

# ColorPursuit™ 1.0

HANDS-ON TUTORIAL



## 3. COLOR REPRODUCTION QUALITY ASSESSMENT

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This is a hands-on tutorial illustrating one of the numerous features and ways of using Alwan ColorPursuit.

Before reading this document, please do read **cp\_introduction.pdf** available on our web site page <http://www.alwancolor.com/english/products/colorpursuit.html>

The purpose of this tutorial is to evaluate **Color Reproduction Quality Assessment** using Alwan ColorPursuit.

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# 1. RGB Workflow

## 1.1. Build an RGB Image workflow

To create an Image workflow create first an **Image Widget**.

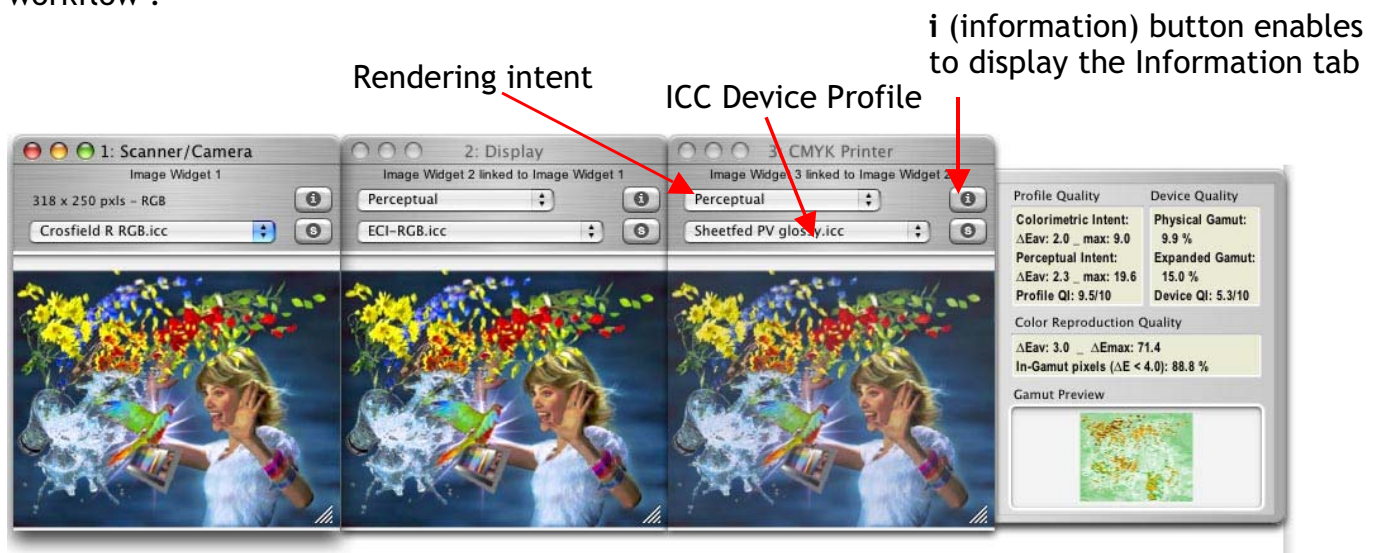
Choose **RGB** Color Space.

Create a **LinkedImage Widget** (automatically linked to Image Widget 1).

Create a second **LinkedImage Widget** (automatically linked to Image Widget 2).

Choose one of your images by **double-clicking** on Image Widget 1 or by choosing **Load image** from the **File** menu or by dragging your image on Image Widget 1.

