

# CREATING AN OUTPUT PROFILE IN FLEXI<sup>®</sup> PRODUCTION MANAGER

Using Color Profiler in Flexi Production Manager

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## About this Document

This document is not the definitive guide to creating output or media profiles. It is instead, intended to be a “GUIDE” to making profiles when using Color Profiler included in Flexi Pro. We will not cover lots of color theory or color management issues. Our intention is to create a document that is a bit more explanation of the help file and to give a few tips that may result in better profiling. The reader agrees to use this information at their own risk.

## Why Output Profiles Are Necessary

Output profiles can be defined as a combination of accounting for printer issues as well as media and ink combinations. Every printer will have its own slight issues, and of course, there are literally hundreds of medias and ink combinations. In fact, some users of Flexi purchase media or inks that have never been combined and therefore discover no output profile is available. Or perhaps they find that the existing profile is not quite right and they must tweak it to get the best ink limit or color quality. Whatever the case, making an output profile is not difficult, but can be tedious and deserves careful attention, never rushing through the process.

We are sure this guide will help you to produce the best output profiles using Flexi’s included Color profiler.

## Do you Really NEED to Create a New Profile?

Before we begin, you should carefully consider whether you really need to create a new profile. Have you thoroughly searched the internet for a profile for the media and ink and printer you are using? Really? Finding an existing profile is like gold! It will save you time, and can be adjusted slightly for your printer if needed.

Also, ask yourself, Is it really a profile issue or could it simply be a color management issue or option? I meet lots of folks who swear that they need a profile, when in fact, a few adjustments in color management options and Production Manager Options can sometimes solve the issue. Need help with color management options? Send us an email: [mrugen@givemehelp.com](mailto:mrugen@givemehelp.com) describing your issues and perhaps we can help you solve them without the need for a new profile.

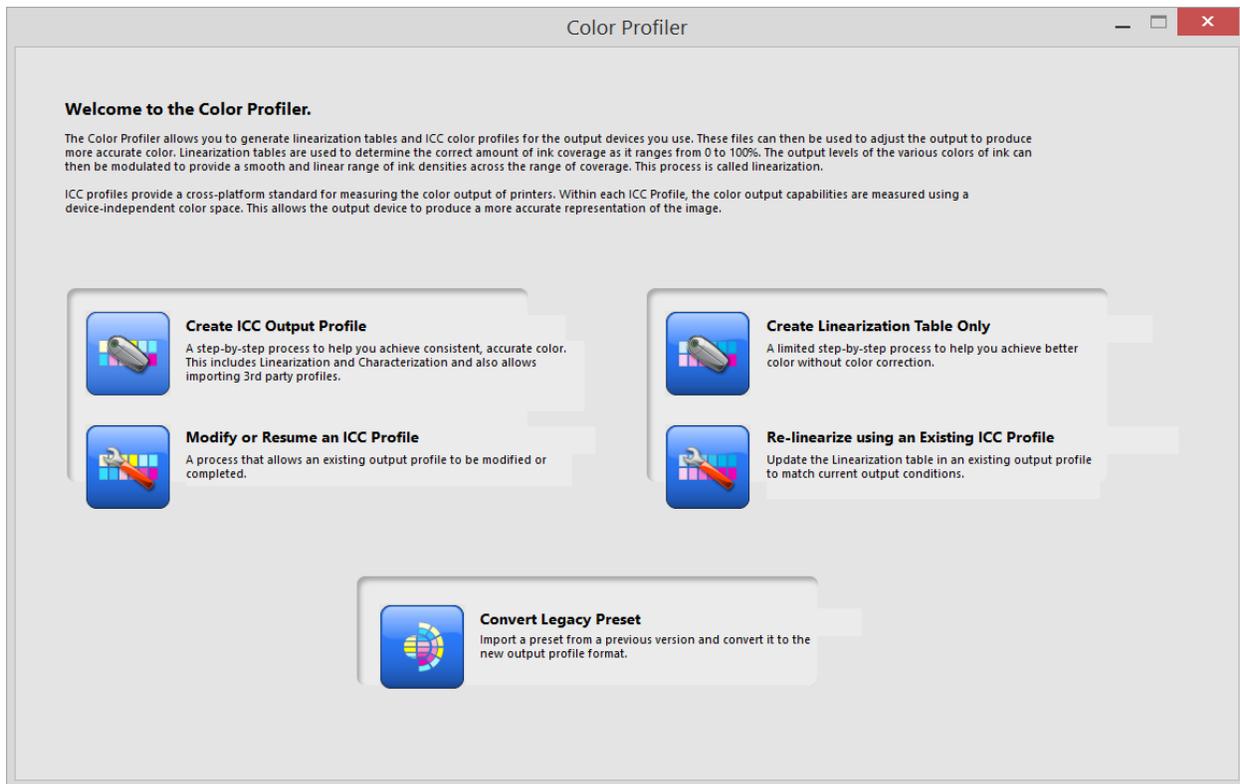
Before we start do the following:

1. Search the SAI Profile Page to see if there is a profile already made or one that is close to the desired media/ink combination: <http://profiles.saicloud.com/>
2. Search the MEDIA maker’s website to see if they have profiles already made.
3. Search the Printer manufacturer’s website to see if they have profiles needed.
4. Go to one of the popular discussion boards and ask if anyone has a profile they are willing to share. (e.g. [www.signs101.com](http://www.signs101.com) or [www.thegraphicsexperts.com](http://www.thegraphicsexperts.com) )

If you have done this and cannot find what you need, then it’s time to take the steps that follow.

## The Flexi Color Profiler Wizard

The folks at SAI have done a good job of setting up the creation of new output profiles using a wizard driven format. Simply following the wizard can result in good profiles.



However, there are places during this procedure that need a bit of explanation and perhaps a few suggestions for you to get the best results.'

As seen above, the wizard is divided into five actions:

**Create ICC Output Profile:** This is the whole process and is used for new medias or inks. It also takes the most time and greatest care.

**Modify or Resume an ICC Profile:** One of the nice things about this wizard is that a new profile does not have to be completed in one sitting. You can start, pause and resume as needed. You can also use this option to modify an existing profile to suit your needs.

**Create Linearization Table Only:** Rather than a full profile, perhaps all that is needed is the management of the ink limits. This works only for ink limits not for color correction as in a full profile creation.

**Re-Linearize Using an Existing ICC Profile:** In this option, you can open an existing profile and simply change or adjust the ink limits. This may be necessary due to printer variations, or other external factors.

**Convert Legacy Preset:** This is used to import older profiles into a newer format that is used for more recent versions of Flexi.

## Preparing to Create an Output Profile

Preparation for creating a new profile or even adjusting an existing one is absolutely necessary.

**DO NOT SKIP THIS STEP!**

This is probably the main reason some have issues after trying to create a profile. Since making a new profile can take hours, that's right, hours, you'll want to make sure you are set up properly before trying to make a profile or you'll just be wasting time.

