Alwan
Color Expertise

Alwan LinkProfiler v3.8

Manual

27 décembre 2012

The Graphic Industry Standardization Company

1.Introduction

Alwan LinkProfiler is a profiling software that allows you to create sophisticated and accurate ICC DeviceLink Profiles.

It includes many innovative and original features not found on other profilers.

1.1.Addressed Problems

If a CMYK file is to be color managed for a destination CMYK digital proofer or printing press using ICC Device profiles, source CMYK data will be converted to CIELAB using the source ICC device profile, and then CIELAB colors are converted to destination CMYK values using the output ICC device profile.

In this operation, important information about the source file contents can be lost.

For example, source pure C, M, Y or K color elements like text, color tints, vector graphics etc... are converted to 4 color CMYK on the output.

This can practically cause undesirable artifacts on the proof like grainy and dirty colors or misleading information like wrong dot structure.

On the printing press this CMYK->CIELAB->CMYK transformation may cause undesirable effects and even printability problems.

If black text or line art turn into CMYK, they will be very difficult to register, will have unsharp borders and will require more ink to print.

1.2.Benefits

Alwan LinkProfiler ICC DeviceLink Profiles ensure:

- Improved digital proof color and visual match
- Accurate Press to Press color match
- Optimal output Black generation and TAC (total area coverage) for the destination printing press
- Maximum Black option for maximum ink savings
- Preservation of C,M,Y,K, CM, CY, MY colors purity with dot gain compensation
- Preservation of achromatic
- Preservation of CMY colors under solid black
- Preservation of solids and registration marks
- Choice or rendering Intent
- Choice of black point compensation

1.3.Competitive Advantages

The best ICC DeviceLink Profiles for demanding production environments.

- Spot on digital proofs

- No more registration problems due to 4 color primaries

- Ink Savings on the printing press

- Total control on the output black generation and TAC with any ICC compliant output device profile

- Developed, tested and validated in demanding press printing environments

- Used to produce ICC based proofs and prints for multi-million circulation titles

1.4.LinkProfiler Editions

Alwan LinkProfiler v 3.8 can be purchased in 3 Editions:

- **LinkProfiler ECO** (all options available)

- **LinkProfiler Press** (without the following options: Maximum Black)

- **LinkProfiler PrePress** (without the following options: Maximum GCR and Maximum Black)

Previous LinkProfiler 3.0 Print dongle activate LinkProfiler 3.8 ECO
Previous LinkProfiler 3.0 Publish dongle activate LinkProfiler 3.8 Prepress

2.About DeviceLink Profiles

The International Color Consortium ICC Device Profile has become very popular and is widely used for color conversions from color space to color space.

(you can find a detailed description of the ICC architecture in Alwan ColorPursuit documentation at http://www.alwancolor.com/ressources/doc_colorpursuit/cp_introduction.pdf)

RGB acquired images can be converted to a Calibrated RGB using the Source Device (Digital Camera, Scanner...) RGB profile and a Destination Calibrated RGB Profile (Adobe RGB, ECI-RGB, sRGB...).

RGB images can also be converted to CMYK using Source Device (Digital Camera, Scanner, Calibrated RGB, Color Space...) RGB profile and Destination Device (Printer, Press...) CMYK Profile.

CMYK images intended to be printed on a Press can be accurately proofed on a Digital Printer using the Source Press profile and Destination Proofer Profile.

CMYK images intended to be printed on Press A can be accurately proofed on Press B using the Source Press A profile and Destination Press B Profile.

All these examples and many others are used daily by thousands of satisfied operators and clients.

However, in some situations, the standard ICC Device Profile processing carries some limitations that can yield to color and visual mismatch as well as to some printability issues on the press.

2.1.Color mismatch

In a standard Device to Device ICC transformation, Input Device values are used with the chosen Input Profile table to calculate PCS values (CIELAB or CIEXYZ), then the chosen Output Profile table is used to calculate the Output Device values.

In this scenario, profiles tables are used as is, meaning that the accuracy of the proofs will also depend on the ability of the original profile builder to generate accurate output tables.

This is not always the case

2.2.Visual mismatch

Even though most printers do have high printing resolution, their effective screening resolution can be relatively low.

For some saturated and dark colors, black dots that are needed to generate the color do not appear on the press print but may appear on the proof with the chosen Proofer Profile.

The only way to solve this problem is to re-generate the black channel of your proofer profile to avoid this kind of artifact.

Another example of Visual mismatch is primary colors (CMYK RGB becoming CMYK on the proof after the ICC transformation.

Even though proof colors may match very well those of the press, their appearance does not necessarily match.