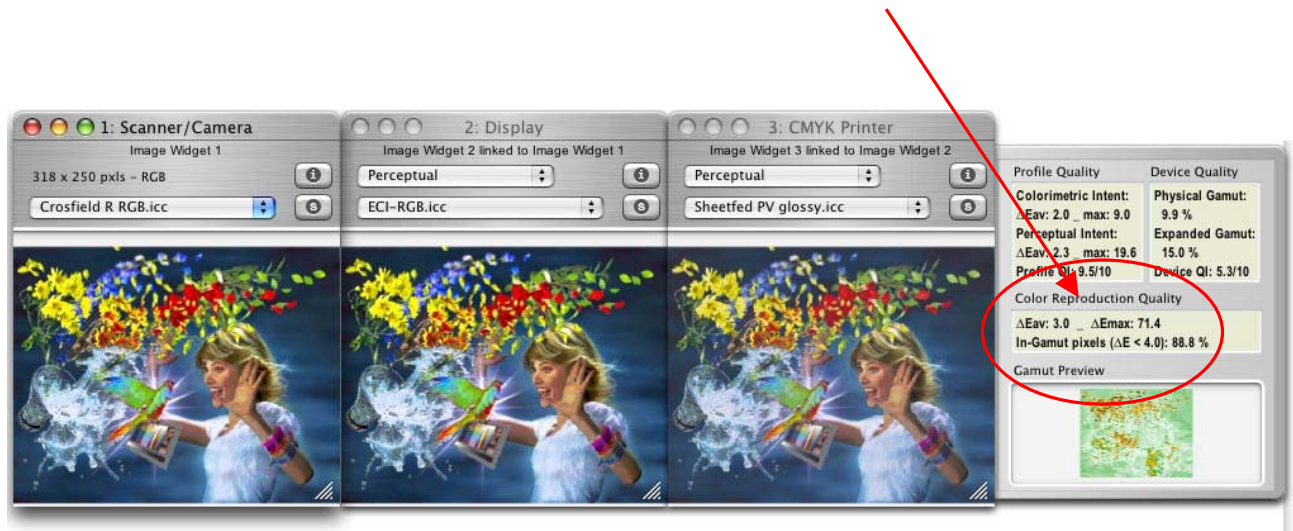
You can choose ICC profiles which are similar to the ones used for this tutorial workflow :



Color Reproduction Quality can now be seen numerically (see part 1.2) as well as visually (see part 1.3) for each of your workflow devices.

## 1.2. Color Reproduction Quality

In the opened Information tab (Sheetfed PV glossy), Color Reproduction Quality figures are calculated in comparison with the previous Image Widget (ECI-RGB) source colors.



**$\Delta E_{av}$ :** indicates the average calculated error in the reproduction of the source colors.

The larger the source space colors, the higher the reproduction average error.  
The larger the device gamut, the smaller the reproduction average error.

### Examples of $\Delta E_{av}$ :

An inaccurate reproduction has a  $\Delta E_{av}$  greater than 5

A fairly accurate reproduction has a  $\Delta E_{av}$  of 4 - 5

An accurate reproduction has a  $\Delta E_{av}$  between, 2 - 4

An excellent reproduction has a  $\Delta E_{av}$  between, 1 - 2

**$\Delta E_{max}$ :** indicates the maximum calculated error in the reproduction of the source colors.

The larger the source space colors, the higher the reproduction maximum error.

The larger the device gamut, the smaller the reproduction maximum error.

$\Delta E_{max}$  is helpful for profile comparison.

For a color reproduction assessment, **In-Gamut pixels** information is more meaningful.

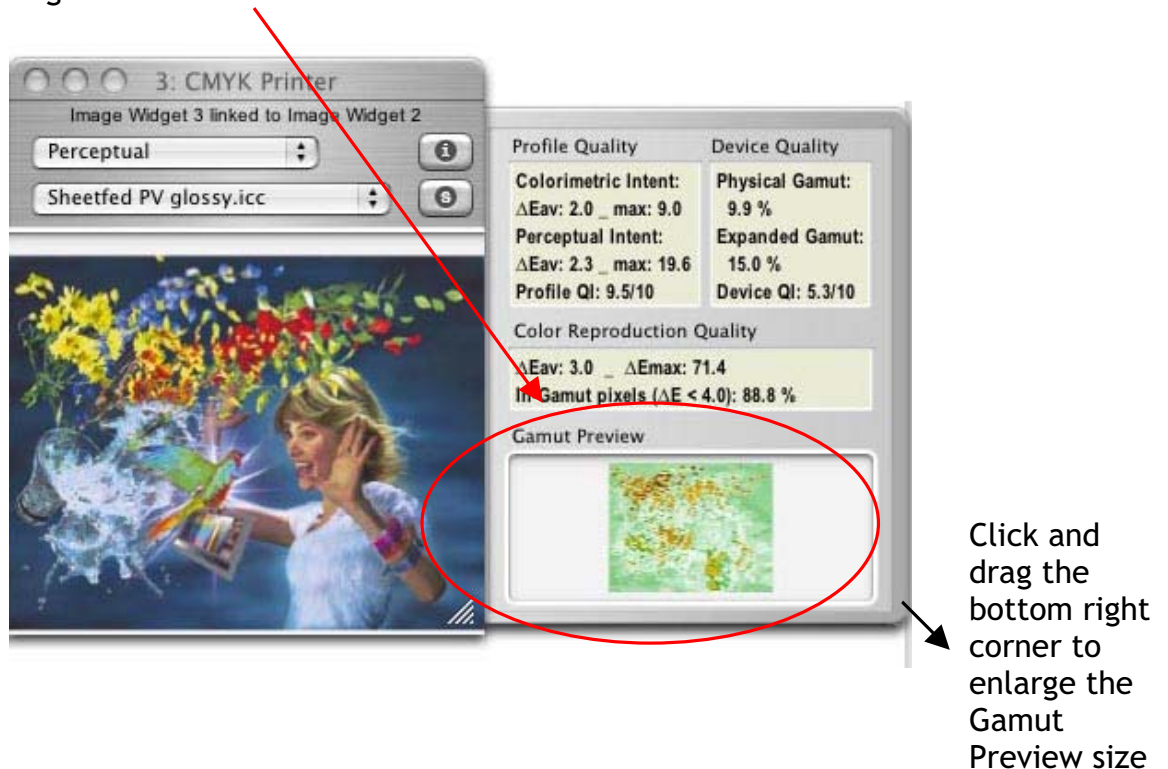
**In-Gamut pixels:** indicates the percentage of source colors that will be reproduced within the error specified in the ColorPursuit Preference (default  $\Delta E = 4.0$ ).

