basICColor®

IMProve

Manual

Index

Chapter 1

Preface

1. Preface

basICColor IMProve is a software solution to enhance measurement data prior to profiling. There are many situations where measurement data is not prepared correctly and therefore causing trouble when creating ICC profiles. There could be reading errors from the measuring instrument or print errors or other artefacts (e.g. inhomogeneous data) resulting in a less than perfect measurement data quality. To optimize the measurement data and to intelligently average multiple data *basICColor IMProve* is the perfect tool. Multiple options for various tasks are available leaving no wishes open. Optical brigthener correction for papers or tone value curve adaptation for various specifications (e.g. according to G7) are possible with *basICColor IMProve* just to name a few.

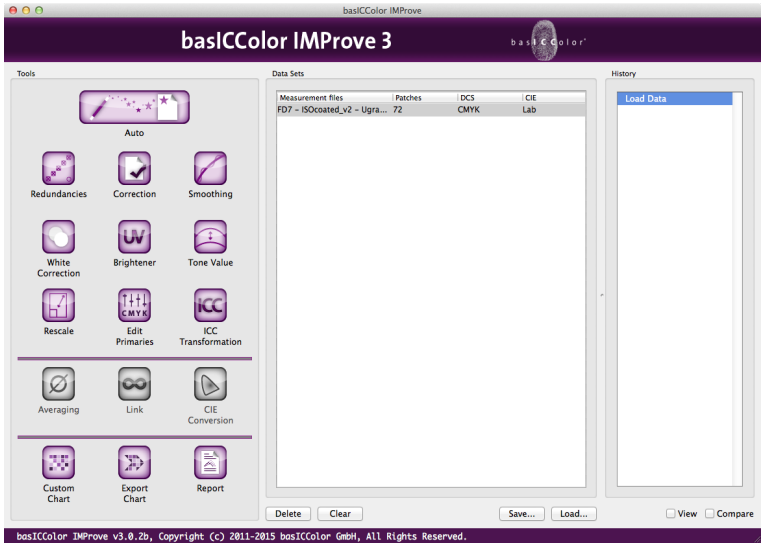
The quality of ICC profiles is very dependant on the quality of the measurement data. In analysing and optimizing measurement data a higher profile quality generation is possible which results in a higher reliability of the print production process. In this regard *basICColor IMProve* optimizes every printer profiling tool in the market be it ICC compliant or not.

Chapter 2

Overview

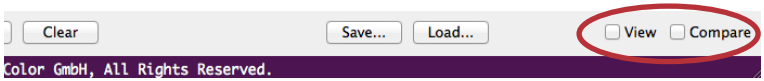
2.Overview

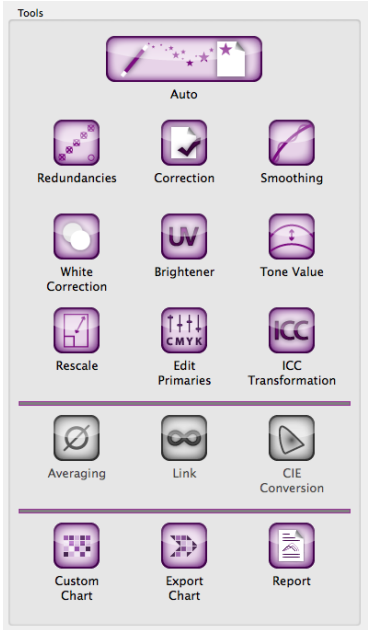
The individual **Tools** are located in the left area of the program screen. You can apply these tools to any measurement data loaded in the **Data Sets** area. All actions are recorded in the **History**. You can return to a previous step by selecting the corresponding entry in **History** at any time.



The windows showing measurement data (active via the **View** checkbox) are updated according to the active history step.

By enabling the **View** checkbox in the lower left edge you can open additional windows to see the measurement file in detail. Enable the checkbox **Compare** and you can compare several measurement files or view a pre-post comparison of a measurement file.



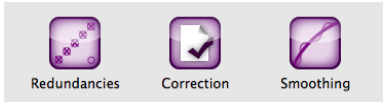


All **Tools** are located in the left part of the programm screen. **Tools** that cannot be used are greyed out.