Over more, having a 4 color Cyan or black on a proof can be very disturbing for a Quality Control operator or a press minder.

2.3.Printability problems

If your files are separated for Press A but you finally decide or have to print on Press B which is very different, the standard ICC solution would be to use Press A Input Profile and Press B Destination Profile and color convert you files to obtain a consistent result.

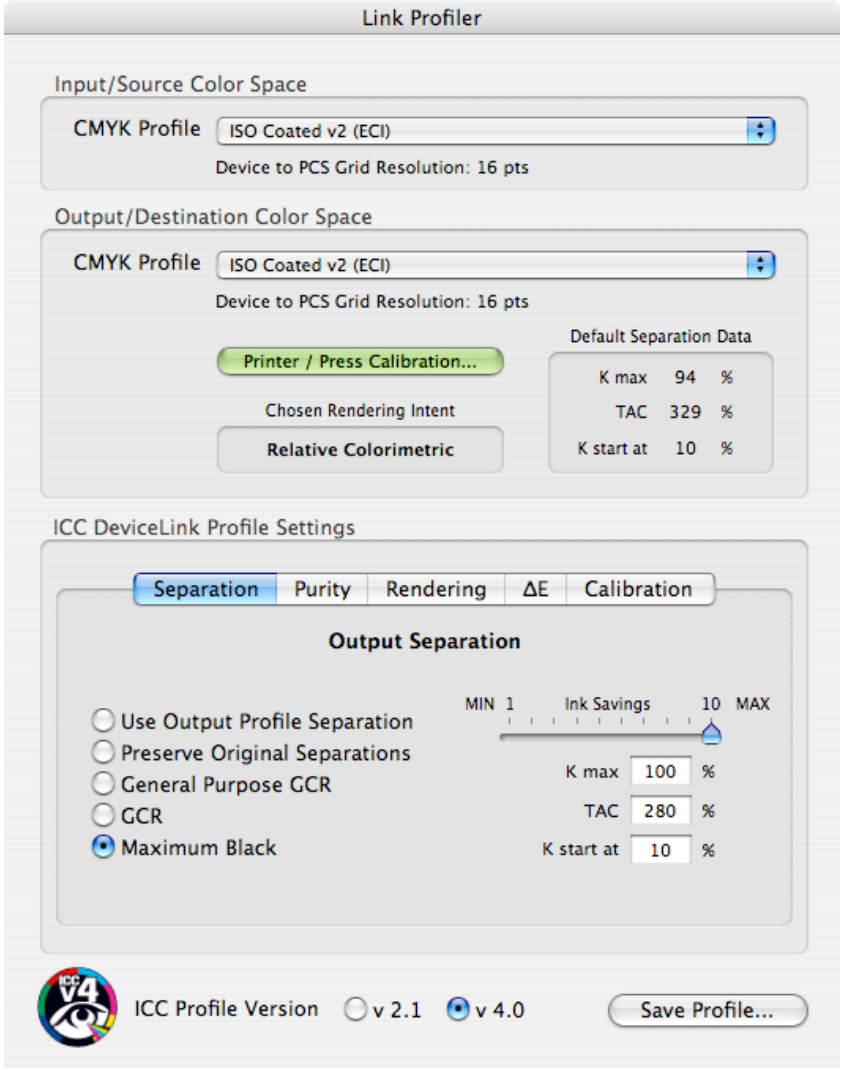
The problem with this operation is that ICC PCS values do not carry any information regarding the nature of the different file components.

Black text and primary CMYK colors used for text, graphics, vignettes, drop shadows etc... are lost and all these page elements become CMYK on the output.

This is not a natural characteristic of CMYK files and plates and the consequence can vary from difficult to impossible registration and printing on the press.

All these problems and many others that will be described later can be solved by using Alwan LinkProfiler CMYK_To_CMYK ICC DeviceLink Profiles building technology.

3.Alwan LinkProfiler Interface



3.1.Input/Source Color Space

3.1.1.CMYK Profile

Here you can select the ICC Profile which corresponds to:

- your target press, if you are building a Profile for your proofer
- the press profile used for the color separation of the files that you wish to process with the DeviceLink Profile

3.1.2. Device to PCS Grid Resolution

Here is given the device to PCS grid resolution as being for information only.

