basICcolor®

spoTTuner

Manual

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Chapter 1

Preface

1. Preface

Reproducing spot colors adequately with process colors has always been one of the most difficult tasks in the graphic arts industry. Especially the visually coherent implementation of so-called out-of-gamut colors (short: OOG colors), that are outside the representable color space with primary colors, succeeds very rarely right away In the conventional printing methods the visually optimal result by adding another ink still remains, although it is a costly solution. With digital printing however, (LFP or inkjet printing, printing on toner systems...) you are usually dependent on the output from the primary colors of the system. The color-management systems (RIPs, color servers...) often struggle with these OOG colors , since they can only apply a compromise between hue, saturation/chroma and lightness for the necessary color changes in the automatic process. This compromise is designed for photographic images and doesn't allow for the visual effect wanted by the graphic designer. This would require a RIP to "understand " the document content. In addition, the CIELAB system, which is the base for most ICC systems, often generates hue errors on huge color differences (drift from red to orange or blue to purple, for example) . Also typographical reasons (eg: excessive inking the LFP), or economic considerations (eg: use of a strong black generation to reduce printing costs) often require a reworking of spot colors.

The *basICColor spoTTuner* helps you to optimally transscribe your spot colors into process colors:

- You can determine for the conversion which visual color property - hue, saturation/chroma or brightness - is most important for the reproduction

- The internal , state-of-the-art color system of *basIC-Color spoTTuner* corrects the oftenoccuring hue errors on CIELAB -based ICC systems , thus ensuring a much better visual result.

- Whether your colors values are in RGB, CMYK or already in L*a*b* or L*C*h°: *basICColor spoTTuner* handles all color models and generates the correct printing values (CMYK or RGB)

- The black generation can be selected freely. On existing spot color separations the black generation can be changed easily, quickly and without color deviation and thus changing the total ink coverage.

- *basICColor spoTTuner* uses the full accuracy of the available color systems and profiles. It shows for the metrological control of your printing results accurate L*a*b*- or L*C*h° - reference values for your color definitions in CMYK or RGB

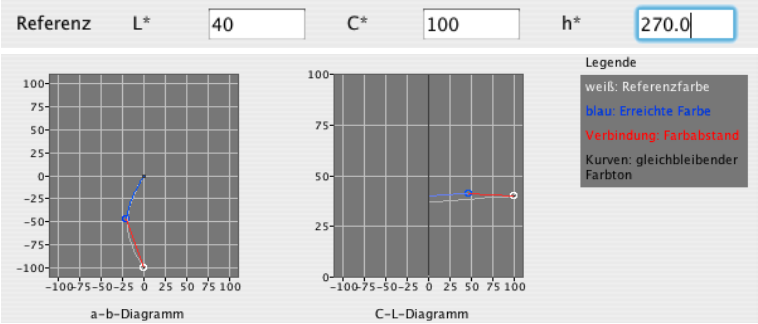
- Color deviations, which result from the limited color gamut of the printing system, are represented by two diagrams graphically. Depending on whether the change is insignificant or clearly visible, calculated color differences are highlighted in green, yellow or red.

Chapter 2

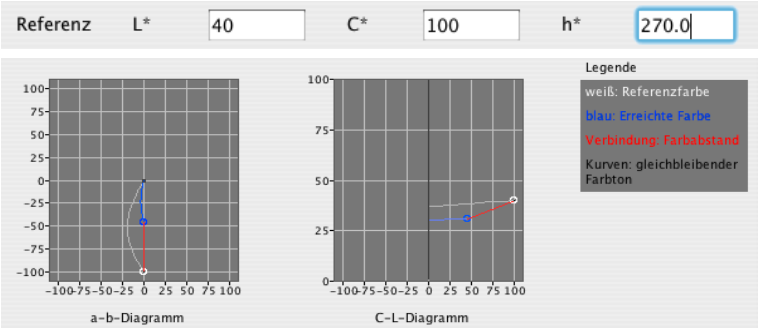
Basics

2. Basics

Today's most widely used color model is the CIELAB color model (L*, a*, b*). All ICC -based color management systems use this color description. It corresponds to the real color perception of the human eye in principle quite well, but has some shortcomings , particularly in the correct color difference evaluation by the simple ΔE(ab) formula. Another peculiarity is, that colors with a visually equal hue are not on a straight line but on curved lines .You can visualize this in *basICColor spoTTuner* nicely by choosing a very colorful color, click in the field for the color angle and use the arrow keys on your keyboard (up / down) and increase the values gradually from 0 to 359. You will find the biggest bend at about 270°. The graphs show the chroma line (color space with same hue) from above (a-b- diagram) as well as from the side (C-L diagram)