Be sure to do the following:

1. Make sure your printer is operating at top performance.
  - a. If service is needed, do it. If print heads need attention, changing or cleaning, do it. Make sure that printer is working properly BEFORE you even start!
2. Make sure you have enough media.
  - a. You'll want to make sure you are using a single lot of media, not two different rolls. You'll need several feet of media, I'd say it's safe to say you'll need about 20 feet, just to be sure you have enough.
3. Make sure you have plenty of ink.
  - a. Important as the rest, make sure you have enough ink to perform the entire process. You will not want to change ink supplies in the middle of the process.
4. Make sure you have plenty of time.
  - a. The process of creating a good, reliable ICC profile will take two days! WHAT???? Yep, there are certain steps that will require the ink cure completely and that can take a few hours, so be sure you have enough time set aside for the process. You will not want to rush through this process. In fact that's why the Flexi profile wizard allows you to pause and resume!
5. Make sure you have a calibrated measuring device.
  - a. I've always used a (Eye One) I1-Pro from Greyttag McBeth but whatever your choice, make sure it's calibrated properly and reliable.

Ok, let's go through the process.

## Basic Steps in Color Output Profiling in Flexi

These are the main steps to creating an ICC Output Profile:

**Profile setup** - Determine general properties of the ICC Profile.

**Ink Limit** - Determine the ink limit for each color of ink.

**Ink Split** - Determine the ink split for light and dark inks.

**Linearization** - Determine what the output levels of each color need to be in order to produce a linear density curve of ink coverage at levels ranging from 0 to 100% coverage.

**Multi-Ink Limit** - Determine the ink limit for combinations of multiple inks.

**Gray balance** - Determines the output levels of each color needed in order to produce a neutral gray for color and grayscale images.

**Characterization** - Determine the color characteristics of the printer.

**ICC Generation** - Measure the color gamut of the output device and generate an ICC profile.

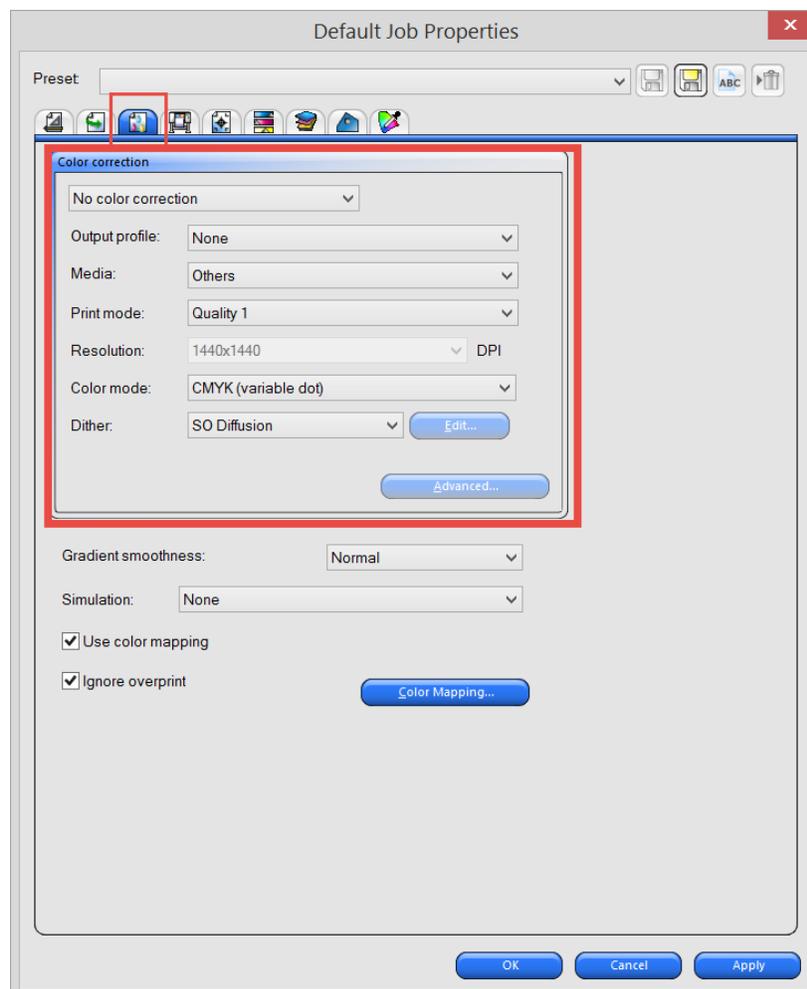
You can click the **Save** button at any time to save the current profile and then come back to it at a later time.

## Creating a NEW ICC Profile – Step-by-Step

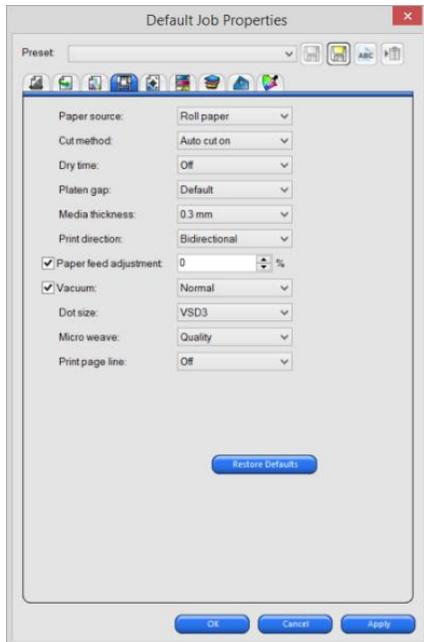
### STEP 1: Create the Printer Setup

First you will want to setup your printer. You may have already done this and if so, you'll want to make sure that all the default settings are set for it. Go through the options and make sure color correction is OFF.

Just go to Production manager and choose SETUP from the menu and DEFAULT JOB PROPERTIES.



You will also need to set any other printer options that you deem needed. Each printer is different, but check the printer specific settings:



Settings like wave patterns, weaves, vacuums, heat settings etc. etc. are all critical to beginning this process because those settings will be used in the printing process during the printing of swatches and test prints.

In the image to the left is the options for an Epson 9890. If I were getting ready to make a profile, I'd check options like the Micro Weave, the Dot size, Media thickness etc. etc.

As mentioned, each printer will have a different set of options. Some have heat settings, some have wave patterns. Whatever your printer options are, understand them and set them properly BEFORE beginning the process of profiling.

### *External Factors Influencing Print Quality*

Before you print test swatches, consider the following factors to maximize the quality of your color calibration:

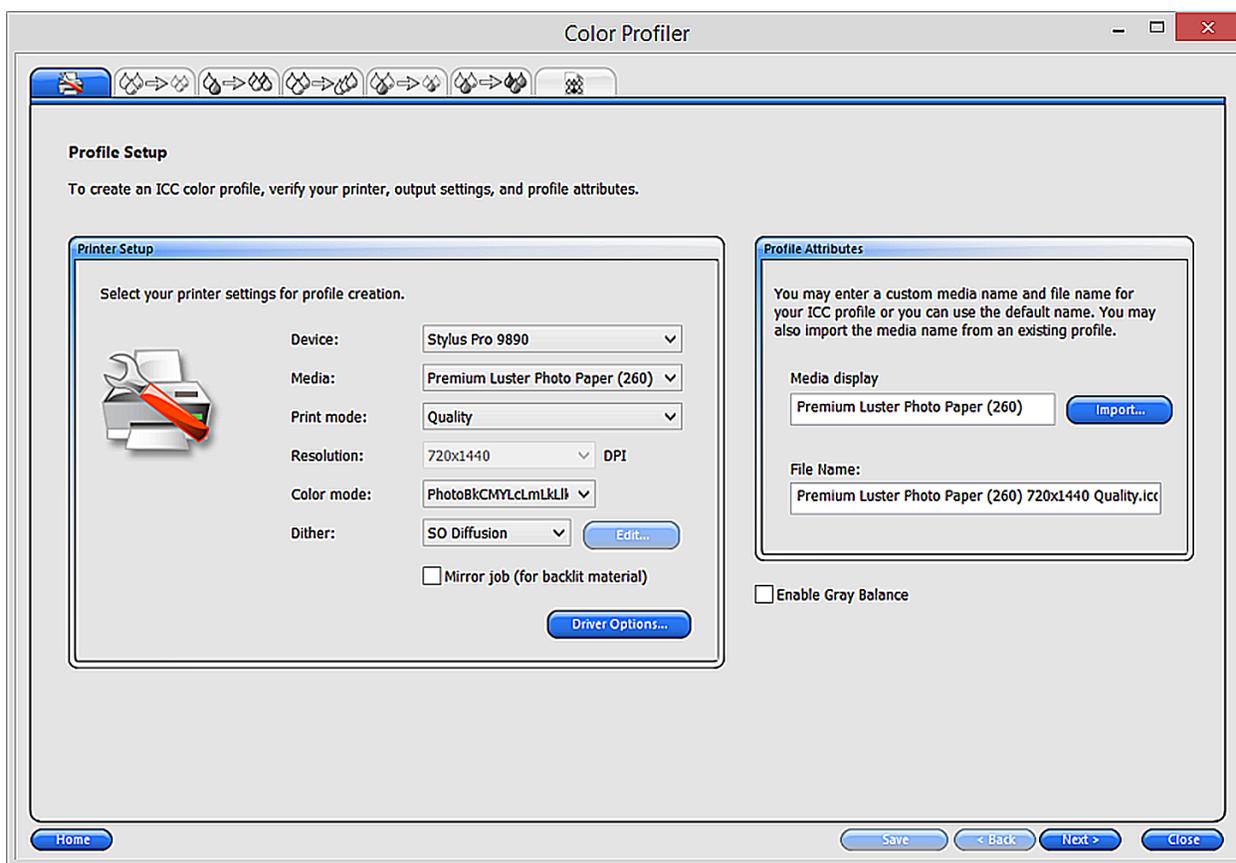
- Ink** Each printer is designed with specific kinds of ink; therefore you should use the manufacturer-recommended inks. Also, make sure the inks are filled and properly primed as instructed by the manufacturer.
- Media** Media is the most important part of the ink and media interaction. This interaction between the ink and media coating affects every aspect of print quality, including color accuracy, vividness and durability, as well as the sharpness of your print. If the ink and media are not properly matched, potential problems include bleeding and smearing.
- Resolution** Resolution measures the number of dots per inch printed by the printer. Changing the resolution affects the dot placement and the amount of ink laid down on the media by the printer.
- Environment** Humidity and temperature affect the drying time for a print, which affects the ink and media interaction. A longer drying time can cause ink bleeding or intentional ink mixing.
- Print mode** For the best results, calibrate using the printer's highest quality print mode. Using the quality mode will reduce banding.

**Print heads** Print heads should be properly primed and all nozzles should be firing. The heads also need to be in alignment. Consult the printer manufacturer's documentation for instructions.

**Measuring Device** The spectrophotometer, colorimeter needs to be calibrated properly for white points and black points. See your device's documentation for calibration instructions.

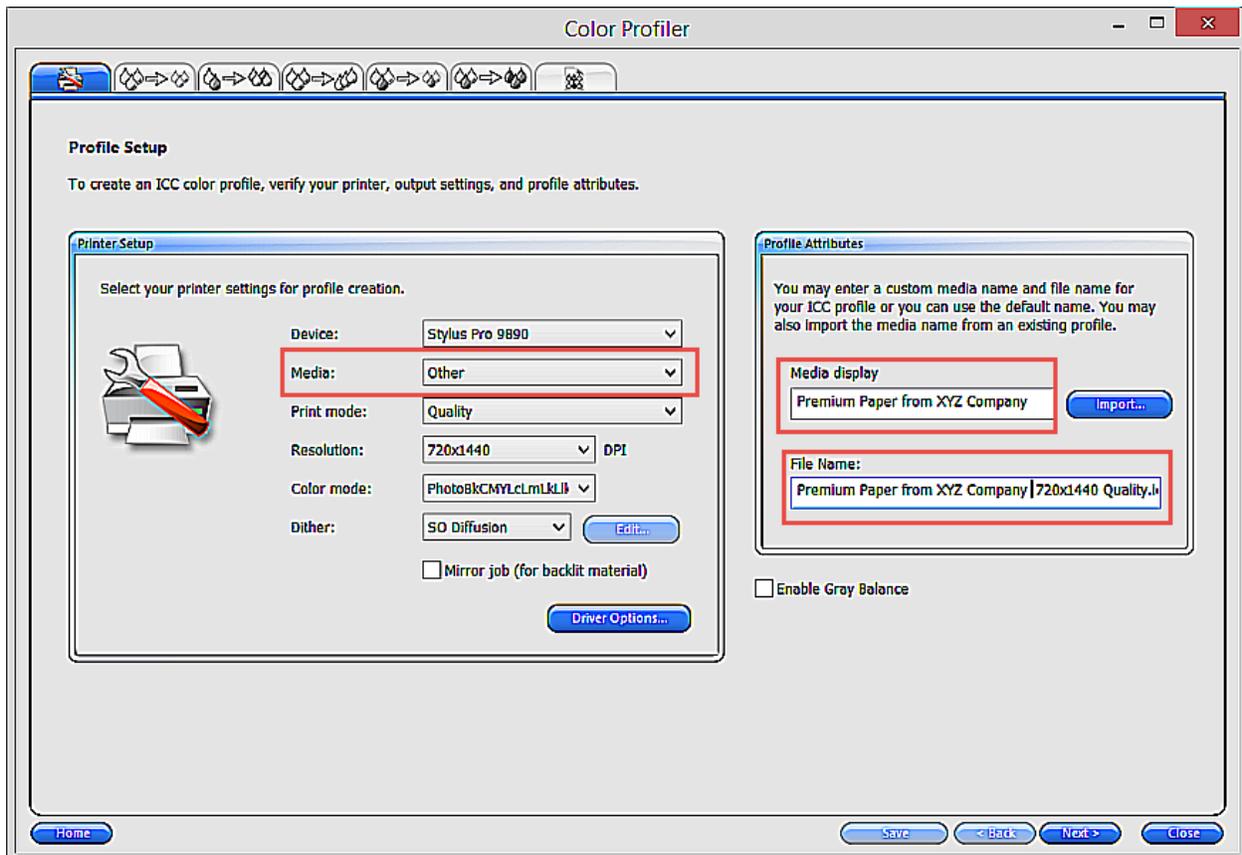
**STEP 2: Profile setup** - Determine general properties of the ICC Profile.