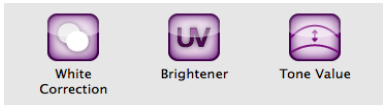
Use the large **Automatic** button at the left edge of the window for an automatic measurement data correction and smoothing.
When a number of measurement files are loaded you can select a single or several measurement files. The tool is applied to the selected measurement file(s).

IMPORTANT: If several measurement files are loaded and no particular file is selected the tool is applied to all files by default. The tool name is tagged to the file name for easier identification.

Tools that cannot be used are greyed-out



A specific sequence in the working method is recommended when preparing measurement data. First clean up redundant color patches (Redundancies) in the measurement file, then correct faulty measurement values (Correction) and finally smooth the measurement data (Smoothing). This sequence is automatically executed by using the **Automatic** function.

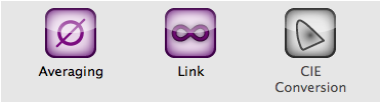


The tools from **White Correction, Brightener** and **Tone Value** fulfill specific tasks, please see the Tools section of this manual.

The **Rescale** tool is an optional tool for resorting and re-arranging unreadable random test charts or even for re-arranging test charts to a completely different layout.

Edit Primaries is a very powerful tool to adjust, modify or extend the primary colors and the paper white in existing measurements.

The **ICC Transformation** tool enables you to use both ICC device and DeviceLink profiles on reference data (device data like CMYK or RGB) to synthetically test the impact of an ICC color conversion with up to three profiles.



The tools in this section (**Averaging**, **Link** and **CIE Conversion**) are designed for use on multiple measurement data units.

- **Averaging** multible measurements of the same target
- **Link** the measured values of several test charts to one new large data file
- With **CIE Conversion** you can change the standard observer or the light source.

This set of tools offers additional features:

- Generate your own reference files for the test chart creation with **Custom Chart**
- Create files of reference test charts for print output as TIFF or PSD files with **Export Chart**
- Create an extensive analysis/report of your measurement data as a PDF or XML file with **Report.**

Optimized measurement data is saved by clicking the **Save** button.

Any measurement files that are no longer required are removed by clicking the **Delete** button.

By clicking the **Clear** button you can delete all uploaded files as well as the entire current history.

Chapter 3

Tools

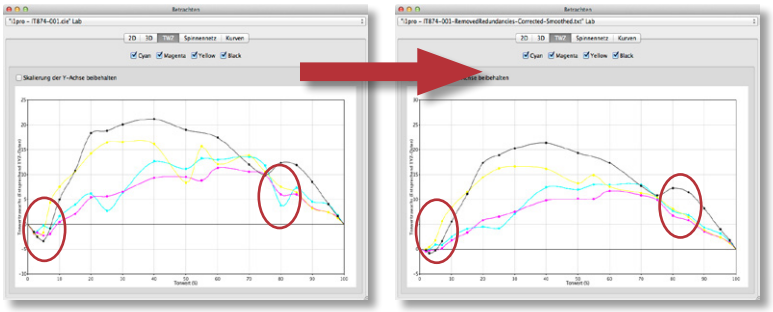

Auto

3. Tools

3.1 Improving and smoothing of measurement data automatically

A specific sequence in the working method is recommended when preparing measurement data. First clean up redundant color patches (Redundancies) in the measurement file, then correct faulty measurement values (Correction) and finally smooth the measurement data (Smoothing). This sequence is automatically executed by using the **Automatic** function.

Example:



Load a measurement file via the **Load** button or simply drag and drop a measurement file into the **Data Sets** area. Select the **Automatic** tool and press “Start” in the opening dialog. You can follow each step if **View** is active and/or reverse the action at any time.

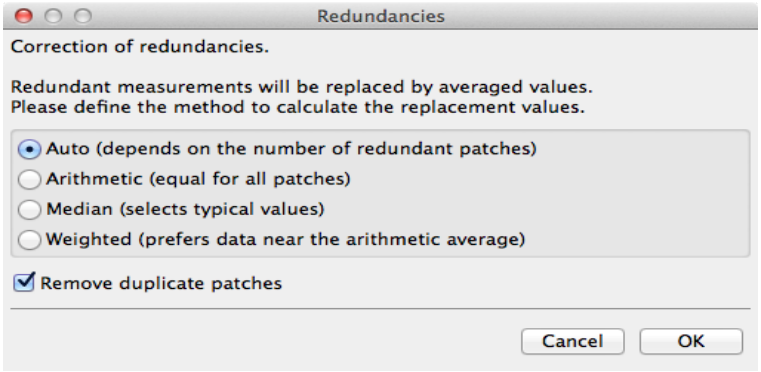
Save the optimized measurement data via the **Save** button as a new file. Now you can use the optimized measurement file to create a high quality ICC printer profile.

