this in the [Print Control Wizard documentation](#).

**Note:** If you are [working with a data center](#), you will need to unlock the database before making any changes to screens, curves, or printing conditions. See [Making Changes to the Database](#) on page 69 for more information.



## 14. Working with Proofer

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**Important:** You first need to [connect your Color Pilot to your Esko Proof Server](#).

Once these applications are connected, you can do the following in Color Pilot:

- [color manage](#) your proofer(s) to match the colors on your press as closely as possible (by [creating a profile](#) and a color strategy, and [checking your output](#)),
- [see details and status information](#) about your proofer(s),
- [monitor and maintain](#) your proofer(s)' output quality,
- perform other color management tasks ([refine your spot colors](#) or [proof an ink book](#)).

**Note:** If you are [working with a data center](#), you will need to unlock the database before making any changes to your proofer(s)' color settings. See [Making Changes to the Database](#) on page 69 for more information.

### 14.1. Color Managing Your Proofer

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**Note:**

Before you start color managing your proofer, make sure that it is correctly set up in Command WorkStation (the client application of the Esko Proof Server). It should:

1. be added as a **Printer**, and have a workflow made from the **Esko Proofing workflow** template set up for it,
2. have all the settings (about the device, substrate, etc) correctly filled in,
3. have an [EPL linearization file](#) attached to it.

Please see the Esko Proof Server documentation on the [Pack Proof documentation page](#) for details.

To color manage the output of your proofer (so that it matches the colors on your press as closely as possible), you need to do the following:

1. [Create a profile](#) for your proofer.
2. Create a color strategy with your **press profile** as input profile, and your **proofer profile** as output profile.

You can either:





- [create a proofing color strategy](#) from the [Color Strategies Library](#),
  - create a basic color strategy [when profiling your proofer](#) and [edit it](#) later in the **Color Strategies Library** to fine tune its color management settings.
3. Check how well your color strategy reproduces your press' colors on your proofer using the [Check Strategy tool](#).


**Note:**  
 After your proofer is set up and you are using it in production, make sure to regularly check that its color reproduction is still satisfactory (we recommend you do this weekly).  
 See [Detecting and Correcting Proofer Drift](#) on page 406.

## 14.2. Your Proofing Device(s)

To see your proofer(s) in Color Pilot, click **Proofers** under **Devices** in the navigation pane. This shows a list of all proofers connected to the Esko Proof Server.

For each proofer, you can see:


- an orange icon  if there is an [unfinished profile](#) attached to your proofer (if you started making a profile earlier on but didn't complete the process),
- the **Proofer Name**,
- its **Ink Set**,
- its **Output Profile Name** (if you have already [created a profile](#) for it),
- the **EPL Filename** of the [linearization file](#) it uses,
- its **Status**:
  -  if it's correctly set up (recently profiled, successfully recalibrated...),
  -  if you need to either finish setting it up (it doesn't have a finished profile yet) or check it (it was profiled, checked or recalibrated more than 2 weeks ago),
  -  if there is something wrong that you need to fix (the last recalibration failed, the profile is extremely old...).
- the date it was **Last recalibrated on** (see [Detecting and Correcting Proofer Drift](#) on page 406 for more information about recalibration).



**Tip:** If you added a proofer, or made some changes to one of your proofers on the Esko Proof Server, click the **Refresh Proofers**  button in the bottom tool bar to see those changes in Color Pilot.

### Proofer Details

Select a proofer to see more information at the bottom of the main pane.

At the bottom left you can see additional details about your proofer (an icon of your proofer series, the proofer **Type**, its **Paper Width** and a more detailed **Status** if applicable).

The status can show:	if:
	<ul style="list-style-type: none"> <li>• the proofer was recently profiled</li> <li>• the profile was recently checked with a positive result</li> <li>• the profile was recently recalibrated successfully</li> </ul>

The status can show:	if:
	<ul style="list-style-type: none"> <li>the proofer doesn't have a profile yet</li> <li>the profile was set more than 2 weeks ago and hasn't been recalibrated yet. Note that you can change this period in the Preferences.</li> <li>the last recalibration is outdated (older than 2 weeks)</li> </ul>
	<ul style="list-style-type: none"> <li>the last relinearization on the proofer failed</li> <li>the last check on the proofer failed</li> <li>the last recalibration on the proofer failed</li> </ul>

### Proofer History

At the bottom right of the main pane, you can see a history of all the color management actions performed on/with that proofer. These can be:

- *profiling* the proofer,
- *relinearizing* the proofer profile,
- *checking* the proofer profile,
- *recalibrating* the proofer profile,
- *restoring* a recalibration,
- *resetting* a recalibration.

When the **Action** involved measuring (for example for a profile check), you can see the **Average Delta E** and the **Maximum Delta E** that were measured.

By default the actions are sorted by **Date** (with the most recent at the top), but you can sort on any other column.

### Proofer History Details

To see even more details, double-click your proofer (or right-click it and select **Open**). Then select an action in the history to show more information underneath (for example, for a recalibration: when was the proofer recalibrated, with which profile and linearization file, how many recalibration cycles were done, what were the final Delta E values...).

To go back to the **Proofers** view, click **Done**, or click the **Proofers** link at the top of the main pane.

## 14.3. Creating a Profile for Your Proofer

You first need to set your proofer up in Fiery Command Workstation (the client application of the Esko Proof Server): set the substrate, the EPL file, and proofer-specific options... (see the Esko Proof Server documentation on the [Pack Proof product page](#) for more information). After that, you can create a profile for your proofer in Color Pilot.

You create a profile by printing a chart containing many color patches made up of different ink combinations, then measuring that printed chart with a spectrophotometer to know how your proofer printed those ink combinations.







This doesn't only tell you how your proofer prints, but also the range of colors (or gamut) you can achieve with that particular proofer and substrate.

You can either create a proofer profile:

- from the **Proofers View**, when setting up your proofer,
- from the **Profiles Library** (see [Profiling Your Proofer](#) on page 148).

To profile your proofer from the **Proofers View**:

1. If your proofer...

<p>... does not have a profile assigned, you will see an orange question mark next to its picture.</p> <p>Click the  <b>Set Profile</b> button in the bottom tool bar.</p>	
<p>... already has a profile assigned, you will see a green check next to your proofer picture.</p> <p>You can still change or update the profile if desired. Click  <b>Set Profile</b> in the bottom tool bar.</p>	
<p>... has an outdated profile, you will see a red cross next to its picture.</p> <p>Click the  <b>Set Profile</b> button in the bottom tool bar to change or update the profile.</p>	

2. In the **Set Profile** dialog that opens, choose to either:

- **Create a new profile.**

**Note:** For the most accurate printing results, we recommend you create a custom profile for your proofer, describing the exact setup on your proofer (ink set, substrate, linearization file...).

- **Use an existing profile**, then select the profile to use in the list below.



**Attention:**

By default, you only see existing profiles made for settings that match your proofer (same linearization file, which also means same ink set and same substrate).

You can deselect **Only show profiles with matching linearization** to see more profiles (with the same ink set but made for other substrates and without/with another linearization file), but **we recommend you don't use one of those**, as it may cause color deviations.

- If your proofer had a profile with a successful recalibration, changing to a different profile will also remove the recalibration.
- However, if you switch back to a profile with a linearization or successful recalibration, you can automatically restore that relinearization or recalibration, if the profile was used on your proofer within the last two weeks.

- If the profile wasn't used within the last two weeks, you will be able to start a [check and recalibrate procedure](#) for it on your proofer.

Note that by default, recalibrations become outdated after two weeks. You can change this period in the Preferences.

If you have selected an existing profile, the profile is assigned to your proofer.

If you chose to **Create a new profile**, continue with the following steps.

**3. The Measure Profile wizard opens.**

It will guide you through the profile creation in three steps:

- [Get Started](#)
- [Measure](#)
- [Summary](#)

**4. At any time, you can save your unfinished work and continue later.** This way you can perform other tasks in the meantime, or safely close the Color Pilot and resume the session after starting up the application again later.



**Attention:**

You can only save one unfinished task per proofer, whether it is a profile, check and recalibration, or a spot color refinement.

This means that you cannot save another unfinished task before either finishing or discarding the first one.

a) Click **Quit Now and Continue Later**. Confirm your choice by clicking **Yes**.

The profiling wizard will close and you will see a badge next to the proofer name:

- : indicates that the profile is unfinished.
- : indicates that an error has occurred, or that the measurement job was cancelled on the proofer.

You can also see the badge on the **Set Profile** button in the bottom tool bar when you select the proofer for which you started the profiling.

b) When you are ready to resume the profiling, click **Set Profile** and then select **Resume unfinished profile**.

This will resume the wizard from the point you saved. However, you cannot go back and change earlier settings.

**Note:**

- At any point, you can click **Quit Now and Continue Later** again to save your unfinished profile in a different state (this discards the previous state of your unfinished profile).
- If you want to discard your unfinished profile and start creating a new profile instead, click **Start New Session**.

### 14.3.1. Get Started

In the **Get Started** step of the **Create Profile** wizard, you print a profiling chart adapted to the ink set you are using (and the substrate set in Fiery Command WorkStation) on your proofer.

1. Color Pilot selects the chart best suited to your proofer settings and displays a preview.

For multi-page charts, you can use the **Page** arrows at the top to view the different pages.

**Note:**

If you have selected [Enable overprint chart selection when creating a proofer profile](#) in the Preferences, you can define the profiling chart to use yourself.

See [Using a Custom Profiling Chart](#) on page 150.

2. If desired, adjust the proof settings to change how the chart will be printed:
  - a) Click **Proof settings...** under the chart.
  - b) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
  - c) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
  - d) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
  - e) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
    - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.
    - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see feedback until the moment your chart is sent to the Proof Server, but no feedback that it has been proofed).
  - f) Click **OK**.
3. Click **Proof Chart** to send the chart to the Esko Proof Server and output it on your proofer.
4. Click **Next** to go to the **Measure** step.

## Using a Custom Profiling Chart

If you have selected [Enable overprint chart selection when creating a proofer profile](#) in the Preferences, you can define the chart you want to use for profiling your proofer:

1. Choose the **Chart Size** to use (**Normal** or **Large**).

When choosing **Large**, the chart will contain more combinations of ink percentages (this is only available when profiling a CMYK proofer).

2. In **Layout Type**, select the chart [layout](#) that you want to print.

- If you want a chart generated on demand, choose **Automatic**.

This takes into account your ink set, your substrate width and the dimensions that your spectrophotometer can measure (if your spectrophotometer is connected).

**Note:** If your chart is much narrower than the substrate (for example if it is generated for a Barbieri Spectro Swing, that can only measure narrow sheets), your chart print out will contain extra margins and cutting lines.

When working with a chart generated on demand:

1. Select the **Patch Set** to use:

- if you are profiling a CMYK proofer, you can choose between **IT8.7/3**, **ECI 2002** and **Normal (non\_uniform, 3 inks + K)**,
- if you are profiling a multicolor proofer, you can choose between **Normal** (a larger patch set containing more CMYK patches), **Equinox** (a smaller patch set containing slightly more extended gamut inks -for example OGV when profiling a CMYKOGV proofer) patches, or additional patch sets for certain proofers,
- if you have created a [custom patch set](#) for your proofer's ink set, you can select it here.

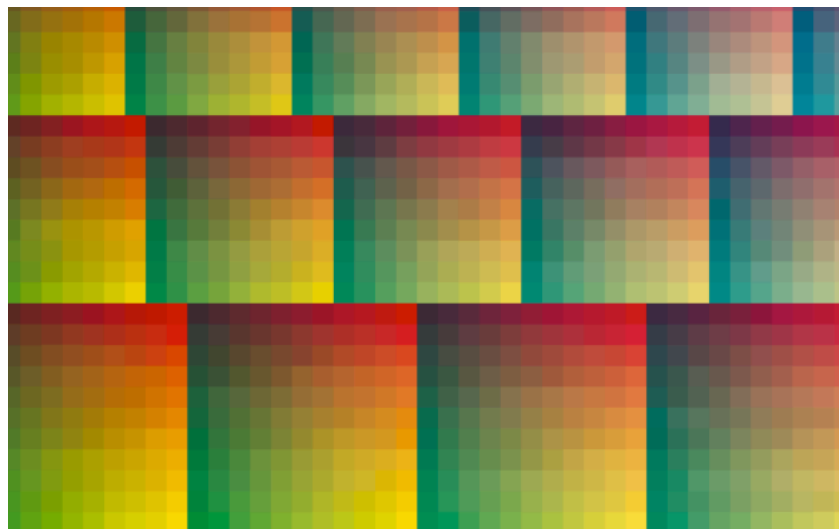
2. Choose how many times you want **Print Each Patch** (you can set a number from 1 to 5).

If you print each patch several times, Color Pilot can **average** the values of several measurements for each patch, to minimize the effects of potential printing problems or bad measurements.

3. Select whether to **Randomize patches** when printing your chart. This will "scramble" the patches instead of printing them in the order of a gradation.

We recommend you do this if your proofer has noticeable printing variations (for example left to right, or sheet start to sheet end printing differences).

If for example you have "color jumps" near the line endings, a regular chart like the one below can concentrate all of the color jump in one area of the profile,



while a randomized chart like the one below will distribute the color jump in more of the profile (which can be partially compensated by averaging if you print your patches several times).



**Tip:** If your proofer prints very evenly (if for example it is a brand new proofer that still prints exactly as per your proofer vendor's specifications), you don't need to print each patch several times or randomize your patches.

- If you want to print an existing chart that you are used to work with, choose **Predefined (legacy)**.

**Note:** If you are working with a Barbieri Spectro Swing spectrophotometer, you can only use legacy charts when measuring a CMYK or CMYKOV profile.





**Attention:** You will only be able to measure this type of chart using the M0 [measurement condition](#), as legacy charts are not adapted to support the dual measurement (measuring with and without UV filtering) required by the M1 and M2 measurement conditions.

When working with a predefined chart, choose the **Overprint Chart** to use (this determines the type of layout your chart will use).

**Note:**

You should choose your chart based on:

- The type of spectrophotometer you will be using to measure the chart.  
If the spectrophotometer is connected, only the appropriate charts are shown.
- The web width available to print the chart.
- The number of patches you want to measure.

**Note:** Charts generated on demand have corner marks, predefined charts have crosshairs.

3. You can see a **Preview** of your chosen chart and some information about it.

**Tip:**


- Click the **View Chart** link to open the chart in the default application for PDF files defined by the operating system.
- Click the **Show File Info** link to open a pop-up showing more information about the chart file (location, name...). You can also open the folder containing the chart file from this pop-up.

## 14.3.2. Measure


In the **Measure** step of the **Create Profile** wizard, you will:



- measure the chart you printed,
- check the measurements,
- name the profile,
- create color strategies outputting to your profile.

1. On the **Measure Page ...** screen you see a preview of the chart.



Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action.

As the patches are measured, you can see a diagonally split view of each patch , with the measured color at the bottom right and the expected color at the top left.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1i0 spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1i0 will use your chosen mode until the end of the current page.

**Tip:**

- After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):
- Go back to the page you have just measured using the back arrow.
  - Right-click the chart preview and select **Save Page Measurements...**
  - Choose a location to save your measurements file (with the `.txt` extension).




**Tip:**

- Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.
1. Make sure that your measurement file:
    - is of the correct page of your chart (if it has several pages),
    - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
  2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

2. After measuring the chart, you will see the **Check Measurements** screen.

On this screen, you can:

a) Inspect your measured data:

- Change the view to **Layout** or **Profile**.
  - The **Layout** view displays the patches as they have been measured on the chart. This can be useful to locate a particular patch on the chart.
  - The **Profile** view displays the patches as they are organised in the profile. This view is useful to spot inconsistencies in the profile.
- Zoom in  on a chart area, zoom out  or fit the whole chart in the preview ,
- Click a patch to see its color values (in the profile's inks and in Lab).

b) Troubleshoot your measured data:

- Re-measure a patch: click a patch then click **Measure again...** Follow the instructions in the **Measure patch again** dialog.

**Note:**

Re-measuring a patch is only useful if there has been a bad measurement:

- For errors on the printout, use the **Repair** function instead.
- For a larger number of errors, re-run the profiling wizard and re-measure the entire chart.

- Repair a patch: click a patch in **Profile** view then click **Repair** (or use **Ctrl+R**). The correct measurement is calculated based on data from the surrounding color patches.
- Use **Find and Repair Bad Measurements...** to automatically detect and (optionally) repair bad patches in your chart.

See [Find and Repair Bad Measurements](#) for details.

c) View some statistics about your proofer's stability (if you are profiling a CMYK, CMYKOG, or CMYKOGV proofer).

See [Checking Your Proofer's Stability](#) on page 157.

**Note:**

Those statistics are not available if you are using a [custom profiling chart](#) and you chose to either:

- use a [legacy chart layout](#),
- use a [normal](#) or [custom](#) patch set for your multicolor proofer,
- not [randomize](#) your chart patches.

**3.** Click **Next** when you are done checking the measurements.

**4.** On the **Select Profile Name** screen:

a) Enter a **Profile Name**.

A default name based on the proofer model and inks is filled in.

- b) Enter a **Description** if desired.
- c) If you want to add keywords to find the profile more easily later, select **Add keywords** and enter your **Keywords**.

Keywords based on the proofer information (model, inks, EPL...) are filled in by default.

5. Click **Next** when you are done.

6. On the **Create Color Strategies** screen, you can create color strategies that have the profile you are creating as output profile. You can use these color strategies later to color manage files that you send to your proofer.

- a) Select the **Create color strategies** option.

By default, the wizard creates at least one color strategy, with:


- the output profile being the profile you just created,
- the input profile (**Press Profile**) being either the **<Same as Output Profile>**, or the default input profile you set *in the Preferences*.

- b) If desired, click **+** to create more color strategies.

Select the input profile to use for each new color strategy.

If you want to delete a color strategy, select it and click **-**.

- c) Edit your new color strategies as desired:

- To rename a strategy, select it, click its name and type the new name (by default, color strategies are named using the profile name and the ink set used).
- To choose a different input profile (**Press Profile**), click **Select** and select your desired profile from the color database.
- To remove the current input profile and have it be the **<Same as Output Profile>**, click the cross .
- If your input and output profile are different, you can select a **Rendering Intent**. It will be used by the color strategy to convert out-of-gamut spot colors and the background color (see *Rendering Intent* on page 225 for more information).

By default, the rendering intent you set in the *Preferences* is selected. Click the small arrow **▼** to select another one.

7. Click **Next** to go to the **Summary** step.

You will see a pop up with a progress bar while Color Pilot creates your profile and color strategies.



## Find and Repair Bad Measurements

You can use **Find and Repair Bad Measurements...** to automatically detect (and optionally repair) bad measurements in your chart.

This detects isolated patches in your profile that differ substantially from patches with similar ink combinations, and can be attributed to spectrophotometer malfunction or misalignment, abnormal measurement conditions, or even damage to the physical print-out itself.

It is particularly useful when working with randomized charts (as the bad patches are not immediately obvious against their neighbors in **Layout View** because they have been randomized).

You can always perform additional *repairs* based on visual inspection of your chart.

1. Click **Find and Repair Bad Measurements...** on the **Check Measurements** page of the **Measure Profile** wizard.  
If bad measurements are detected in your chart, the **Repair Bad Measurements** dialog opens.
2. In the **Repair Bad Measurements** dialog, you can cycle through bad patches by using the  and  buttons.

For each bad patch you can see:

1. The patch status. This can be **Not Repaired**, **Repaired**, or **Remeasured**.
2. The ink combination used to generate the patch.
3. The patch's **Lab** values before and after repair.
4. A small preview area showing the color difference between the Lab values before and after repair.
5. The **delta E** between the Lab values before and after repair.

**Note:** Patches with high delta E values are likely in need of repair, while patches with lower delta E values may be acceptable, particularly in darker areas of the profile, where sampling performed by the application is sparser and spotting a bad measurement can be difficult.

6. A small preview area showing the patch centered next to its neighboring patches in the profile.  
You can use this to visually verify that the patch is actually bad, and to facilitate the task of locating the patch in your profile chart.
3. For each bad patch that you inspect, you can:
  - a) Click **Repair (Ctrl+R)** to repair the patch.  
The patch is immediately repaired. The patch status changes to **Repaired**, and all preview areas are updated. The **Repair (Ctrl+R)** button changes to **Undo Repair**.
  - b) Click **Undo Repair** to revert the repair.
  - c) Click **Measure again...** to re-measure the patch.  
This opens the **Measure patch again** dialog. To re-measure the patch, follow the instructions in the dialog.
  - d) Double-click **Repair** to revert to the original measurement.  
The patch status changes to **Not Repaired**.

You can also click **Repair All (x)** to automatically repair all patches, where x is the number of bad patches detected. The **Repair All (x)** button changes to **Undo Repair All (x)**.

To accept the repairs, click **OK**. If you want to revert the repairs later, you will have to re-measure the chart.

### Checking Your Proofer's Stability

If you are profiling a CMYK, CMYKOG, or CMYKOGV proofer, you can view statistics about your proofer's stability in the **Proofer Stability** area of the **Check Measurements** screen.

These statistics will help you know what to expect of your proofing setup (proofer and spectrophotometer) in terms of color accuracy, as your best proof can only be as color accurate as your proofing setup.

They will also highlight any potential color accuracy problem with your proofer's individual inks.

To calculate these statistics, Color Pilot adds some duplicate patches in different areas of your profiling chart, and calculates the **Delta E** difference between those duplicate patches when you measure them.

It adds duplicate patches for:

- each of the profile's inks (the solid patch and at least one tint patch per ink),
- different levels of grey (using black and/or combinations of other inks),
- the substrate.

The exact set of duplicate patches (including how many times they are duplicated) depends on your proofer, chart layout and ink set.

The average values of the duplicate patches are used to calculate the profile, to make it more representative of how your proofer prints.

**Note:**

- You will see these statistics if you are using the chart that *Color Pilot generated automatically* for profiling.
- If you are using a *custom chart*, you will only see these statistics if you are using:
  - an *Automatic Layout Type* (as this layout includes stability patches),
  - an *Equinox Patch Set* (as this patch set includes stability patches),
  - *Randomize Patches* (as the additional stability patches need to be distributed across the chart to be representative of how your proofer prints).

To check your proofer's stability:

1. Select the **ΔE Formula** you want to use to calculate the color differences.  
By default, Color Pilot uses the Delta E formula you chose *in the Preferences*.
2. Check the **Average ΔE** and **Maximum ΔE** for:

<b>All Patches</b>	This gives you an idea of the general stability of your proofing setup (proofer and spectrophotometer).
The <b>Substrate</b>	This gives you an idea of your spectrophotometer's stability (as no ink is printed).
Each of your proofer's inks	This gives you an idea of how stable each ink is (as for a same proofer, some inks can be very stable and others a lot less).  For inks with higher Delta E values, we recommend you check your print head alignment (as this can in some cases be the cause of the color accuracy problem).

The **Average ΔE** is the average of the Delta E values found between all duplicates of a certain patch (for example the substrate patch), or of a group of patches (for example all duplicates of the Yellow solid and tints patches).

The **Maximum ΔE** is the maximum Delta E value found between those duplicate patches/groups of patches.

**Tip:**

If you have several proofers, you can use the stability results to decide which proofer to use for each job.

For example, if the yellow of one of your proofers has higher Delta E values, you can send jobs containing a lot of yellow to the other proofer.

### 14.3.3. Summary

On the **Summary** screen, you will see a summary mentioning the profile and any color strategy created.

1. Select **Continue to Strategy Check** if you want to check how well the color strategy/one of the color strategies you just created reproduces your press' colors on your proofer.
2. Click **Finish** to close the wizard and save the profile.
3. If you chose to **Continue to Strategy Check** and you created several color strategies, select the one you want to check in the pop-up that opens.

Color Pilot then opens the **Check Strategy** wizard. It will guide you through the strategy check in two steps:

- [Get Started](#) on page 246
- [Measure](#) on page 246

## 14.4. Checking Your Color Strategy

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Once you have made a [profile](#) and a [color strategy](#) for your proofer, you can check how well your color strategy reproduces your press' colors on your proofer using the **Check Strategy** tool.

You can do this either:

- from the **Proofers View** (as explained below),
  - [when profiling your proofer](#),
  - from the **Color Strategies Library** (see [Checking Your Proofing Color Strategy](#) on page 245).
1. Right-click the proofer you are working with and select **Check Strategy...**

**Note:** If this option is not available, make sure that your proofer has an [EPL linearization file](#) and a [profile made](#) using that EPL.

2. If you have created several color strategies for this proofer, select the one you want to use.

By default, you can only see proofing color strategies:

- whose output profile has the same ink set as your proofer,
- whose output profile was made using your proofer's EPL linearization file.

**Note:**

For better color accuracy, we recommend you use a color strategy whose output profile is your proofer profile, made using your proofer's EPL linearization file.

However, it is possible to check another color strategy: deselect **Disable strategies that do not match the proofer's EPL** to show all proofing color strategies that have an output profile matching your proofer's ink set.

3. The **Check Strategy** wizard opens.  
It will guide you through the strategy check in two steps:
  - [Get Started](#) on page 246
  - [Measure](#) on page 246

### 14.4.1. Get Started

In the **Get Started** step of the **Check Strategy** wizard, you print a test chart (whose patches have been converted through your chosen color strategy) on your proofer.

1. Color Pilot displays a preview of the test chart.  
  
This chart is based on the ISO 12642-2 chart, and contains a randomized subset of your strategy's input profile patches.  
  