Select the Color Profiler from the setup menu, then choose to create a new profile. The result should be the dialog box below:



This will be the main wizard used for creating a new profile. As you progress, the tabs seen at the top of the menu will move to the right. You may and should save your progress periodically so as not to lose your place, and you can pause and resume as needed based on your daily tasks. In fact, in some of the steps, you will need to allow several hours or even overnight for swatches to dry and cure before taking measurements.

Verify that the Printer Setup matches your device and settings as discussed earlier. If you are creating a new profile for a new media or ink set, then in the media option scroll to the bottom and choose OTHER.



So in the case above, I've decided to categorize my new profile under the OTHER settings for media. I also want to display the media as "Premium Paper for XYZ Company" Here you can give your profile any name you wish. In addition, the FILE NAME should include the names of the media, the resolution used, and the print mode. This will make it easier to choose when using it in Production Manager later.

I would also recommend that you ENABLE Grey Balance, so that you can make sure to create neutral greys.

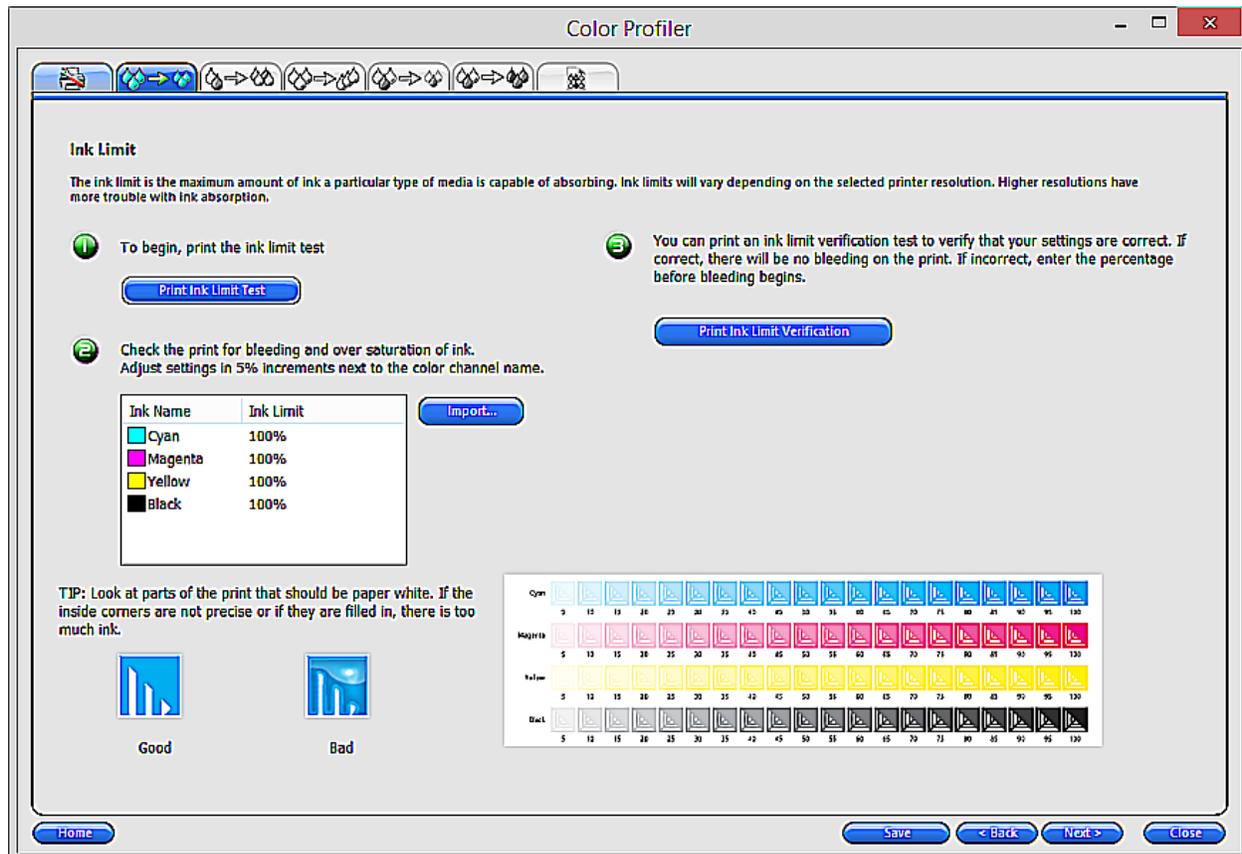
On the following page is a table with short definitions of each of the options for this initial menu.

Device	The device for which you are creating an ICC Profile.
Media	The media list provided by the device driver. If the driver has no media list, others will be selected.
Print mode	The device's print mode.
Resolution	The device's resolution.
Color mode	The color modes that will be profiled (CMYK, CMYKLcLm, RGB, etc.)
Dither	The pattern in which the individual dots that make an image are applied to the media.
Edit	Opens options for Angled Screen.
Mirror job backlit material)	Mirror job (for Check this if the material will be backlit by a light box when scanned.)
Driver Options	The settings related to the selected output device. The options displayed may vary depending on your output device.
Media display name	The name of the media that will be displayed in Job Properties. This can be used to add custom media names to the media list. See Color Management Tab for more information.
Import	Click to import a media name from an existing ICC Profile.
File name	The name of the resulting ICC profile when clicking <b>Save</b> or <b>Generate</b> .  To create a duplicate of an ICC profile, change the name before making other changes and re-generate. This allows you to make a new profile based on an existing one.

Once you have all the initial setting in place, you may click NEXT.

**STEP 3: Ink Limit** - Determine the ink limit for each color of ink.

In my opinion, this is one of the most critical steps in profile making. This step is used to determine the maximum allowable ink that can be placed on the media without bleeding, cracking or puddling. It is critical for saving ink as much as it is for getting great color. That means you need to take your time on this one and make some good choices.



This is a three step process. A swatch will be printed with a specific pattern and shown above. After you print this pattern allow the ink to dry or cure for at least 30 minutes, THEN do the examination. You may want to use a magnifier of some type to look closely at the results. Remember if you rush this, you may not get reliable results.

**1. Print the ink limit text pattern.**

- This is pretty simple. A pattern will print. Each individual pattern is a 5% increment of ink. At some point, so enough ink will be used that the pattern begins to bleed or puddle or have some other anomaly. Once entire table of swatches is printed remove it and allow to dry. If you have excess media, and you will, cut the excess away so the printed pattern is easy to handle.

**2. Adjust the ink limit settings.**

- Okay, here's the part you need to get right. Take the dried pattern and look at each individual swatch for each of the colors printed. Start at the bottom of the print and

work your way up to 100%. At some point, you will notice a loss in sharpness at the corners of the swatch. Note that percentage value. Repeat this for each color.

- b. It's possible that you may have trouble "seeing" the difference between two of the upper swatches. For example perhaps the 70% and 80% swatches look about the same. If that is the case pick the higher percentage.
- c. Enter the values you choose in the table of item #2.