Note*: Measurement data is saved in some ICC-printer profiles. (basICColor DeviL always saves measurement data in the ICC profile). This data can simply be extracted by draging and droping the measurement file into the Data Sets area of basICColor IMProve.*

3.2 Redundancies

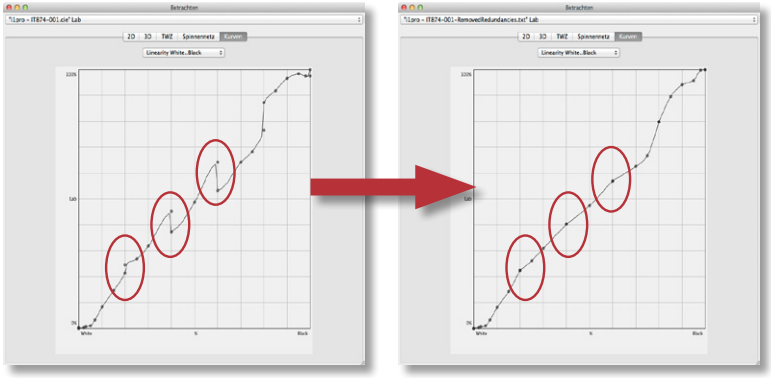
Redundant color patches, especially if they have very different measured values, can lead to errors during profile creation. Hence it makes sense to average redundant color patches (e.g. 10 different measurements of the same color) and replace them with the same value. You can do this using the Redundancies tool.

There are four different ways to replace redundant measured values with the same values in a measurement file:



Auto

Using the **Auto** method, different methods are used depending on the number of color patches. So it is quite possible that some color patches will be treated using a different method to others. As the most intelligent method, the **Auto** method is preferable to the others.



Arithmetic

If, for example, only two color patches have to be averaged, **Arithmetic**, i.e. the average of the measurements, is used.

Median and Weighted

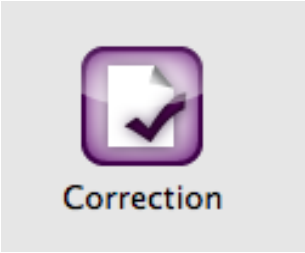
If more than three color patches exist, the **Auto** method uses **Weighted** or **Median**. Both with the **Median** and the **Weighted** method, when there is a large number of measured values, widely discordant values are discarded for the purposes of finding an average.

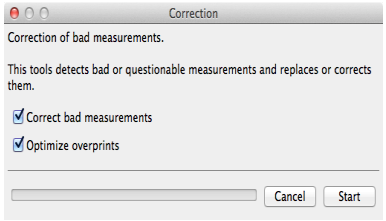
Median is a method from the field of statistics and denotes a value lying at the midpoint between two halves.

Remove duplicate Patches

Multible color patches are deleted by activating the **Remove duplicate Patches** checkbox additionally to the selected calculating method. This setting calculates the color value first, then all patches of the same color value are removed except one.

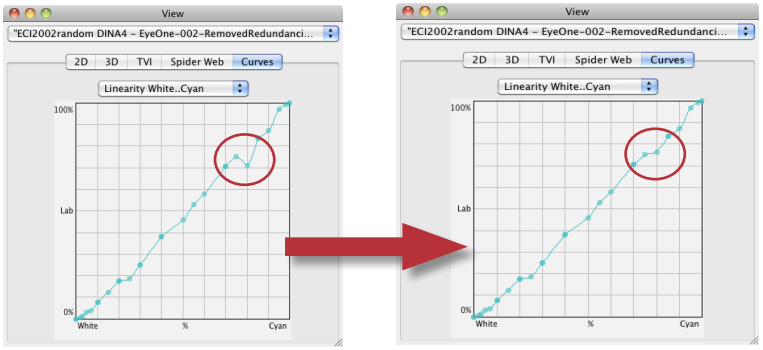
Note*: Emission data, for example multiple spectral readings from a light source saved in one measurement file without any DCS data, can be averaged using the Redundancies tool. If the measurements are spectral the averaging will be done on spectral data.*