If you are working with a multicolor profile, the ISO 12642-2 chart is extended with patches that include the multicolor inks.  
  
You can use the **Page** arrows at the top to view the different pages.
2. If desired, adjust the proof settings to change how the chart will be printed:
  - a) Click **Proof settings...** under the chart.
  - b) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
  - c) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
  - d) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
  - e) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
    - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.
    - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see feedback until the moment your chart is sent to the Proof Server, but no feedback that it has been proofed).
  - f) Click **OK**.
3. Click **Proof Chart** to send the chart to the Esko Proof Server and output it on your proofer.




4. Click **Next** to go to the **Measure** step.


## 14.4.2. Measure



In the **Measure** step of the **Check Strategy** wizard, you will measure the chart you printed and check the measurements.

1. On the **Measure Page ...** screen you see a preview of the chart.



Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action.

As the patches are measured, you can see a diagonally split view of each patch , with the measured color at the bottom right and the expected color at the top left.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

### Note:

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1i0 spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.Your i1i0 will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**


2. When you are done measuring the chart, you can inspect the results in detail in the **Check Measurements** screen.

See [Checking Your Measurements' Results](#) on page 248 for more information.

3. When you are done inspecting, click **Finish** to close the **Check Strategy** wizard.

### Checking Your Measurements' Results

When you are done measuring your Strategy Check chart, you can inspect the results on the **Check Measurements** screen.

1. For each patch in your chart, you can see:
  - a patch number,
  - the expected and measured patch color ,
  - the expected color's composition in the input profile's inks,

**Tip:** You can check this to see if there are specific areas of the input profile that your proofer has trouble reproducing (for example, if all the colors containing 100% black fail, your proofer may not be able to reproduce your darkest colors accurately).

- the **Predicted ΔE** between the input color and the output color calculated by the color strategy,

**Note:**

- By default, any predicted *Delta E* value that is lower than *your chosen tolerance for proofing strategies* is shown as *Less than* your tolerance.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail *in the Preferences*.



- The Delta E formula used to calculate the **Predicted ΔE** and the **Measured ΔE** is the one *from your chosen color strategy* (you can see it at the bottom of the screen).

- the **Measured ΔE** between the input color and the output color measured on the proof,

**Tip:**

Click the arrow in the column header to see other color difference measurements, (**Measured ΔH, Measured ΔCh** or **Measured %ΔT**).

See *Other Color Difference Indicators* on page 31 for more information.

- whether the measured color values pass all your relevant *tolerances*  or fail one or more of them .

**Note:** If you have *disabled some tolerances* and there is no tolerance relevant for a particular patch (for example the **Substrate** tolerance for the substrate patch), this patch won't have a **Status** icon.



**Tip:** Hover on a fail status icon to see which tolerance(s) the patch didn't meet.

You can sort the patches by any of those columns.

2. To view the measured chart (with split patches), select **Measurements** in the **View** field at the top of the screen.

**Tip:** Hover on a patch to see its composition in the input profile's inks.

3. In both the **Samples** and the **Measurements View**, you can see information for / **Highlight** different sets of patches (at the top right):
  - **All** patches
  - the **Patches with above average ΔE**
  - the **Substrate** patch
  - the **Primaries** patches
  - the **Process Solids** patches
  - the **Control Strip** patches

- the **CMY Neutrals** patches
  - the patch with the **Maximum  $\Delta E$**
  - the **Worst 5 Percent** patches
  - the **Outer Gamut** patches
  - the **CMYK** patches (if you are working with a multicolor input profile)
4. If you select a patch in the samples list or the measured chart, you can see more information at the bottom left, including:
- the **Lab** and **LCh** values of the **Target** and **Measured** colors,
  - all the color difference statistics for this patch (**Predicted  $\Delta E$** , **Measured  $\Delta E$** , **Measured  $\Delta H$** , **Measured  $\Delta Ch$**  and **Measured  $\% \Delta T$** ).
5. If you are checking a color strategy that uses a *relative colorimetric rendering intent* (that doesn't simulate your press' substrate color on your proofer), you can choose to adjust your target color values to what you can reproduce on your proofer paper without simulating the press substrate. To do this, select **Adjust target Lab for proofing paper color**. This recalculates all target Lab/LCh values and color difference values.
6. You can also see the  **$\Delta E$  Formula** used for the Delta E calculations. This is the one *set in your tolerances*.
7. At the bottom right of the screen, you can see statistics for different sets of patches, and whether they pass your tolerances or not.
- The **Strategy Statistics** tab displays:
    - the **Average** Delta E
    - the **Maximum** Delta E
    - the **Maximum** Delta E of the **Best 95 %** of the patches (everything except the worst 5%)
  - The **Statistics per Ink** tab displays the  **$\Delta E$** ,  **$\Delta H$**  and  **$\% \Delta T$**  values for your input profile's CMYK channels.
  - The **Other Statistics** tab displays:
    - the **Substrate** Delta E
    - the **Average** Delta E of the **Control Strip** patches
    - the **Maximum** Delta E of the **Control Strip** patches
    - the **Average** Delta E of the **Outer Gamut** patches
    - the **Average** Delta H of the **CMY Neutral** patches
    - the **Average** Delta Ch of the **CMY Neutral** patches
    - the **Maximum** Delta Ch of the **CMY Neutral** patches
- Next to each statistic, you can see your corresponding tolerance in brackets, and the pass  or fail  status (unless *you disabled* the corresponding tolerance).
- You can also see a general pass or fail status for each statistics tab (the status shows fail if one of the statistics didn't meet its corresponding tolerance).

8. To view or change the tolerances used for the Strategy Check, click **Set Tolerances**.

By default, the tolerances you set in the [Preferences](#) are used here, but you can edit them as desired.

In the **Set Tolerances** pop-up, you can:

- select what kind of tolerances you want to use: **ISO 12647-7:2016 Contract Proof**, **ISO 12647-7:2007 Contract Proof**, or **Custom** ones,
- define individual tolerances, and enable/disable them as desired (when choosing **Custom**),
- choose the **ΔE Formula** to use for calculating Delta E values (you can choose a Delta E formula or use the one [from the color strategy](#) you are checking),
- save your settings to the [Preferences](#) to use the same tolerances and Delta E formula next time you do a Strategy Check.

9. You can see a general pass or fail status icon at the bottom of the **Check Measurements** screen.



10. If desired, you can **Save a report** containing the result of your Strategy Check (including the detailed information you can see on the screen).

- a) Click **Save report** at the bottom of the screen.
- b) Browse to your desired location.
- c) In **Save as type**, select either **PDF Files (\*.pdf)** or **Text Files (\*.txt)** depending on which file format you want the report in.  
For example, you may want a text file to send to an MIS system, but a PDF report to show to a colleague or customer.
- d) Click **Save**.

If your Strategy Check failed, see [If the Strategy Check Fails](#) on page 251 for troubleshooting tips.

## If the Strategy Check Fails

If your strategy check [fails](#), you can investigate the cause of the failure and in some cases correct it.

### Different Gamut Sizes

If your color strategy is trying to reproduce the output of a press that has a large [gamut](#) using a proofer with a smaller gamut, some of your press' colors will not be reproducible by your proofer.

To check whether this is the cause of the problem, you can perform a [gamut check](#).

If it does turn out that your proofer's gamut is too small to reproduce all of your press' colors, trying using a different proofer with a wider gamut (you will need to make a [proofer profile](#) and a [color strategy](#) outputting to that proofer profile).

### Outdated Proofer Profile

If your proofer profile is older than 2 weeks, it may not reflect how the proofer prints as accurately as when you created it. In this case, we recommend you [check and recalibrate](#) your proofer profile.

If your strategy still fails after this, you should [create a new profile](#) for your proofer (and [update your color strategy](#)).

### Failure in Different Areas

The [type of patches](#) that causes your strategy to fail can also indicate what the problem might be.

- If the gray patches (**CMY Neutrals**) are failing, it may mean that your proofer is unstable.

Try comparing colors on proofs generated at different times (for example first thing after turning the proofer on, and after it has run for a while), and if needed contact your proofer vendor for assistance.

- If the failing patches are mostly in the shadows, your proofer profile resolution may not be high enough.

You should [inspect](#) the dark areas of your profile, and if needed [create a new profile](#) for your proofer (and [update your color strategy](#)).

- If single channels patches (**Primaries**) are failing, it may mean that your proofer has mechanical stability issues (typically with the paper feed, paper tension or print head alignment). Contact your proofer vendor for assistance if needed.

If those patches still fail after correcting the mechanical issues (especially the yellow patches), try using a [Delta E formula](#) other than **CIELAB Delta E (Classic)** (as color differences in the yellow areas seems larger when using this formula than what they appear to the human eye).

## 14.5. Detecting and Correcting Proofer Drift

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When using a proofer to simulate a press, it is very important to know how your proofer prints, and manage this over time. Otherwise it is impossible to accurately proof jobs.

[Profiling your proofer](#) is a good initial step, but over time environmental factors can make your proofer drift from its profile significantly, causing colors to look different than expected.

Since making a profile can be quite time consuming, you can instead **check** if the proofer is still in line with its profile, and if necessary, perform some changes to the profile to **recalibrate** it so that it accurately represents the proofer again.

When checking and recalibrating your profile instead of completely re-profiling your proofer, you don't need to update your color strategies with a new profile.

The **Check and Recalibrate** wizard consists of (up to) three steps:

1. **Relinearization**
2. **Check**
3. **Recalibration**

### Relinearization

When setting up your proofer in Command WorkStation (the client application of the Esko Proof Server), you should have assigned an [EPL linearization file](#) to it. See [this knowledge base article](#) for more information.

An EPL linearization file adjusts how your proofer prints to get best results on a certain substrate (it adapts the quantities of inks used so that your proofer can achieve maximum color density without hue shifts).

However, once your proofer drifts, the adjustments from the EPL file are not adapted to its current state anymore.

**Relinearization** is an optional step that checks if the inks in your proofer print as defined in the profile, by:

1. printing a chart containing tints of all of the proofer's inks (only pure inks, no overprints),
2. measuring this chart to check for density or hue shifts (you can set tolerances for these shifts in the [Preferences](#)).

The relinearization can correct most mild shifts, but if the inks are different from the inks in the profile, or if your printing nozzles are clogged up, you can only fix that on the proofer itself, not by running a wizard (however, the wizard will detect this and give you a recommendation).

In some cases, the relinearization will be sufficient to correct the proofer drift (but you should still perform a **Check** afterwards to know if that is the case).

In other cases, you will also need to recalibrate, to correct the overprints too.

**Attention:**

If your proofer is not operating under average conditions (for example if you have just started it up), you should not relinearize or recalibrate as you would be correcting your profile wrongly, pulling it further from its normal state.

You can however perform a check if you want to see how differently your proofer prints at that moment.

To include a relinearization step in your Check and Recalibrate procedure, you need to enable it in the [Preferences](#).

### Check

In the **Check** step, you:

1. print a one-page variable test chart based on your original profile and your spectrophotometer (containing a sample of the chart used to make the profile),
2. measure it to check if it meets the color tolerances you have set in the [Preferences](#).

If you are satisfied with the level of color difference between the measured chart and the profile, you can stop after the **Check** step. If you aren't, you can perform a **Recalibration** step.

### Recalibration

In the **Recalibration** step, the wizard applies a correction to fix the drift found in the **Check** step.

After recalibration, you evaluate if the color differences have improved enough. If they haven't, you can perform another recalibration step.

When you are satisfied with the results of the recalibration, you can save that recalibration. It will be attached to the combination of proofer and profile.

**Note:** If you have recalibrated your profile successfully but later switched your proofer to a different profile, your recalibration is not lost. If you switch back to the recalibrated profile within a two weeks period, Color Pilot will propose to restore your recalibration automatically.

### Checking and Recalibrating Inline or Offline

Certain proofers have a built-in spectrophotometer, which allows for inline measurement (the color is measured automatically, while the printout is still in the proofer).

You can choose to relinearize, check and recalibrate those proofers using an automated procedure: you just set your tolerances and click **Start**, and the wizard does the rest.

See [Automatic Check and Recalibrate \(Using Inline Measurement\)](#) on page 409.

For other proofers, or if you prefer to have the flexibility to do more or less recalibration cycles once you start seeing the first results, you can use the manual version of the **Check and Recalibrate** wizard.

You will proof a chart, measure it, and decide whether to recalibrate based on the measurements. You can then do more recalibration cycles until you are happy with the results.

See [Manual Check and Recalibrate \(Using Offline Measurement\)](#) on page 412.

## 14.5.1. When to Check and Recalibrate

### Proofing Setup Validation

There is no need to run the [Check and Recalibrate wizard](#) immediately after profiling your proofer, as it is meant to help you correct your proofer drift **over time**.

If you want to **validate your proofing setup** after profiling your proofer, we recommend you create a color strategy with your proofer profile as output profile, and run a **Strategy Check** on that color strategy.

See [Checking Your Color Strategy](#) on page 399 for more information.


### Check and Recalibration Frequency

We recommend you run the **Check and Recalibrate** wizard at regular intervals, weekly or at least every two weeks.

However, it is also a good idea to run the Check and Recalibrate wizard in case a verification fails.

## 14.5.2. Checking and Recalibrating Your Profile

You can check and recalibrate your proofer profile if it is a **spectral profile** (all profiles you make in Color Pilot are spectral). You cannot check and recalibrate XYZ profiles (see [Spectral and XYZ Profiles](#) on page 141 for more information).

1. In the **Proofers** view, select your proofer and click the **Check and Recalibrate**  button in the bottom tool bar.
2. If your proofer supports [inline measurement](#), you will see a pop-up asking you whether to perform an **Inline** or **Manual** check and recalibration.
  - Select **Inline** to use the [automatic Check and Recalibrate wizard \(using inline measurement\)](#).
  - Select **Manual** to use the [manual Check and Recalibrate wizard \(using offline measurement\)](#).
3. If you have [chosen](#) to always be asked whether to perform a [relinearization](#) when checking and recalibrating your profile, you will see a pop-up asking you whether to include a **relinearization step** in your Check and Recalibrate procedure.
4. If you see a warning (for example that there is no spectrophotometer connected, or that your proofer doesn't have a drying time specified), correct the cause of the warning and try again.
5. Depending on what you have chosen, you will get either:
  - the [automatic Check and Recalibrate wizard \(using inline measurement\)](#),
  - the [manual Check and Recalibrate wizard \(using offline measurement\)](#).



## Automatic Check and Recalibrate (Using Inline Measurement)

If your proofer supports *inline measurement* and you have *chosen* to use that option, Color Pilot will start the automatic **Check and Recalibrate** wizard.

1. If your proofer model can support either an **ILS20** or an **ILS30** spectroproofer, select which **Spectroproofer Type** is mounted on it.

Color Pilot will generate a chart compatible with your spectroproofer.



### Attention:

- ILS20 models only support the M0 *measurement condition*.
- ILS30 models support M0, M1 and M2.

To get color accurate measurements, you should make sure that the measurement condition set on your spectroproofer matches the one in your proofer profile.

If you get a warning that this is not the case, you should change your (ILS30) spectroproofer's measurement condition in Command WorkStation (the client application of the Esko Proof Server). Please see the Esko Proof Server documentation on the [Pack Proof documentation page](#) for details.

We recommend that when measuring any chart inline, you always check the measurement condition on your spectroproofer (you can [set this in the Preferences](#)).

The next time you check and recalibrate this proofer inline, your spectroproofer type will be remembered.

2. If desired, click **Set Tolerances** to see and/or edit the Delta E and Delta H tolerances for this Check and Recalibrate procedure.

### Note:

The **Tolerances** values are taken from the *Relinearization* (if applicable) and *Check and Recalibrate* Preferences. You can either:

- leave them as they are,
- change them for this Check and Recalibrate procedure only,
- change them and save the changed values to the Preferences (select **Save settings to preferences** before clicking **OK**).

- a) If you have chosen to include a *relinearization* step in your Check and Recalibrate procedure, choose whether you want to:
  - **Always perform relinearization,**
  - **Never perform relinearization,**
  - be asked whether to perform the relinearization step every time (**Ask me every time I start the check and recalibrate procedure**).
- b) If you are including a relinearization step, you can also set **Relinearization Tolerances**:

- In **Overall hue shift**, set how much the measured ink or substrate hue may differ from the corresponding ink or substrate hue in the profile before giving an error (and making the relinearization fail).
  - In **Solid lightness / chroma**, set how much the measured solid density may differ from the solid density in the profile before giving an error (and making the relinearization fail).
- c) Set **Check and Recalibrate Tolerances** for the check and recalibrate steps:

- **Average Delta E**

**Note:** A human eye can generally perceive color differences above 2 Delta E. It is extremely difficult to reproduce colors with an average Delta E below 0.5.

- **Maximum Delta E**
- **Substrate Delta E**
- **Primaries Delta H**
- **Grey Delta E**

If the differences between the values measured in the check step and the values in the profile are over these **Delta E** and **Delta H** tolerances, the wizard will start a recalibration cycle (up to the **Maximum amount of inline cycles** you define).

- d) You can also set the **Delta E Formula** to use during the check and recalibration.

**3.** Click **Start** to start the check and recalibration.

This will:



1. *relinearize* your proofer (if you have chosen to relinearize),

**Note:** If the relinearization fails (if the Delta E and Delta H values measured are over the **Relinearization Tolerances** you set), the wizard will stop and give you a warning.

2. check if the proofer needs a recalibration (by printing a check chart and measuring it automatically),
3. if it does, recalibrate the proofer.

If the results still aren't within the tolerances you defined, a new recalibration cycle is started (up to the **Maximum amount of inline cycles** you defined in the **Tolerances** dialog or the *Preferences*).

**4.** Click **Show Details** to see details of the recalibration in the same window (at the end of each cycle).

In the **Result** column, you will see  if all elements are within your tolerances, and  if some elements are over them.

If some elements are over the tolerances, you will also get a warning that the recalibration failed, and advising you on what to do.

**5.** Click **Show Report** at the bottom of the details area to see the recalibration data.

See *Check and Recalibrate Report* on page 411 for details.

If your recalibration failed, see *If the Recalibration Fails* on page 418 for troubleshooting tips.

### Check and Recalibrate Report

You can find the following information in the report about your [inline Check and Recalibrate](#) procedure:

1. If you have performed a relinearization step, you will see the **Relinearization Results** tab.

a) The top table shows some details about the **Substrate** patch, and each **Ink's** solid patch.

You can see:

- a double patch with the color expected from the profile on the left, and the measured color on the right,
- the **Dot Gain** measured for the profile's inks (if you have relinearized this profile before, you will also see the **Old Dot Gain**, measured in the last relinearization),
- the **Status** after relinearization. This can be:
  - **On target**, if the measurements were identical to the ones expected from the profile, and needed no correction.
  - **Corrected**, if the measurements weren't as expected, but the relinearization could correct the gap.
  - **Hue shift**, if the measurements showed a hue shift that couldn't be corrected (the hue of the ink measured differed too much from the profile ink hue).

**Note:** You can set how much the measured ink hue may differ from the profile ink hue before giving this error (and making the relinearization fail) by changing the **Overall hue shift** tolerance in the [Preferences](#).

- **Density error**, if the measurements showed a density problem that couldn't be corrected (the density of the measured solid differed too much from the solid density in the profile).

**Note:** You can set how much the measured solid density may differ from the profile solid density before giving this error (and making the relinearization fail) by changing the **Solid lightness / chroma** tolerance in the [Preferences](#).

b) The graph shows the **Correction curves** applied by the relinearization for each ink.

Select **Measured points** if you also want to see the chart's measurements on the graph. If you have relinearized this profile before, you can also show the **Old correction curves**, applied in the last relinearization.

c) The wizard also gives you a **Recommendation**.

For example:

- If you have **density errors**, this is generally due to a problem with the inks or the proofer's hardware (for example the ink nozzles may be clogged up).
- If you have **hue shifts**, your inks might be old or come from a different batch than the ones you used to make the profile.

- If your **substrate** measurement is not as expected (the substrate Delta E is higher than your [tolerance](#)), you should check your substrate and/or manually remeasure it (to make sure there is no spectrophotometer error).

Such problems cannot be corrected by the relinearization. You will need to check your inks, substrate and/or your proofer first, fix the problems, then do another relinearization.

**Tip:**

Generally, we recommend that you:

1. Check that the loaded substrate, linearization file and proofer profile match.
2. Check the ink levels on the proofer and replace inks if needed.
3. Perform a nozzle check.
4. If the problem persists, contact your ink and/or proofer vendor.

2. The **Overview** tab shows information about your proofer and the recalibration results:
  - the **Proofer** name, its **Device Profile** and **Linearization File** (.ep1),
  - on the **General** tab: the Delta E and Delta H values after recalibration (compared to the values found by the Check step),
  - on the **Channels** tab: the **Average** and **Maximum** Delta E after recalibration for every **Ink** that the proofer can print (compared to the values found by the Check step),
  - on the **Cycles** tab: the Delta E and Delta H values after each cycle, and whether those meet the tolerances (✓) or not (✗),
  - how many patches are **On target**, cannot be improved further (**Refinement stopped (can't get closer)**) or **Can be refined** (by performing more cycles).
3. The **Samples** tab gives information about all profile patches that were used to recalibrate the device and their **Current State**.

You can select a sample to see how it changed through each **Iteration** in the bottom table.

### Manual Check and Recalibrate (Using Offline Measurement)

If your proofer doesn't have a built-in spectrophotometer, or if it does but you have selected to not use inline measurement when performing a Check and Recalibrate, Color Pilot will start the manual Check and Recalibrate wizard.

In the **Check and Recalibrate** dialog that opens:

1. If you have chosen to include a [relinearization](#) step in your Check and Recalibrate procedure, print a **Relinearization Chart** and measure it (see [Relinearizing Your Profile](#) on page 413).
2. Print a **Check Chart** and measure it (see [Checking Your Profile](#) on page 415).
3. Decide whether the results are good enough or you need to recalibrate the profile (see [Recalibrating Your Profile](#) on page 417).
4. If necessary, perform several **Recalibration** cycles.

**Attention:**

To get color accurate measurements, you should make sure that the measurement condition set on your spectrophotometer matches the one in your proofer profile.

If this is not the case, you will get a warning asking you to use the measurement condition of your profile for measuring.

We recommend you always use the same measurement condition for all your color management. You can set your preferred one in the Preferences (see [Selecting the Measurement Condition You Are Working with](#) on page 70).

## Relinearizing Your Profile

The **Check and Recalibrate** wizard will start with a **Relinearization** step if you have *chosen to include it*. This step will check your proofer's inks and how they are printed, and correct any drifts if possible.

1. The **Proof Relinearization Chart** screen shows the chart to be printed and measured in the **Relinearization** step.

This chart contains 51 patches for each proofer ink, and ink eaters to make sure the area to measure is printed in a stable way. It fits on one page.

You can change the proof settings if desired:


- a) Click **Proof settings...** under the chart.
- b) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
- c) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
- d) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
- e) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
  - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.
  - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see feedback until the moment your chart is sent to the Proof Server, but no feedback that it has been proofed).
- f) Click **OK**.

2. Click **Proof Relinearization Chart** to:



- a) Send the chart as a PDF to your Esko Proof Server.
- b) Have your Proof Server process the job (RIP it, generate a preview if you selected **Create a preview on the Proof Server...**).
- c) Print this PDF on your proofer.

You should see the message **Chart successfully sent to the proofer**.

**Note:** You can cancel this process at any stage.

3. Click **Next**, then follow the instructions on screen to measure the printed chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action.

**Note:** If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or change its measurement condition.

4. When you are done measuring the test chart, you will see the **Relinearization Results** screen.
  - a) The top table shows some details about the **Substrate** patch, and each **Ink's** solid patch.

You can see:

- a double patch with the color expected from the profile on the left, and the measured color on the right,
- the **Dot Gain** measured for the profile's inks (if you have relinearized this profile before, you will also see the **Old Dot Gain**, measured in the last relinearization),
- the **Status** after relinearization. This can be:
  - **On target**, if the measurements were identical to the ones expected from the profile, and needed no correction.
  - **Corrected**, if the measurements weren't as expected, but the relinearization could correct the gap.
  - **Hue shift**, if the measurements showed a hue shift that couldn't be corrected (the hue of the ink measured differed too much from the profile ink hue).

**Note:** You can set how much the measured ink hue may differ from the profile ink hue before giving this error (and making the relinearization fail) by changing the **Overall hue shift** tolerance in the [Preferences](#).

- **Density error**, if the measurements showed a density problem that couldn't be corrected (the density of the measured solid differed too much from the solid density in the profile).

**Note:** You can set how much the measured solid density may differ from the profile solid density before giving this error (and making the relinearization fail) by changing the **Solid lightness / chroma** tolerance in the [Preferences](#).

- b) The graph shows the **Correction curves** applied by the relinearization for each ink.

Select **Measured points** if you also want to see the chart's measurements on the graph. If you have relinearized this profile before, you can also show the **Old correction curves**, applied in the last relinearization.

- c) Depending on the **Status** of your inks, the wizard will give you a **Recommendation**.

For example:

- If you have **density errors**, this is generally due to a problem with the inks or the proofer's hardware (for example the ink nozzles may be clogged up).
- If you have **hue shifts**, your inks might be old or come from a different batch than the ones you used to make the profile.

- If your **substrate** measurement is not as expected (the substrate Delta E is higher than your *tolerance*), you should check your substrate and/or manually remeasure it (to make sure there is no spectrophotometer error).