100% means that the image reproduction will match visually the original.

88,8% means that only this percentage of image pixel colors will be reproduced accurately with the chosen Device and Rendering Intent.

### 1.3. Gamut Preview

The **Gamut Preview** image displayed in the information tab shows the source image colors which are in-gamut and those which are out of gamut of the chosen Device and Rendering Intent.



Gamut Preview colors which are displayed in white are those reproduced with a  $\Delta E$  of 0.

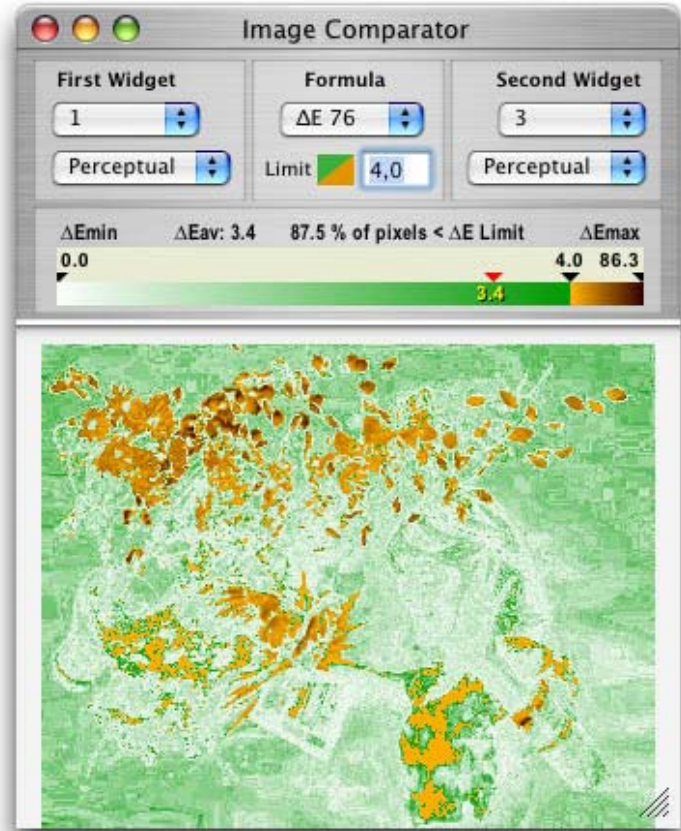
Gamut Preview colors which are displayed in green are those reproduced with a  $\Delta E$  less than the **Preferences** value (Default  $\Delta E = 4.0$ ).

Gamut Preview colors which are displayed in orange are reproduced with a  $\Delta E$  greater than the **Preferences** value (Default  $\Delta E = 4.0$ ).

Gamut Preview colors which are displayed in brown are reproduced with  $\Delta E_{max}$ .