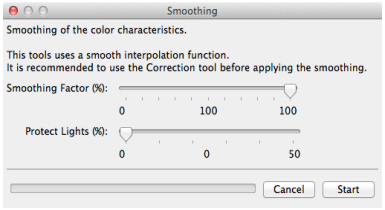


3.3 Correction

The **Correction** tool detects faulty measurements or "illogical" measured values and replaces these with expected values. An example of an illogical measured value would be if the color value of a gradation value were brighter or darker than expected based on the adjacent colors. This could be due to unwanted variations in the printing process, for example, or a color patch that was contaminated during measurement. Another example of an illogical measured value is when instead of a red color value, there is a green one. Something like that is a sure sign of an incorrect measurement. If such faults are not detected and corrected, they will result in poor printer profiles.



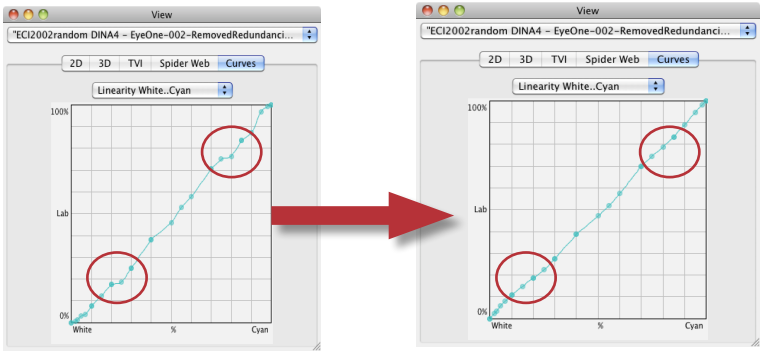
Note: The Correction tool must always be used on measurement data before applying the Smoothing tool. During smoothing, faulty measurements would be retained and incorporated in the resulting file. This, however, would generate an error in the measurements.



3.4 Smoothing

basICColor IMProve offers the possibility to smooth measuring data. This option is quite useful if a reference profile for a whole series of printing systems has to be created.

Most printing systems show a quite linear tonal printing

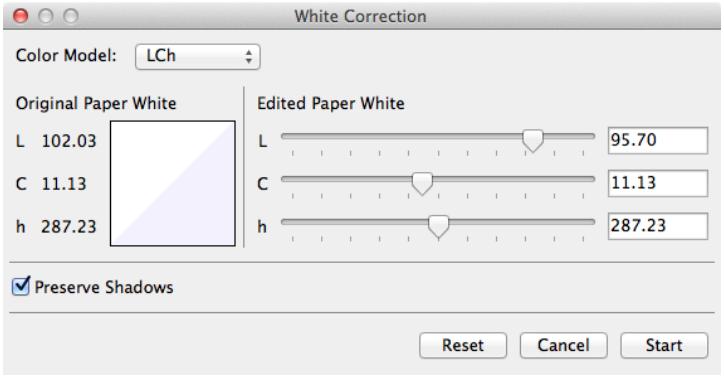


behavior. But uncommon printing media like textiles or structured Fine Art media can effect the measurements and it's possible that some of the measurements become quite strange sometimes. In this case it can make sense to smooth the measurement readings to compensate the negative effects (e.g. structures) that have influence on the measurements.

3.5 White Correction

The tool **White Correction** allows to apply manual corrections to the whitest color patch of the measurement data which is typically the paper or substrate color. The tool is to be used on a single measurement file. The correction in form of a modified Lab or LCh input value is helpful in such circumstances where either a certain target white point shall be reached or corrections are needed to lighten or darken or recolor the file. The manual correction is then applied to the entire measurement data keeping the print characteristic intact.

Example:
In some cases a visual correction of the measured paper white may be necessary. In the case of translucent materials such as Ceramics , films or semi-transparent media the 45/0 measuring geometry can get a too dark reading for the media white point . To avoid the use of special measurement technology or other elaborate procedures, you can make adjustments with the help of the **White Correction** tool quite simply.