Graphic 1: correct color matching in consideration of the hue error of the CIELAB system



Graphic 2: Inadequate color matching by the CIELAB/ΔE(ab)-system, which is the base for most color management systems / ICC profiles

Chapter 3

Application

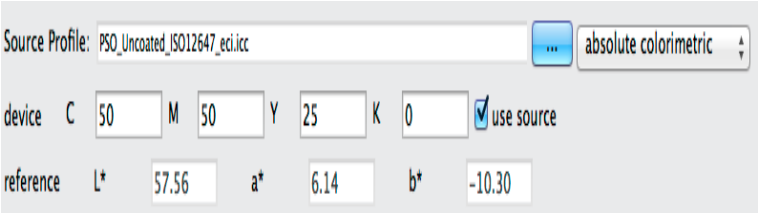
3. Application

The *basICColor spoTTuner* is a very handy "color calculator". It supports you in many ways in your daily work :

- Reading accurate L*a*b* - or L*C*h° -reference values for your color definitions in CMYK or RGB for metrological control of your printing results with a spectralphotometer.
- Spot color separation: calculating the process color values of any color for CMYK or RGB printing systems, input of RGB, CMYK, L*a*b* or L*C*h° values
- Altering the black generation of existing spot color separations

3.1 Reading of reference values

This is very easy with your color calculator. Click "Source Profile"and upload the ICC profile of the color space in which you have defined your colors. After entering your CMYK or RGB values the L*a*b* and / or L*C*h° values are shown immediately.

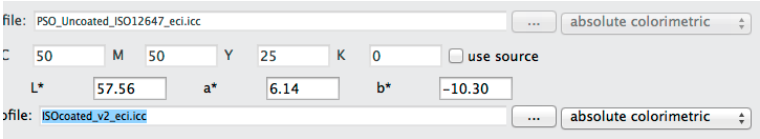


Select your reference color system in the “Settings”. Choose “absolute colorimetric” for an accurate display of your color definition. You should only use source profiles on D50 (LStar, RGB, ECI-RGB, ...). D65 profiles (sRGB, Adobe RGB) should be avoided whenever possible. If these profiles have to be used, you should use “relative colorimetric“ in most cases.

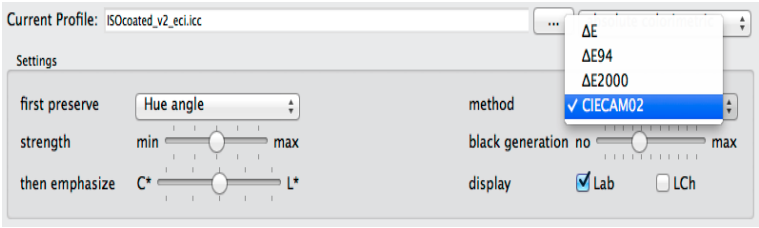
With use of a spectralfotometer you can now measure the printing result and compare the L*a*b*values of the measurement with the digital definition of the color in the file,regardless of the used color space. The closest match can be found,if you compare the printed results with the values of the print data (for example, offset printing). If the data is again converted into another, smaller color space before printing , it will lead to changes in color, especially at OOG colors .A prediction of the expected deviations can be found in the “Result” section after you select the source and output profiles , and rendering intents to suit your workflow

3.2 Spot color separation

This is probably the most common use of your new color calculator. Enter your color definition as described under 4.1. If spot colors L*a*b* - or L*C*h° values are available, please set “use source” off and enter the colorimetric color definition directly.