Such problems cannot be corrected by the relinearization. You will need to check your inks, substrate and/or your proofer first, fix the problems, then do another relinearization.

**Tip:**

Generally, we recommend that you:

1. Check that the loaded substrate, linearization file and proofer profile match.
2. Check the ink levels on the proofer and replace inks if needed.
3. Perform a nozzle check.
4. If the problem persists, contact your ink and/or proofer vendor.

5. Depending on the *relinearization results*, do the following:

If your inks and substrate were <i>on target</i>	Click <b>Finish</b> to exit the wizard and save the relinearization (it be attached to your profile).
If the relinearization <i>corrected</i> the quantities of inks used	Click <b>Next</b> to perform a <i>Check</i> to see if your profile's overprints also need correction (if they do, you should perform a <i>Recalibration</i> ).  When you finish the Check and Recalibrate wizard and save the results, your relinearization will be saved too.
If there was too much of a <i>hue shift</i> or <i>density error</i>	Close the wizard without saving (click the upper right cross) to discard the relinearization and do the necessary adjustments on your proofer or inks.

**Checking Your Profile**

You perform the **Check** step to check how accurately the proofer profile represents the current behavior of the proofer.

1. The **Proof Check Chart** screen shows a one-page variable chart based on your original profile and your spectrophotometer.

You can change the proof settings if desired:

- a) Click **Proof settings...** under the chart.
- b) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
- c) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
- d) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
- e) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
  - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if

your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.

- **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see feedback until the moment your chart is sent to the Proof Server, but no feedback that it has been proofed).


f) Click **OK**.

2. Click **Proof Check Chart** to:



- a) Send the chart as a PDF to your Esko Proof Server.
- b) Have your Proof Server process the job (RIP it, generate a preview if you selected **Create a preview on the Proof Server...**).
- c) Print this PDF on your proofer.

You should see the message **Chart successfully sent to the proofer**.

**Note:** You can cancel this process at any stage.

3. Click **Next**, then follow the instructions on screen to measure the printed chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action.

**Note:** If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or change its measurement condition.

4. When you are done measuring the chart, you will see the **Result of check and recalibrate: check iteration** screen, that shows:

- The differences between the profile colors and the colors you measured. You see a patch of each color, the Delta E between the two, and the measured colors' composition in the profile's inks.
- Whether the measured color values are **On target**, **Could be improved** or **Could not improve further**.

To view the measured chart, select **Measurements** in the **View** field at the top of the screen.

In both the **Samples** and the **Measurements View**, you can see information for or **Highlight**:

**All Patches**

the **Patches with above average Delta E**

the **Worst 10 percent**

the **Substrate**

the **Primaries**

the **Greys**

the patch with the **Maximum Delta E**

If you select a patch in the list or in the measured chart, you can see more information at the bottom right, including the Lab and LCh values of the profile and measured colors.

At the bottom left of the screen, you can see:

the **Average Delta E**

the **Maximum Delta E**



the **Substrate Delta E**  
the **Primaries Delta H**  
the **Grey Delta E**

If a criterion (for example the **Average Delta E**) is bigger than the tolerance set for it in the [Preferences](#), you will see a red cross ❌ next to it. You will see a green checkmark ✅ if it is within the Delta E tolerance.

**Note:**

You can change the Delta E tolerances: Click the **Change Tolerances** link to change them in the **Tolerances** pop-up. You can also change the **Delta E Formula**.

Select the **Save settings to preferences** option before clicking **OK** if you want to change the tolerances and/or Delta E formula in the Preferences too.

**5. If...**

- the **Check** step gave Delta E values above your tolerances, click **Next** to go to the [Recalibration step](#).

You can also click **Finish check** to quit the wizard without performing a recalibration.

- If the **Check** step gave a good result, click **Next** then **Finish** to quit the wizard.

If you want to [recalibrate your profile](#) anyway to see if you can get it even closer to the way your proofer prints, click **One more cycle...**

**Recalibrating Your Profile**

You perform the **Recalibration** step to apply some curves to your proofer profile so that it accurately represents your proofer again.

1. The **Proof Recalibration Chart** screen shows a variable recalibration chart, created based on the results of the **Check** step.

Change the **Proof settings...** if desired, and click **Proof Recalibration Chart**.

2. Measure the recalibration chart with your spectrophotometer.
3. On the **Result of check and recalibrate** screen, you see:
  - The differences between the profile colors and the recalibrated colors you measured.
  - Whether the recalibrated color values are **On target**, **Could be improved** or **Could not improve further**.

In the **General Statistics** area at the bottom, you see the Delta E and Delta H values after recalibration (column **1** is the **Check** stage, column **2** is the **Recalibration** stage).

**4. If:**

- You are happy with the results of the recalibration, click **Finish** to use this recalibration for your proofer.
- You find that the differences are still too big, click **Next** to do another recalibration cycle. Then repeat steps 1, 2 and 3.

**Tip:**

Typically, the first cycle or two will give the greatest improvement, but the results are likely to stop improving after a few cycles. We recommend you run a maximum of 3 to 5 cycles.

A recalibration will never give worse result than before, even if the Delta E goes up: only the best measurements of all recalibration cycles will be used.

5. On the **Check and recalibrate complete** screen, click **Finish** to close the **Check and recalibrate** wizard.

**Tip:** If your recalibration failed, see [If the Recalibration Fails](#) on page 418 for troubleshooting tips.

You can see the recalibration information in the [proofer history](#) (make sure your proofer is selected).

**Note:** If at some point you want to go back to the state the proofer was in before recalibrating, right-click it in the **Proofers** view and select **Reset Recalibration**.

### 14.5.3. If the Recalibration Fails

If your recalibration fails, you can investigate the cause of the failure and in some cases correct it.

#### Analysing the Color Difference Values

- If your **Average Delta E** is still above tolerance after running several recalibration cycles, first check that you have a realistic tolerance:
  - an average of 2  $\Delta E$  will generally give you a decent color reproduction (as humans can typically only perceive color differences above 2  $\Delta E$ ),
  - an average of 1  $\Delta E$  is a very good result,
  - an average of 0.5  $\Delta E$  is extremely difficult to obtain in a real-life proofing setup.

If your Delta E tolerance is realistic but your **Average Delta E** doesn't drop below it, see [Troubleshooting Hardware Problems](#) on page 418.

- If your **Maximum Delta E** is above tolerance, you can in certain cases ignore it without having proofing issues, particularly if:
  - the patch with the maximum delta E is a dark patch, or a saturated orange or green patch,
  - you are using the **CIE Lab Delta E (Classic)** formula.
- If your **Substrate Delta E** is too high, check whether the type of paper currently in your proofer is the same as the one you used to make your profile.
- If your **Primaries Delta H** and/or **Grey Delta E** is too high, check whether the inks in your proofer are the same as the ones you used to make your profile (they may also be from the same vendor but from a different batch, or be too old).

#### Troubleshooting Hardware Problems

If your **Average Delta E** stays high after running several recalibration cycles, there is likely to be a problem with your spectrophotometer or proofer.

- To check for problems with the spectrophotometer, go to the **Measurements View** on the [results screen](#), and check where the highest Delta E values are located (filter on the **Worst 10 percent**).

If they are all in one region of the chart, or at the beginning or end of a line, you need to check your spectrophotometer.

- To check for problems with the proofer's inks, go to the **Samples View** on the results screen, and check the primary patches (filter on **Primaries**). If one or more channels are almost out of ink, you will see it here.

**Note:** If your proofer uses light and/or light-light inks (for Cyan, Magenta and/or Black), you will only see whether those are almost out in the lightest patches.

You can also check the ink levels on the proofer itself, and check for clogged nozzles.

- You can also check for other proofer problems (for example horizontal or vertical stripes) on the printed chart.
- If the problem persists, you should contact your ink and/or proofer vendor.

### Making a New Profile

If the recalibration keeps failing but you cannot find any problem with your spectrophotometer or proofer, the profile may have simply drifted too much over time.

In this case, you should [make a new profile](#).

## 14.6. Refining Spot Colors

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Color Pilot will provide a good baseline conversion for your spot colors. If you want to further improve how they are simulated using your proofer's inks, you can refine them using the **Refine Spot Colors** wizard.

Refining spot colors fine-tunes the reproduction of both solid and tints.

If the inks you are refining are [profiled](#) (defined from several measurements), the refinement will be applied on the existing measured tints, giving you a more color accurate result (for example in gradients).

For inks where only the solid is defined, the refined tints will be derived from the solid refinement (for example the refined 50% will be 50% of the refined solid). This means that your spot colors' tints may not be reproduced as accurately as their solids (as some inks can have hue or density shifts within their color range).

We recommend you work with profiled inks whenever possible.

### Note:

Before you start refining spot colors, make sure that:

- your proofer has an [EPL linearization file](#) and a [profile made](#) using that EPL,
- its profile is either recent or recently (and successfully) [checked/recalibrated](#).

You can refine your spot colors either:

- from the **Proofers View** (as explained below),
  - from the color strategy that you are using to output to your proofer (see [Refining Exceptions](#) on page 231).
1. Right-click the proofer you want to use and select **Refine Spot Colors...**
  2. If you don't have a color strategy using the proofer profile as output profile, you will see a message asking you to create one.
    - a) Click **Yes**.
    - b) Enter a **Color Strategy Name**.

- c) Choose a **Press Profile** (if you selected a default one [in the Preferences](#) it is pre-filled in here). The **Proofer Profile** is filled in automatically.
- d) Select the **Rendering Intent** to use for color conversion.

By default, this is the one you set in the [Preferences](#) (if you select a different one here, your choice will be remembered in the Preferences).

You can choose between:

- Absolute Colorimetric**
- Relative Colorimetric**
- Perceptual**
- Saturation**

**Note:**

- You can only choose a rendering intent when your [input and output profiles](#) are different (if they are the same, process colors don't need to be converted).
- You can only choose a **Perceptual** or **Saturation** rendering intent if you are working with an [ICC Proofer Profile](#).

See [Rendering Intent](#) on page 225 for more information about how different rendering intents influence color conversion.

- e) Click **OK**.

Color Pilot creates a basic color strategy (without ink mappings, dot gain curves...) and opens the **Refine Spot Colors** wizard.

3. In the **Get Started** step of the **Refine Spot Colors** wizard, you select the color strategy to use (if you didn't just create one).

See [Get Started](#) on page 420.

4. In the **Refine Cycles** step, you perform the spot color refinement. You can do as many refinement cycles as is necessary.

See [Refine Cycles](#) on page 422.

5. The **Finish** step confirms that the color strategy was updated with the refined values.

See [Finish](#) on page 242.

You can now close the wizard.

### 14.6.1. Get Started

In the **Get Started** step of the **Refine Spot Colors** wizard, you will select the color strategy to use (if you didn't just [create one](#)) and the spot colors to refine.

1. On the **Select a Color Strategy** screen, select your **Color Strategy Name** among the color strategies that have your proofer profile as output profile.

From this screen, you can also:

- Create a color strategy (if you don't have a color strategy with a matching profile, or if you want to use a new basic strategy -without ink mappings, dot gain curves...- for the refinement):

1. Click **Create Color Strategy...**
2. Enter a **Color Strategy Name**.
3. Choose a **Press Profile** (if you selected a default one *in the Preferences* it is pre-filled in here).

The **Proofer Profile** is filled in automatically.

4. Select the **Rendering Intent** to use for color conversion.

By default, this is the one you set in the *Preferences* (if you select a different one here, your choice will be remembered in the Preferences).

You can choose between:

- Absolute Colorimetric**
- Relative Colorimetric**
- Perceptual**
- Saturation**

See *Rendering Intent* on page 225 for more information about how different rendering intents influence color conversion.

**Note:**

- You can only choose a rendering intent when your *input and output profiles* are different (if they are the same, process colors don't need to be converted).
- You can only choose a **Perceptual** or **Saturation** rendering intent if you are working with an *ICC Proofer Profile*.

5. Click **OK**.

This creates a basic color strategy (without ink mappings, dot gain curves...) and selects it for the spot color refinement.

- See information about the selected color strategy: click **Show Color Strategy Info...** to view the information in a pop-up.
- Find the color strategy you want to use more easily, if you have a lot of strategies: click **Find Color Strategy...** and use the pop-up to view **Recently Used** strategies, all **Color strategies with appropriate settings**, or use the **Search** field to search on strategy name or keyword.

You can also click the **Keywords** column to sort strategies by keyword.

You can see your selected color strategy's **Ink Set** in a table.

Click **Next** when you are ready to proceed.

2. On the **Select Spot Colors** screen, add colors to refine by:

- Clicking **+** and selecting the ink(s) to add in the dialog that opens.

**Tip:**

- Use the **Shift** or **Ctrl** key to select several inks, or **Ctrl+A** to select all inks in an ink book.
- You can also use the **Search** field.
- Clicking **Add Inks from a PDF file...** to select one or more (Normalized or regular PDFs) file(s), and adding some or all of the spot colors contained in these files to the list.

Use this if you have trouble getting a good match for one or more particular spot color(s) in one of your files.

**Note:**

- For regular PDFs, Color Pilot will first look for the inks in the predefined books (such as process and PANTONE ink books), and then in the preferred **Ink Book** (defined in the [Preferences](#)) before checking other ink books you created.
- If the inks found in the file(s) are not present in the database, they will be greyed out with **<unregistered>** shown as their ink book, and you will see a warning that some of the inks in the selected PDF(s) are unregistered.  
  
Unregistered inks are not added to the ink selection as they don't contain enough information to make a useful refinement.

To remove an ink from the list, select it and click the - button.

Click **Next** when you are done.

## 14.6.2. Refine Cycles

In the **Refine Cycles** step of the **Refine Spot Colors** wizard, you select a spot color refinement method and carry out the refinement. You can do several refinement cycles, using one or more methods.


1. On the **Select spot colors and refining method** screen, choose the spot color refinement method to use:
  - Choose **Visually, by proofing a number of variations** to print a variations chart for each color on your proofer, then visually select the right patch from the printed output.
  - **Automatically, by measuring a proofed sample** to measure a sample that was proofed with your color strategy and automatically correct the color deviation.
  - **Automatically, by measuring test chart iterations** to proof a number of variations of each spot color in a spectrophotometer layout and measure it so the best conversion values can be calculated automatically.
  - **Manually** to edit the spot colors conversion values manually.

**Note:** If you choose a method involving measurements, make sure that the [measurement condition](#) selected on your spectrophotometer matches the one used to measure your proofer profile.

2. Decide **which spot colors you want to refine in this cycle**.

By default, all spot colors you added in the **Get Started** step are selected. For each spot color, you can see:

- the conversion values before refinement (calculated using the color strategy or the result of any previous refinement cycle),

**Note:** If you have already performed a refinement cycle, the color values that were changed are indicated by a pencil icon .

- whether the spot color is already saved as an exception **In the Color Strategy**,

- the **Predicted  $\Delta E$**  between the spot color and the conversion values before refinement.

**Note:**

- This is calculated using the [Delta E formula of your color strategy](#).
- By default, any predicted [Delta E](#) value that is lower than [your chosen tolerance for proofing strategies](#) is shown as `Less than` your tolerance.  
This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).  
However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).
- If you have already refined a spot color using the **Automatically, by measuring test chart iterations** method, the measured Delta E is shown in blue.

You can sort the spot colors by any column in the table.

Deselect the colors you don't want to refine.

**Tip:**

- You can perform different refinement cycles on different spot colors (for example, if you have printed samples for some of the colors, but want to refine the other ones using test charts).
- To only select a few of the colors, click the top check box to deselect them all, then only select the colors to refine in this cycle.

3. Click **Next**.
4. Carry out the refinement cycle as explained in one of the following:
  - [Refine Colors Visually, by Proofing a Number of Variations](#) on page 235,
  - [Refine Colors Automatically, by Measuring a Proofed Sample](#) on page 237,
  - [Refine Colors Automatically, by Measuring Test Chart Iterations](#) on page 238,
  - [Refine Colors Manually](#) on page 242
 (depending on the method you chose).
5. At any time, you can pause the refinement process and save your unfinished refinement for that proofer and color strategy.

This way you can perform other tasks in Color Pilot, then resume working on your spot colors refinement later.





**Attention:**

You can only save one unfinished task per proofer, whether it is a profile, check and recalibration, or a spot color refinement.

This means that you cannot save another unfinished task before either finishing or discarding the first one.

- a) Click the **Quit Now and Continue Later** button. Confirm your choice by clicking **Save and Quit** in the pop-up dialog.

This closes the wizard and shows a badge next to the press name:

- : indicates that the refinement is unfinished.
- : indicates that an error has occurred, or that the refinement was cancelled on the proofer.

You can also see the badge on the **Refine Spot Colors** button in the bottom tool bar when you select the proofer for which you started the refinement process.

- b) When you are ready to resume the refinement, select your proofer and click the **Refine Spot Color** button in the bottom tool bar again.

You will see a pop-up warning you about the unfinished refinement. Click **Resume**. This will open the **Refine Spot Colors** wizard at the point where you paused the refinement. You can then continue your refinement.

**Note:**

- To start a new refining session instead, click **Start new session** in the pop-up. Completing the new session (or saving another unfinished refinement) will discard the unfinished refinement.
- To discard the unfinished refinement at any time, right-click your proofer and select **Remove Unfinished Task**.

6. If necessary, click **Next** and repeat steps 1 to 4 to do another refinement cycle.

You can use a different refinement method, and you can do as many cycles as you want.

7. Click **Finish** when you are done refining your inks.

### Refine Colors Visually, by Proofing a Number of Variations

Use this method to proof a variations chart for each color, then visually select the best patch from the proofer's output. The variations charts contain patches with different ink combinations that vary around the existing conversion values.

1. For each spot color, do the following:
  - a) Choose the **Patch Size** to use for the variations chart (**Small, Medium** or **Large**).
  - b) Choose up to three inks to print the chart.

For each **Ink**, define:

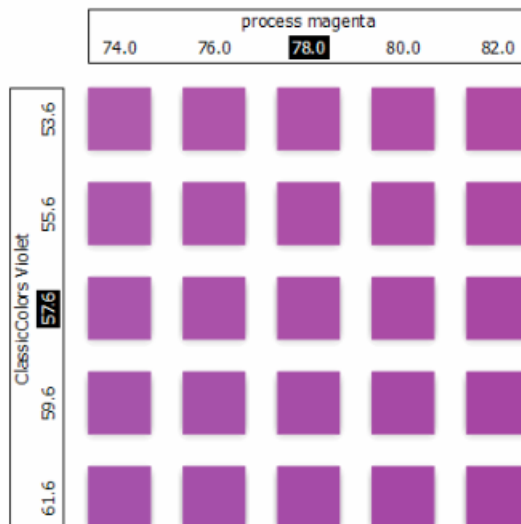
- The difference in ink percentage for each variation (**Step**).
- The number of steps **Up** and **Down**.

The starting value is the percentage of that ink in the conversion values (from the color strategy, or any previous refinement cycle). You can see those conversion values, along with a patch of the spot color, at the top of the dialog.

For example, you are refining PANTONE Purple C, whose conversion values in the color strategy are 57.6% cyan and 78% magenta. For both the cyan and the magenta ink, you choose a **Step** of 2.0%, 2 steps **Up** and 2 steps **Down**.






For each ink, the variation chart will use the color strategy value and other values around it defined by the steps you chose. So the magenta percentages used here will be 74%, 76%, 78% (color strategy value), 80% and 82%.




You can see a preview of your variations chart on the right, showing the ink percentages.

**Tip:** If you hover on a color patch, a tool tip will display the percentages of that patch.

**Note:** If an ink percentage is near 100%, the number of **Steps Up** will be limited to not go over 100%. For example with a starting percentage of 98% and a step of 2%, you can only have one step up (100%).

- c) If you are using three inks, you will get several grids in your variations chart (each grid with a different percentage of the third ink). You can choose to **Align** them **Horizontally** or **Vertically**.  
For example, if you have four or more grids aligned horizontally and you see a message warning you that the chart's dimensions are too large for your press, try to align them vertically.  
If you still see the warning after changing the alignment, you need to remove some steps in the third ink to have fewer grids. If necessary, you can print the other steps in another refinement cycle.
- d) You can use the view buttons to get a better view of all the grids:
  - **Pan mode** : When this view mode is selected, the cursor changes into an open hand. By clicking the chart and dragging you can move the chart around.
  - **Zoom in mode** : When this view mode is selected, the cursor changes into a magnifying glass. Clicking anywhere will zoom in the chart on that position. By clicking and dragging the mouse, you can also select an area in the chart you want to zoom in on.
  - **Zoom out mode** : This view mode is the reverse of **Zoom in mode**.

- **Reset zoom**  : Click to reset the chart so it fits in the view.
- e) Click **Next**.  
Repeat this for each spot color to refine and click **Next** when you are done.
2. In the next screen, you can see the variations chart(s) you just defined.  
Click **Proof settings...** if you want to change how the chart(s) will be printed.
    - a) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
    - b) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
    - c) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
    - d) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
      - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.
      - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see feedback until the moment your chart is sent to the Proof Server, but no feedback that it has been proofed).
    - e) Click **OK**.
  3. Click **Proof Variations Charts** to send the variations charts as a PDF to your Esko Proof Server and print this PDF on your proofer.
 

**Note:** Grid charts that are too big to fit on a proofer sheet will automatically be split up into multiple sheets, making optimal use of the available substrate material.
  4. Look at the printed output and decide which patch is the best match for each spot color.
  5. Click **Next** in the **Refine Spot Colors** wizard and click the best match patch on the variations chart for the first spot color.  
Click **Next** and do the same for the next spot color... until you have picked a best match for all spot colors you refined.
  6. Click **Next** to see the refined values (ink percentages) and the Delta E between original and refined colors.  
The values with a pencil icon are the values that were changed by (one of) the refinement cycle(s) you just did.
  7. If you are satisfied with the refined values, click **Finish**.  
This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.  
If you are not satisfied, you can click **Next** and do another refinement.

## Refine Colors Automatically, by Measuring a Proofed Sample

Use this method if you want to match the color of a physical sample rather than the corresponding spot color in your color database (for example a color from a previous proofing job, a spot color in a PANTONE book, a sample you got from a customer...).


You will measure the Lab values of that sample, and Color Pilot will generate a color build to match those values as accurately as possible, and save that color build as an exception in your color strategy.

This is faster than proofing a new chart then [choosing the best match visually](#) or [measuring a proofed chart](#).

1. After selecting **Automatically, by measuring a proofed sample** and clicking **Next**, Color Pilot will detect the connected spectrophotometer (and ask you to calibrate it if necessary), then show the **Measure Sample** dialog.

Measure the proofed sample with your spectrophotometer then click **OK**.

### Note:

- If necessary, you can use the **More Actions** button  to reconnect or calibrate the spectrophotometer, or change its [measurement condition](#).
- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.

The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.

2. Repeat this for each proofed sample of a spot color you want to correct.
3. The next screen shows the refined spot color conversion values calculated from the samples' Lab values.

Select a spot color in the table at the left to see its refined conversion values. The values with a pencil icon are the values changed by the refinement.

If you are not satisfied with a measurement, you can redo it (click **Remeasure Original Sample**). You can also **Reset to Original Values**.

4. When you are satisfied with the refined values, click **Finish**.

This saves the refined conversion values for the spot colors as **Refined Output Profile Values** in the color strategy.

If you are not satisfied, you can click **Next** and do another refinement.

## Refine Colors Automatically, by Measuring Test Chart Iterations

Use this method to print a number of variations of each spot color in a spectrophotometer layout and measure it so the best conversion values can be calculated automatically.

You can use this to refine whole ink books at once if desired.

1. On the **Select out of gamut spot colors to refine** screen, select which out of [gamut](#) colors you want to refine.

Spot colors are considered "in gamut" when they can be reproduced by your proofer within a specified *Delta E* tolerance (the one you set in the *Preferences*).

Spot colors with a Delta E a bit above this tolerance can typically benefit from refinement.

However, spot colors with a Delta E far above this tolerance may just not be accurately reproducible by your proofer. In this case, you may want to remove those spot colors from the refinement, to save yourself time and effort.

The Delta E is calculated using the *Delta E formula of your color strategy* (you can see it at the bottom of the spot colors list).

**Tip:**

- Click the **ΔE** column to sort the spot colors by increasing or decreasing Delta E, and see more easily which colors need refinement if you have a lot of spot colors.
- To select or deselect all inks, click the check box at the top of the inks list.

2. In the next screen, select the **Number of color patches** you want to print per spot color (as a minimum).

The default setting is 10 patches per color, but you can go as high as 100. If you print more color patches in the first cycle, you may need to do fewer refinement cycles (and vice-versa).

The screen indicates how many pages will need to be printed.

If the number of spot colors to refine is low, you can select **Add extra patches to fill page**, to use as many patches as is required to fill a full proofer sheet.

**Note:** If you are using an M1 or M2 *measurement condition*, the chart will be automatically adapted to support the dual measurement (measuring with and without UV filtering) required by these measurement conditions (the patches will be slightly bigger and there will be slightly more white space in between lines of patches).


3. The next screen shows the chart with all the spot color patches (if there are several pages, you can click the arrows next to the **Page** field at the top right to view other pages).

Click **Proof settings...** if you want to change how the chart(s) will be printed.