**3. Print ink limit verification.**

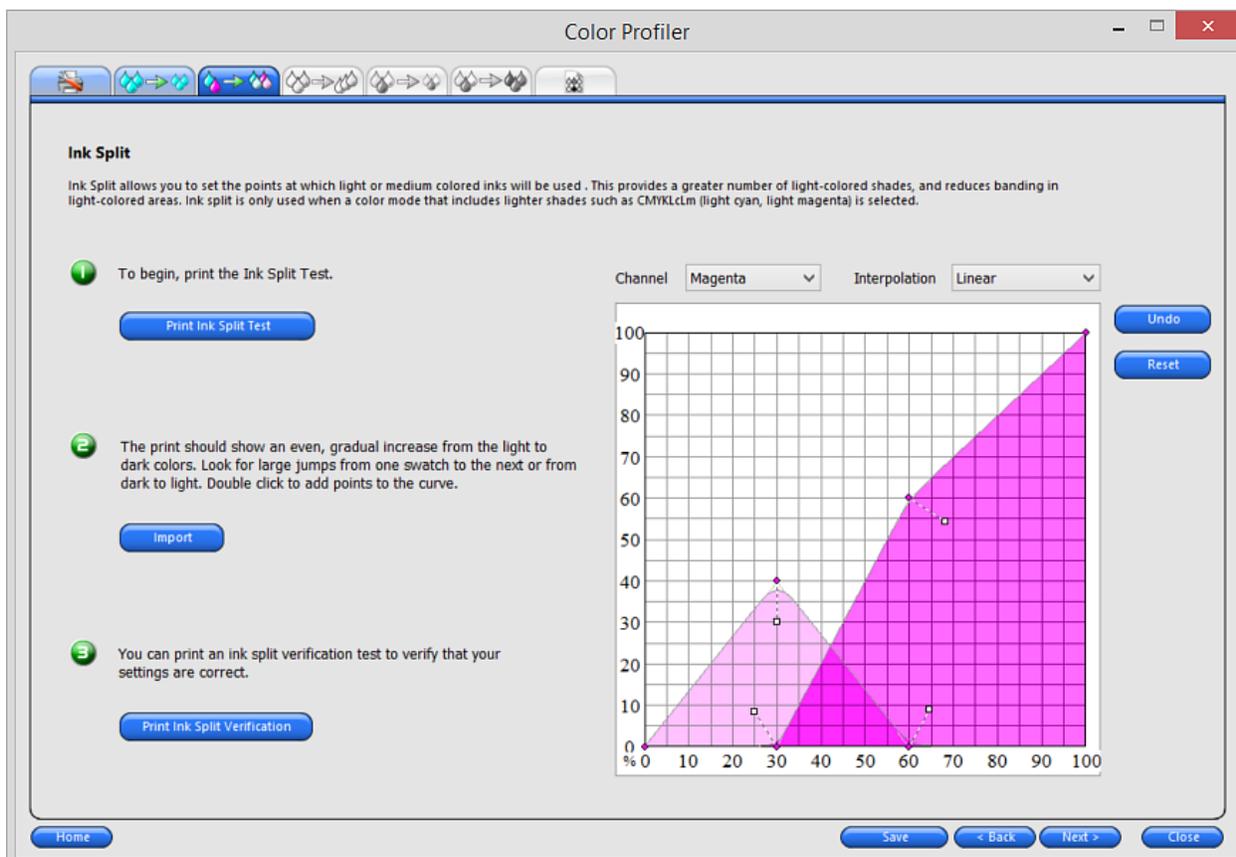
- a. Okay, now print this table again using the button in item 3. If you have made good choices, the individual swatches will all look good without bleeding or other effects. If at the high end, 100% you notice bleeding etc., then lower the ink limit by 5% and repeat this step.

By the way IT'S TIME TO USE THE SAVE BUTTON!

Once you are satisfied, click next.

**STEP 4: Ink Split** - Determine the ink split for light and dark inks.

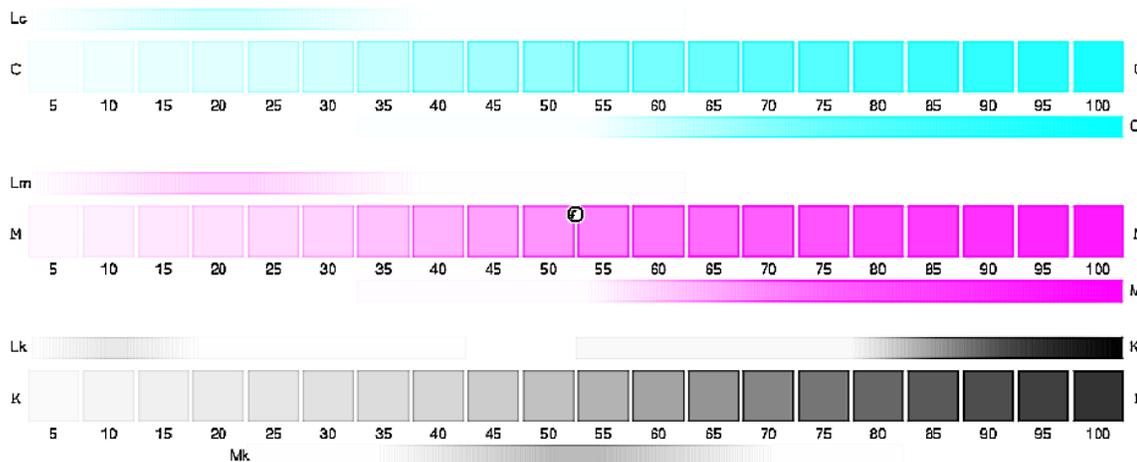
In this step, you will determine when to use, say Magenta rather than Light Magenta, or Cyan rather than Light Cyan.



**1. Print the Ink Split test.**

- a. The Ink Split dialog allows you to set the points at which light or medium colored inks will be used instead of normal "dark" inks. This provides a greater number of light-colored shades, and reduces banding in light-colored areas. Ink split is only used when a color mode that includes light such as **CMYKLcLm** is selected.

(M1) Ink Split Reference: Stylus Pro 9690\_Quality\_PhotosetCMYKLcLmLkK (2 bit)\_720x1440\_BO D Fusion\_4/1/2015 11:42 AM

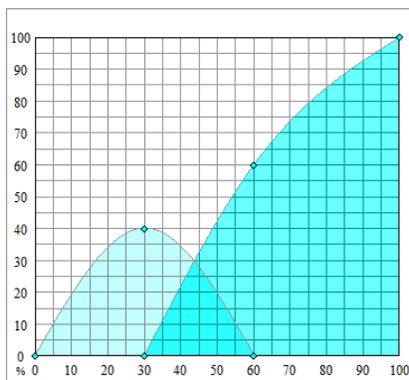


**2. Adjust if necessary.**

- a. Look for a smooth gradient. If you notice any significant jumps from one swatch patch to another, then an adjustment may be needed. You can double click on a curve to add points. The entire curve can be edited if needed.
- b. I have typically found that adjustments are not needed most times.