3.2. Output/Destination Color Space

3.2.1. CMYK Profile

Here you can select the ICC Profile which corresponds to:

- your proofer, if you are building a Profile for your proofer

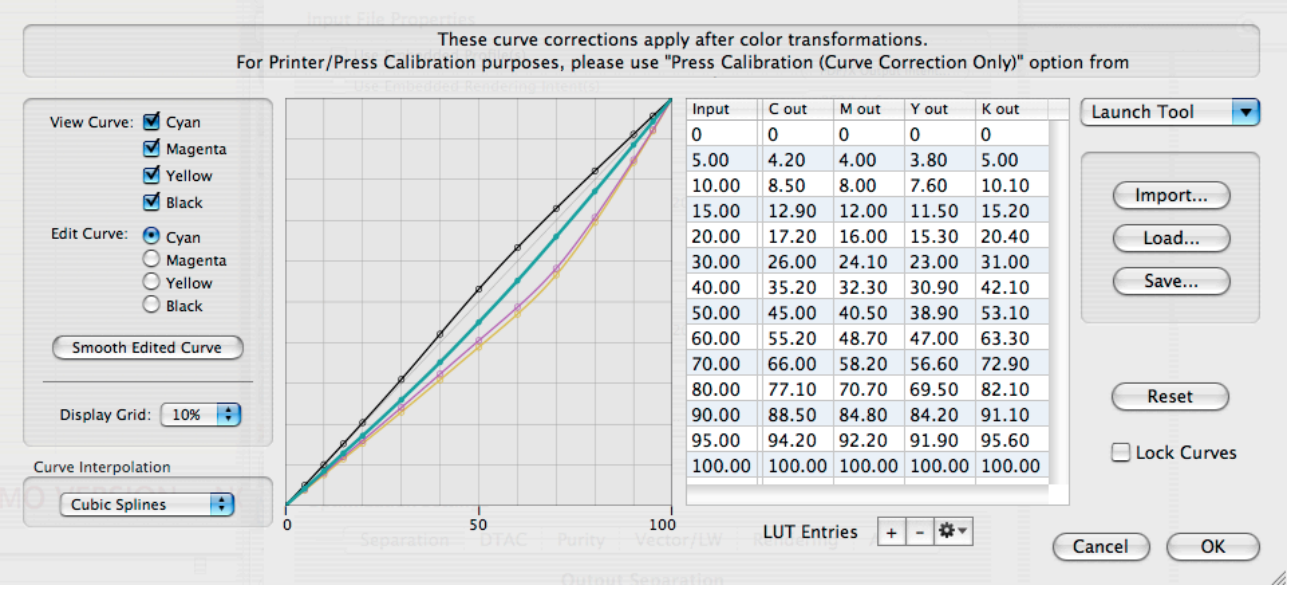
- the destination press which will be used to print the files that you wish to process with the DeviceLink Profile

3.2.2. Device to PCS Grid Resolution

Here is given the device to PCS grid resolution as being for information only.

3.2.3. Printer/Press Calibration

Printer / Press Calibration... option allows you to apply sophisticated curve corrections to your files.



The interface allows you to enter and display input and output values by means of a graph and a Look-up table (LUT).

This is very useful for adjusting Dot Gain and for matching ISO standard or G7 specification.

These corrections are applied after all color management conversions.

If you want to apply only curve corrections and deactivate color-management, you can choose **Printer Calibration (Curve Correction Only)** in the Action Tab. This could be useful for Press Characterization issue.

A curve is made of a customizable number of points/entries .

Each point corresponds to a LUT entry point. You can create new entries thanks to the **LUT Entries** menu.

You can edit the different curves within the displayed graph or through the input / output LUT entries values.

You can use the Printer / Press Calibration option in 3 different ways:

1- Define your own curve corrections

You can define your custom curves directly in the interface.

2- import correction curves generated by IDEALink Curve (G7/NPDC approach)

You can launch IDEALink Curve application from **Launch Tool** pop up menu.

See Chapter III. for further details on how to export IDEALink curves for CMYK Optimizer

You can import generated curves corrections by choosing the Import... button

3- import correction curves generated by Bodoni pressSIGN (ISO 12647/Dot Gain approach)

You can launch Bodoni pressSIGN application from Tool pop up menu.

See III for further details on how to export pressSIGN curves for CMYK Optimizer

You can import generated curves corrections by choosing the **Import...** button

Load...

This button enables you to load a saved correction file

Save...

This button enables you to save current curve corrections.

Saved files can then be loaded into Printer / Press Calibration using Load... button

Reset

This button enables you to reset the current changes.

Lock Curves

Check this option if you want to prevent any change

Smooth Edited Curve

This button allows you to smooth the displayed correction curve. You can see smoothing effect on displayed curves and displayed values.

Note that you can press this button many times if you need a smoother curve.

Curve Interpolation

The selected option determines which algorithm is used to interpolate the values between the different points/entries.