- a) In the **Proof Settings** dialog that opens, choose the **Rotation** to apply when printing.
- b) Select **Create a preview on the Proof Server** if you want to preview your chart in Fiery Command Workstation (the Esko Proof Server's client application) before proofing it.
- c) Select **Add White Underprint** if you want a white underprint in your print jobs (this is only available if your proofer supports white ink).
- d) Color Pilot will send the chart to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
  - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your chart (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other jobs until your chart is proofed.
  - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other jobs as soon as the chart has been sent to the Proof Server (you will see

feedback until the moment your chart is sent to the Proof Server, but no feedback that it has been proofed).



e) Click **OK**.

4. Click **Proof Test Chart** to send the test chart as a PDF to your Esko Proof Server and print this PDF on your proofer.
5. Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.

**Tip:**


After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

6. After you finished measuring, you will see a list of the spot colors on the **result of measuring test chart** screen with:
  - A warning sign  if the color is still out of **Gamut**,
  - The new **ΔE** after refinement,
  - The **State** of the conversion values (**On target**, **Could be improved** or **Could not improve further**).

To view the measured chart, select **Measurements** in the **View** field at the top of the screen.

At the bottom of the screen, you can see the total number of spot colors as well as the average Delta E before and after the refinement.

If you select a spot color in the list or in the measured chart, you can see more information at the bottom right, including the new conversion values and the target and measured Lab values and color patches.

7. If you want to do another iteration of this refinement cycle, do the following:
  - a) Click **Next**.

The wizard will generate a new chart to print, using only the spot colors that had the **Could be improved** state after the last iteration. If all your spot colors have the **Could not improve further** state, the wizard will not generate a new chart.

**Note:** This chart will use as many patches per spot colors as is necessary for the refinement. Depending on the spot color, this could be more or less than the number of color patches you chose before the first iteration.

- b) Print the new test chart.
  - c) Measure the new test chart.

On the **result of measuring test chart** screen, you will see the updated results for the refined spot colors. You will see a **ΔE** column for each iteration, and a new **average measured ΔE**.

**Note:** If a patch measured in the new iteration is worse than what was found in the previous iteration, the previous iteration's result will be used.

You can do more iterations as long as you have colors with the **Could be improved** state.

8. After each refinement iteration, you can pause spot colors to define which colors will go through the next run of refinement. Paused colors will not be part of the next iteration.

**Tip:** This is useful if there are spot colors that have a high Delta E after the first iteration and you think that further iterations will not improve the spot color match.

- a) To pause a spot color, right-click it on the **result of measuring test chart** screen and select **Pause refining**.

**Note:** If there are no spot colors in the **Could be improved** state (for example, all spot color are **Paused**), you cannot start a new iteration.

- b) If you want to unpaue a spot color, select the paused color, right-click it and choose **Continue refining**. The color will then get the **Could be improved** status.

**9.** Once you are satisfied with the results, click **Finish Cycle**.

You can then **save a report** about the refinement (if you have set this in the [Preferences](#)). This is a text file that you can save in the location of your choice.

After this, you can do another refinement cycle using another refinement method, or click **Finish**.

This saves the refined conversion values for your spot colors as **Refined Output Profile Values** in the color strategy.

### Refine Colors Manually

Use this method if you want to edit the output ink percentages used to reproduce the spot colors manually.



**Attention:** Make sure that your monitor is calibrated before refining spot colors manually. However, please be aware that viewing an ink on a screen can never be completely color accurate.

1. On the **Refine manually** screen, select the first spot color you want to refine.

On the right hand side, you can see its conversion values and the **Predicted ΔE** between the spot color and the conversion values.

**Note:**

- The *Delta E* is calculated using the *Delta E formula of your color strategy* (you can see it underneath).
- By default, any predicted Delta E value that is lower than *your chosen tolerance for proofing strategies* is shown as `Less than` your tolerance.

This is because very low theoretical Delta E values may not be achievable in a real life setup (due to proofer instability and/or imperfections in the profile).

However, you can still choose to show these predicted Delta E values in more detail *in the Preferences*.

2. In the **New Values** row, click the output ink percentage(s) to edit and enter the percentage(s) you want to use or click the arrows to increase or decrease the value(s).

At the bottom, you can see color patches and Lab/LCh values for the **Target** spot color, the **Original** converted color (from the color strategy or a previous refinement cycle) and the **New** converted color (using the percentages you just entered).

You can also see the Delta E between **Target** and **Original** converted color, and between **Target** and **New** converted color.

Use this to help you find the best percentages for your spot color.

**Note:** If you are not satisfied with your new color conversion, you can click **Reset to Original Values** to start over.

3. Do this for every spot color in your list.
4. If you are not satisfied with the refined values, you can click **Next** and do another refinement.

When you are satisfied, click **Finish**.

This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.

### 14.6.3. Finish

After clicking **Finish** after one or more refinement cycles, you will see the **Summary** screen, and a message stating that:

- your spot colors were refined successfully,
- the color strategy was updated (the refinement values are stored in the color strategy's **Exceptions** list).

Click **Finish** again to close the wizard.

## 14.7. Proofing Inks and Ink Books

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Once you have set up your proofer, you can easily proof inks and ink books on it.

You can do this to have a physical sample of a custom ink book for example, or to have a visual reference of what certain spot colors look like on a certain substrate. You can then present these proofs to customers to set the expectations right before they order production work using these colors.

If a customer is hesitating between different ink sets for their job (for example CMYK vs. 7 color printing, or CMY vs. CMYK), you can proof their job's inks using different color strategies, to help them make a decision based on both quality and cost.

1. Select your proofer and click the **Proof Ink Book** tool  in the bottom tool bar.

**Note:** Make sure you have *made a profile* and a *color strategy* for the proofer you want to use.

2. In the pop-up that opens, select the ink book to proof.

If you have lots of ink books, you can sort them by **Name** or by **Keyword**, or use the **Search** bar at the bottom to find your ink book more easily.

**Note:** You cannot proof more than one ink book at once.

3. On the **Proofer** tab of the **Proof Ink Book** dialog, you see some information about the proofer you selected (proofer **Type**, **Ink Set**, **Profile** and **EPL *linearization file***).

If you want to use a different proofer, click **Select** and choose another one.



4. Click **Proof settings...** to change the following proofing options as desired:
  - a) Choose the **Rotation** to apply when printing.
  - b) Select **Create a preview on the Proof Server** if you want to preview your proofing job in Fiery Command Workstation (the client application of the Esko Proof Server) before outputting it on your proofer.
  - c) Select **Add White Underprint** if you want a white underprint on your proof (this is only available if your proofer supports white ink).
  - d) Color Pilot will send your proofing job to the Esko Proof Server, which will send it to your proofer. Depending on what you want to do next, select either:
    - **Wait until job is printed before continuing (slower)** if you want to see feedback in Color Pilot up to and including the moment the proofer outputs your proof (select this for example if your proofer is in a different room, or generally has a queue of waiting jobs). Note that when selecting this, you won't be able to use Color Pilot for other tasks until the proof is ready.
    - **Continue when the job is previewed (no feedback from Proof Server)** to be able to use Color Pilot for other tasks as soon as this proofing job has been sent to the Proof Server (you will see feedback until the moment your job is sent to the Proof Server, but no feedback that is has been proofed).
  - e) Click **OK**.

5. In **Color Strategy**, select a color strategy you made to output to your proofer profile.

6. On the **Ink Book** tab, choose if you want to **Print**:

- the **Entire Ink Book** (this is selected by default if you selected a whole ink book when opening the **Proof Ink Book** tool).

You can see all of the ink book's inks in the **Inks** list below.

**Tip:** You can see the ink book's total number of pages next to **Current Ink Book**.

- a **Page Range**; then enter the page range in the following format:

- 1, 3, 5 to print pages 1, 3 and 5,
- 1-5 to print pages 1 to 5,
- 1, 3-5 to print pages 1 and 3 to 5.

Press **Enter** or **Tab** to see the inks that will be printed in the **Inks** list.

- an **Ink Selection** (this is selected by default if you selected one or more inks when opening the **Proof Ink Book** tool).

Then use the **+** or **-** buttons to add or remove inks from the **Inks** list.

**Note:** It is not possible to proof inks from several ink books at once.

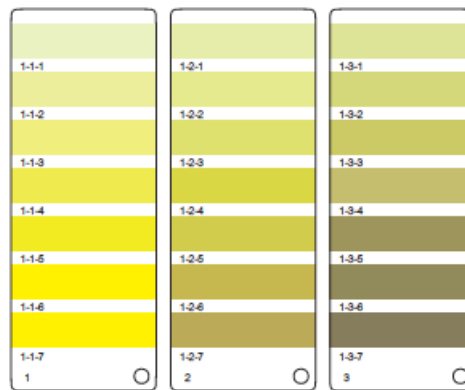
7. On the **Layout** tab, choose the **Layout Style** to use: **PANTONE Ink Book Format** or **Small Ink Book Format**.

Both formats display the ink patches in one or more vertical strips. Each strip is surrounded by a black line, shows the ink name under each ink patch and the page number from the ink book at the bottom of the strip.

- The **PANTONE Ink Book Format** displays ink patches to resemble a physical PANTONE ink book. Ink patches are 42 x 17 mm with 9 mm between two patches.



- The **Small Ink Book Format** display ink patches in a more compact way, using less paper. Ink patches are 30 x 7 mm with 3 mm between two patches.



8. Choose what to do with **Empty Patches**. You can either:

- select **Include, preserving ink book layout** if you want to print the ink patches in the order you see them in the ink book (one strip will be printed for each ink book column. Strips may contain empty patches).



**Attention:**

An ink book **column** is displayed as a **row** of ink patches in the **Ink Books** library.  
 PANTONE ink books have 7 ink patches per column and 1 column per page. Other ink books may have a different number of ink patches and columns per page.

- select **Skip them, minimizing paper use** if you want to only print patches containing inks (one strip may then contain patches from more than one column, if some columns had empty patches).

**Note:** Empty pages and empty columns are always skipped.

9. If desired, add some extra information to the proof:

- the **Output values** (from your color strategy) that are used by the proofer to print each ink;
- which ink patches cannot be satisfactorily simulated by the proofer (select **Mark 'out of gamut' inks** for this);

**Note:**

This is calculated by comparing the **Expected Delta E** of the inks on the proof to your **Delta E** tolerance for out of *gamut* colors.

By default, the **Tolerance** used is the one you set *in the Preferences*, but you change it here if desired.

- the ink book column numbers next to the page numbers, in the format `page number-column number` (select **Column and page numbers**);
- the **Expected Delta E** between the ink in your color database and the patch output on the proofer.

Select the **Delta E Formula** to use for calculating this (the formula you chose *in the Preferences* is selected by default).

**Note:** You can only add **Output values**, **Expected Delta E** and **Mark 'out of gamut' inks** when printing with the **PANTONE Ink Book Format**.

10. In **Patches per Strip**, select how many ink patches you want to print per vertical strip: either a custom number or the value **from the ink book** (how many ink patches the ink book contains per column; for example, this is 7 for **PANTONE** ink books, and 4 for the **process** ink book).
11. Click the **Proof** button to send the ink book/ink patches to your proofer.  
If there is any feedback from your proofer, you will see it next to the **Proof** button.

## 14.8. Using Your Multicolor Proofer as CMYK

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If you have a multicolor proofer, you may want to use it as a CMYK only proofer in certain cases. This is typically when you both:

- want your proofs' colors to be more stable (as printing with CMYK gives a more stable output than using additional inks),
- don't need a wide *gamut* (as you will be able to reproduce less colors with CMYK than when using additional inks).

To do this, you need to first allow it in the Preferences (see *Enable using multichannel proofers as a CMYK device*), then do the following in the **Proofers** view:

1. Right-click the multicolor proofer you want to use as CMYK only and select **Only Use CMYK**.
2. *Create a new profile* for your proofer.

Any *recalibration* or unfinished task (marked with ) linked to the previous profile will be removed.

3. *Create a color strategy* with your new proofer profile as output.

If you later want to use your proofer as a multicolor proofer again, right-click it again and deselect **Only Use CMYK**.

You will need to re-assign it its previous multicolor profile manually, and perform a recalibration if needed (if your previous recalibration for the multicolor profile is less than two weeks old, you can *restore* it automatically).

## 15. Working with Digital Presses

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**Important:**

You can only see your digital press if you are using the color database used by your DFE Server.

To do this:

1. Go to the [Server Preferences](#) and connect to your DFE Server (you need to select **Connect to AE-Server in a LAN**).
2. Go to the [Database Preferences](#) and select **Obtain from Esko server** to use the color database defined on your DFE Server.
3. Click **OK** in the preferences dialog and **restart Color Pilot**.



**Attention:** If you are connected to an [Automation Engine server in a data center](#), you cannot connect to the DFE Server driving your digital press at the same time (so you cannot work with both Automation Engine server in a data center and a digital press).

### 15.1. Your Digital Press(es)

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**Note:**

You can work with more than one digital press (if you are working with more than one DFE Server).



To see all presses in Color Pilot, you need to:

1. Centralize the **resources** of your DFE Server on one server (this can be a master DFE Server or for example an Automation Engine server).
2. Select this server in the DFE Server's **Configuration** tool: click **Configure** under **Resources Search Path** on the **Data** tab.
3. Restart the DFE Server's **Print Controller**.

For more details, please consult the DFE Server documentation.

- To see your digital press(es) in Color Pilot, click **Digital Presses** under **Devices** in the navigation pane.

You can see details about your digital press(es) in the different [views](#):

- In grouped list view , you can see a list of all existing [configurations](#) for each press (and the configuration details: **Substrate**, **Print Dimensions**, **Ink Set**, etc.), when you last changed something in a configuration (**Last Action**), and any [keyword](#) associated with your configurations.
- In icons view , you can also see the name of the press PC (**Press server name**), the name of the PC on which the DFE Server is running (**DFE server name**), the press **Type**, and details about the configuration currently set on the press.

You can double-click a press in icons view to see all of its existing configurations (or right-click the press and select **Open**).

## 15.2. Color Managing Your Digital Press

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To color manage the output of your digital press, you first need to perform some initial setup:

1. [Choose a digital press configuration.](#)
2. [Define the ink limits for that configuration.](#)
3. [Create a digital press profile.](#)
4. [Define print settings.](#)

**Note:** Make sure to always set up your digital press' color management in that order (do not create a profile first then an ink limitation).

## 15.3. Choosing a Digital Press Configuration

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Digital press configurations specify a number of press settings, typically some or all of the following:


- the **Substrate** used on the press (this shows the substrate name, or the substrate ID if the substrate name is not set in your DFE Server),
- the maximum printable area given the dimensions of the press and substrate (**Print Dimensions**),
- the press' current **Ink Set**,
- the **Ink Type** of the inks used on press (this can indicate if the press uses food packaging inks for example),
- the **Ink Limitation Set** (if you made one already) for that combination of press, ink and substrate (see [Working with Ink Limitation Sets for Digital Presses](#) on page 359 for more information),
- the press' **Profile** (if you made one already), that describes how your press prints with its current setup (see [Working with Profiles](#) on page 137 for more information),
- the **Screening** used on the press (**Rainbow**, **AM** or **<default>** if left unspecified),
- additional **Print Settings** used when printing on that press (see [Defining Print Settings](#) on page 488 for more information).

To create a digital press configuration, you need to use your DFE Server's Configuration Tool (please see your DFE Server documentation for details).

**Note:**

- You need to have created configurations for your digital press in your DFE Server **before** you can use them here.
- In your DFE Server's Configuration Tool, digital press configurations are called **Color Pilot configurations**.

To assign a digital press configuration to your press:

1. In the icon view , click the **Select...** link next to **Configuration** under your digital press' picture.


2. Select a configuration matching the current setup on your press (ink set, screening, substrate...) and click **Select**.

Configurations with a green check ✓ already specify a profile for your digital press, configurations with an orange question mark ? don't.

If a configuration was already assigned to your digital press, it will have a flag ▼.



**Attention:** If you need to *limit the amount of ink* printed by your press (for quality and/or cost reasons), do not choose a digital press configuration made for CMYKO, CMYKV or CMYKG, as you won't be able to *create an ink limitation set* for a configuration using one of those ink sets.

**Tip:** You can also assign a configuration to your press from the grouped list view : right-click your desired configuration and select **Make Current Configuration**.



**Attention:**

If you change your press setup (especially the ink set, screening or substrate), you will need to:

1. make a configuration reflecting your new setup in the DFE Server's Configuration Tool,
2. assign this new configuration to your digital press as described above.

## 15.4. Exporting and Importing Digital Press Configurations

### Exporting Digital Press Configurations

To export your digital press configurations, go to **File > Export Library...** The archive will also contain all other library objects, but you can remove them from the list before saving the archive. See [Exporting the Library](#) on page 39.

**Note:** Your digital press configuration's *Print Settings* and any unfinished work cannot be exported.

### Importing Digital Press Configurations

Use **File > Import** or **Ctrl+Alt+I** to import an archive containing digital press configurations.

They are imported using their existing name (you cannot rename them).

**Note:**

- If you are importing a digital press configuration for a press that already has a configuration in Color Pilot, its existing configuration will be overwritten.  
To keep the existing configuration, remove the new digital press configuration from the archive you are importing.
- If you are importing a digital press configuration for a press that is not present in Color Pilot, this press will be added.

### Moving Digital Press Configurations to Another Database

If you want to move your digital press configurations to a different database, do the following:

1. Export your digital press configurations to an archive.
2. Redirect your DFE Server to the new database location. Please see your DFE Server installation guide for details.
3. Redirect your Color Pilot application to the new database location (the same one you just redirected your DFE Server to). See [Setting Your Color Database Location](#) on page 67.
4. Import your digital press configurations from the archive you created.


**Note:** It is recommended to perform steps (2) and (3) in this order.

## 15.5. Defining Ink Limits for Your Digital Press Configuration

To avoid the negative effects of printing with too much ink (substrate distortion, ink not drying fast enough between layers...), you need to define the maximum amount of ink to use for your digital press configuration (see [Working with Ink Limitation Sets for Digital Presses](#) on page 359 for more information).

**Note:** You should do this before making a profile for your digital press configuration.

To do this from your digital press configuration:

1. Select your digital press configuration and click  **Set Ink Limits** in the bottom tool bar.  
If your digital press configuration doesn't have any ink limitation set assigned yet, it also has a **Set Ink Limits...** button associated with it.



**Attention:**

If you made your digital press configuration for a CMYKO, CMYKV or CMYKG ink set, you will not be able to create an ink limitation set for that configuration.

In that case, [choose another digital press configuration](#) (one made for CMYK, CMYKOG, CMYKOV or CMYKOGV, depending on your press and the jobs you typically print).

2. In the **Set Ink Limits** dialog that opens, choose to either:

- **Create a new ink limitation set.**

**Note:** For the most accurate printing results, we recommend you create a custom ink limitation set for your digital press, ink set and substrate.

- **Use an existing ink limitation set**, then select the ink limitation set to use in the list below.



**Note:**

- This is only available if you have already created at least one ink limitation set, or if your press vendor has provided you with ink limitation sets for your ink set and substrate.
- You should only reuse ink limitation sets between digital presses of the same type, that have the same ink set but also the same substrate (as different substrates can take different amounts of ink, see [Working with Ink Limitation Sets for Digital Presses](#) on page 359).
- The list only shows ink limitation sets made for the ink set in your digital press configuration (for example if you have an ink limitation set for CMYK, but your digital press is set up to use CMYKOV, you will not be able to use the CMYK ink limitation set).

Click **OK**. If you have selected an existing ink limitation set, this will close the dialog.

3. If you chose to **Create a new ink limitation set**, the **Set Ink Limits for Press ...** wizard will open.

It will help you determine the best ink limits to use for your particular combination of press, inks and substrate, in four steps:

**Step 1: Set Ink Limit per Ink** (see [Defining Ink Limits for Individual Inks](#) on page 361)


**Step 2: Linearization** (see [Linearization](#) on page 369)

**Step 3: Set Total Ink Limit** (see [Defining the Total Ink Limit](#) on page 372)

**Step 4: Summary** (see [Evaluating and Saving your Ink Limits](#) on page 454)


4. At any time, you can save your unfinished work and continue later. This way you can perform other tasks in the meantime, or safely close the Color Pilot and resume the session after starting up the application again later.

- a) Click **Quit Now and Continue Later**. Confirm your choice by clicking **Yes**.

This closes the wizard and shows a  badge with the message `Unfinished Ink Limitation Set` under/next to your digital press (depending on the view).

You can also see the badge on the  **Set Ink Limits** button in the bottom tool bar when the digital press and configuration for which you started the ink limitation set are selected.

**Note:** If you want to discard the unfinished ink limitation set that you saved, right-click your digital press configuration and select **Remove Unfinished Task**.

- b) When you are ready to resume working on the ink limitation set, click  **Set Ink Limits** again. In the **Set Ink Limits** dialog, select **Resume unfinished ink limitation set** to resume the wizard from the point you saved. Note that you cannot go back and change earlier settings.

**Note:**

You can also:

- Create a new ink limitation set instead: select **Ignore unfinished ink limitation set and create a new ink limitation set**.
- **Use an existing ink limitation set** instead (it must have been made for the ink set that your digital press configuration uses).

### 15.5.1. Defining Ink Limits for Individual Inks

The **Set Ink Limit per Ink** step of the **Set Ink Limits for Press ...** wizard helps you determine the maximum amount of each ink that can be printed.

1. If your digital press supports white underprint, set the **Ink Limit for White** first.

The white ink limit you set here will be applied to any file containing the **ClassicColors White** ink (when printing your files using this ink limitation set and a color strategy [with white as an extra output ink](#)).

**Note:** Ink limitation sets that contain an ink limit for the white ink cannot be used in a "classic" Color Engine Pilot (version 14.X or 12.X)..

2. Decide how you want to determine the ink limits for the other inks:
  - Choose **With a visual test chart** if you want to print a chart with gradations of each ink, and assess visually up to which ink percentages you get a satisfactory printing quality.  
See [With a Visual Test Chart](#) on page 362.
  - Choose **By measuring a test chart** if you want to print a chart with gradations of each ink, measure those gradations with a spectrophotometer, and have the wizard calculate the best ink limits based on those measurements (you will still be able to evaluate and change the percentages as desired).  
See [By Measuring a Test Chart](#) on page 363.
  - Choose **Manually** if you already know from experience how much ink can be printed on your particular substrate and just want to enter the maximum percentages.  
See [Manually](#) on page 369.

#### With a Visual Test Chart

If you want to decide what ink limitation percentages to use by looking at a printed chart, do the following:

1. The wizard displays the chart that will be printed. This chart contains a set of patches of different percentages (between 65% and 100%), for all output inks of your press.  
Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings [defined for your digital press](#) are used).
2. In the **Print Settings** dialog that opens:
  - a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.

- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- d) Click **OK**.

- 3. Click **Print Chart** to send the chart to the digital press for printing.

- 4. Once the chart is printed, find the best percentage to use as ink limit for each ink: this is the first percentage that gives you the maximum saturation you can print.



- 5. Go back to the wizard and enter the percentages that you found (they must be between 50% and 100%).

**Note:** By default, the black ink limit is set to 100% (as solid black is important for text). If you want to change it, you need to first deselect the **Set ink limit of black to 100%** option.

- 6. When you are finished setting ink limits for individual inks, go to the *Linearization step*.

**By Measuring a Test Chart**

If you want to print a chart with gradations and measure those gradations to calculate the best ink limits automatically, do the following:

- 1. The wizard displays the chart that will be printed. This chart contains a set of patches of different percentages, for all output inks of your press.

**Note:** If you are using an M1 or M2 *measurement condition*, the chart will be automatically adapted to support the dual measurement (measuring with and without UV filtering) required by these measurement conditions (the patches will be slightly bigger and there will be slightly more white space in between lines of patches).

Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings *defined for your digital press* are used).

2. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**


This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).



**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.

- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- d) Click **OK**.



3. Click **Print Chart** to send the chart to the digital press for printing.

4. Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

5. The next screen shows the ink limits calculated by the wizard based on your measurements.

You can evaluate these inks limits using:

- a measurements table,

- a set of curves,
- a color wheel.

You can change the ink limits as desired in each of these tools, and your changes will be reflected in all of them.

- a) The measurements table shows the proposed maximum percentages and the measurement data. For each output ink, you can see:

- The **Ink Limit** percentage that gives you the maximum saturation without causing *negative printing effects*.

You can change the percentages manually if desired.

**Note:** By default, the black ink limit is set to 100% (as solid black is important for text). If you want to change it, you need to first deselect the **Set ink limit of black to 100%** option.

If you are not happy with your changes, you can get back to the ink limits calculated by the wizard by clicking **Reset to Measured**.

- The **Lab** and **LCh** values for that ink limit percentage.

Those values are updated automatically if you change the **Ink Limit** percentage.

**Tip:** If you are trying to match a standard, you can change the ink limits so that the **Lab** and **LCh** values match the ones given in the standard.

- The **Density** value for that percentage.

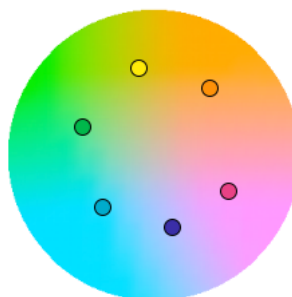
The **Density** is calculated using the **Density Formula** shown above (by default, this is the one you chose *in the Preferences*, but you can change it here as desired).

The **Density** value is updated automatically if you change the **Ink Limit** percentage.

**Tip:** If you are trying to match a standard, you can change the ink limits so that the **Density** values match the ones given in the standard.