**3. Print a verification and Re-adjust if needed.**

- a. Once adjustments are finished, click next. **SAVE YOUR WORK!**

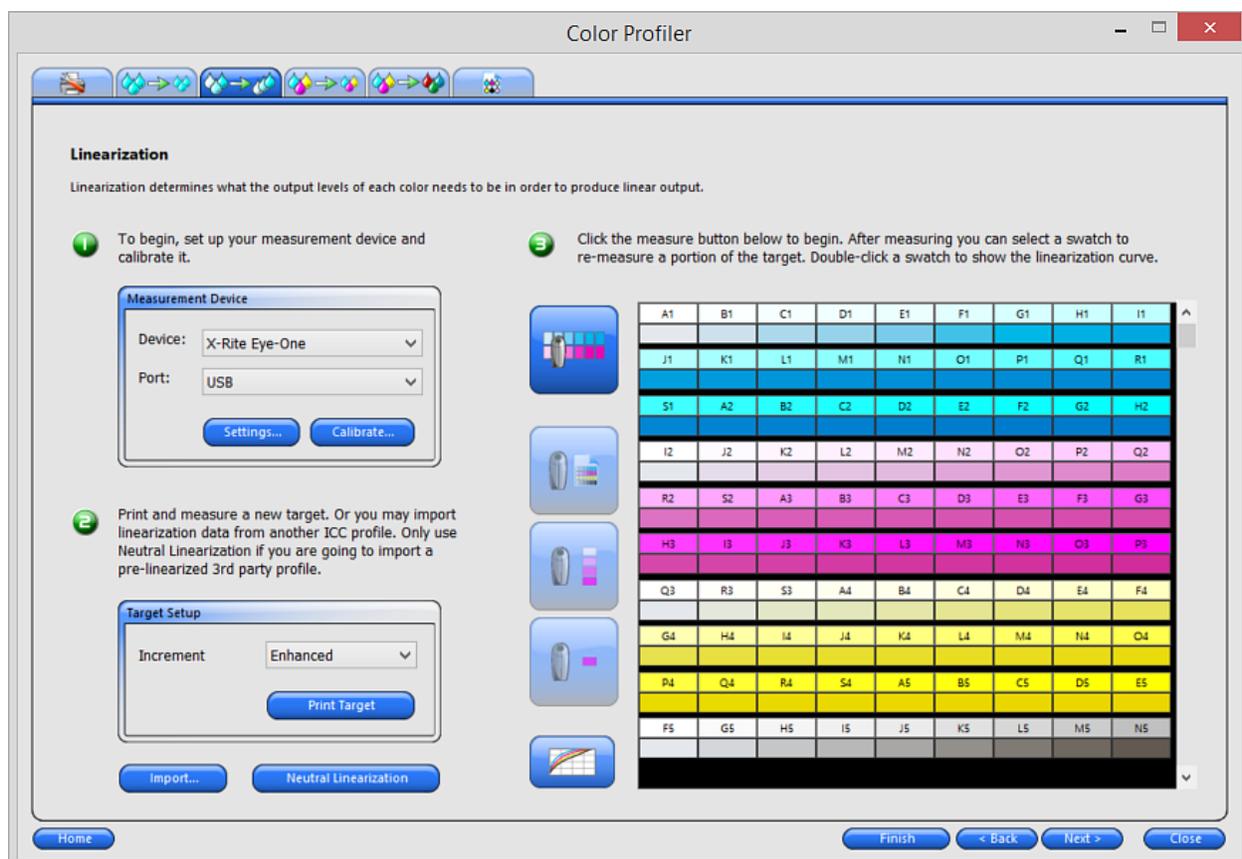


Each shade of ink is represented by a curve plotted on the chart. The chart illustrates the amount of each shade of ink that will be output in order to provide a certain amount of coverage. The range of coverage that can be specified in the image (0% to 100%) is plotted on the X-axis, and the corresponding coverage of each shade of ink is plotted on the Y-axis.

Look at the critical area where both inks are used. This can be seen on the Ink Split Test where the swatch increments have color bars above and below, and on the curve where the colors overlap. Each color patch in these areas should be darker than the previous swatch increment and look like a smooth gradient. The amount of change between swatch increments will be corrected in Linearization.

**STEP 5: Linearization** - Determine what the output levels of each color need to be in order to produce a linear density curve of ink coverage at levels ranging from 0 to 100% coverage. At this stage, you will now use the ink limits and ink splits set to print and determine linearization. Basically, a measureable chart will be printed. You will use your spectrophotometer to measure the density of each color from 0% to 100%. The result will be a linearization table that will be used during characterization procedures.

Once again, I want to emphasize patience and time. Once the chart is printed, it should be allowed to completely dry before making measurements. This could take a few hours or even overnight. In addition, patience is needed to make the measurements. Be sure to follow the proper procedures when measuring the charts to assure good data is captured.



1. **Setup your measuring device.**
  - a. Set up the device and run any calibrations to assure it is working properly. If the calibration button is disabled, it simply means that Flexi will not support calibration directly and you should calibrate using the instructions that came with the device.
2. **Print the targets.**
  - a. Increments: your choices are Enhanced, 5% or 10%. Use Enhanced when creating a new profile, the other choices are typically for re-linearizing an existing profile.
  - b. Allow sufficient time of the targets to dry.

### 3. Measure the targets.

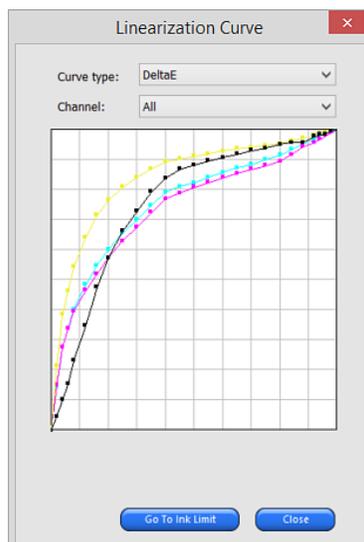
- a. Once the targets are dry, you can begin taking measurements. The first big button on the right of the menu will start the process. If errors in measurements are detected, perhaps you measured the swatch too quickly or slowly, the color profiler will let you know and allow you to re-measure.

### 4. Review the results.

- a. Once all measurements have been made, click the bottom button on the right to look at each ink channel. The curve should be smooth without large jumps.