You can choose between

- **Polynomial 5**
- **Cubic Spline**
- **Linear**

Default Option is Cubic Spline which is Alwan's preferred algorithm.

Printer / Press Calibration applies to gray objects the same way it does to black.

3.2.4. Chosen Rendering Intent

It displays one of the four ICC Rendering Intents, and it corresponds to that chosen on the Rendering tab selection (see part III.3.3.)

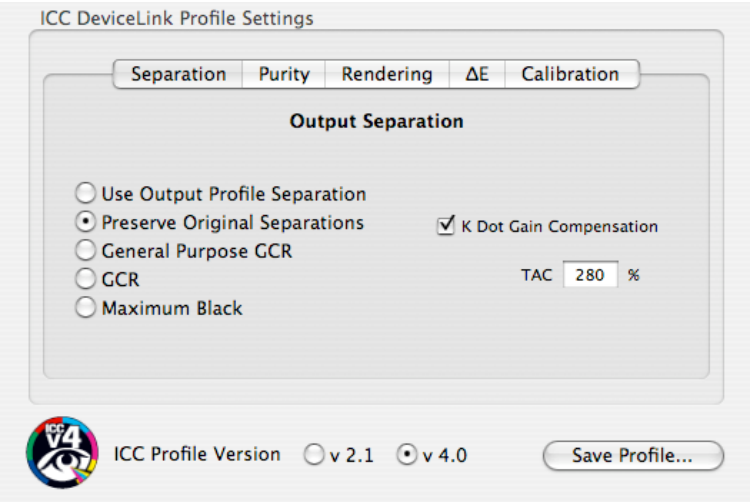
3.2.5. Default Separation Data

The displayed information on the right is extracted from the selected CMYK Profile and is a property of this ICC Profile.

- K Max indicates the maximum amount of Black obtained in the Output separation
- TAC which means Total Area Coverage indicates the maximum amount of CMYK overprint obtained in the Output separation
- K start for CIE_L indicates the lightness of the color where Output Black generation starts

3.3.ICC DeviceLink Profile Settings

Four tabs enable you to customize the characteristics of your device link profile:



3.3.1.Separation Tab

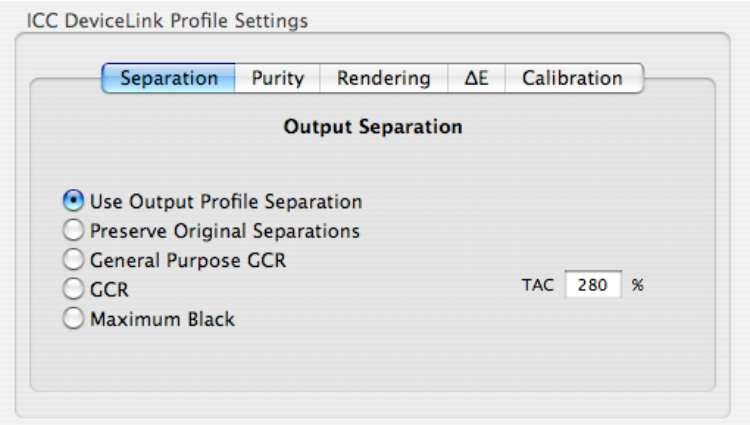
The **Separation tab** allows you to take full control on the output CMYK files black generation.

Original Output Profile PCSToDevice tables are ignored for all separation options except for **Use Output Profile Separation option**.

New tables are calculated in accordance with the chosen Black Generation settings detailed in the following pages.

Use Output Profile Separation

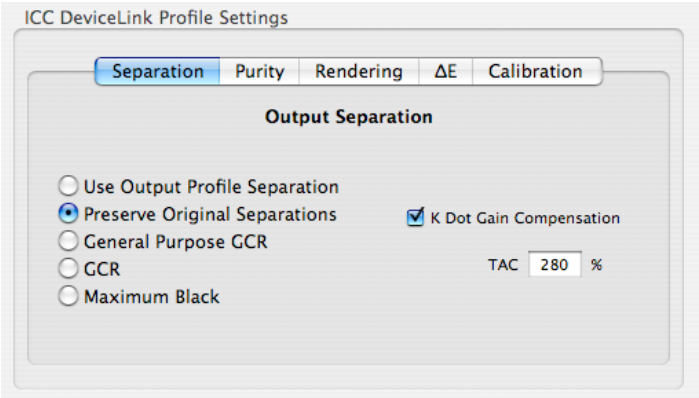
Use Output Profile Separation allows you to use you chosen Output Profile PCS to Device table for the DVL profile building.