P.S. 1: You can enlarge the Gamut Preview image by clicking and dragging the lower right corner of the **Info** tab

P.S. 2: You can analyse the Color Reproduction Quality of an entire workflow (Source to Destination) using Image Comparator and comparing the Source and Destination Widgets (Crosfield scanner and Sheetfed PV glossy in this example):



P.S. 3: If you put your mouse cursor on the **Gamut Preview** image, a scale of colors will be displayed reminding you of the Preview color code:

$\Delta E_{min}$  (minimum error)

$\Delta E_{av}$  (average error displayed in yellow figure)

Preferences chosen accuracy (default  $\Delta E=4$ )

$\Delta E_{max}$  (maximum error)

## 2. CIELAB Workflow

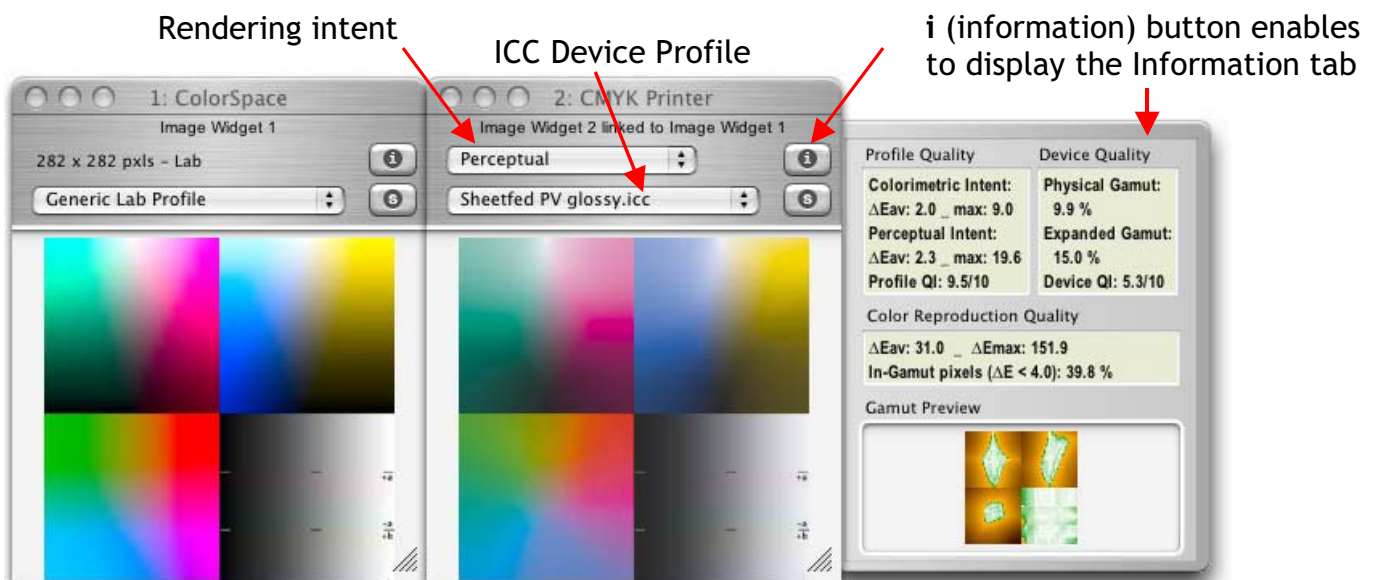
### 2.1. Build a CIELAB Image workflow

To create an Image workflow, create first an **Image Widget**.  
Choose **Lab Color Space**, and then create a **LinkedImage Widget**.

Create a **LinkedImage Widget** (automatically linked to Image Widget 1).

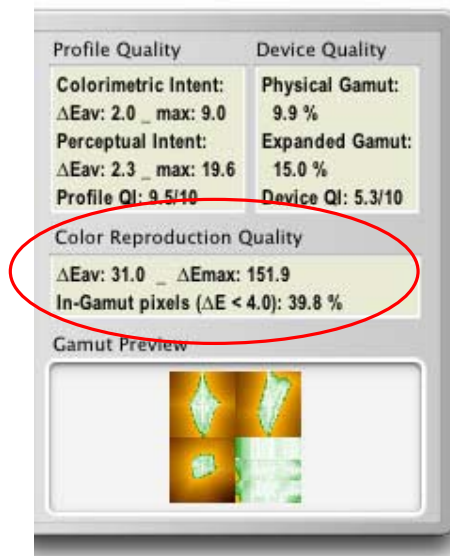
You can choose one of your CIELAB images by **double-clicking** on Image Widget 1 or by choosing **Load image** from the **File** menu or by dragging your image on Image Widget 1.