This is how it's done:

- Load your measurement data
- Click on **White Correction**
- Choose to adjust the corrections in LCh or Lab Color Mode.
- Change the mode at any time. LCh allows to adjust only the hue or chroma whereas corrections in a* and b* will change hue and chroma simultaneous. The splitted color patch displays the original white on the left side and the modified white on the right side.

Note: *The sliders allow for very small changes. If the range of the sliders should be to small you can simply enter the numbers you like in the number fields. The sliders will then jump to the middle position again allowing you to modify the value in small quantities again, if needed.*

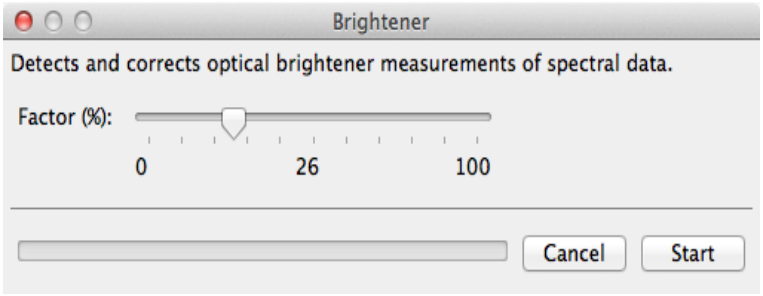
- When changing the Lightness (L* value) typically the darkest colors of your measurement files will be affected, too. If you want that the black point and the darkest colors are not affected the Preserve Shadows checkbox should be checked, which is the default setting any way.

- Clicking the **Reset** button will discard your slider modifications.

- Clicking the **Start** button will apply your changes on the entire measurement file. The dialog will close automatically after calculation.

3.6 Correction of optical brighteners

Paper manufacturers often use optical brighteners to make the paper look brighter. Unfortunately, we run our visual validations under different conditions to the measuring device. Whilst under standard 5000 Kelvin lighting conditions the paper seems brighter, measured values usually deliver a very blue-ish white without actually being brighter.



The problem here is validation under standard lighting booths, which usually delivers a not perfect match with the D50 illuminant. Spectrophotometric measurements with the D50 illuminant then lead to problems in using the profile, in particular with validation under standard lighting, because the excessively blue proportion of the paper white is compensated in order to achieve a neutral gray. This is bothersome in, for example, an overly yellow gray balance or paper simulation during proofing.

To counterbalance this effect, the **Brightener** tool can be used on measurement data. Spectral measurement data (remission data) is required for optimal operation of this tool. In the first step of this process, the tool analyses the remission curve of the paper white to ascertain whether the paper contains optical brighteners or is, for example, merely a blue-colored paper. The second step is correction, but this only takes place if an optical brightener has been detected.

The correction can be adjusted steplessly via a slider control and at 100%, a similar result will be achieved as if the paper were measured with a UV cut filter.

Using the **Brightener** tool results in modification of the spectral values of the paper white, which is incorporated into all areas of the measured value file that are affected by the optical brightener. Naturally, these will predominantly be the bright color values and less, or not at all, in the shadows or the highly saturated colors. If the measurement file is available with spectral remission values, *basICColor IMProve* will preserve the spectral data.

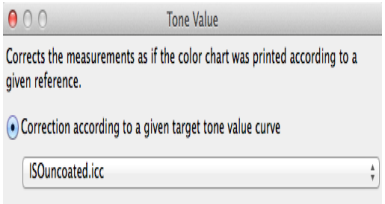
Note: *Correction of the optical brightener is best applied to spectral measurement data (remission values). Other tools, e.g. Automatic, Correction or Smoothing, should not be used until after brightener correction has been performed because these tools would convert spectral measured values into Lab values and would therefore render detection of the optical brightener inoperative. Correction of the Lab values works with non-spectral measured values too, but in this case a more basic compensation model is used.*

3.7 Tone Value

The tool **Tone Value** allows to adapt the tone value of your measurement data to the desired tone value curves or to optimize the gray balance.

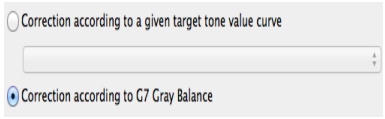
Let's say you want to produce according to tone value increase properties or gray balance properties and you want to create a suitable profile for this. Even if you try to work as accurately as possible with the CtP curves on the press in order to achieve the desired properties, you will always get deviations caused by technical production and metrological factors.