This option is useful if you want to benefit from your Output device profile gamut mapping, or if you would like to achieve the same colorimetric results as when using ICC device profiles based color transformations with color management or image editing software.

Preserve Original Separations

This option allows you to preserve the original separations of the input file.



With the same ICC profile selected as Input and Output CMYK Profile for the queue, input files plates integrity is preserved. Only dark areas exceeding the chosen maximum TAC are recalculated by the software to meet the maximum target TAC.

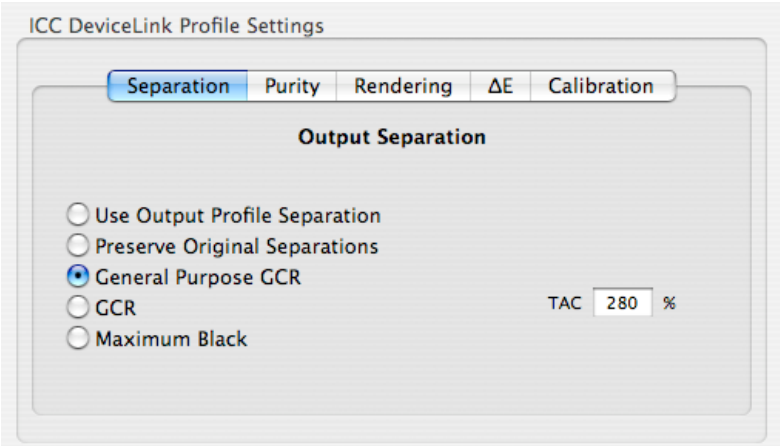
You can choose to use the **K Dot Gain Compensation.** If **K Dot Gain Compensation** is unchecked, output CMY values will be calculated keeping original K values, so that original black generation is preserved.

If **K Dot Gain Compensation** is checked, output Black channel will be Dot Gain managed using Input/Output Profiles black dot gain difference. CMY values are calculated depending on those new K Values.

General Purpose GCR

Output CMYK values are calculated with a General purpose GCR rule.

This choice corresponds to a Medium GCR (3.3) with a K start at 20%, and a Kmax at 98%



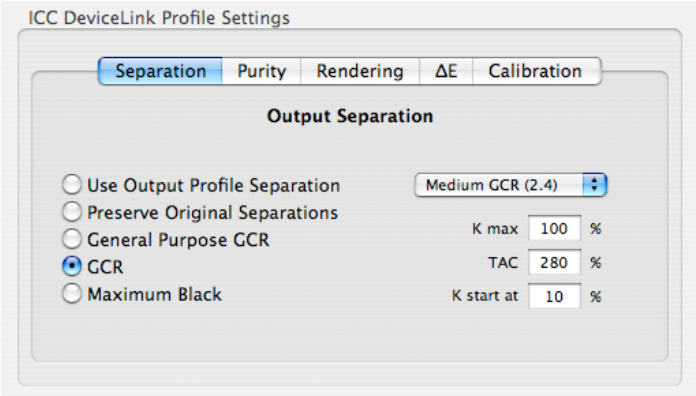
TAC default value is that of the original Output Profile.

You can leave it or modify it.

GCR (LinkProfiler Press and ECO Editions only)

This option allows you to take full control of your output Black Generation.

GCR stands for Gray Component Replacement i.e. Black replacing CMY grays in the separation.



All Black Generation parameters can be set.

- GCR popup menu allows you to choose the strength of Black replacement.

The range of selection is very wide, from No Black (CMY only) to Maximum Black replacement (practically all equal amounts of CMY are replaced by equivalent black).

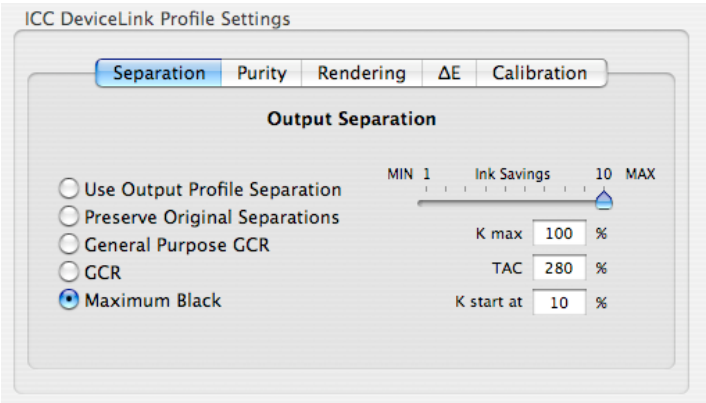
- K Max indicates the maximum desired amount of Black obtained in the Output separation.