- The **Ink Trap** percentage for secondary colors (for some digital press types).

Secondary colors are colors that can be printed using two output inks. These output inks must be next to each other on the color wheel.



For example:

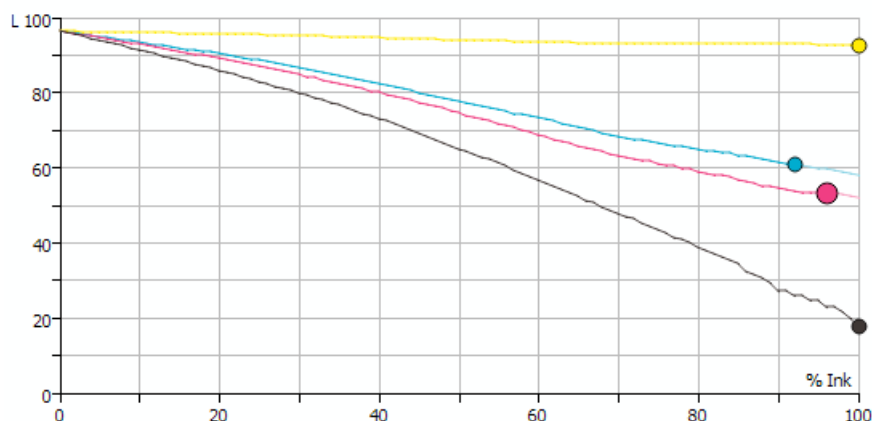
- You can print Orange/Red using Yellow and Magenta,
- You can print Blue/Violet using Magenta and Cyan,
- You can print Green using Cyan and Yellow.

You cannot make secondary colors using Black (adding another color to Black just makes a richer Black).

When printing with a multicolor ink set, only colors that are not part of the ink set can be considered secondary colors. For example, when printing with CMYKOG, Blue/Violet is a secondary color, but Orange and Green are not.

The **Ink Trap** percentage measures how well two output inks print together to make a secondary color. For best results, the density of the sum of the two output inks and the density of the secondary color should be similar, and the **Ink Trap** percentage should be close to 100%.

- b) The curves show the lightness values across the whole printing range (0-100%) for each output ink.

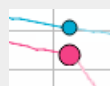


The ink limits are indicated by dots ●. You can drag a dot further along the curve (closer to 100%) to increase the ink limit, or drag it back to decrease it.

**Tip:**

The curves should look relatively linear.

If you see the lightness decreasing sharply at the end of a curve, it typically means that from this point on, adding more ink doesn't increase the chroma of the ink but only makes it darker (you can check this using the **LCh** values in the measurements table).

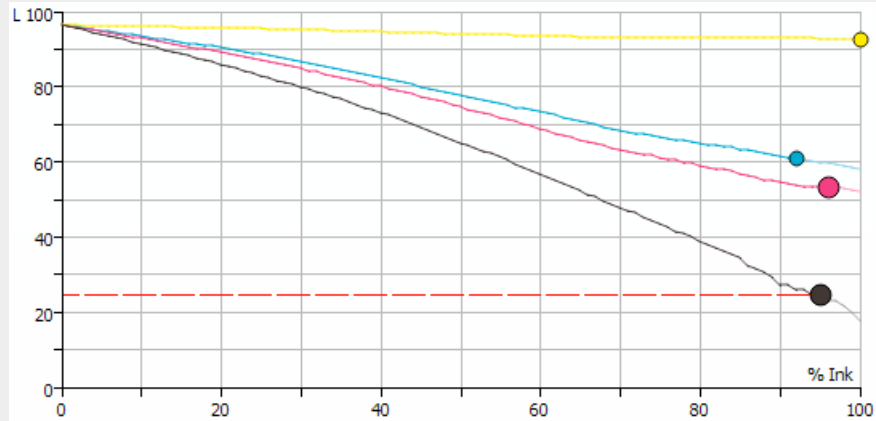


In this case, you should place the ink limit just before the sharp decrease.

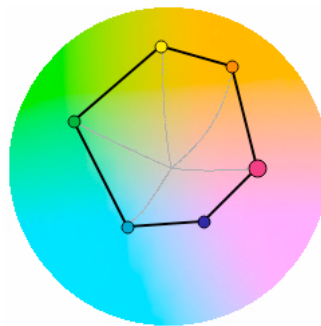
You can only move the black dot if you have deselected **Set ink limit of black to 100%**.



**Attention:** When limiting the amount of black, make sure the lightness for the maximum black percentage is not too high, as this would cause a loss of details in the shadows.



c) The color wheel shows you the press gamut (the colors you can reproduce) when working within your ink limits.



To increase an ink limit, drag the dot towards the outside of the color wheel, or drag it towards the inside to decrease it.

The point where the curves of each color meet in the center is the white point.

**Note:**

You cannot change the ink limits of your secondary colors. They depend on the limits of the inks used to print those colors.





**Tip:**

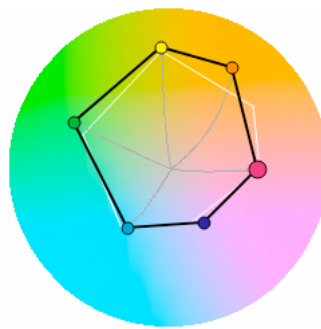
If you see one of the curves making a hook at the end, it typically signals a hue shift in the shadows for that ink (you can check this using the **LCh** values in the measurements table).



In this case, you should place the ink limit just before the hook.

- d) If you are trying to match a standard or another press, select the profile you want to match in **Reference Profile**.

You can then see the *gamut* of that profile outlined in white on the color wheel, and you can compare it with the gamut you can achieve with your current ink limits.



You can then adjust the ink limits to match the profile if desired.

- 6. When you are finished setting ink limits for individual inks, go to the [Linearization step](#).

**Manually**

If you already know how much ink can be printed on your substrate, do the following:

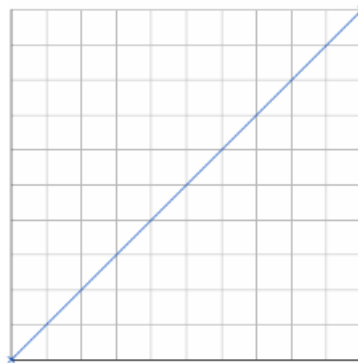
- 1. Enter the maximum percentages to use for each ink (they must be between 50% and 100%).

**Note:** By default, the black ink limit is set to 100% (as solid black is important for text). If you want to change it, you need to first deselect the **Set ink limit of black to 100%** option.

- 2. When you are finished setting ink limits for individual inks, go to the [Linearization step](#).

**15.5.2. Linearization**

The wizard's **Linearization** step helps you automatically adjust your digital press' dot gain (to make it linear), so that color reproduction is more consistent.



When calculating the adjustment needed for each output ink, the wizard will take into account the *ink limit you just set* for that ink.

1. Choose whether to linearize your digital press.
  - If you are linearizing your press another way (for example through good dot gain curves in your RIP), select **No** to skip the linearization and go directly to the *Set Total Ink Limit* step.
  - If not, select **Yes** to print and measure a linearization chart as explained below.
2. The wizard displays the chart that will be printed. This chart contains a set of patches of different percentages (between 0% and 100%), for all output inks of your press.

Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings *defined for your digital press* are used).

3. In the **Print Settings** dialog that opens:
  - a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**  
 This option is only available if your digital press supports it.  
 Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.


- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**  
 This option is only available if:



- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.



- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
  - d) Click **OK**.
4. Click **Print Chart** to send the chart to the digital press for printing.

5. Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:

- is of the correct page of your chart (if it has several pages),
- is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.

2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

6. You can check the results of the linearization in the next screen.

a) By default, you can see the **Linearization Curves** that will be applied to your press' output inks.

To display the curves one by one, deselect **Show All Curves** and select one of the output inks.

This also shows the **Curve Values** (what will be printed for each input percentage) for that ink at right.

b) To see the measured data curves instead of the linearization curves, choose to **Show** the **Measured Tone Value** (this also shows the tone values measured for each percentage at right).

This uses the **Tone Metric** you chose *in the Preferences* by default, but you can change it here as desired (the curves and the tone values are updated automatically).

The linearization curves will be stored in your ink limitation set, so that when you attach the ink limitation set to your digital press, the linearization curves will be applied as well.

7. When you are done, go to the [Set Total Ink Limit](#) step.

### 15.5.3. Defining the Total Ink Limit

The wizard's **Set Total Ink Limit** step helps you determine the maximum amount of ink that can be printed on your substrate.

Decide how you want to determine the total ink limit:

- Choose **With a visual test chart** if you want to print a chart with gradations of each ink, and assess visually up to which ink percentages you get a satisfactory printing quality.

See [With a Visual Test Chart](#) on page 372.

- Choose **Manually** if you already know from experience how much ink can be printed on your particular substrate and just want to enter the maximum percentages.

See [Manually](#) on page 373.

#### With a Visual Test Chart

If you want to decide what total ink limit percentage to use by looking at a printed chart, do the following:

1. The wizard displays the chart that will be printed.

This chart contains:

- overprints of all of your press' output inks, adding up to different total ink percentages (150% to 400%),
- overprints of ink pairs used to print *secondary colors*, in different percentages (100% to 200%)(if your digital press supports this).

Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings *defined for your digital press* are used).

2. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.

- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- d) Click **OK**.

3. Click **Print Chart** to send the chart to the digital press for printing.

4. Once the chart is printed, find the best percentages to use as:

- **Ink Limit for Secondaries** (if your digital press supports this)
- **Total Ink Limit**

**Note:** The **Total Ink Limit** percentage can be less than the sum of all *single ink limits*, as most colors are not printed using all inks on press.

Those are the percentages that already give you the best total ink coverage but that don't cause any *negative printing effects* yet.

Enter them in the wizard.

### Manually

If you already know how much ink can be printed on your substrate, do the following (depending on your digital press type):

- Enter the maximum percentage to use as **Ink Limit for Secondaries**. This must be between 100% and 200%, and cannot be more than the **Total Ink Limit** percentage.
- Enter the Desired **Total Ink Limit** (it must be between 100% and 400%).

**Note:** The Actual **Total Ink Limit** can be different because of *single ink limits* and linearization curves. It is displayed below the Desired Total Ink Limit.

You should enter the percentages that already give you the best total ink coverage but that don't cause any *negative printing effects* yet.

### 15.5.4. Evaluating and Saving your Ink Limits

In the wizard's **Summary** step, you can print a chart to evaluate the ink limits you just set, then save your ink limitation set when you are satisfied.

1. The wizard displays the evaluation chart that will be printed.

This chart is the same as the *total ink limit chart*, but with your finished ink limitation set (containing your *ink limits per ink*, *linearization curves* and *total ink limit*) applied to it.

When working with CMYKOG, the chart also contains images and other elements to help you better evaluate your ink limitation set's effects.

Click **Print Settings...** if you want to change how the chart will be printed (by default the print settings *defined for your digital press* are used).

2. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

**Tip:** If you have set a maximum percentage *for the white ink*, your test chart will contain a white underprint of that percentage.

- c) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- d) Click **OK**.

3. Click **Print Chart** to send the chart to the digital press for printing.

4. Once the chart is printed, check that you are satisfied with the effects of your ink limitation set.  
If needed, you can still go back and tweak your ink limitation set (use the **Back** button at the bottom of the wizard or the back arrow at the top depending on your operating system).
5. Once you are satisfied with the results:
  - a) Enter an **Ink Limitation Set Name**.  
A default name based on your substrate and ink set is filled in.
  - b) Enter a **Description** if desired.
  - c) If you want to add [keywords](#) to find the ink limitation set more easily later, select **Add keywords** and enter your **Keywords**.  
Keywords based on the digital press configuration are filled in by default.
6. Select whether you want to **Create a profile using this ink limitation set** (we recommend you do this so that your press profile takes the ink limits you just set into account).  
Click **Finish**.  
Your ink limitation set is applied to your digital press configuration and listed in the **Ink Limitation Sets Library**.
7. If you chose to create a profile, the profiling wizard will open.  
See [Creating a Profile for Your Digital Press Configuration](#) on page 455 for more information.

## 15.6. Removing an Ink Limitation Set from Your Digital Press Configuration

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1. Right-click your digital press configuration and select **Remove Ink Limitation**.
2. Click **OK**.  
The ink limitation set is not assigned to your digital press configuration anymore, but still exists in the **Ink Limitation Sets Library**.

### Tip:

If you want to make a new ink limitation set for your press configuration, you don't need to first remove the one that's already assigned to it.

You can just proceed as explained in [Defining Ink Limits for Your Digital Press Configuration](#) on page 440.

Your previous ink limitation set will automatically be replaced by the new one (but will continue to exist in the **Ink Limitation Sets Library**).

## 15.7. Creating a Profile for Your Digital Press Configuration

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Once you have [selected a configuration](#) and [created an ink limitation set](#) for your digital press (if you are working with a digital press that supports ink limitation sets), you can create a profile for it.

You create a profile by printing a chart containing many color patches made up of different ink combinations, then measuring that printed chart with a spectrophotometer to know how your press printed those ink combinations.





This doesn't only tell you how your press prints, but also the range of colors (or *gamut*) you can achieve with that particular digital press configuration.

You can either create a digital press profile:

- from the **Digital Presses Library**, when setting up your digital press,
- from the **Profiles Library** (see [Profiling Your Digital Press](#) on page 159).

To profile your digital press configuration from the **Digital Presses Library**:

**1.** If your digital press configuration...

<p>... does not specify a profile, you will see an orange question mark next to your press picture.</p> <p>Click the  <b>Set Profile</b> button under your press picture or in the bottom tool bar.</p>	
<p>... already specifies a press profile, you will see a green check next to your press picture.</p> <p>You can still change or update the profile if desired. Click  <b>Set Profile</b> in the bottom tool bar.</p>	

**2.** In the **Set Profile** dialog that opens, choose to either:

- **Create a new profile.**

**Note:** For the most accurate printing results, we recommend you create a custom profile for your digital press configuration, as the configuration specifies the exact setup on your press (ink set, screening, substrate...).

- **Use an existing profile**, then select the profile to use in the list below.

**Note:** Color Pilot comes with predefined standard profiles for different substrates with different ink sets. If you don't have the time or color knowledge to create a custom profile, you can pick the appropriate standard one.

**Table: Predefined Standard Profiles**

Substrate	Corresponding standard profiles
Fasson PE85 white TOP	<ul style="list-style-type: none"> <li>• HPI-PE-WHITE-CMYK</li> <li>• HPI-PE-WHITE-CMYKOGV</li> <li>• HPI-PE-WHITE-CMYKOV</li> </ul>
Fasson PE85 Transparent TOP	<ul style="list-style-type: none"> <li>• HPI-PE-TRANS-CMYK</li> <li>• HPI-PE-TRANS-CMYKOV</li> </ul>
Fasson Metalized Silver TOP Paper	<ul style="list-style-type: none"> <li>• HPI-METAL-SILV-PAPER-CMYK</li> <li>• HPI-METAL-SILV-PAPER-CMYKOV</li> </ul>
Fasson Cream Antique TOP	<ul style="list-style-type: none"> <li>• HPI-CREAM-ANTIQ-CMYK</li> <li>• HPI-CREAM-ANTIQ-CMYKOGV</li> </ul>



Substrate	Corresponding standard profiles
	<ul style="list-style-type: none"> <li>HPI-CREAM-ANTIQ-CMYKOV</li> </ul>
Wausau Coated 2.3 mil White Polypropylene	<ul style="list-style-type: none"> <li>HPI-PP-WHITE-CMYK</li> <li>HPI-PP-WHITE-CMYKOGV</li> <li>HPI-PP-WHITE-CMYKOV</li> </ul>
Wausau Coated Estate #8 with Wet Strength	<ul style="list-style-type: none"> <li>HPI-EST-8-CMYK</li> <li>HPI-EST-8-CMYKOGV</li> <li>HPI-EST-8-CMYKOV</li> </ul>
Wausau Coated Metalized Bright Silver Paper	<ul style="list-style-type: none"> <li>HPI-BRIGHT-SILV-PAPER-CMYK</li> <li>HPI-BRIGHT-SILV-PAPER-CMYKOV</li> </ul>



**Attention:**

By default, you only see existing profiles made for settings that match your digital press configuration (same ink set, screening, substrate...).

You can deselect **Only show profiles with settings that match the configuration** to see profiles with other settings, but we recommend you don't use one of those, as it may cause color deviations.

Your final color match is not only affected by the exact color of your inks, or the exact shade of your substrate, but also by the screening on your press, as different screening settings affect how the ink dots overprint on each other, therefore affecting the resulting color.

Click **OK**. If you have selected an existing profile, this will close the dialog. The profile is assigned to your press.

If you chose to **Create a new profile**, continue with the following steps.

3. If you chose in the [Preferences](#) to have Color Pilot to always ask you whether to use the inline or offline spectrophotometer, select either **Inline** or **Offline** in the pop-up that opens.

**Tip:** You can select **Do not ask me again** if you want Color Pilot to remember your selection and change it in the Preferences.

4. The **Measure Profile** wizard opens.
  - If you are working with an inline spectrophotometer, see [Creating a Profile with an Inline Spectrophotometer](#) on page 458.
  - If you are working with an offline spectrophotometer, see [Creating a Profile with an Offline Spectrophotometer](#) on page 466.
5. At any time, you can save your unfinished work and continue later. This way you can perform other tasks in the meantime, or safely close the Color Pilot and resume the session after starting up the application again later.



**Attention:**




You can only save one unfinished task per digital press configuration, whether it is an ink limitation set, a profile, or a spot color refinement.

This means that if for example you started making an ink limitation set for your digital press configuration but didn't finish (so you have a unfinished ink limitation task saved), and you start profiling your press, you cannot save an unfinished version of your profile without discarding your unfinished ink limitation task.

In this case you should finish making your ink limitation set first before profiling your press (you will get better results when the maximum amount of ink that can be laid down on the substrate is determined before making the profile anyway).

- a) Click **Quit Now and Continue Later**. Confirm your choice by clicking **Yes**.

The profiling wizard will close and you will see a badge next to the press name:

- : indicates that the profile is unfinished.
- : indicates that the profile is waiting for the measurements from the inline spectrophotometer on the press (when working with an inline spectrophotometer).
- : indicates that an error has occurred, or that the measurement job was cancelled on the press.

You can also see the badge on the **Set Profile** button in the bottom tool bar when you select the digital press and configuration for which you started the profiling.

- b) When you are ready to resume the profiling, click **Set Profile** and then select **Resume unfinished profile**.

This will resume the wizard from the point you saved. However, you cannot go back and change earlier settings.

**Note:**

- At any point, you can click **Quit Now and Continue Later** again to save your unfinished profile in a different state (this discards the previous state of your unfinished profile).
- If you want to discard your unfinished profile and start creating a new profile instead, click **Start New Session**.

### 15.7.1. Creating a Profile with an Inline Spectrophotometer

The **Measure Profile** wizard will guide you through the profile creation in three steps: [Get Started](#) on page 161, [Measure Profile](#) on page 164 and [Finish](#) on page 466.

#### Get Started

In the **Get started** step of the **Measure Profile** wizard, you will choose and print a profile chart.

**Tip:**

Color Pilot can *check your digital press' stability* while profiling. To do this, use the following options:

- an *Equinox Patch Set*,
- *Randomize Patches*.

**1.** On the **Select Overprint Chart** screen, choose the **Chart Size** to use (**Normal** or **Large**).

When choosing **Large**, the chart will contain more combinations of ink percentages (this is only available when working with a CMYK press configuration).

**2.** Select the **Patch Set** to use:

- if you are profiling a CMYK press configuration, you can choose between **IT8.7/3**, **ECI 2002** and **Normal (non\_uniform, 3 inks + K)**,
- if you are profiling a multicolor press configuration, you can choose between **Normal** (a larger patch set containing more CMYK patches) and **Equinox** (a smaller patch set containing slightly more extended gamut inks -for example OGV when profiling a CMYKOGV press configuration) patches.
- If you selected **Enable custom patch sets when creating a digital printing profile** *in the Preferences*, you can also select a custom patch set adapted to your digital press configuration's ink set.

**3.** Choose how many times you want **Print Each Patch** (you can set a number from 1 to 5).

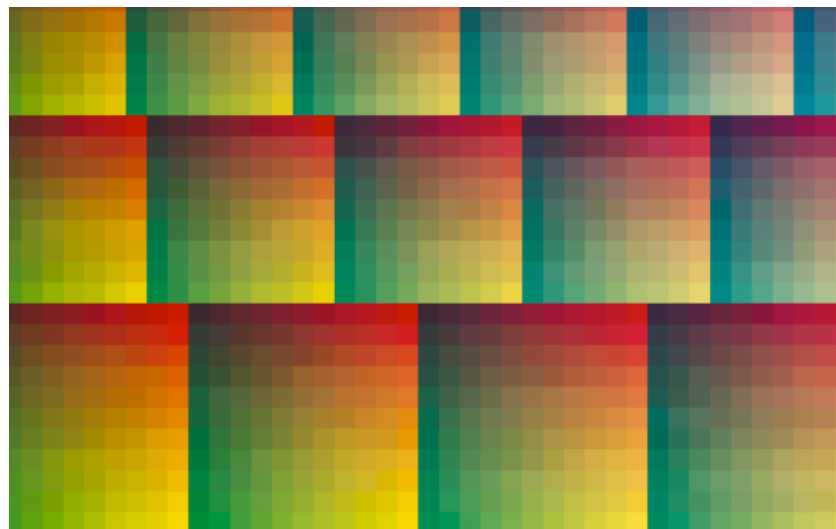
If you print each patch several times, Color Pilot can **average** the values of several measurements for each patch, to minimize the effects of potential printing problems or bad measurements.

**Note:** When measuring with an inline spectrophotometer, you can print a maximum of 10 000 patches. If printing the patches several times generates more patches than that, some patches will be printed less times to have a total of 10 000 patches.

**4.** Select whether to **Randomize patches** when printing your chart. This will "scramble" the patches instead of printing them in the order of a gradation.

We recommend you do this, especially if your press has noticeable printing variations (for example left to right, or sheet start to sheet end printing differences).

If for example you have "color jumps" near the line endings, a regular chart like the one below can concentrate all of the color jump in one area of the profile,



while a randomized chart like the one below will distribute the color jump in more of the profile, which is easier to compensate using *averaging* and *smoothing*.



**Tip:**

The need for averaging, randomizing and smoothing depends on how your press prints. The more printing variations you notice, the more those options are useful to alleviate those variations.

For example, if you are working with a wide format press, you have more of a risk of having left to right printing differences.

However, if you see that your press prints very evenly (if for example it is a brand new press that still prints exactly as per your press vendor's specifications), you don't need to print each patch several times, randomize your patches or smooth your gradations.

You can see the **Number of patches** that will be printed, but you cannot see the *layout* of the chart, as it will be generated on the fly at the press side to fit the substrate and the inline spectrophotometer installed.

5. Click **Next** to go to the **Print and Measure Overprint Chart** screen.

Click **Settings...** if you want to change how the chart(s) will be printed (by default the print settings *defined for your digital press* are used).

6. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- c) Select **Generate an extra Magenta separation** if you want to generate an extra separation called *Magenta 1* in areas where Orange, Violet or Green inks overlap with Magenta.

**Note:** This option is only available if your digital press supports it.

**Important:** Remember to select this option when you intend to print production jobs that use a color strategy with *Magenta 1*.

- d) The **Layout** and **Page Range** options are not applicable when working with an inline spectrophotometer, as the chart layout is not generated by the Color Pilot, but directly by the press, to fit its substrate and inline spectrophotometer format.
- e) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- f) Click **OK**.

7. Click the **Print and Measure Overprint Chart** button to print the chart and launch the automatic measurement with your inline spectrophotometer.

If you click **Quit Now and Continue Later** before the inline measurements have been completed, you will not be able to reuse them. The next time you print and measure your chart, you will receive a warning that your existing inline measurements will be discarded.

**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the chart is printed on the first press engine to safeguard against color variation inside the color profiles.

To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE Server client.




8. Once the chart is printed and measured, click **Next** to go to the [Check Measurements](#) screen.

**Measure Profile**

As the inline spectrophotometer measured your profiling chart automatically, the **Measure Profile** step starts with checking those measurements.

1. On the **Check Measurements** screen, you can:

- a) Inspect your measured data:

- Zoom in  on a chart area, zoom out  or fit the whole chart in the preview ,
- Click a patch to see its color values (in the profile's inks and in Lab).

- b) Troubleshoot your measured data:

- Repair a patch: click a patch in **Profile** view then click **Repair** (or use **Ctrl+R**). The correct measurement is calculated based on data from the surrounding color patches.
- Use **Find and Repair Bad Measurements...** to automatically detect and (optionally) repair bad patches in your chart.

See [Find and Repair Bad Measurements](#) for details.

**Note:** If the bad patches can be traced to printing variations of your press, you should try smoothing your profile instead.

- **Apply Smoothing** on your measurements if they still look "coarse" after re-measuring or repairing the bad patches (this is usually the case when your press has a lot of variation or noise).



Smoothing makes sure that there is a more regular progression of the ink values between neighboring patches, so that you will have more reliable color tints on press, especially when printing jobs with gradations.



We also recommend you apply smoothing if you only printed each patch one time (as Color Pilot couldn't automatically average your measurements then).

Smoothing may take a few minutes, and is reversible (click **Undo Smoothing** to get back to the unsmoothed measurements).

- c) View some statistics about your digital press' stability.