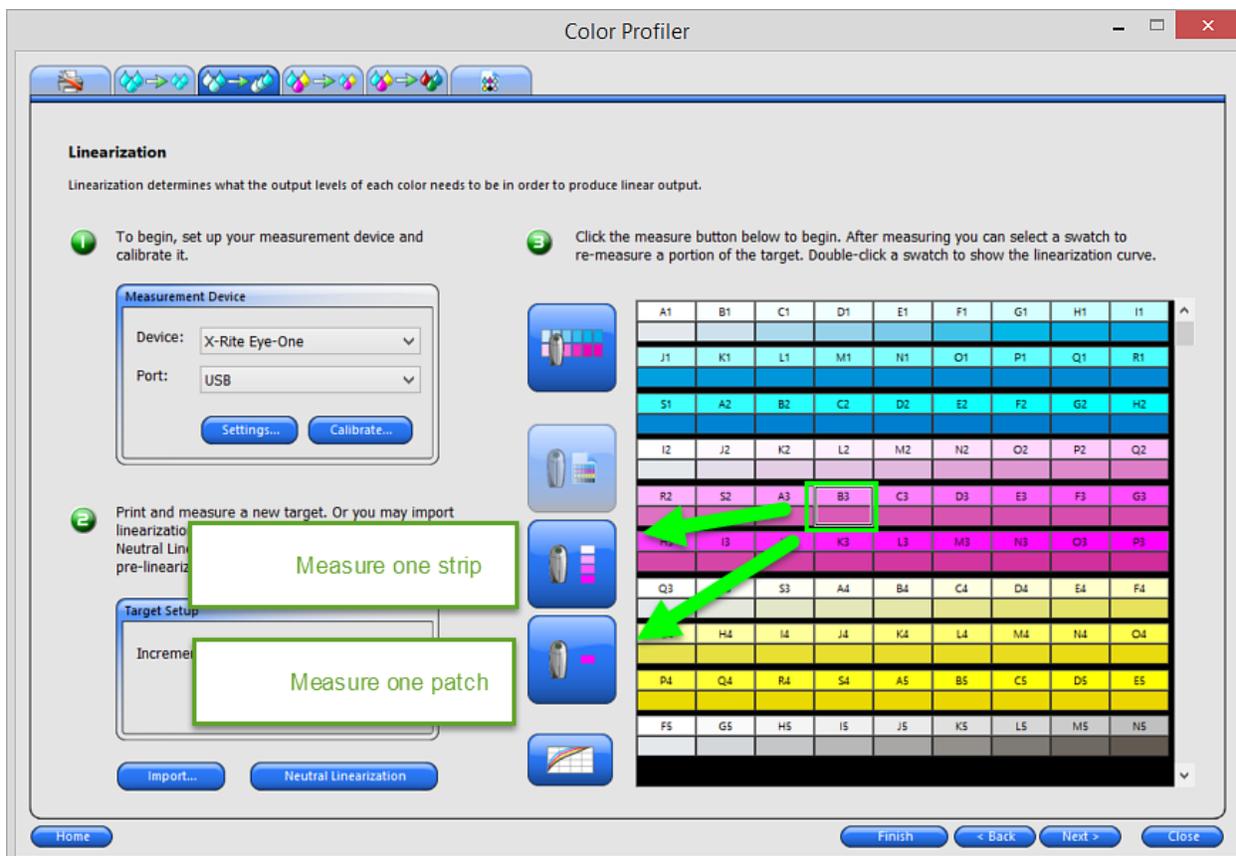


The above are two examples of what you might see after linearization. Each would be considered legitimate with the one on the right the better on the two.



In this image, all of the ink channels are overlaid to show differences that are expected. The main point to gain from this is that each of the ink curves are smooth and without major changes from one grid point to the next.

If needed, you can re-measure a specific patch or strip of patches by simply clicking on the chart in color profiler and choosing the appropriate button.

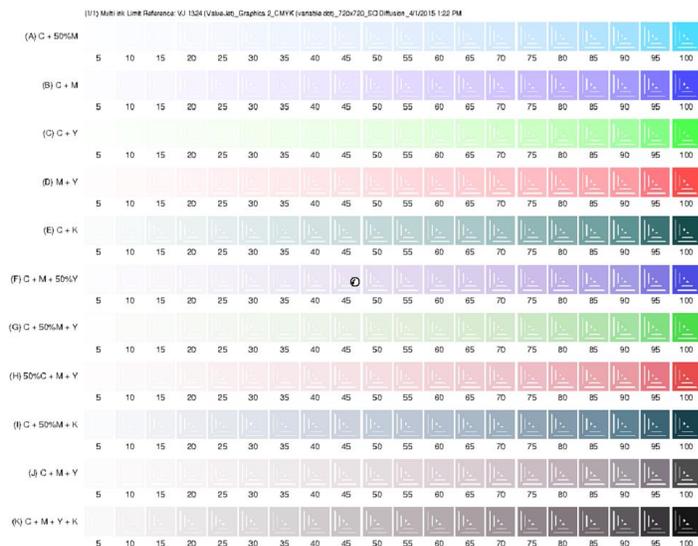


If all is well, move to the next procedure by clicking next, SAVE THE DATA!

(In the above I am using an existing profile to produce this paper, so the save button is missing.)

**STEP 6: Multi-Ink Limit** - Determine the ink limit for combinations of multiple inks.

Like you did in the very beginning of this profile creation for CMYK ink limits, you will not do so for multi-inks. In other words, RED is produced by adding Yellow and Magenta. So what is the ink limit for producing a good red when both yellow and magenta inks are used together?



**1. Print the Multi-Ink Chart**

a. As you can see in this chart that you will print, each combination of inks is used. You will need to allow time for this chart to dry and cure BEFORE determining the ink limits, just as you did for the CMYK ink limit observations.

2. Check the patches for bleeding etc.
3. Change the ink limits in the table
4. Print a verification chart.

The procedure is exactly the same as it was for the CMYK ink limits. When done click next!

Ink Name	Ink Limit
(A) C + 50%M	100%
(B) C + M	100%
(C) C + Y	100%
(D) M + Y	100%
(E) C + K	100%
(F) C + M + 50...	95%

**STEP 7: Gray balance** - Determines the output levels of each color needed in order to produce a neutral gray for color and grayscale images.

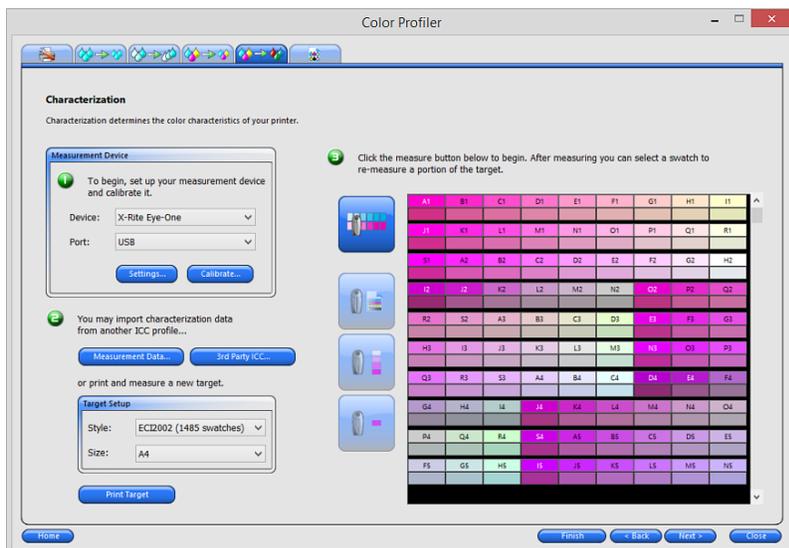
In this procedure, you need to take care so that when you print greys or black to white gradients, you get neutral greys and not a leaning toward cyan, magenta or yellow. Do this step right and your greys will be really neutral.

A1	B1	C1	D1	E1	F1	G1	H1	I1
J1	K1	L1	M1	N1	O1	P1	Q1	R1
S1	A2	B2	C2	D2	E2	F2	G2	H2
I2	J2	K2	L2	M2	N2	O2	P2	Q2
R2	S2	A3	B3	C3				

The procedure is exactly the same as for STEP 5 and will not be repeated here. (Let's save a tree!)

**STEP 8: Characterization** - Determine the color characteristics of the printer.

Perhaps the most tedious of steps because you will be measuring hundreds of color patches. Automated devices make this a bit swifter. Manual devices, such as the EyeOne can be slow and many time the strip must be re-measured, but overall it is just tedious not difficult to do. This procedure is very much like STEP 5 so refer there for details.