- TAC Total Area Coverage indicates the maximum amount of CMYK overprint obtained in the Output separation.

- K start at indicates where black generation starts. This means that black will appear when CMY values are 10% or more.

Maximum Black (LinkProfiler ECO Edition only)

This option allows you to use the maximum amount of Black ink possible on the printing press without visible compromise on print quality, especially shadows and three quarter tones details.



- **K Max** indicates the maximum desired amount of Black obtained in the Output separation. For significant ink savings, set a high value (90%-100%).

- **TAC** which means Total Area Coverage indicates the maximum amount of CMYK overprint obtained in the Output separation.

- **K start at** indicates where black generation starts. This means that black will appear when CMY values are 10% or more.

- **Ink Savings** option allows you to use the maximum amount of Black ink for your press without loss of details in shadows and three quarter tones

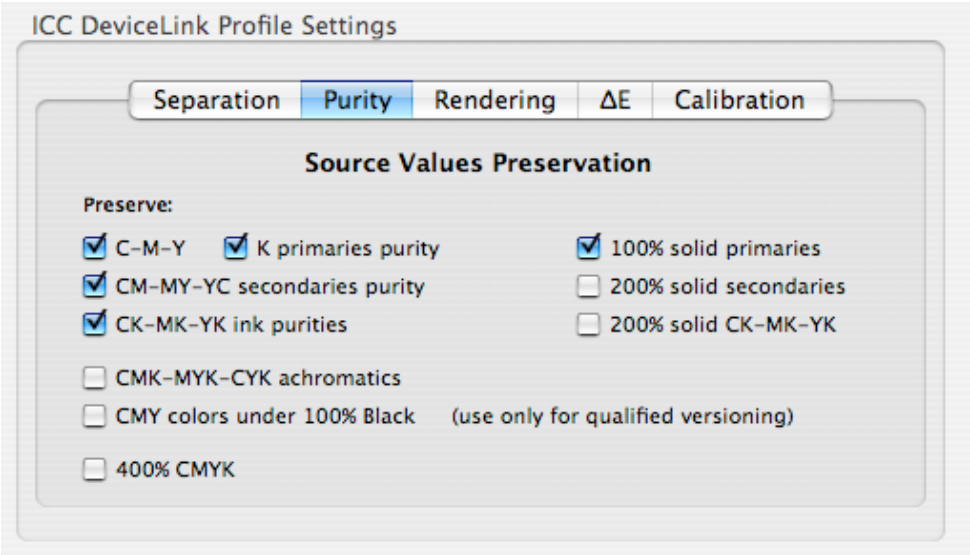
MIN setting is approximately equivalent to **Maximum GCR** (see next paragraph).

MAX setting allows you to typically save between 10% and 30% more ink in comparison to conventional **GCR.**

3.3.2.Purity tab

This tab lets you set constraints in the output separation in order to preserve the integrity of some of the input files values characteristics.

This will allow you to avoid printability issues and problems on the press.



C-M-Y or K primaries ink purity

All input C, M, Y or K only colors of any value will remain pure C, M, Y or K on the output. Only dot gain compensation will be applied.

For example a 50% Cyan on the input may become 54% Cyan only on the output.

The output color remained pure Cyan, but its value was adjusted to take into account the (lower) dot gain of the output press.

CM-MY-YC secondaries purity

All input CM-MY-YC only colors of any value will remain pure CM-MY-YC on the output. Only dot gain compensation will be applied.

For example a C50-M50 (Cyan 50% and Magenta 50%) Blue Color may become C54-M56 on the output. The output color remained pure CM, but CM values have been adjusted to take into account the (lower) dot gain of the output press.

CK-MK-YK secondary colors ink purity

All input CK-MK-YK only colors of any value will remain pure CK-MK-YK on the output. Only dot gain compensation will be applied.

For example a C40-K90 (Cyan 40% and Black 90%) Blue Color may become C35-K86 on the output. The output color remained pure CK, but CK values has been adjusted to take into account the (higher) dot gain of the output press.

CMK-MYK-CYK achromatic

Tints that are composed of 3 primary inks including Black will remain as such.

Only dot gain compensation and black generation will be applied.

For example a C20-M20-K20 (Cyan 20% Magenta 20% and Black 20%) may become C18-M22-K23 on the output.

CMY colors under 100% Black

CMY input values will be color managed and adjusted in the output separation keeping Black to 100%.

This option is useful for international titles where CMY channels are the same for all editions with only Black text changing (having text included in the bitmaps).