See [Checking Your Digital Press' Stability](#) on page 167.

**Note:**

Those statistics are not available if you chose to either:

- use a *normal* patch set for your multicolor digital press configuration,
- not *randomize* your chart patches.

2. Click **Next** when you are done checking the measurements.
3. On the **Select Profile Name** screen:
  - a) Enter a **Profile Name**.

A default name based on the digital press configuration's substrate and inks is filled in.
  - b) Enter a **Description** if desired.
  - c) If you want to add *keywords* to find the profile more easily later, select **Add keywords** and enter your **Keywords**.

Keywords based on the digital press configuration are filled in by default.
4. Click **Next** when you are done.

### Find and Repair Bad Measurements



You can use **Find and Repair Bad Measurements...** to automatically detect (and optionally repair) bad measurements in your chart.

This detects isolated patches in your profile that differ substantially from patches with similar ink combinations, and can be attributed to spectrophotometer malfunction or misalignment, abnormal measurement conditions, or even damage to the physical print-out itself.

It is particularly useful when working with randomized charts that have been printed multiple times. In this case the bad patches are not immediately obvious against their neighbors in **Layout View** because they have been randomized, and they may be undetectable in **Profile View** because they have already been averaged.

You can use **Find and Repair Bad Measurements...** in combination with *smoothing*, but it is recommended that you apply **Find and Repair Bad Measurements...** first, because smoothing a profile containing bad measurements can spread the error across multiple patches.

You can always perform additional *repairs* based on visual inspection of your chart.

1. Click **Find and Repair Bad Measurements...** on the **Check Measurements** page of the **Measure Profile** wizard.  
If bad measurements are detected in your chart, the **Repair Bad Measurements** dialog opens.
2. In the **Repair Bad Measurements** dialog, you can cycle through bad patches by using the  and  buttons.  
For each bad patch you can see:
  1. The patch status. This can be **Not Repaired**, **Repaired**, or **Remeasured**.
  2. The ink combination used to generate the patch.
  3. The patch's **Lab** values before and after repair.
  4. A small preview area showing the color difference between the Lab values before and after repair.
  5. The **delta E** between the Lab values before and after repair.

**Note:** Patches with high delta E values are likely in need of repair, while patches with lower delta E values may be acceptable, particularly in darker areas of the profile, where sampling performed by the application is sparser and spotting a bad measurement can be difficult.

6. A small preview area showing the patch centered next to its neighboring patches in the profile.  
You can use this to visually verify that the patch is actually bad, and to facilitate the task of locating the patch in your profile chart.
3. For each bad patch that you inspect, you can:
  - a) Click **Repair (Ctrl+R)** to repair the patch.  
The patch is immediately repaired. The patch status changes to **Repaired**, and all preview areas are updated. The **Repair (Ctrl+R)** button changes to **Undo Repair**.
  - b) Click **Undo Repair** to revert the repair.
  - c) Click **Measure again...** to re-measure the patch.  
This opens the **Measure patch again** dialog. To re-measure the patch, follow the instructions in the dialog.  
If the patch has been printed multiple times, select the desired patch to re-measure. After measuring, the patch status is updated to **Remeasured** and all preview areas are updated as well.
  - d) Double-click **Repair** to revert to the original measurement.  
The patch status changes to **Not Repaired**.

You can also click **Repair All (x)** to automatically repair all patches, where **x** is the number of bad patches detected. The **Repair All (x)** button changes to **Undo Repair All (x)**.

To accept the repairs, click **OK**. If you want to revert the repairs later, you will have to re-measure the chart.

### Checking Your Digital Press' Stability

You can view statistics about your digital press' stability in the **Press Stability** area of the **Check Measurements** screen.

These statistics will help you know what to expect of your printing setup (digital press and inline spectrophotometer) in terms of color accuracy, as your best print can only be as color accurate as your printing setup.

They will also highlight any potential color accuracy problem with your digital press' individual inks.



To calculate these statistics, Color Pilot adds some duplicate patches in different areas of your profiling chart, and calculates the *Delta E* difference between those duplicate patches when you measure them.

It adds duplicate patches for:

- each of the profile's inks (the solid patch and at least one tint patch per ink),
- different levels of grey (using black and/or combinations of other inks),
- the substrate.

The exact set of duplicate patches (including how many times they are duplicated) depends on your ink set and chart layout.

The average values of the duplicate patches are used to calculate the profile, to make it more representative of how your digital press prints.

**Note:**

To see these statistics, you need to be using the following profiling options:

- an *Equinox Patch Set* (as this patch set includes stability patches),
- *Randomize Patches* (as the additional stability patches need to be distributed across the chart to be representative of how your digital press prints).

To check your digital press' stability:

1. Select the **ΔE Formula** you want to use to calculate the color differences.  
By default, Color Pilot uses the Delta E formula you chose *in the Preferences*.
2. Check the **Average ΔE** and **Maximum ΔE** for:

<b>All Patches</b>	This gives you an idea of the general stability of your printing setup (digital press and inline spectrophotometer).
The <b>Substrate</b>	This gives you an idea of your spectrophotometer's stability (as no ink is printed).
Each of your digital press inks	This gives you an idea of how stable each ink is (as for a same digital press, some inks can be very stable and others a lot less).

The **Average ΔE** is the average of the Delta E values found between all duplicates of a certain patch (for example the substrate patch), or of a group of patches (for example all duplicates of the Yellow solid and tints patches).

The **Maximum ΔE** is the maximum Delta E value found between those duplicate patches/groups of patches.

**Tip:**

If you have several digital presses, you can use the stability results to decide which digital press to use for each job.

For example, if the yellow of one of your digital presses has higher Delta E values, you can send jobs containing a lot of yellow to the other digital press.

## Finish

In the **Finish** step, you can create color strategies that have the profile you just created as output profile. You can use these color strategies later to color manage files to be printed on the press you just profiled.

You can create several color strategies with different ink sets (all of the profile's inks or a subset of them). This allows you to print with different ink sets (for example with 7 inks for higher quality/color fidelity or with fewer inks but at a lower cost/faster) after profiling the press only once.

This also means that you can refine each ink subset separately and have a different list of [exceptions](#) for each ink subset.

1. On the **Create Color Strategies** screen, select the **Create color strategies** option.

By default, the wizard creates at least one color strategy, with:



- the output profile being the profile you just created,
- the **Input Profile** being either the **<Same as Output Profile>**, or the default input profile you set [in the Preferences](#).

Depending on the ink set of the digital press configuration you profiled, you may see additional color strategies with a subset of your new profile's **Ink Set** as output profile. For example, if you profiled a CMYKOV configuration, you can also have color strategies that can be used to output to CMYK and CMYKO.

2. If desired, click **+** to create more color strategies.

If you want to delete a color strategy, select it and click **-**.

3. Edit your new color strategies as desired:

- To rename a strategy, select it, click its name and type the new name (by default, color strategies are named using the profile name and the ink set used).
- To choose a different **Input Profile**, click **Select** and select your desired profile from the color database.
- To remove the current **Input Profile** and have it be the **<Same as Output Profile>**, click the cross .
- To change the **Ink Set** of the output profile, click the small arrow  and select your desired ink set in the list.

4. If you have selected a white underprint in the **Settings...** before printing the chart, the option **Add White as an extra output ink** is automatically selected. As a result, all strategies created by the wizard will have **ClassicColors White** as an output ink.

5. Click **Next** when you are done.

6. On the **Summary** screen, you will see a summary mentioning the substrate used, and the profile and any color strategy created.

7. Click **Finish** to close the wizard.

## 15.7.2. Creating a Profile with an Offline Spectrophotometer

The **Measure Profile** wizard will guide you through the profile creation in three steps: [Get Started](#) on page 169, [Measure Profile](#) on page 173 and [Finish](#) on page 466.

## Get Started

In the **Get started** step of the **Measure Profile** wizard, you will choose and print a profile chart.

1. On the **Select Overprint Chart** screen, choose the **Chart Size** to use (**Normal** or **Large**).

When choosing **Large**, the chart will contain more combinations of ink percentages (this is only available when working with a CMYK press configuration).

2. In **Layout Type**, select the chart *layout* that you want to print.

- If you want a chart generated on demand, choose **Automatic**.

This takes into account your ink set, your substrate width and the dimensions that your spectrophotometer can measure (if your spectrophotometer is connected).

**Note:** If your chart is much narrower than the substrate (for example if it is generated for a Barbieri Spectro Swing, that can only measure narrow sheets), your chart print out will contain extra margins and cutting lines.

When working with a chart generated on demand:

1. Select the **Patch Set** to use:

- if you are profiling a CMYK press configuration, you can choose between **IT8.7/3**, **ECI 2002** and **Normal (non\_uniform, 3 inks + K)**,
- if you are profiling a multicolor press configuration, you can choose between **Normal** (a larger patch set containing more CMYK patches) and **Equinox** (a smaller patch set containing slightly more extended gamut inks -for example OGV when profiling a CMYKOGV press configuration) patches.
- If you selected **Enable custom patch sets when creating a digital printing profile** *in the Preferences*, you can also select a custom patch set adapted to your digital press configuration's ink set.

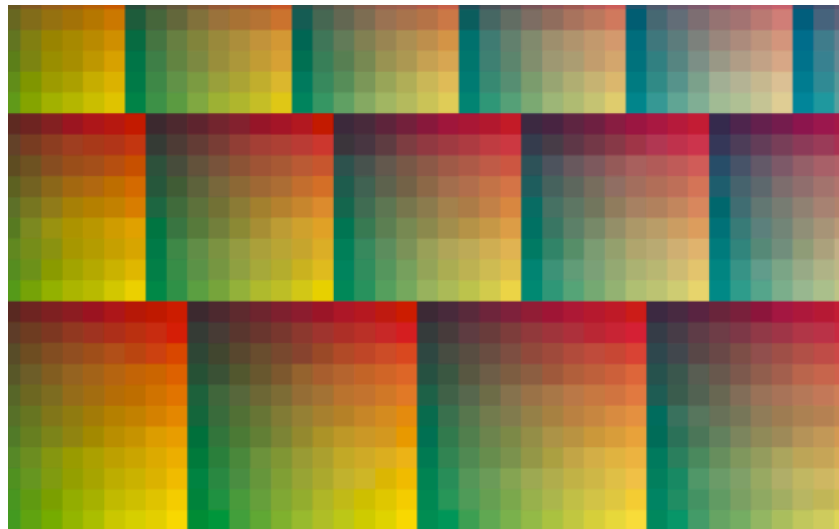
2. Choose how many times you want **Print Each Patch** (you can set a number from 1 to 5).

If you print each patch several times, Color Pilot can **average** the values of several measurements for each patch, to minimize the effects of potential printing problems or bad measurements.

3. Select whether to **Randomize patches** when printing your chart. This will "scramble" the patches instead of printing them in the order of a gradation.

We recommend you do this, especially if your press has noticeable printing variations (for example left to right, or sheet start to sheet end printing differences).

If for example you have "color jumps" near the line endings, a regular chart like the one below can concentrate all of the color jump in one area of the profile,



while a randomized chart like the one below will distribute the color jump in more of the profile, which is easier to compensate using *averaging* and *smoothing*.



**Tip:**

The need for averaging, randomizing and smoothing depends on how your press prints. The more printing variations you notice, the more those options are useful to alleviate those variations.

For example, if you are working with a wide format press, you have more of a risk of having left to right printing differences.

However, if you see that your press prints very evenly (if for example it is a brand new press that still prints exactly as per your press vendor's specifications), you don't need to print each patch several times, randomize your patches or smooth your gradations.

**Tip:**

Color Pilot can [check your digital press' stability](#) while profiling. To do this, use the following options:

- an [Automatic Layout Type](#),
  - an [Equinox Patch Set](#),
  - [Randomize Patches](#).
- If you want to print an existing chart layout that you are used to work with, choose **Predefined (legacy)**.

**Note:** If you are working with a Barbieri Spectro Swing spectrophotometer, you can only use legacy charts when measuring a CMYK or CMYKOV profile.



**Attention:** You will only be able to measure this type of chart using the M0 [measurement condition](#), as legacy charts are not adapted to support the dual measurement (measuring with and without UV filtering) required by the M1 and M2 measurement conditions.

When working with a predefined chart, choose the **Overprint Chart** to use (this determines the type of layout your chart will use).

**Note:**

You should choose your chart based on:

- The type of spectrophotometer you will be using to measure the chart.  
If the spectrophotometer is connected, only the appropriate charts are shown.
- The web width available to print the chart.
- The number of patches you want to measure.

**Note:** Charts generated on demand have corner marks, predefined charts have crosshairs.

3. You can see a **Preview** of your chosen chart and some information about it.

**Tip:**

- Click the **View Chart** link to open the chart in the default application for PDF files defined by the operating system.
- Click the **Show File Info** link to open a pop-up showing more information about the chart file (location, name...). You can also open the folder containing the chart file from this pop-up.

4. Click **Next** to go to the **Print Overprint Chart** screen.

Click **Settings...** if you want to change how the chart(s) will be printed (by default the print settings [defined for your digital press](#) are used).

5. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- c) Select **Generate an extra Magenta separation** if you want to generate an extra separation called *Magenta 1* in areas where Orange, Violet or Green inks overlap with Magenta.

**Note:** This option is only available if your digital press supports it.

**Important:** Remember to select this option when you intend to print production jobs that use a color strategy with *Magenta 1*.

- d) Choose how to determine your chart's **Layout**.

- Leave **Optimize the sheet layout for minimal substrate consumption** selected if you want Color Pilot to automatically calculate the best layout.

- If you want to set the layout manually, do the following:

1. Select **One page per sheet**.
2. If there are enough patches to fill several pages, select the **Page Range** to print, or choose to print **All Pages**.

**Tip:**

You can separate page numbers by a comma, or use a dash to indicate a page range (for example 3, 6–9).

Use this option to reprint a page that cannot be measured anymore, because it has been damaged for instance.

3. Choose the **Rotation** to apply when printing your chart.

- e) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined [when configuring your digital press](#)).

- f) Click **OK**.

6. Click the **Print Overprint Chart** button to print the chart.

**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the way the chart is printed depends on the [Layout Type](#) you chose:

- A chart with an **Automatic** layout is printed on the first press engine to safeguard against color variation inside the color profiles.

To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE Server client.

- A chart with a **Predefined (legacy)** layout is printed on the press engine available at printing time.


Color Pilot does not add an empty page to the chart before submitting it for printing.

7. Once the chart is printed, click **Next** to go to the **Measure Profile** step.



## Measure Profile

In the **Measure Profile** step of the **Measure Profile** wizard, you will measure the chart you printed, check the measurements and name the profile.



1. On the **Measure Page ...** screen you see a preview of the chart.

Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.
- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

2. After measuring the chart, you will see the **Check Measurements** screen.  
On this screen, you can:
  - a) Inspect your measured data:






- Change the view to **Layout** or **Profile**.
  - The **Layout** view displays the patches as they have been measured on the chart. This can be useful to locate a particular patch on the chart.
  - The **Profile** view displays the patches as they are organised in the profile. This view is useful to spot inconsistencies in the profile.

**Note:**

If you *printed each patch several times*, the **Profile** view shows the averaged measurements (there is one patch per ink percentage combination, which is an average of all measurements for that ink percentage combination).

The **Layout** view shows the original measurements (all the patches measured for each ink percentage combination).

As a result, Lab values for the same patch may differ between Layout and Profile view.

- Zoom in  on a chart area, zoom out  or fit the whole chart in the preview ,
  - Click a patch to see its color values (in the profile's inks and in Lab).
- b) Troubleshoot your measured data:
- Re-measure a patch: click a patch then click **Measure again...** Follow the instructions in the **Measure patch again** dialog.

**Note:**

Re-measuring a patch is only useful if there has been a bad measurement:

- For errors on the printout, use the **Repair** function instead.
- For a larger number of errors, re-run the profiling wizard and re-measure the entire chart.

**Tip:** If you *printed each patch several times*, you can choose which of these duplicate patches to remeasure: in the **Measure patch again** dialog, click **Next Patch** until your desired patch is selected.



**Attention:**

When using a Barbieri Spectro Swing spectrophotometer, you cannot measure single patches.

If you notice bad measurements, you can either **Repair** the bad patches, or go back and re-measure the whole chart (use the **Back** button at the bottom of the wizard or the back arrow at the top depending on your operating system).

- Repair a patch: click a patch in **Profile** view then click **Repair** (or use **Ctrl+R**). The correct measurement is calculated based on data from the surrounding color patches.

- Use **Find and Repair Bad Measurements...** to automatically detect and (optionally) repair bad patches in your chart.

See [Find and Repair Bad Measurements](#) for details.

**Note:** If the bad patches can be traced to printing variations of your press, you should try smoothing your profile instead.

- **Apply Smoothing** on your measurements if they still look "coarse" after re-measuring or repairing the bad patches (this is usually the case when your press has a lot of variation or noise).



Smoothing makes sure that there is a more regular progression of the ink values between neighboring patches, so that you will have more reliable color tints on press, especially when printing jobs with gradations.



We also recommend you apply smoothing if you only printed each patch one time (as Color Pilot couldn't automatically average your measurements then).

Smoothing may take a few minutes, and is reversible (click **Undo Smoothing** to get back to the unsmoothed measurements).

- c) View some statistics about your digital press' stability.

See [Checking Your Digital Press' Stability](#) on page 178.

**Note:**

Those statistics are not available if you chose to either:

- use a [legacy chart layout](#),
- use a [normal](#) patch set for your multicolor digital press configuration,
- not [randomize](#) your chart patches.

**3.** Click **Next** when you are done checking the measurements.

**4.** On the **Select Profile Name** screen:

- a) Enter a **Profile Name**.

A default name based on the digital press configuration's substrate and inks is filled in.

- b) Enter a **Description** if desired.
- c) If you want to add *keywords* to find the profile more easily later, select **Add keywords** and enter your **Keywords**.

Keywords based on the digital press configuration are filled in by default.

5. Click **Next** when you are done.

### Find and Repair Bad Measurements



You can use **Find and Repair Bad Measurements...** to automatically detect (and optionally repair) bad measurements in your chart.

This detects isolated patches in your profile that differ substantially from patches with similar ink combinations, and can be attributed to spectrophotometer malfunction or misalignment, abnormal measurement conditions, or even damage to the physical print-out itself.

It is particularly useful when working with randomized charts that have been printed multiple times. In this case the bad patches are not immediately obvious against their neighbors in **Layout View** because they have been randomized, and they may be undetectable in **Profile View** because they have already been averaged.

You can use **Find and Repair Bad Measurements...** in combination with *smoothing*, but it is recommended that you apply **Find and Repair Bad Measurements...** first, because smoothing a profile containing bad measurements can spread the error across multiple patches.

You can always perform additional *repairs* based on visual inspection of your chart.

1. Click **Find and Repair Bad Measurements...** on the **Check Measurements** page of the **Measure Profile** wizard.  
If bad measurements are detected in your chart, the **Repair Bad Measurements** dialog opens.
2. In the **Repair Bad Measurements** dialog, you can cycle through bad patches by using the  and  buttons.

For each bad patch you can see:

1. The patch status. This can be **Not Repaired**, **Repaired**, or **Remeasured**.
2. The ink combination used to generate the patch.
3. The patch's **Lab** values before and after repair.
4. A small preview area showing the color difference between the Lab values before and after repair.
5. The **delta E** between the Lab values before and after repair.

**Note:** Patches with high delta E values are likely in need of repair, while patches with lower delta E values may be acceptable, particularly in darker areas of the profile, where sampling performed by the application is sparser and spotting a bad measurement can be difficult.

6. A small preview area showing the patch centered next to its neighboring patches in the profile.  
You can use this to visually verify that the patch is actually bad, and to facilitate the task of locating the patch in your profile chart.
3. For each bad patch that you inspect, you can:
  - a) Click **Repair (Ctrl+R)** to repair the patch.  
The patch is immediately repaired. The patch status changes to **Repaired**, and all preview areas are updated. The **Repair (Ctrl+R)** button changes to **Undo Repair**.

- b) Click **Undo Repair** to revert the repair.
- c) Click **Measure again...** to re-measure the patch.

This opens the **Measure patch again** dialog. To re-measure the patch, follow the instructions in the dialog.

If the patch has been printed multiple times, *select the desired patch to re-measure*. After measuring, the patch status is updated to **Remeasured** and all preview areas are updated as well.

- d) Double-click **Repair** to revert to the original measurement.  
The patch status changes to **Not Repaired**.

You can also click **Repair All (x)** to automatically repair all patches, where x is the number of bad patches detected. The **Repair All (x)** button changes to **Undo Repair All (x)**.

To accept the repairs, click **OK**. If you want to revert the repairs later, you will have to re-measure the chart.

### Checking Your Digital Press' Stability

You can view statistics about your digital press' stability in the **Press Stability** area of the **Check Measurements** screen.

These statistics will help you know what to expect of your printing setup (digital press and spectrophotometer) in terms of color accuracy, as your best print can only be as color accurate as your printing setup.

They will also highlight any potential color accuracy problem with your digital press' individual inks.

To calculate these statistics, Color Pilot adds some duplicate patches in different areas of your profiling chart, and calculates the *Delta E* difference between those duplicate patches when you measure them.

It adds duplicate patches for:

- each of the profile's inks (the solid patch and at least one tint patch per ink),
- different levels of grey (using black and/or combinations of other inks),
- the substrate.

The exact set of duplicate patches (including how many times they are duplicated) depends on your ink set and chart layout.

The average values of the duplicate patches are used to calculate the profile, to make it more representative of how your digital press prints.

**Note:**

To see these statistics, you need to be using the following profiling options:

- an *Automatic Layout Type* (as this layout includes stability patches),
- an *Equinox Patch Set* (as this patch set includes stability patches),
- *Randomize Patches* (as the additional stability patches need to be distributed across the chart to be representative of how your digital press prints).

To check your digital press' stability:

1. Select the **ΔE Formula** you want to use to calculate the color differences.  
By default, Color Pilot uses the Delta E formula you chose *in the Preferences*.
2. Check the **Average ΔE** and **Maximum ΔE** for:

<b>All Patches</b>	This gives you an idea of the general stability of your printing setup (digital press and spectrophotometer).
The <b>Substrate</b>	This gives you an idea of your spectrophotometer's stability (as no ink is printed).
Each of your digital press inks	This gives you an idea of how stable each ink is (as for a same digital press, some inks can be very stable and others a lot less).

The **Average ΔE** is the average of the Delta E values found between all duplicates of a certain patch (for example the substrate patch), or of a group of patches (for example all duplicates of the Yellow solid and tints patches).

The **Maximum ΔE** is the maximum Delta E value found between those duplicates patches/groups of patches.

**Tip:**

If you have several digital presses, you can use the stability results to decide which digital press to use for each job.

For example, if the yellow of one of your digital presses has higher Delta E values, you can send jobs containing a lot of yellow to the other digital press.

**Finish**

In the **Finish** step, you can create color strategies that have the profile you just created as output profile. You can use these color strategies later to color manage files to be printed on the press you just profiled.

You can create several color strategies with different ink sets (all of the profile's inks or a subset of them). This allows you to print with different ink sets (for example with 7 inks for higher quality/color fidelity or with fewer inks but at a lower cost/faster) after profiling the press only once.

This also means that you can refine each ink subset separately and have a different list of *exceptions* for each ink subset.

1. On the **Create Color Strategies** screen, select the **Create color strategies** option.

By default, the wizard creates at least one color strategy, with:



- the output profile being the profile you just created,
- the **Input Profile** being either the **<Same as Output Profile>**, or the default input profile you set *in the Preferences*.

Depending on the ink set of the digital press configuration you profiled, you may see additional color strategies with a subset of your new profile's **Ink Set** as output profile. For example, if you profiled a CMYKOV configuration, you can also have color strategies that can be used to output to CMYK and CMYKO.

2. If desired, click + to create more color strategies.

If you want to delete a color strategy, select it and click -.

3. Edit your new color strategies as desired:

- To rename a strategy, select it, click its name and type the new name (by default, color strategies are named using the profile name and the ink set used).
  - To choose a different **Input Profile**, click **Select** and select your desired profile from the color database.
  - To remove the current **Input Profile** and have it be the **<Same as Output Profile>**, click the cross .
  - To change the **Ink Set** of the output profile, click the small arrow  and select your desired ink set in the list.
4. If you have selected a white underprint in the **Settings...** before printing the chart, the option **Add White as an extra output ink** is automatically selected. As a result, all strategies created by the wizard will have **ClassicColors White** as an output ink.
  5. Click **Next** when you are done.
  6. On the **Summary** screen, you will see a summary mentioning the substrate used, and the profile and any color strategy created.
  7. Click **Finish** to close the wizard.

## 15.8. Checking Your Color Strategy

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Once you have made a [profile](#) and a [color strategy](#) for your digital press, you can check how well your color strategy produces the desired colors on your digital press using the **Check Strategy** tool.

You can do this either:

- from the **Digital Presses View** (as explained below),
- [when profiling your digital press](#),
- from the **Color Strategies Library** (see [Checking Your Digital Printing Color Strategy](#) on page 294).

1. Right-click the digital press configuration you are working with and select **Check Strategy...**
2. If you have created several color strategies for this configuration, select the one you want to use.

By default, you can only see digital printing color strategies with the same output profile as your configuration.

However, it is possible to check another color strategy: deselect **Hide color strategies which do not match the configuration profile** to show all digital printing color strategies that have an output profile with an ink set equal to or smaller than your configuration's ink set.