With the **Tone Value** tool, there are three different ways to ensure tone value correction is incorporated perfectly into measurement data.



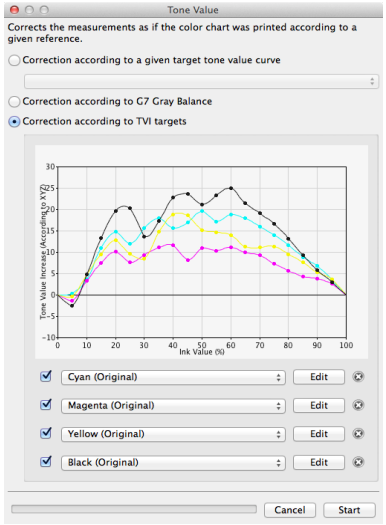
- With the first option, **Correction according to a given profile**, specify a standard profile and the tone value curves from this profile. The measured values are adjusted to achieve exactly the same tone value increase curves as those achieved with the standard profile that was specified.

Note: *Depending on the loaded measurement data only ICC profiles fitting the color space are shown e.g. CMYK or multi-color.*

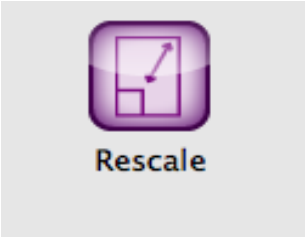


- With the second option, **Correction according to G7 Gray Balance**, the tone value curves are calculated to match the gray balance requirements of the G7 calibration process.

Note: *G7 is defined to work with CMYK only. However it is possible to apply the G7 process on the CMYK parts of a multi-color measurement file. The additional (multicolor) channels will not be effected. The G7 calibration process ensures that the CMY curves reach a neutral gray of defined lightness values throughout the entire gray balance curve.*

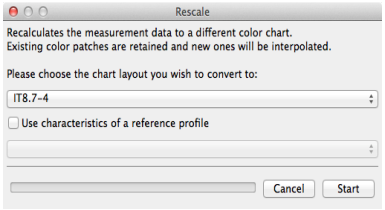


- The third option **Correction according to TVI targets** allows for detailed manual editing of each channel allowing the user to predefine the tone value increases that should be incorporated in the measurement data. This feature works for CMYK and multicolor color spaces.



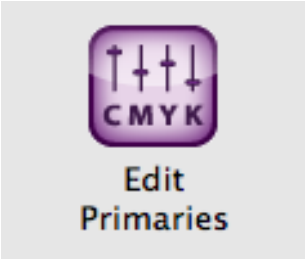
3.8 Rescale

basICColor IMProve offers the possibility of calculating large test charts that can be used for profiling from small test chart measurement files. In some printing processes, (e.g. flexo printing on uneven materials) it is extremely difficult to achieve an artifact-free printing of a large ECI2002 test chart. The procedure of placing several small test charts, e.g. Ugra/FOGRA Mediawedge 3, averaging them in *basICColor IMProve* and then scaling up to a large ECI2002 test chart with the Rescale tool is more effective here.



Example: Select the measurement file that you want to scale up and click on the **Rescale** button.
Select the desired test chart layout to which the measurement file should be scaled up.
If you already have an ICC printer profile (reference profile), that approximately describes your standard to be printed, you can select the printer profile by checking the option **Use characteristics of a reference profile.**
If you do not have a profile like this, do not activate the checkmark.
Click on **Start** and *basICColor IMProve* will calculate and interpolate the missing color patches from your small chart and create the desired chart layout.
Save the scaled up measurement value file as a new file by clicking the **Save** button.

Note: *Missing color patches are automatically supplemented when scaling to other charts. Missing color patches (e.g. from overprinting colors that are missing in small charts) can be assessed better with the help of a reference profile.*
In reverse, you can also use the Rescale tool to extract the color patches required for the Fogra/Ugra-Media Wedge V3 from a measured large ECI2002 or IT8.7-4 test chart. basICColor IMProve uses the color patches from the available measurement file 1:1 in the new chart layout. This enables you to produce your own media wedge reference files for verifying printed proofs very easily.