PS: Please use this option only when needed and very carefully because shadows & dark tones can be significantly affected. We recommend to have a high DVL resolution grid when this option is active.

Please also note that vector text are not affected by this option.

400% CMYK

Input files colors made of (C=M=Y=K=100%) remain unchanged in the output file.

This option does not affect registration marks made of the “All” special spot color.

100% solid primaries

Input solids primaries remain unchanged in the output separation. For instance (C0 M100 Y0 K0) stays at (C0 M100 Y0 K0) and (C0 M0 Y0 K100) stays at (C0 M0 Y0 K100).

200% solid secondaries

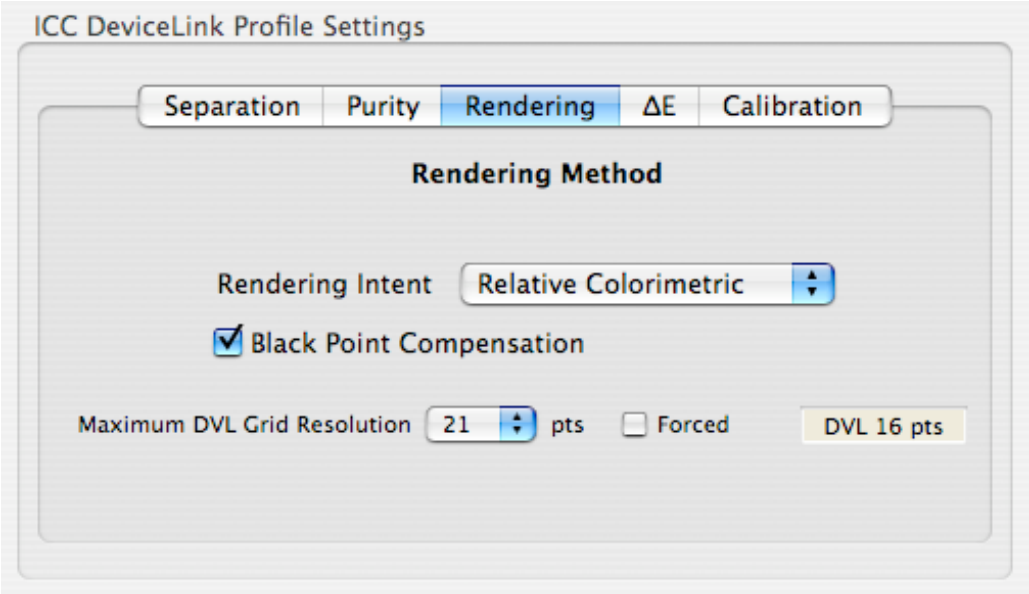
Input solid secondaries (without black) remain unchanged in the output separation. For instance (C100 M100 Y0 K0) stays at (C100 M100 Y0 K0).

200% CK-MK-YK

Input colors made of K100 and C100 or M100 or Y100 remain unchanged in the output separation. For instance (C100 M0 Y0 K100) stays at (C100 M0 Y0 K100).

3.3.3.Rendering tab

This tab allows you to choose the ICC Device Profiles Rendering Intent tables that will be used to build the DeviceLink Profile.



Rendering intent

This popup menu allows you to choose one of the four ICC intents, Perceptual, Relative Colorimetric, Absolute Colorimetric and Saturation.Choose the one that fits your purposes.

Black Point Compensation

This option will compensate for the differences in dynamic range between Input and Output device gamuts.

Blacks and three quarter tones will not be clipped or lost if the Destination gamut is smaller than the Source Gamut.

Blacks and three quarter tones will not lose their visual deepness and contrast if the Destination gamut is larger than the Source Gamut.

Relative Colorimetric

Rendering Intent with **Black Point Compensation** is probably the most widely used option for Press to Press Match.

Maximum DVL Grid Resolution

Allows you to choose CMYK Optimizer DeviceLinkProfiles maximum size.

The higher the grid resolution, the larger the DVL profile, the longer DVL Profile calculation time will be.

Default value is 11.

Available grid resolution ranges from 11 to 21 grid points DVL Profiles.