3. The **Check Strategy** wizard opens.

It will guide you through the strategy check in two steps:

- [Get Started](#) on page 295
- [Measure](#) on page 297

### 15.8.1. Get Started

In the **Get Started** step of the **Check Strategy** wizard, you print a test chart (whose patches have been converted through your chosen color strategy) on your digital press.

1. Color Pilot displays a preview of the test chart.

This chart can contain one or two sets of patches, which are randomized and mixed to produce the most accurate and reliable results:

- A set of patches to measure the stability of the press. This patch set contains a randomized subset of your strategy's input profile patches.

The measurements of these patches will be compared to the strategy's input profile to determine if your digital press is still printing under the same conditions as when the profile was created.

- A set of patches to measure the quality and accuracy of the color conversion. This chart is based on the ISO 12642-2 chart.

This patch set is only included if your strategy converts the process colors. Your strategy converts process colors if its input and output profiles are different, or if the black channel is switched off in the output, causing black to be converted to CMY.

If your strategy has a multicolor input profile, the ISO 12642-2 chart is extended with patches that include the multicolor inks.

You can use the **Page** arrows at the top to view the different pages.

2. If desired, adjust the print settings to change how the chart will be printed:

- a) Click **Print settings...** under the chart.
- b) In the **Print settings** dialog, select **Mirror Image** if you want your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- c) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- d) Choose how to determine your chart's **Layout**.

- Leave **Optimize the sheet layout for minimal substrate consumption** selected if you want Color Pilot to automatically calculate the best layout.
- If you want to set the layout manually, do the following:
  1. Select **One page per sheet**.
  2. If there are enough patches to fill several pages, select the **Page Range** to print, or choose to print **All Pages**.

**Tip:**

You can separate page numbers by a comma, or use a dash to indicate a page range (for example 3, 6–9).

Use this option to reprint a page that cannot be measured anymore, because it has been damaged for instance.

3. Choose the **Rotation** to apply when printing your chart.
  - e) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
  - f) Click **OK**.
3. Click **Print Chart** to send the variations charts as a PDF to your DFE Server and print this PDF on your digital press.


**Note:** Strategy Check charts that are too big to fit on a press sheet will automatically be split up into multiple sheets, making optimal use of the available substrate material.

4. Click **Next** to go to the **Measure** step.


## 15.8.2. Measure



In the **Measure** step of the **Check Strategy** wizard, you will measure the chart you printed and check the measurements.

1. On the **Measure Page ...** screen you see a preview of the chart.

Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action.

As the patches are measured, you can see a diagonally split view of each patch , with the measured color at the bottom right and the expected color at the top left.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.



**Note:**

- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- If you are using an X-Rite i1i0 spectrophotometer, it reads the chart line by line by default (this is the "scan mode").  
If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.  
For the next line, the spectrophotometer automatically switches back to scan mode.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):

- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
    - is of the correct page of your chart (if it has several pages),
    - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
  2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**
2. When you are done measuring the chart, you can inspect the results in detail in the **Check Measurements** screen.  
See [Checking Your Measurements' Results](#) on page 298 for more information.
  3. When you are done inspecting, click **Finish** to close the **Check Strategy** wizard.

## Checking Your Measurements' Results

When you are done measuring your Strategy Check chart, you can inspect the results on the **Check Measurements** screen, which consists of two tabs:

- **Stability Patches**
- **Conversion Patches**


**Note:** If your chart doesn't contain a separate set of patches for checking the accuracy of the color conversion (see [Get Started](#)), there are no tabs, and only the stability patches are shown.

1. [Check the Stability Patches](#).
2. [Check the Conversion Patches](#).
3. If desired, you can [save a report](#) containing the results of your Strategy Check.

If your Strategy Check failed for either patch set, see [If the Strategy Check Fails](#) for troubleshooting tips.

### Checking Stability Patches

When you are done measuring your Strategy Check chart, you can inspect the results on the **Stability Patches** tab of the **Check Measurements** screen.

1. For each patch in your chart, you can see:
  - a patch number,
  - the expected and measured patch color ,
  - the expected color's composition in the input profile's inks,



**Tip:** You can check this to see if there are specific areas of the input profile that your press has trouble reproducing (for example, if all the colors containing high percentages of black fail, your digital press may have a problem printing the black ink correctly).

- the **Measured ΔE** between the input color and the output color measured on the print,

**Tip:**

Click the arrow in the column header to see other color difference measurements, (**Measured ΔH, Measured ΔCh** or **Measured %ΔT**).

See [Other Color Difference Indicators](#) on page 31 for more information.

- whether the measured color values pass all your relevant [tolerances](#)  or fail one or more of them .



**Tip:** Hover on a fail status icon to see which tolerance(s) the patch didn't meet.

You can sort the patches by any of those columns.

2. To view the measured chart (with split patches), select **Measurements** in the **View** field at the top of the screen.

**Tip:** Hover on a patch to see its composition in the input profile's inks.

3. In both the **Samples** and the **Measurements View**, you can see information for / **Highlight** different sets of patches (at the top right):
  - **All** patches
  - the **Patches with above average ΔE**

- the **Substrate** patch
  - the **Primaries** patches
  - the **Primary Solids** patches
  - the patch with the **Maximum  $\Delta E$**
  - the **Worst 5 Percent** patches
4. If you select a patch in the samples list or the measured chart, you can see more information at the bottom left, including:
- the **Lab** and **LCh** values of the **Target** and **Measured** colors,
  - all the color difference statistics for this patch (**Predicted  $\Delta E$** , **Measured  $\Delta E$** , **Measured  $\Delta H$** , **Measured  $\Delta Ch$**  and **Measured  $\% \Delta T$** ).
5. You can also see the  **$\Delta E$  Formula** used for the Delta E calculations. This is the one [set in your tolerances](#).
6. At the bottom right of the screen, you can see statistics for different sets of patches, and whether they pass your tolerances or not.
- The **Strategy Statistics** tab displays:
    - the **Average** Delta E
    - the **Maximum** Delta E
    - the **Maximum** Delta E of the **Best 95 %** of the patches (everything except the worst 5%)
    - the **Substrate** Delta E
  - The **Statistics per Ink** tab displays the  **$\Delta E$** ,  **$\Delta H$**  and  **$\% \Delta T$**  values for your input profile's CMYK channels.
- Next to each statistic, you can see your corresponding tolerance in brackets, and the pass  or fail  status.
- You can also see a general pass or fail status for each statistics tab (the status shows fail if one of the statistics didn't meet its corresponding tolerance).
- The tolerances you set in the [Preferences](#) are used here.
7. You can see a general pass or fail status icon for all stability patches at the bottom of the **Check Measurements** screen.




### Checking Conversion Patches

When you are done measuring your Strategy Check chart, you can inspect the results on the **Conversion Patches** tab of the **Check Measurements** screen.

**Note:** This tab is only available if your chart contains a separate set of patches for checking the accuracy of the color conversion (see [Get Started](#)).

1. For each patch in your chart, you can see:

- a patch number,
- the expected and measured patch color ,
- the expected color's composition in the input profile's inks,

**Tip:** You can check this to see if there are specific areas of the input profile that your press has trouble reproducing (for example, if all the colors containing 100% black fail, your press may not be able to reproduce your darkest colors accurately).

- the **Predicted  $\Delta E$**  between the input color and the output color calculated by the color strategy,



**Note:** By default, any predicted *Delta E* value that is lower than 2  $\Delta E$  is shown as `Less than 2.0`. You can [customize this](#).

- the **Measured  $\Delta E$**  between the input color and the output color measured on the print,

**Tip:**

Click the arrow in the column header to see other color difference measurements, (**Measured  $\Delta H$ , Measured  $\Delta Ch$  or Measured  $\% \Delta T$** ).

See [Other Color Difference Indicators](#) on page 31 for more information.

- whether the measured color values pass all your relevant [tolerances](#)  or fail one or more of them .

**Tip:** Hover on a fail status icon to see which tolerance(s) the patch didn't meet.



You can sort the patches by any of those columns.

2. To view the measured chart (with split patches), select **Measurements** in the **View** field at the top of the screen.

**Tip:** Hover on a patch to see its composition in the input profile's inks.

3. In both the **Samples** and the **Measurements View**, you can see information for / **Highlight** different sets of patches (at the top right):

- **All** patches
- the **Patches with above average  $\Delta E$**
- the **Substrate** patch
- the **Primaries** patches
- the **Primary Solids** patches

- the **CMY Neutrals** patches
  - the patch with the **Maximum  $\Delta E$**
  - the **Worst 5 Percent** patches
  - the **Outer Gamut** patches
  - the **CMYK** patches (if you are working with a multicolor input profile)
4. If you select a patch in the samples list or the measured chart, you can see more information at the bottom left, including:
- the **Lab** and **LCh** values of the **Target** and **Measured** colors,
  - all the color difference statistics for this patch (**Predicted  $\Delta E$** , **Measured  $\Delta E$** , **Measured  $\Delta H$** , **Measured  $\Delta Ch$**  and **Measured  $\% \Delta T$** ).
5. You can choose to adjust your target color values to what you can reproduce on your digital press substrate without simulating the reference or standard substrate color.
- To do this, select **Adjust target Lab for printing substrate color**. This recalculates all target Lab/LCh values and color difference values. This setting is selected by default.
6. You can also see the  **$\Delta E$  Formula** used for the Delta E calculations. This is the one [set in your tolerances](#).
7. At the bottom right of the screen, you can see statistics for different sets of patches, and whether they pass your tolerances or not.
- The **Strategy Statistics** tab displays:
    - the **Average** Delta E
    - the **Maximum** Delta E
    - the **Maximum** Delta E of the **Best 95 %** of the patches (everything except the worst 5%)
  - The **Statistics per Ink** tab displays the  **$\Delta E$** ,  **$\Delta H$**  and  **$\% \Delta T$**  values for your input profile's CMYK channels.
  - The **Other Statistics** tab displays:
    - the **Substrate** Delta E
    - the **Average** Delta E of the **Outer Gamut** patches
    - the **Average** Delta H of the **CMY Neutral** patches
    - the **Average** Delta Ch of the **CMY Neutral** patches
    - the **Maximum** Delta Ch of the **CMY Neutral** patches
- Next to each statistic, you can see your corresponding tolerance in brackets, and the pass  or fail  status.
- You can also see a general pass or fail status for each statistics tab (the status shows fail if one of the statistics didn't meet its corresponding tolerance).
- The tolerances you set in the [Preferences](#) are used here.
8. You can see a general pass or fail status icon at the bottom of the **Check Measurements** screen.



### Saving a Report

If desired, you can save a report containing the result of your Strategy Check (including the detailed information you can see on the screen).

1. Click **Save report** at the bottom of the screen.
2. Click the **Browse...** button next to the **File Name** field to change the location where your report will be saved.
3. Enter a file name for the report.  
By default the application will suggest the name of the strategy, appended with the date and time.
4. If desired, you can change the banner that is shown at the top of the first page of the report, for example to use the logo and brand colors of your company.  
You can use common image formats such as JPG, PNG, GIF or BMP.
5. If desired, in **Description** you can enter any extra information about this strategy check that is not added to the report by default.
6. Finally, decide what information you want to add to the report.

The report will always contain the following information:

- The name of the color strategy
- The name of the digital press configuration
- The  $\Delta E$  Formula used for the  $\Delta E$  calculations
- The date of the report
- The overall status of the stability patches (pass or fail)

If your strategy check includes color conversion patches (see [Get Started](#)), the report will also contain:

- The overall status of the color conversion patches (pass or fail)

You can add more information by selecting the following options:

Selecting...	will add...
<b>Stability Statistics</b>	one additional page containing the measured $\Delta E$ , $\Delta H$ or $\% \Delta T$ value, tolerance and pass/fail icon for every statistic that is measured for the stability patches.
<b>Stability Details</b>	pages containing the output values, measured and target LabCh, measured $\Delta E$ , $\Delta H$ , $\Delta Ch$ and $\% \Delta T$ and pass/fail status for all stability patches.

Selecting...	will add...
	<p><b>Note:</b> Checking this setting will add many pages to your report. While this information can provide a useful reference for tracking the stability of your press, you may want to deselect this option if you want to print the report or share the information with third parties.</p>
<b>Conversion Statistics</b>	<p>one additional page containing the measured <math>\Delta E</math>, <math>\Delta H</math> or <math>\% \Delta T</math> value, tolerance and pass/fail icon for every statistic that is measured for the conversion patches.</p> <p><b>Note:</b> This setting is only available if your strategy check includes color conversion patches (see <a href="#">Get Started</a>).</p>
<b>Conversion Details</b>	<p>pages containing the input values, measured and target LabCh, measured <math>\Delta E</math>, <math>\Delta H</math>, <math>\Delta Ch</math> and <math>\% \Delta T</math> and pass/fail status for all color conversion patches.</p> <p><b>Note:</b></p> <ul style="list-style-type: none"> <li>This setting is only available if your strategy check includes color conversion patches (see <a href="#">Get Started</a>).</li> <li>Selecting this setting will add many pages to your report. While this information can provide a useful reference for tracking the quality of your color conversion, you may want to deselect this option if you want to print the report or share the information with third parties.</li> </ul>

7. Click **Save** to write a PDF report.

### If the Strategy Check Fails

If your strategy check fails for [Stability Patches](#) or [Conversion Patches](#), you can investigate the cause of the failure and in some cases correct it.

#### Different Gamut Sizes

If your color strategy is trying to reproduce a standard or conventional press with a large [gamut](#) using a digital press with a smaller gamut, some of your press' colors will not be reproducible by your digital press.

This will typically cause a fail status in the **Conversion Patches** tab on one or more Primary patches and/or saturated patches (these are patches with values of 100% for some of the input inks).

To check whether this is the cause of the problem, you can perform a [gamut check](#).

If it does turn out that the press gamut is too small to reproduce all of your input profile's colors, try using a different substrate or digital press with a wider gamut (you will need to make a [profile](#) and a [color strategy](#) outputting to that digital press profile).

### Outdated Press Profile

If your digital press is older than two weeks, it may not reflect how the digital press prints as accurately as when you created it. In this case, we recommend you recalibrate the press using the press software.

If your strategy still fails after this, you should [create a new profile](#) for your digital press (and [update your color strategy](#)).

### Failure in Different Areas

The [type of patches](#) that causes your strategy to fail can also indicate what the problem might be.

- If the gray patches (**CMY Neutrals**) are failing, it may mean that your digital press is unstable.

Try comparing colors on prints generated at different times (for example the first few samples of a press run, and after it has run for a while), and if needed contact your press vendor for assistance.

- If the failing patches are mostly in the shadows, your press profile resolution may not be high enough.

You should [inspect](#) the dark areas of your profile, and if needed [create a new profile](#) for your digital press (and [update your color strategy](#)).

- If single channels patches (**Primaries**) are failing in the **Stability Patches** tab, it may mean that your press has mechanical stability issues or problems with the ink formulation. Investigate this problem using the tools provided by the press vendor. Contact your press vendor for assistance if needed.

If those patches still fail after correcting the mechanical issues (especially the yellow patches), try using a [Delta E formula](#) other than **CIELAB Delta E (Classic)** (as color differences in the yellow areas seems larger when using this formula than what they appear to the human eye).

## 15.9. Defining Print Settings

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You can define general print settings for your digital press in Color Pilot. You can override these settings for individual print jobs in the DFE Server.

In the icon view :

1. Click your digital press then click **Change...** next to **Print Settings**.
2. In the **Print Settings** dialog that opens:
  - a) Select **Mirror Image** if you want to your print jobs to be mirrored.

#### Note:

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.



- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- c) Select **Generate an extra Magenta separation** if you want to generate an extra separation called `Magenta 1` in areas where Orange, Violet or Green inks overlap with Magenta.

**Note:** This option is only available if your digital press supports it.


**Important:** Remember to select this option when you intend to print production jobs that use a color strategy with `Magenta 1`.

- d) Choose the **Rotation** to apply when printing.  
e) Click **OK**.

## 15.10. Refining Spot Colors

Color Pilot will provide a good baseline conversion for your spot colors. If you want to further improve how they are printed on your digital press, you can refine them using the **Refine Spot Colors** wizard.

**Note:** To do this, your [digital press configuration](#) needs to have an [output profile](#).

1. From the **Digital Presses** library, open the **Refine Spot Colors** wizard by either:
  - selecting your digital press (or your digital press configuration in grouped list view ) and clicking the **Refine Spot Colors** button in the bottom tool bar,
  - right-clicking your digital press (or your digital press configuration in grouped list view) and selecting **Refine Spot Colors**.
2. If you don't have a color strategy using the digital press profile as output profile, you will see a message asking you to create one.
  - a) Click **Yes**.
  - b) Enter a **Color Strategy Name**.
  - c) Choose an **Input Profile** (if you selected a default one [in the Preferences](#) it is pre-filled in here).  
The **Output Profile** is the one attached to your digital press configuration.
  - d) Click **OK**.  
This creates a basic color strategy (without ink mappings, dot gain curves...).

You can see the **Digital Press**, **Configuration** and **Color Strategy** you are using at the bottom left of the **Refine Spot Colors** wizard.

3. In the **Get Started** step of the **Refine Spot Colors** wizard, you select the spot colors to refine and your color strategy.

See [Get Started](#) on page 490.

4. In the **Refine Cycles** step, you perform the spot color refinement. You can do as many refinement cycles as is necessary.  
See [Refine Cycles](#) on page 491.
5. The **Finish** step confirms that the color strategy was updated with the refined values.  
See [Finish](#) on page 242.  
You can now close the wizard.

### 15.10.1. Get Started

In the **Get Started** step of the **Refine Spot Colors** wizard, you will select the spot colors to refine and a color strategy.

1. On the **Select Spot Colors**/**Select Inks** screen, add inks by:
  - Clicking **+** and selecting the ink(s) to add in the dialog that opens.

**Tip:**

- Use the **Shift** or **Ctrl** key to select several inks, or **Ctrl+A** to select all inks in an ink book.
  - You can also use the **Search** field.
- Clicking **Add Inks from a PDF file...** to select one or more (Normalized or regular PDFs) file(s), and adding some or all of the spot colors contained in these files to the list.

Use this if you have trouble getting a good match for one or more particular spot color(s) in one of your files.

**Note:**

- For regular PDFs, Color Pilot will first look for the inks in the predefined books (such as process and PANTONE ink books), and then in the preferred **Ink Book** (defined in the [Preferences](#)) before checking other ink books you created.
- If the inks found in the file(s) are not present in the database, they will be greyed out with **<unregistered>** shown as their ink book, and you will see a warning that some of the inks in the selected PDF(s) are unregistered.  
  
Unregistered inks are not added to the ink selection as they don't contain enough information to make a useful refinement.

To remove an ink from the list, select it and click the **-** button.

Click **Next** when you are done.

2. On the **Select a Color Strategy** screen, select your **Color Strategy Name** among the color strategies that have the digital press profile as output profile.

You can see the selected color strategy's **Ink Set** below. If some of the output profile's inks were turned off in the strategy (see [Choosing the Output Separations](#) on page 293), they will appear greyed out here.

**Tip:**

From this screen, you can also:

- Create a color strategy (if you don't have a color strategy with a matching profile, or if you want to use a new basic strategy -without ink mappings, dot gain curves...- for the refinement): click **Create Color Strategy...** then enter the color strategy name and click **OK**.
- See information about the selected color strategy: click **Show Color Strategy Info...** to view the information in a pop-up.
- Find the color strategy you want to use more easily, if you have a lot of strategies: click **Find Color Strategy...** and use the pop-up to view **Recently Used** strategies, all **Color strategies with matching profile**, or use the **Search** field to search on strategy name or keyword.  
You can also click the **Keywords** column to sort strategies by keyword.

Click **Next** when you are done.

## 15.10.2. Refine Cycles

In the **Refine Cycles** step of the **Refine Spot Colors** wizard, you select a spot color refinement method and carry out the refinement. You can do several refinement cycles, using one or more methods.


1. On the **Select spot colors and refining method** screen, choose the spot color refinement method to use:
  - Choose **Visually, by printing a number of variations** to print a variations chart for each color, then visually select the right patch from the printed output.
  - **Automatically, by measuring a printed sample** to measure a sample that was printed with your color strategy and automatically correct the color deviation.
  - **Automatically, by measuring test chart iterations** to print a number of variations of each spot color in a spectrophotometer layout and measure it so the best conversion values can be calculated automatically.
  - **Manually** to edit the spot colors conversion values manually.

**Note:** If you choose a method involving measurements, make sure that the [measurement condition](#) selected on your spectrophotometer matches the one used to measure your digital press profile.

2. Decide **which spot colors you want to refine in this cycle**.

By default, all spot colors you added in the **Get Started** step are selected. For each spot color, you can see:

- the conversion values before refinement (calculated using the color strategy or the result of any previous refinement cycle),

**Note:** If you have already performed a refinement cycle, the color values that were changed are indicated by a pencil icon .

- whether the spot color is already saved as an exception **In the Color Strategy**,

- the **Predicted  $\Delta E$**  between the spot color and the conversion values before refinement.

**Note:**

- This is calculated using the [Delta E formula of your color strategy](#).
- By default, any predicted [Delta E](#) value that is lower than [your chosen tolerance for digital printing strategies](#) is shown as `Less than` your tolerance.  
This is because very low theoretical Delta E values may not be achievable in a real life setup (due to digital press instability and/or imperfections in the profile).  
However, you can still choose to show these predicted Delta E values in more detail [in the Preferences](#).
- If you have already refined a spot color using the **Automatically, by measuring test chart iterations** method, the measured Delta E is shown in blue.

You can sort the spot colors by any column in the table.

Deselect the colors you don't want to refine.

**Tip:**

- You can perform different refinement cycles on different spot colors (for example, if you have printed samples for some of the colors, but want to refine the other ones using test charts).
- To only select a few of the colors, click the top check box to deselect them all, then only select the colors to refine in this cycle.

If you added an extra output ink [as extra separation](#) in the color strategy, it will be shown here too.

**3. Click Next.**

**4. Carry out the refinement cycle as explained in one of the following:**

- [Refine Colors Visually, by Printing a Number of Variations](#) on page 279,
- [Refine Colors Automatically, by Measuring a Printed Sample](#) on page 282,
- [Refine Colors Automatically, by Measuring Test Chart Iterations](#) on page 283,
- [Refine Colors Manually](#) on page 288

(depending on the method you chose).



**5. At any time, you can pause the refinement process and save your unfinished refinement for that press and configuration.**

This way you can perform other tasks in Color Pilot, then resume working on your spot colors refinement later.

- a) Click the **Quit Now and Continue Later** button. Confirm your choice by clicking **Save and Quit** in the pop-up dialog.

This closes the wizard and shows a badge next to the press name:

- : indicates that the refinement is unfinished.

- : indicates that the refinement is waiting for the measurements from the inline spectrophotometer on the press (when working with an inline spectrophotometer).
- : indicates that an error has occurred, or that the refinement job was cancelled on the press.

You can also see the badge on the **Refine Spot Colors** button in the bottom tool bar when you select the digital press and configuration for which you started the refinement process.

- b) When you are ready to resume the refinement, select your digital press (with the relevant configuration) and click the **Refine Spot Color** button in the bottom tool bar again.

You will see a pop-up warning you about the unfinished refinement. Click **Resume**. This will open the **Refine Spot Colors** wizard at the point where you paused the refinement. You can then continue your refinement (but not go back and for example change the inks).

**Note:**

- To start a new refining session instead, click **Start new session** in the pop-up. Completing the new session (or saving another unfinished refinement) will discard the unfinished refinement.
- To discard the unfinished refinement at any time, right-click your digital press and select **Clear Unfinished Refinement**.

6. If necessary, click **Next** and repeat steps 1 to 4 to do another refinement cycle.  
You can use a different refinement method, and you can do as many cycles as you want.
7. Click **Finish** when you are done refining your inks.

### Refine Colors Visually, by Printing a Number of Variations

Use this method to print a variations chart for each color, then visually select the best patch from the printed output. The variations charts contain patches with different ink combinations that vary around the existing conversion values.

1. For each spot color, do the following:
  - a) Choose the **Patch Size** to use for the variations chart (**Small, Medium** or **Large**).
  - b) Choose to **Allow values over 100%** if you want a higher percentage (for instance 120% or double strike) to print the variations chart.

This increases the color range of the press and produces more saturated colors by printing a separation more than once.

The visual spot color refinement allows you to find out how much of this extra separation is needed to achieve the desired color.

- c) Choose up to three inks to print the chart.

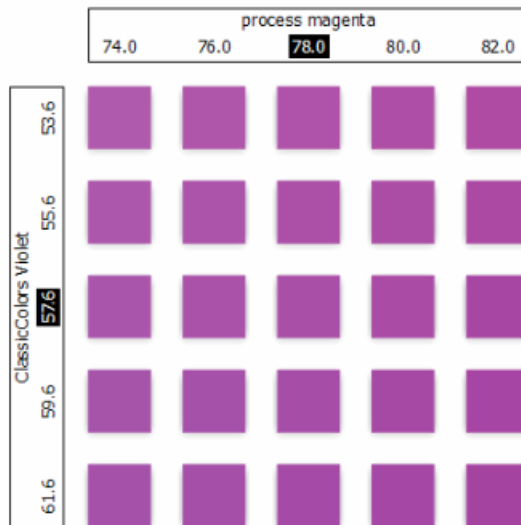
For each **Ink**, define:

- The difference in ink percentage for each variation (**Step**).
- The number of steps **Up** and **Down**.