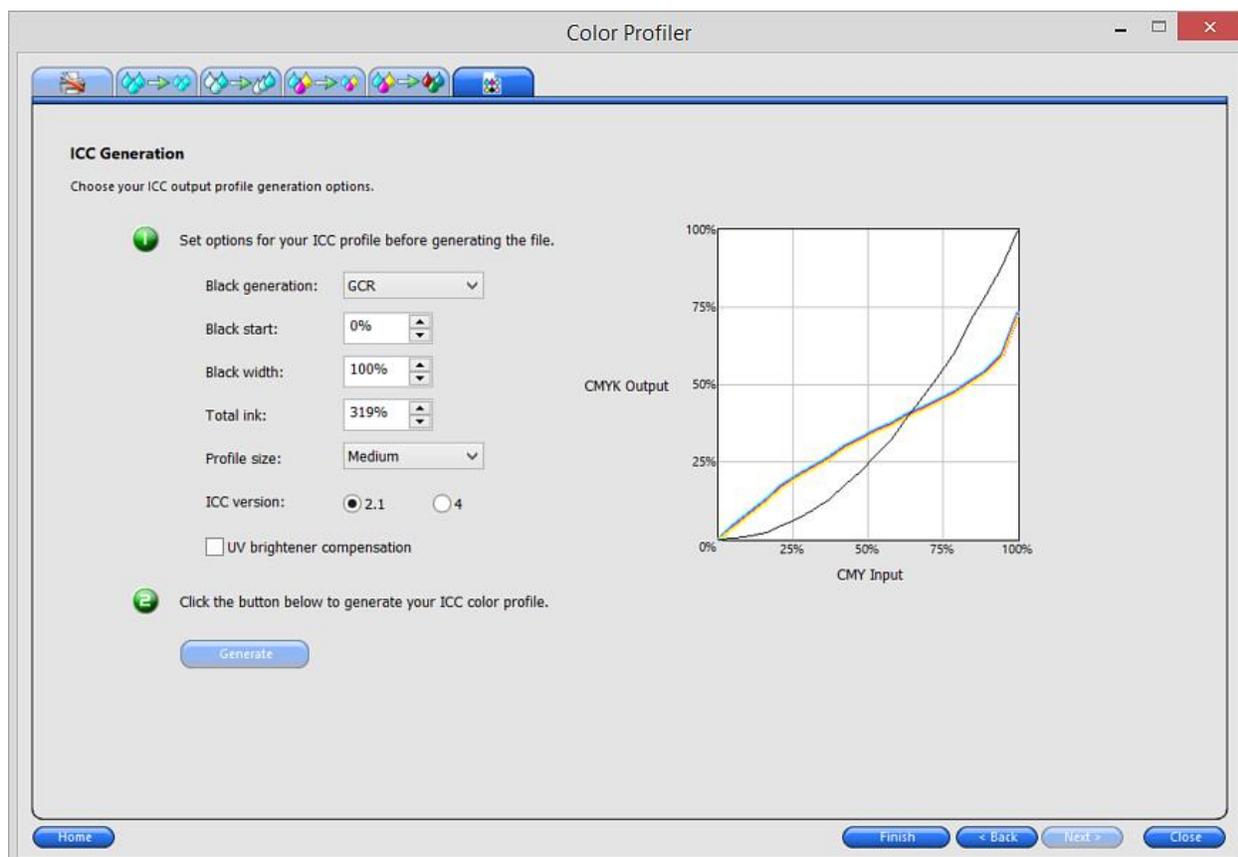


**Calibrate your device.**

- 1. Select the target type.**
  - a. Here, I suggest you select the target with the greatest number of swatches to be measured for greater accuracy.
- 2. Print the target.**
  - a. Yep, give it time to dry and cure! By now you should know about how long.
- 3. Make the measurements.**
  - a. Again if errors in reading the patches occur, Flexi will allow you to re-measure so just be patient.

**STEP 9: ICC Generation** - Measure the color gamut of the output device and generate an ICC profile.

Well, you finally made it! The last step!



Okay, the options are numerous but typically the defaults are just fine. Below are the option explanations, but for most profiles, just click GENERATE!

**Black generation** In theory, cyan, magenta and yellow mixed together should produce black. In practice, mixing CMY together produces a muddy dark gray. In addition, CMY black tends to over-saturate the print medium, because it requires coverage from all three inks.

The solution is to use the CMYK color model, which adds a true black that replaces CMY. The CMYK model reduces over-saturation, produces better blacks, and requires less ink.

The GCR settings determine when and to what extent CMY will be replaced by black (K). The higher the GCR is set, the more CMY black is replaced with K black.

The available settings are:

- Auto      CMY black will be replaced with true black. Most
- UCR      settings do 100%
- GCR      replacement of CMY with

GCR Max	black at high coverage levels, but progressively less at
UCR	lower levels of coverage. The
Smooth	<b>GCR Max Smooth</b> setting replaces CMY with black whenever possible.
GCR Max	
Smooth	Pictures generated with higher GCR will tend to show more contrast and detail, but slightly less color.
Black Start	This determines at which percentage of gray the black (K) channel begins to replace CMY.
Black Width	A low Black Width value only generates black in the neutral areas. High values also generate black in the colorful shadows.
Total Ink	This is a sum of the ink limit values for C, M, Y and K. Each color can have an ink limit of up to 100%; the total ink limit is a maximum of 300%. Increasing total ink limit may improve contrast of the print.
Profile Size	Size of the LUTs (Lookup Tables) in the profile. The size has an impact on the precision of the profile and its calculation time. It has no impact on the processing time using the profile.
ICC Version	The current standard is ICC 2.1, however, the new ICC 4 utilizes a new specification as defined by the International Color Consortium. See <a href="http://www.color.org">www.color.org</a> for more details on the ICC 4 definition.
UV Brightener Compensation	When viewing a proof in a light box, check this option to compensate for the appearance of a proof that is printed on paper with strong brighteners.  Use this option when the proofing paper has more brighteners than the production paper.

STEP 10: Go grab your favorite beverage and give the new profile a try.

I would suggest you download a nice test image for testing your new profile. Here are some links to do so. Congratulations, you've made a new profile!

<https://www.google.com/search?q=print+test+images&tbm=isch&source=Int&tbs=isz:l&sa=X&ei=pz0cVeCaLceggwSpulDADA&ved=0CBUQpwU&dpr=1.25&biw=1680&bih=992>

I try to use one that has solid colors, skin tones and grayscale.

NOTE: This is just a guide in using the Color Profiler from SA International. There are many variables in profiling from hardware issues to measuring device issues to; well, observer issues. The reader agrees to use this guide at their own risk.

Be sure to visit our blog where you will find great articles on numerous subjects of interest to the graphics professional along with links to great video training!

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[Givemehelp.com](http://Givemehelp.com) is the website of Givemehelp, Inc and founder Mark A. Rugen. Mr. Rugen has over 25 years' experience in the graphic industry and is a Flexi expert. He teaches webinars and live seminars on subjects such as Flexi, Color Management and more. He produces training materials including online videos and DVDs for sale through his website and authorized resellers such as SA International, the creators of Flexi software and other production and design software.