Choose an ICC profile for your output Image Widget:



Device Color Reproduction Quality can be seen numerically (part 2.2) as well as visually (part 2.3) in the Information tab.

## 2.2. Color Reproduction Quality



**$\Delta E_{av}$ :** indicates the average calculated error in the reproduction of the source colors.

The larger the source space colors, the higher the reproduction average error.  
The larger the device gamut, the smaller the reproduction average error.

**Examples of  $\Delta E_{av}$  :**

An inaccurate reproduction has a  $\Delta E_{av}$  greater than 5

A fairly accurate reproduction has a  $\Delta E_{av}$  of 4 - 5

An accurate reproduction has a  $\Delta E_{av}$  between, 2 - 4

An excellent reproduction has a  $\Delta E_{av}$  between, 1 - 2

**$\Delta E_{max}$ :** indicates the maximum calculated error in the reproduction of the source colors.

The larger the source space colors, the higher the reproduction maximum error.

The larger the device gamut, the smaller the reproduction maximum error.

$\Delta E_{max}$  is helpful for profile comparison.

For a color reproduction assessment, **In-Gamut pixels** information is more meaningful.

**In-Gamut pixels:** indicates the percentage of source colors that will be reproduced within the error specified in the ColorPursuit Preference (default  $\Delta E = 4.0$ ).

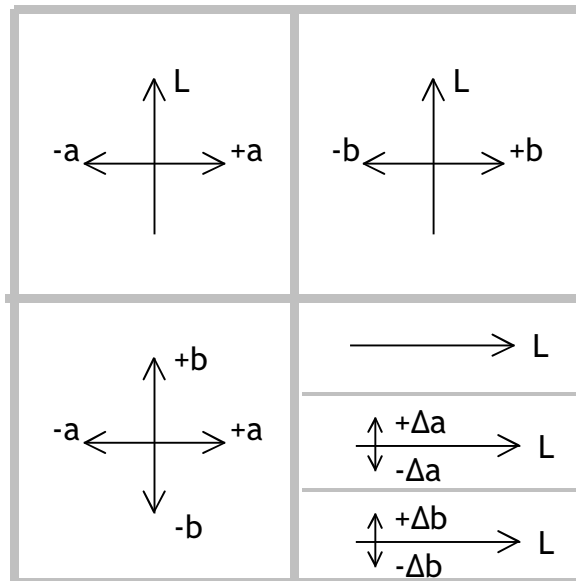
100% means that the image reproduction will match visually the original.

39.8% means that only this percentage of image pixels colors will be reproduced accurately with the chosen Device and Rendering Intent.

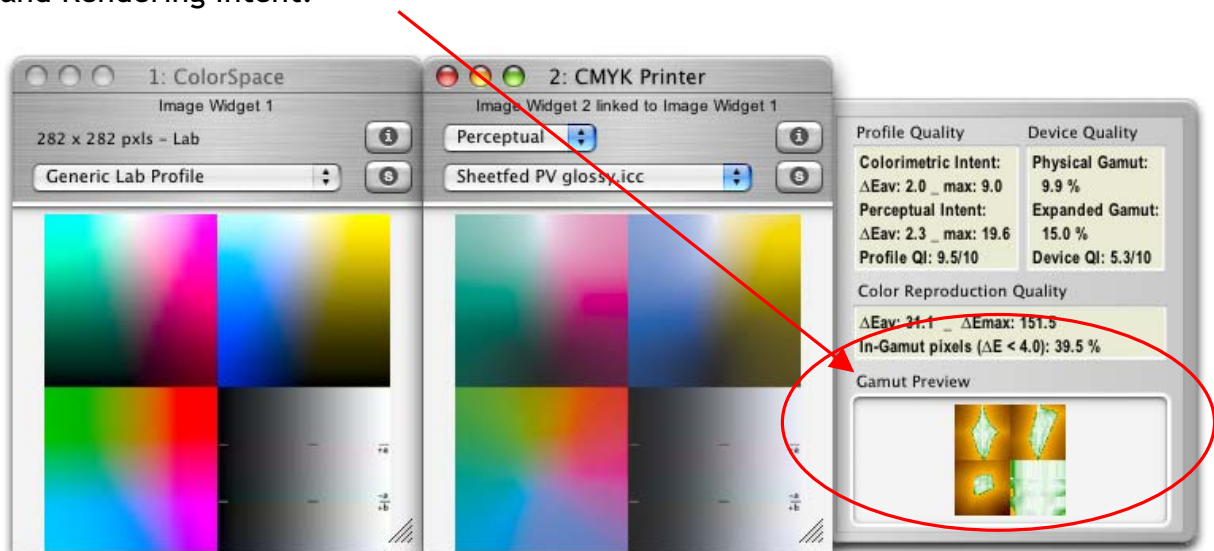
This figure is relatively low in this case because CIELAB color space is very large compared to a press gamut.