3.9 Edit Primaries

The **Edit Primaries** tool allows the user to add, remove and exchange primaries or the paper/substrate into an existing measured test chart. In typical print production, adding or swapping ink(s) requires the expense of printing a full blown test chart. The **Edit Primaries** tool will simply require the spectral data of the new ink(s) to be added or exchanged. **Edit Primaries** will not only exchange the inks but also recalculate all overprints based on intelligent spectral color models and generates new measurement data.

Potential efficiency gain with the **Edit Primaries** tool in typical production scenarios:

- Variance in press condition: The characterization press run is slightly deficient in solid ink density or hue on one or more colors.

- Exchange of paper/substrate: The inks are the same but a slightly different paper is used in production or a specific job.

- Exchanging inks in packaging print production:
Create a new set of characterization data that swaps in e.g. Blue for a Cyan or a Rhodamine Red for Magenta.

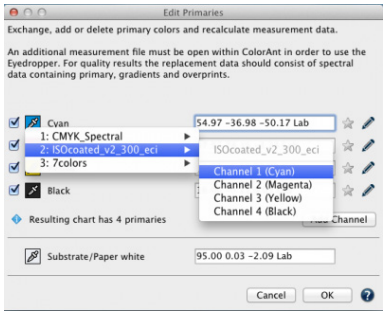
- Flexibility for packaging customers: Create different color variants from a full blown 7 color press characterization data set by deleting channels to building new characterization data sets without printing a new test chart. For example, from an 7C data set (e.g. CMYK+Orange+Green+Violet) build variants for CMYK only, CMY+Violet, CMYK+Orange+Green or other combinations. The production facility would need to insure the press is stable and depending on the color needs of the job, print and select the profile with the least amount of channels.

- Increasing CMYK gamut: Adding a 5th, 6th or 7th color to a CMYK printing process.

3.9.1 Exchange of a primary color

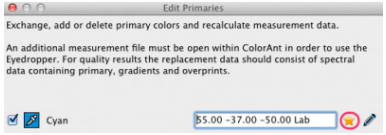
- Load the measurement data of a test chart for editing in *basICColor IMProve*. The suggested workflow is to load another data set with the measured new primaries, including gradations of the primaries and overprint information.

- Select the measurement data of a test chart measurement file for editing and click Edit Primaries.



- Exchanging a primary: Click on the eyedropper icon of the color to be exchanged (see screenshot demonstrating an exchange of Cyan).

- Select the new primary from another data set loaded in *basICColor IMProve*. Click on the channel to be imported the primary. Selecting a color from an other channel is also an option. In **Edit Primaries** the Lab value of the new primary will be shown to allow you the check immediately if the changes have taken place. If the imported measurement data are spectral data the star will be highlighted.

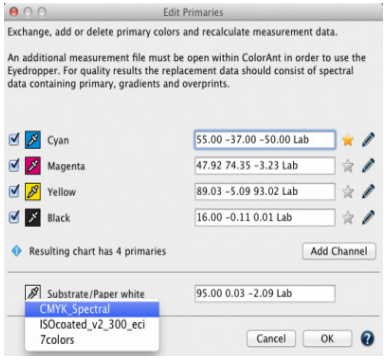


Note: *The most powerful function related to **Edit Primaries** during import of measurement data happens in the background. **Edit Primaries** has the ability to dynamically choose the best patches from the data provided. The more complete the data that is provided to the **Edit Primaries** tool (spectral data is preferred) the more accurate the results. Some items that will improve the exchange are gradations of the primary color, overprint information, such as the primary with black. If there is only one full tone patch, basICColor IMProve will assume a certain printing behavior.*

- If no measurement data of your new primary is available, there is the option to enter the Lab values into the numbers box. Even though you have to consider that all calculations are not as exact as if they were done based on spectral measurement data. This will also be visualized by a gray star icon.

- When complete click **OK** and your data will be modified and shown in the **Data Sets** section of *IMProve*. Save your new data with **File/Save** as to be used for other tasks, for example, creation of ICC profiles with *basICColor IMProve*.

- To check the exchange of primaries, use the **Compare** tool to verify the data.



3.9.2 Exchange of paper/substrate

- Load the test chart measurement data and load the secondary file containing information of the measured paper white into *basICColor IMProve*.

- Select the measurement data of a test chart for editing and click **Edit Primary**.