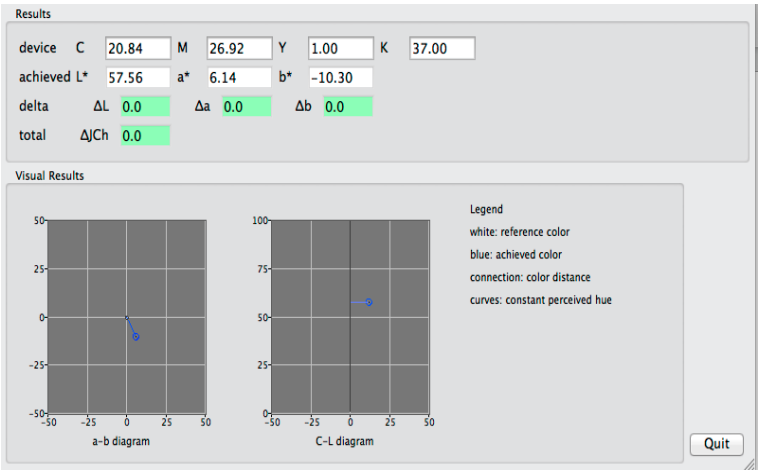
Now choose your calculation method. We recommend to use CIECAM02 as it corrects the hue error of older, simpler systems like ΔE (=ΔE(ab).



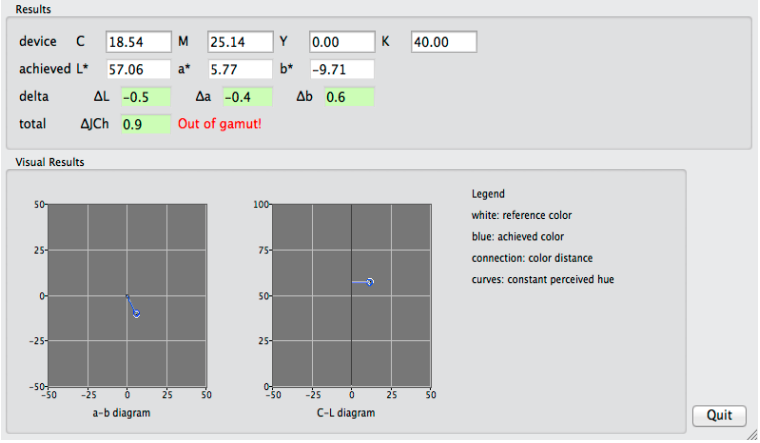
Select your calculation priority for the conversion in the pull-down menu “first preserve”. *basICColor spoTTuner* then tries, within technical limitations, to reproduce the specified color property to as closely as possible. To optimize the hue for spot- or special colors using the CIECAM02-system leads to optimal results in most cases.

Use the slider “strength“ to set the strength of the weighting. The setting “then emphasize “ allows to further weigh between the remaining two parameters, in the example above chroma and lightness . You see the effect in the graphics , as well as in the numerical evaluation of color deviations. For visualization of the calculation results use the calculated CMYK values, for example, in Photoshop.

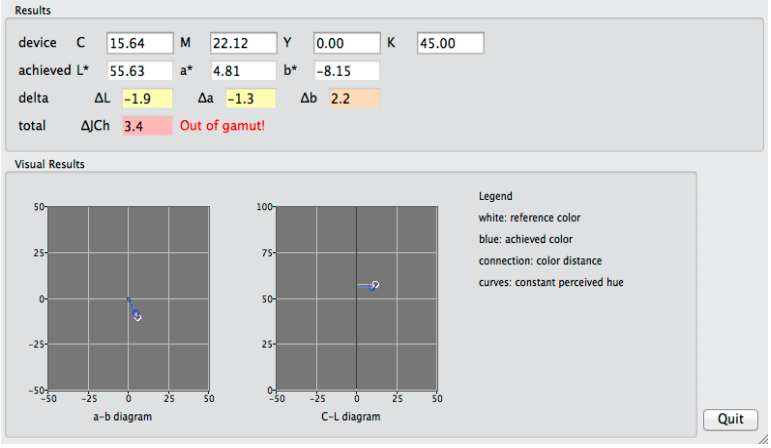
Color deviations are displayed both numerically and graphically. Depending on the distance of the deviation, the fields are highlighted in color from green to red. Some examples:



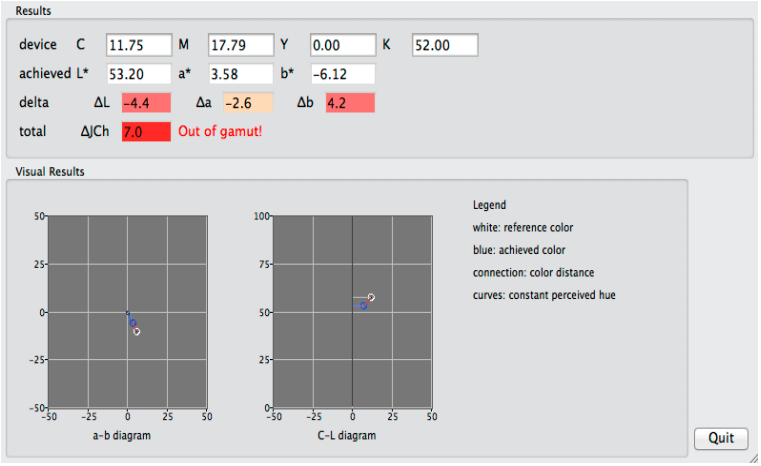
The color matches exactly, the reference color and the calculated color are on top of each other in the garphic.



The color entered is slightly outside the printable area . The discrepancies are just visible



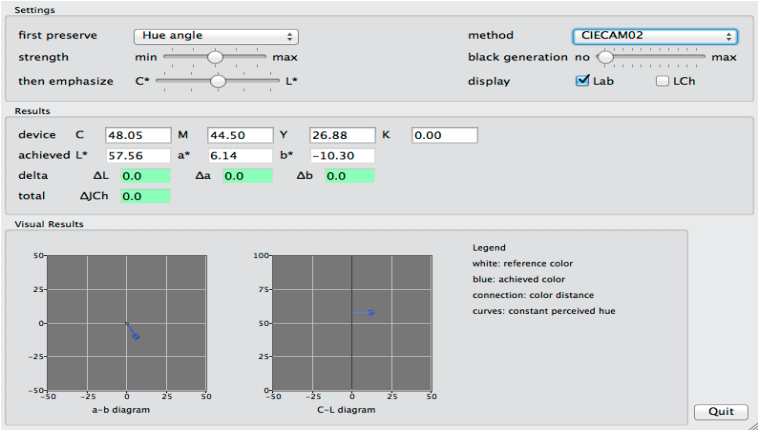
The reference color was set further outside the printable area. The deviation of the hue angle is minimized according to the setting . Deviations in brightness and chroma appear



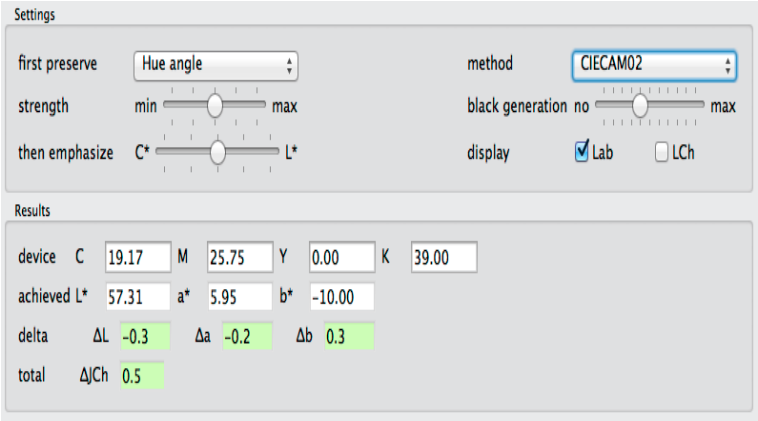
The reference color is far beyond the printable color range . The hue deviation is as far minimized as possible. Changes in brightness and in particular chroma are clearly visible. By choosing other settings the results can be varied.

3.3 Changing the black generation

The *basICColor spoTTuner* allows for an extremely fine, yet quick and easy control of black generation for spot color calculation. Just move the slider “black generation“ slowly from “no” to “max” until the first color changes occur.



Minimum black generation level : color calculation without using black



First light, not yet visible color deviations occur. This is the maximum sensible black insert for the chosen reference color

If you want to re-seperate already calculated CMYK values for spot colors for your output medium please select the the same source- and target profile and set both rendering intent settings to “absolute colorimetric”. This way the color is kept accurately and the black generation can be edited freely using the slider.

This setting is extremely useful in daily practice. By using more black on large, homogeneous areas the ink coverage can be lowered and printing costs are minimized.

You can also manually edit the CMYK values. The resulting color difference to the chosen reference color is calculated based on the given values and on the above selected calculation method.

Chapter4

Product Information basICColor spoTTuner

4. Product Information basICColor spoTTuner

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