Forced

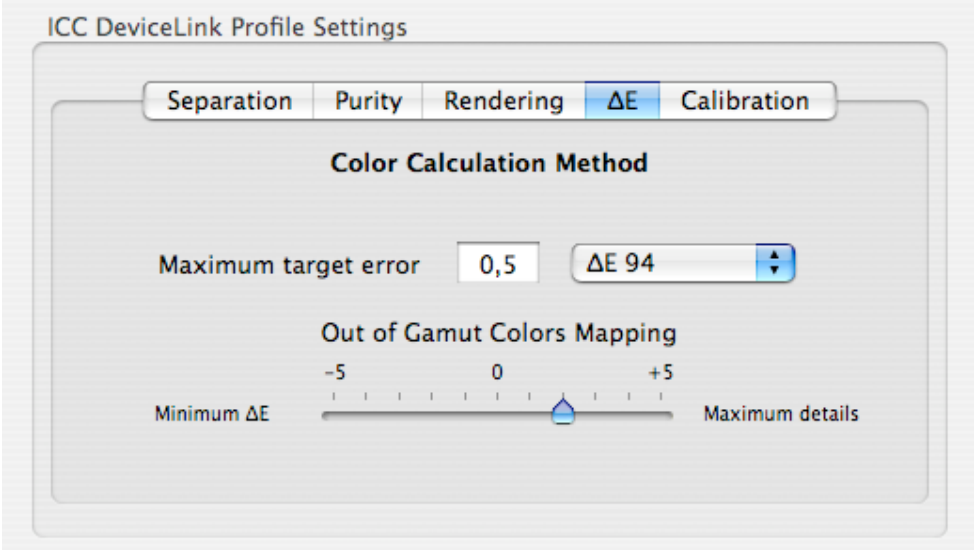
If Force option is unchecked, CMYK Optimizer DeviceLinkProfiles resolution is limited to the chosen **Maximum DVL Grid Resolution** provided it is lower or equal to the source profile grid resolution. This means that DVLP resolution cannot exceed the source profile grid points number.

If Force option is checked, CMYK Optimizer DVL profiles grid points will be forced to the chosen **Maximum DVL Grid Resolution** number.

You can see the number of grid point your DVL will generate at the right of the force option.

3.3.4.ΔE tab

The **ΔE tab** allows you to set some of the parameters influencing the error calculation method used in the profile building process.



Default values must not be modified unless you know exactly what you are doing. Please contact Alwan Color Expertise or your assigned Application Specialist if you wish to make changes.

Maximum Target Error

Defines the target ΔE for the DeviceLinkProfile building calculation.

Lower ΔE requires more iteration and makes Profile Building longer but at the same time it will increase the quality of color matching.

Default value is 0.5.

ΔE CIELAB or **ΔE 94** formula

You can choose between these 2 formulae. Default formula is **ΔE 94**.

Out of Gamut Colors Mapping

Input Profile may contain colors that are out of the gamut of the Output profile.

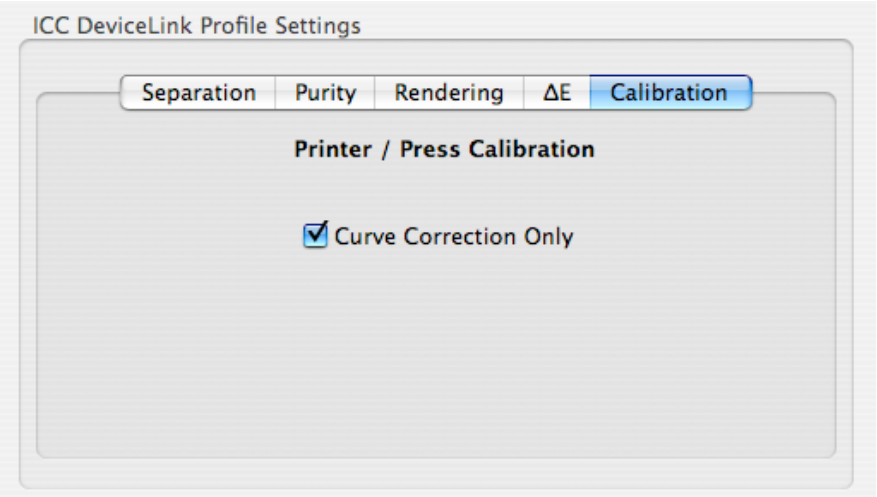
In this case at profile building stage, a choice can be made whether to favor colorimetry or color perception in the mapping operations.

Minimum ΔE will ensure that measured colors on the output will be as close as possible to corresponding input colors.

Maximum Details (default setting) will ensure that image details on the output will match as closely as possible to those on input.

3.3.5.Calibration tab

This tab allow you to just apply **Curve Correction Only** without color management.



If **Curve Correction Only** is checked your Separation, Purity, Rendering, ΔE settings won't be considered, only the Printer / Press Calibration will be considered.

3.3.6.ICC Profile Version

This option enable you to choose the version of the DVL you want to generate.

You can choose the 2.1 or the 4.0 version.