The starting value is the percentage of that ink in the conversion values (from the color strategy, or the previous refinement cycle if you have already done at least one). You can see those conversion values, along with a patch of the spot color, at the top of the dialog.

For example, you are refining PANTONE Purple C, whose conversion values in the color strategy are 57.6% cyan and 78% magenta. For both the cyan and the magenta ink, you choose a **Step** of 2.0%, 2 steps **Up** and 2 steps **Down**.

For each ink, the variation chart will use the color strategy value and other values around it defined by the steps you chose. So the magenta percentages used here will be 74%, 76%, 78% (color strategy value), 80% and 82%.



You can see a preview of your variations chart on the right, showing the ink percentages.

**Tip:** If you hover your cursor over a color patch, a tool tip will display the percentages of that patch.


**Note:** If an ink percentage is near 100% and you did not select the **Allow values over 100%** option, the number of **Steps Up** will be limited to not go over 100%. For example with a starting percentage of 98% and a step of 2%, you can only have one step up (100%).




- d) If you are using three inks, you will get several grids in your variations chart (each grid with a different percentage of the third ink). You can choose to **Align** them **Horizontally** or **Vertically**.

For example, if you have four or more grids aligned horizontally and you see a message warning you that the chart's dimensions are too large for your press, try to align them vertically.

If you still see the warning after changing the alignment, you need to remove some steps in the third ink to have fewer grids. If necessary, you can print the other steps in another refinement cycle.

- e) You can use the view mode buttons to get a better view of all the grids:

- **Pan mode** : When this view mode is selected, the cursor changes into a open hand. By clicking the chart and dragging you can move the chart around.

- **Zoom in mode** : When this view mode is selected, the cursor changes into a magnifying glass. Clicking anywhere will zoom in the chart on that position. By clicking and dragging the mouse, you can also select an area in the chart you want to zoom in on.
  - **Zoom out mode** : This view mode is the reverse of **Zoom in mode**.
  - **Reset zoom** : Click to reset the chart so it fits in the view.
- f) Click **Next**.  
Repeat this for each spot color to refine and click **Next** when you are done.
2. In the next screen, you can see the variations chart(s) you just defined.  
Click **Print Settings...** if you want to change how the chart(s) will be printed (by default the print settings *defined for your digital press* are used). In the **Print Settings** dialog that opens:
- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**  
This option is only available if your digital press supports it.  
Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**  
This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- c) Select **Generate an extra Magenta separation** if you want to generate an extra separation called *Magenta 1* in areas where Orange, Violet or Green inks overlap with Magenta.

**Note:** This option is only available if your digital press supports it.

**Important:** Remember to select this option when you intend to print production jobs that use a color strategy with *Magenta 1*.

- d) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- e) Click **OK**.

3. Click **Print Variations Charts** to send the variations charts as a PDF to your DFE Server and print this PDF on your digital press.

**Note:** Grid charts that are too big to fit on a press sheet will automatically be split up into multiple sheets, making optimal use of the available substrate material.

**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the chart is printed on the first press engine to safeguard against color variation inside the color profiles.

To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE Server client.

4. Look at the printed output and decide which patch is the best match for each spot color.
5. Click **Next** in the **Refine Spot Colors** wizard and click the best match patch on the variations chart for the first spot color.  
Click **Next** and do the same for the next spot color... until you have picked a best match for all spot colors you refined.
6. Click **Next** to see the refined values (ink percentages) and the Delta E between original and refined colors.  
The values with a pencil icon are the values that were changed by (one of) the refinement cycle(s) you just did.
7. If you are satisfied with the refined values, click **Finish**.  
This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.  
If you are not satisfied, you can click **Next** and do another refinement.

**Refine Colors Automatically, by Measuring a Printed Sample**

Use this method if you want to match the color of a physical sample rather than the corresponding spot color in your color database (for example a color from a previous job, a spot color in a PANTONE book, a sample you got from a customer...).


You will measure the Lab values of that sample, and Color Pilot will generate a color build to match those values as accurately as possible, and save that color build as an exception in your color strategy.

This is faster than printing a new chart then *choosing the best match visually* or *measuring a printed chart*.

1. After selecting **Automatically, by measuring a printed sample** and clicking **Next**, Color Pilot will detect the connected spectrophotometer (and ask you to calibrate it if necessary), then show the **Measure Sample** dialog.  
Measure the printed sample with your spectrophotometer then click **OK**.



**Note:**

- If necessary, you can use the **More Actions** button  to reconnect or calibrate the spectrophotometer, or change its *measurement condition*.
- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.  
The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.
- You cannot use a Barbieri Spectro Swing spectrophotometer for this, as it cannot take single measurements.

2. Repeat this for each printed sample of a spot color you want to correct.
3. The next screen shows the refined spot color conversion values calculated from the samples' Lab values.

Select a spot color in the table at the left to see its refined conversion values. The values with a pencil icon are the values changed by the refinement.

If you are not satisfied with a measurement, you can redo it (click **Remasure Original Sample**). You can also **Reset to Original Values**.

4. When you are satisfied with the refined values, click **Finish**.

This saves the refined conversion values for the spot colors as **Refined Output Profile Values** in the color strategy.

If you are not satisfied, you can click **Next** and do another refinement.

### Refine Colors Automatically, by Measuring Test Chart Iterations

Use this method to print a number of variations of each spot color in a spectrophotometer layout and measure it so the best conversion values can be calculated automatically.

You can use this to refine whole ink books at once if desired.

1. If you chose in the *Preferences* to have Color Pilot to always ask you whether to use the inline or offline spectrophotometer, select either **Inline** or **Offline** in the pop-up that opens.

**Tip:** You can select **Do not ask me again** if you want Color Pilot to remember your selection and change it in the *Preferences*.

2. On the **Select out of gamut spot colors to refine** screen, select which out of *gamut* colors you want to refine.

Spot colors are considered "in gamut" when they can be reproduced by your digital press within a specified *Delta E* tolerance (the one you set in the *Preferences*).

Spot colors with a Delta E a bit above this tolerance can typically benefit from refinement.

However, spot colors with a Delta E far above this tolerance may just not be reproducible by your digital press. In this case, you may want to remove those spot colors from the refinement, to save yourself time and effort.

The Delta E is calculated using the [Delta E formula of your color strategy](#) (you can see it at the bottom of the spot colors list).

**Tip:**

- Click the **ΔE** column to sort the spot colors by increasing or decreasing Delta E, and see more easily which colors need refinement if you have a lot of spot colors.
- To select or deselect all inks, click the check box at the top of the inks list.

3. In the **Cycle 1: Refine automatically by measuring test chart iterations (Iteration 1)** screen, select the **Number of color patches** you want to print per spot color (as a minimum).

The default setting is 10 patches per color, but you can go as high as 100. If you print more color patches in the first cycle, you may need to do fewer refinement cycles (and vice-versa).

The screen indicates how many pages will need to be printed.

**Note:**

- If you are using an inline spectrophotometer, you will only see the total number of patches and not the number of sheets or pages, as this is determined later at the press.
- If you work with an iliO or a Barbieri Spectro Swing and the number of spot colors is low, the wizard will automatically use as many patches as is required to fill a full iliO sheet.
- If you are using an M1 or M2 [measurement condition](#), the chart will be automatically adapted to support the dual measurement (measuring with and without UV filtering) required by these measurement conditions (the patches will be slightly bigger and there will be slightly more white space in between lines of patches).

4. If you are using...

- an offline spectrophotometer, the next screen shows the chart with all the spot color patches (if there are several pages, you can click the arrows next to the **Page** field at the top right to view other pages);
- an inline spectrophotometer, the next screen shows the number of spot colors to be refined and the number of patches that will be printed.

Click **Settings...** if you want to change how the chart(s) will be printed (by default the print settings [defined for your digital press](#) are used).

5. In the **Print Settings** dialog that opens:

- a) Select **Mirror Image** if you want to your print jobs to be mirrored.

**Note:**

This option is only available if your digital press supports it.

Selecting this option does not reverse the ink order automatically: you will need to do this on the DFE Server.

- b) Select **Add White Underprint** if you want a white underprint in your print jobs.

**Note:**

This option is only available if:

- your digital press supports it,
- it is possible to use an additional ink on press (for example if your press can print with 7 inks but you are already using CMYKOGV, you will not be able to add a white underprint).

- c) Select **Generate an extra Magenta separation** if you want to generate an extra separation called *Magenta 1* in areas where Orange, Violet or Green inks overlap with Magenta.

**Note:** This option is only available if your digital press supports it.

**Important:** Remember to select this option when you intend to print production jobs that use a color strategy with *Magenta 1*.

- d) If you are using an offline spectrophotometer, choose how to determine your chart's **Layout**.
- Leave **Optimize the sheet layout for minimal substrate consumption** selected if you want Color Pilot to automatically calculate the best layout.
  - If you want to set the layout manually, do the following:
    1. Select **One page per sheet**.
    2. If there are enough patches to fill several pages, select the **Page Range** to print, or choose to print **All Pages**.

**Tip:**

You can separate page numbers by a comma, or use a dash to indicate a page range (for example 3, 6–9).

Use this option to reprint a page that cannot be measured anymore, because it has been damaged for instance.

3. Choose the **Rotation** to apply when printing your chart.

**Note:** When working with an inline spectrophotometer, the chart layout is not generated by Color Pilot, but directly by the press, to fit its substrate and inline spectrophotometer format.

- e) If you want to always use the print settings you just defined when printing on this digital press, select **Save Settings to Digital Press** (this replaces the settings defined *when configuring your digital press*).
- f) Click **OK**.

6. If you are using an inline spectrophotometer, click the **Print and Measure Test Chart** button to print the chart and launch the automatic measurement with your inline spectrophotometer.

A message will notify you if there is an error or the job is cancelled on the press, and you can restart the process by clicking the **Print and Measure Test Chart** again.

At the end of the measurement, the wizard will automatically switch to the **Result of measuring test chart** screen explained below.

7. If you are using an offline spectrophotometer, click **Print Test Chart** to:
- a) Send the chart as a PDF to your Digital Front End Server,

b) Have your Digital Front End Server process the job (RIP it, generate a preview...),


**Note:** Charts automatically make optimum use of the substrate so that no material is wasted. If the size of the substrate permits, several charts will be rotated, reduced or merged to fill up a sheet.

c) Print this PDF on your digital press.



**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the chart is printed on the first press engine to safeguard against color variation inside the color profiles.

To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE server client.

8. Follow the instructions at the bottom left of the dialog to measure each page of your chart, clicking the play button  or **Next** after each action to get to the next one.

The preview is updated to reflect each action. When measuring with a Barbieri Spectro Swing, you can see a percentage indicating the measurement progress.

If necessary, you can pause  a measurement, or use the action button  to stop, reconnect or calibrate the spectrophotometer, or to change the measurement condition.

**Note:**



- If the spectrophotometer cannot detect any patches, or ends up partially or completely over a gap instead of over a patch, you should stop it, place it correctly and restart it.

The spectrophotometer cannot detect this automatically, so you should check whether the patches you see on screen correspond to those on the printed chart.

- If you are using an X-Rite i1iO spectrophotometer, it reads the chart line by line by default (this is the "scan mode").

If it cannot read a line on the chart, after 4 tries it will automatically switch to measuring patch by patch, until the end of the line (the application then shows a red rectangle around the patch being measured, this is the "patch mode"). This is slower but more fail-safe.

For the next line, the spectrophotometer automatically switches back to scan mode.

- You can also switch to scan mode or patch mode manually:
  1. click the action button  and select **Stop Spectrophotometer**,
  2. depending on what you want to do, select either **Measure Line by Line** or **Measure Patch by Patch**,
  3. use the play button  or **Next** to restart the measurement.

Your i1iO will use your chosen mode until the end of the current page.

**Tip:**

After you are done measuring a page, you can save the measurement data as a measurement file if desired (in the CGATS - Committee for Graphic Arts Technologies Standards - color measurement format):


- Go back to the page you have just measured using the back arrow.
- Right-click the chart preview and select **Save Page Measurements...**
- Choose a location to save your measurements file (with the `.txt` extension).

**Tip:**

Alternatively, if you had already measured your chart and saved the measurement, you can load your measurement file instead of re-measuring it here.

1. Make sure that your measurement file:
  - is of the correct page of your chart (if it has several pages),
  - is a CGATS (Committee for Graphic Arts Technologies Standards color measurement format) file, with the `.it8`, `.txt` or `.cgats` extension.
2. Right-click the chart preview in the measuring wizard and select **Load Page Measurements...**

9. After you finished measuring, you will see a list of the spot colors on the **result of measuring test chart** screen with:

- A warning sign  if the color is still out of **Gamut**,
- The new **ΔE** after refinement,
- The **State** of the conversion values (**On target**, **Could be improved** or **Could not improve further**).

To view the measured chart, select **Measurements** in the **View** field at the top of the screen.

At the bottom of the screen, you can see the total number of spot colors as well as the average Delta E before and after the refinement.

If you select a spot color in the list or in the measured chart, you can see more information at the bottom right, including the new conversion values and the target and measured Lab values and color patches.

10. If you want to do another iteration of this refinement cycle, do the following:

- a) Click **Next**.

The wizard will generate a new chart to print, using only the spot colors that had the **Could be improved** state after the last iteration. If all your spot colors have the **Could not improve further** state, the wizard will not generate a new chart.

**Note:** This chart will use as many patches per spot colors as is necessary for the refinement. Depending on the spot color, this could be more or less than the number of color patches you chose before the first iteration.

- b) Print the new test chart.
- c) Measure the new test chart.

On the **result of measuring test chart** screen, you will see the updated results for the refined spot colors. You will see a  **$\Delta E$**  column for each iteration, and a new **average measured  $\Delta E$** .

**Note:** If a patch measured in the new iteration is worse than what was found in the previous iteration, the previous iteration's result will be used.

You can do more iterations as long as you have colors with the **Could be improved** state.

11. After each refinement iteration, you can pause spot colors to define which colors will go through the next run of refinement. Paused colors will not be part of the next iteration.

**Tip:** This is useful if there are spot colors that have a high Delta E after the first iteration and you think that further iterations will not improve the spot color match.

- a) To pause a spot color, right-click it on the **result of measuring test chart** screen and select **Pause refining**.

**Note:** If there are no spot colors in the **Could be improved** state (for example, all spot color are **Paused**), you cannot start a new iteration.

- b) If you want to unpause a spot color, select the paused color, right-click it and choose **Continue refining**. The color will then get the **Could be improved** status.

12. Once you are satisfied with the results, click **Finish Cycle**.

You can then **save a report** about the refinement (if you have set this in the [Preferences](#)). This is a text file that you can save in the location of your choice.

After this, you can do another refinement cycle using another refinement method, or click **Finish**.

This saves the refined conversion values for your spot colors as **Refined Output Profile Values** in the color strategy.

## Refine Colors Manually

Use this method if you want to edit the output ink percentages used to reproduce the spot colors manually.



**Attention:** Make sure that your monitor is calibrated before refining spot colors manually. However, please be aware that viewing an ink on a screen can never be completely color accurate.

1. On the **Refine manually** screen, select the first spot color you want to refine.

On the right hand side, you can see its conversion values and the **Predicted  $\Delta E$**  between the spot color and the conversion values.

**Note:**

- The *Delta E* is calculated using the *Delta E formula of your color strategy* (you can see it underneath).
- By default, any predicted Delta E value that is lower than *your chosen tolerance for digital printing strategies* is shown as `Less than` your tolerance.  
This is because very low theoretical Delta E values may not be achievable in a real life setup (due to digital press instability and/or imperfections in the profile).  
However, you can still choose to show these predicted Delta E values in more detail *in the Preferences*.

2. In the **New Values** row, click the output ink percentage(s) to edit and enter the percentage(s) you want to use or click the arrows to increase or decrease the value(s).

At the bottom, you can see color patches and Lab/LCh values for the **Target** spot color, the **Original** converted color (from the color strategy or a previous refinement cycle) and the **New** converted color (using the percentages you just entered).

You can also see the Delta E between **Target** and **Original** converted color, and between **Target** and **New** converted color.

Use this to help you find the best percentages for your spot color.

**Note:** If you are not satisfied with your new color conversion, you can click **Reset to Original Values** to start over.

3. Do this for every spot color in your list.
4. If you are not satisfied with the refined values, you can click **Next** and do another refinement.

When you are satisfied, click **Finish**.

This saves the refined conversion values for the spot colors as **Custom Values** in the color strategy.

### 15.10.3. Finish

After clicking **Finish** after one or more refinement cycles, you will see the **Summary** screen, and a message stating that:

- your spot colors were refined successfully,
- the color strategy was updated (the refinement values are stored in the color strategy's **Exceptions** list).


Click **Finish** again to close the wizard.

## 15.11. Printing Inks and Ink Books

You can easily print inks and ink books to have a visual reference of what your spot colors look like on your digital press with a certain substrate.

You can then present these printouts to customers to set the expectations right before they order production work using these colors.

If a customer is hesitating between different ink sets for their job (for example CMYK vs. 7 color printing, or EPM/CMY vs. CMYK), you can print their job's inks using different color strategies, to help them make a decision based on both quality and cost.

1. Select your digital press configuration and click the **Print Ink Book** tool  in the bottom tool bar.


**Note:** Make sure you have [made a profile](#) and a [color strategy](#) for your digital press configuration.

2. In the pop-up that opens, select the ink book to print.

If you have lots of ink books, you can sort them by **Name** or by **Keyword**, or use the **Search** bar at the bottom to find your ink book more easily.

**Note:** You cannot proof more than one ink book at once.

3. On the **Press** tab of the **Print Ink Book** dialog, you see some information about the digital press configuration you selected (**Substrate**, **Ink Set** and **Profile**).

If you want to use a different digital press configuration, click **Select** and choose another one. Make sure you select a digital press configuration that has a valid profile (this is indicated by a green check .

4. Review the **Print Settings...** and change them if necessary.

These are the same as the [general Print Settings](#) you set for your digital press.

Changing them here only affects printing the ink book or inks, but you can select **Save Settings to Digital Press** in the **Print Settings** dialog to set them as general print settings for your digital press (to replace the settings defined [when configuring your digital press](#)).

5. Select a **Color Strategy** matching your chosen press configuration.

6. On the **Ink Book** tab, choose if you want to **Print**:

- the **Entire Ink Book** (this is selected by default if you selected a whole ink book when opening the **Print Ink Book** tool).

You can see all of the ink book's inks in the **Inks** list below.

**Tip:** You can see the ink book's total number of pages next to **Current Ink Book**.

- a **Page Range**; then enter the page range in the following format:

- 1, 3, 5 to print pages 1, 3 and 5,
- 1-5 to print pages 1 to 5,
- 1, 3-5 to print pages 1 and 3 to 5.

Press **Enter** or **Tab** to see the inks that will be printed in the **Inks** list.

- an **Ink Selection** (this is selected by default if you selected one or more inks when opening the **Print Ink Book** tool).

Then use the **+** or **-** buttons to add or remove inks from the **Inks** list.



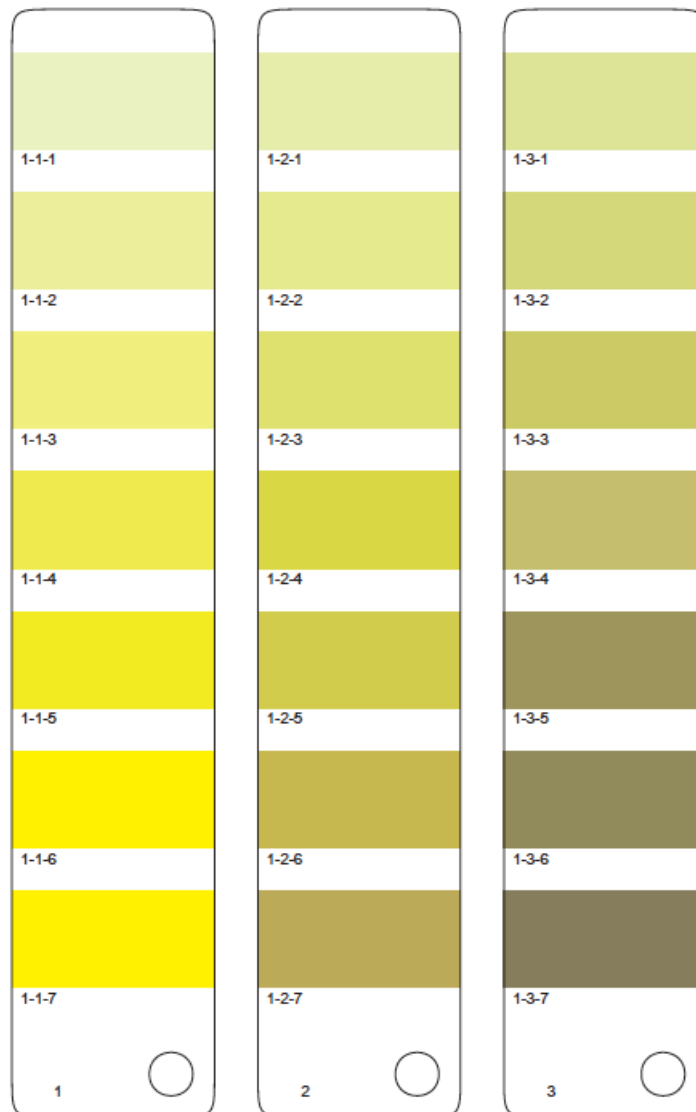
**Note:**

- If you select a large number of pages, the **Print Ink Book** tool will first fill a complete sheet (using the maximum repeat length defined on the press). If the pages do not fit on one sheet, more than one print job will be created.
- It is not possible to print inks from several ink books at once.

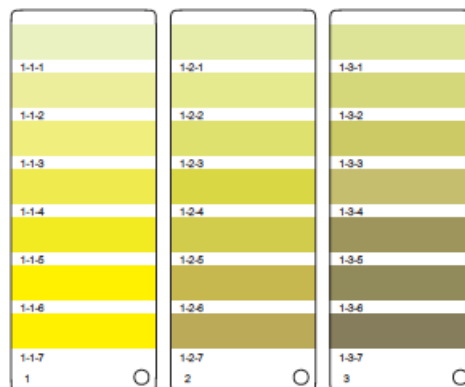
7. On the **Layout** tab, choose the **Layout Style** to use: **PANTONE Ink Book Format** or **Small Ink Book Format**.

Both formats display the ink patches in one or more vertical strips. Each strip is surrounded by a black line, shows the ink name under each ink patch and the page number from the ink book at the bottom of the strip.

- The **PANTONE Ink Book Format** displays ink patches to resemble a physical PANTONE ink book. Ink patches are 42 x 17 mm with 9 mm between two patches.



- The **Small Ink Book Format** display ink patches in a more compact way, using less paper. Ink patches are 30 x 7 mm with 3 mm between two patches.



8. Choose what to do with **Empty Patches**. You can either:

- select **Include, preserving ink book layout** if you want to print the ink patches in the order you see them in the ink book (one strip will be printed for each ink book column. Strips may contain empty patches).



**Attention:**

An ink book **column** is displayed as a **row** of ink patches in the **Ink Books** library.  
 PANTONE ink books have 7 ink patches per column and 1 column per page. Other ink books may have a different number of ink patches and columns per page.

- select **Skip them, minimizing paper use** if you want to only print patches containing inks (one strip may then contain patches from more than one column, if some columns had empty patches).

**Note:** Empty pages and empty columns are always skipped.

9. If desired, add some extra information to the print out:

- the **Output values** (from your color strategy) that are used by the press to print each ink;
- which ink patches cannot be satisfactorily simulated by the press (select **Mark 'out of gamut' inks** for this);

**Note:**

This is calculated by comparing the *expected Delta E* of the inks on print to your *Delta E* tolerance for out of gamut colors.

By default, the tolerance used in the one you set *in the Preferences*, but you can *change it here* if desired.

- the ink book column numbers next to the page numbers, in the format `page number-column number` (select **Column and page numbers**);
- the **Expected ΔE** between the ink in your color database and the patch output on the press.  
 The **ΔE Formula** used for calculating this is the formula *from your color strategy*.  
 If you have selected **Mark 'out of gamut' inks**, you can adjust the **Tolerance** to use if desired.

**Note:** You can only add **Output values**, **Expected ΔE** and **Mark 'out of gamut' inks** information when printing with the **PANTONE Ink Book Format**.

10. In **Patches per Strip**, select how many ink patches you want to print per vertical strip: either a custom number or the value **from the ink book** (how many ink patches the ink book contains per column; for example, this is 7 for **PANTONE** ink books, and 4 for the **process** ink book).

11. Select **Enable step and repeat and finishing marks** if you want to use the Step and Repeat and finishing marks functionality on the DFE Server.

This option is useful if you intend to cut out the individual pages of the ink book.

The next time you print an ink book, Color Pilot will suggest what you selected here by default.

**Note:** When printing on an HP Indigo 8000 press, this option is not available.

12. Click the **Print** button to send the ink book/ink patches to print as one or more PDFs to the DFE Server.

They are automatically ripped on the DFE Server. You can then print the PDF(s) from the DFE Server Client.

**Note:**

When working with an HP Indigo 8000 digital press, which has two press engines, the chart is printed on the first press engine to safeguard against color variation inside the color profiles.

To do this, Color Pilot adds an empty page to the chart before submitting it for printing. You can view the chart print job containing the empty page (the second page) in the DFE Server client.