## 2.3. Gamut Preview

The internal source CIELAB image represents four zones corresponding to different slices in the CIELAB color space:



The **Gamut Preview** image displayed in the information tab shows the source image colors which are in-gamut and those which are out of gamut of the chosen Device and Rendering Intent.



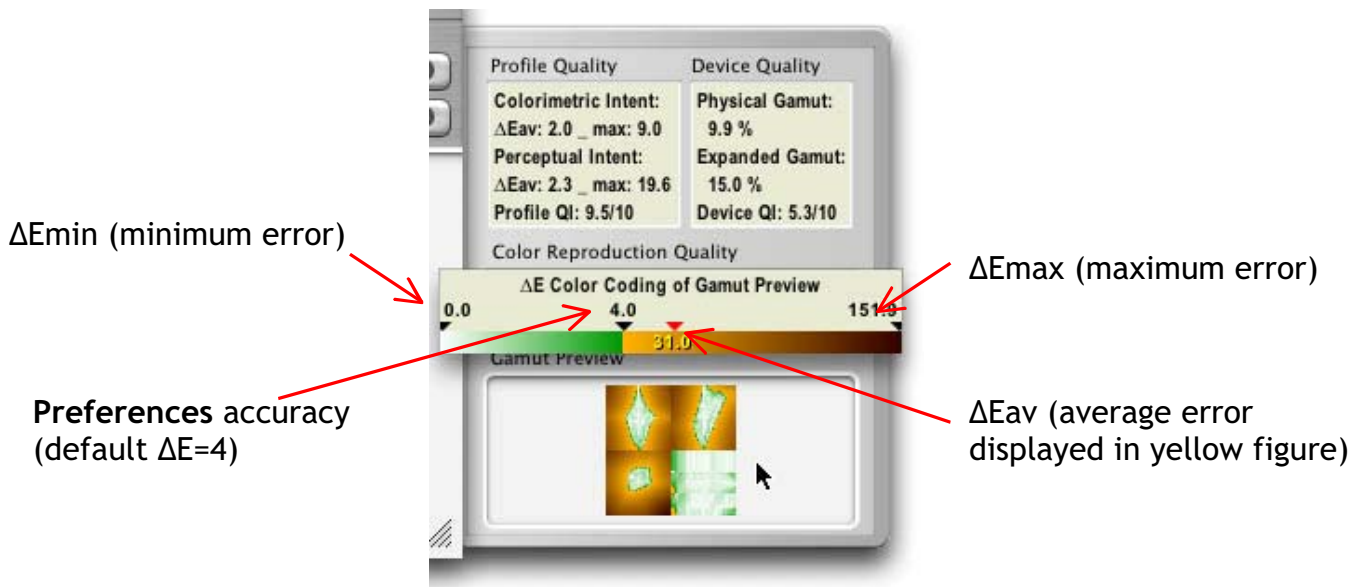
Gamut Preview colors which are displayed in white are those reproduced with a  $\Delta E$  of 0.

Gamut Preview colors which are displayed in green are those reproduced with a  $\Delta E$  less than the **Preferences** value (Default  $\Delta E = 4.0$ ).

Gamut Preview colors which are displayed in orange are reproduced with a  $\Delta E$  greater than the **Preferences** value (Default  $\Delta E = 4.0$ ).

Gamut Preview colors which are displayed in brown are reproduced with  $\Delta E_{max}$ .

If you put your mouse cursor on the **Gamut Preview** image, a scale of colors will be displayed reminding you of the image color code:



## 2.4. About CIELAB source image

CIELAB source image is interesting for color quality assessments. It shows you in a glance your device profile gamut boundaries which correspond to the green contour of each figure.

CIELAB is a very large color space which contains very saturated colors and has a very high dynamic range.

When it is used as source space, **ΔEav** and **ΔEmax** show very high figures. This is not necessarily a Device or a Profile problem because these figures are not relevant in absolute terms. They are more useful for profile comparisons.

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