- Click on the eyedropper icon of the **Substrate/Paper white** and select the new paper white from an other data set loaded in *IMProve*. Click on the name of the data set to import the data.

- Alternatively, if there is no measurement file of the new paper white available, you may enter the new Lab values into the number array. Of course, this is not as precise as working with spectral data.

- After you are done click OK and your data set will be modified. *basICColor IMProve* will calculate modified measurement data which can be found under **Data Sets**. Save this file under **File/ Save** as for further usage, e.g. creation of ICC printer profiles with *basIC-Color DeviL*.

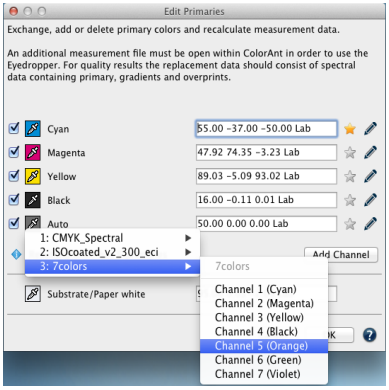
Adding channels

- Load the test chart measurement data and load the secondary file with the measured primaries, gradation and overprint information into *basICColor IMProve*.

- Select the measurement data of a test chart for editing and click **Edit Primary**.

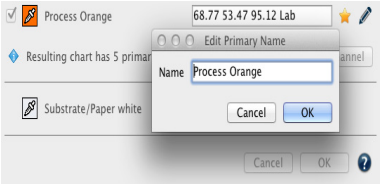
- Click on **Add Channel.** A new channel with some default gray Lab values and the channel name **Auto** is added.

Note: *The **Auto** entry will pick the channel name from the other data set.*



- Click on the eyedropper icon of the new channel and select the new primary from another data set loaded in *basICColor IMProve*. Click on the channel to import the data.

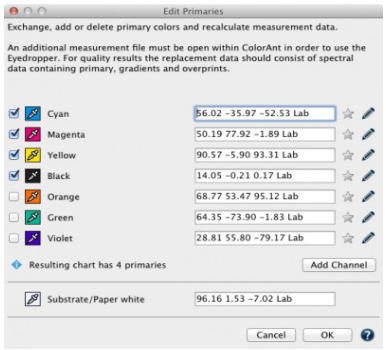
- In our screenshot shown is an example where a 5th color Orange has been added to an original CMYK data set.



- In case you wish to rename the channel you may click on the pencil icon and enter the desired name in the upcoming dialog ***Edit Primary Name.***

- Click **OK** and the new 5 inks data set will be generated. *basICColor IMProve* will calculate modified measurement data which can be found under **Data Sets**. Save this file under **File/Save** as for further usage, e.g. creation of ICC printer profiles with *basICColor DeviL*.

- To examine the new 5 color data set, use the **View** tool and select the tabs **2D, 3D, SpiderWeb, TVI** to check that all colors including overprints have been added to be able to build a 5 channel printer profile with *basICColor DeviL*. If you wish, you can modify the TVI curves of the 5th channel further by using the **Tone value** tool.



Removing channels

- Load and select the measurement data of a test chart and click **Edit Primary**.

- Disable the checkboxes in front of the channels that need to be deleted and click **OK**. The information area in the **Edit Primary** dialog below displays the channels the resulting data set will contain.

- The new data set will be reduced to the channels that have been enabled. Please be aware that this is a multicolor file and may only be used in *basICColor DeviL* if a multicolor license is loaded.

Note: *Another feature of **Edit Primaries** is to use this tool to extract the primary ramps of one channel. Simply disable all checkboxes except the one channel that is required.*

3.10 ICC Transformation

With the **ICC Transformation** tool you can use both ICC device and DeviceLink profiles on reference data (device data like CMYK or RGB) to synthetically test the impact of an ICC color conversion with up to three profiles. The tool also shows only those profiles that fit a selected data set. If CMYK data is loaded, only CMYK profile or CMYK DeviceLink profiles are shown preventing unnecessary error messages.

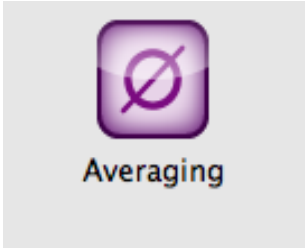
In this example we would like to explain how exactly a SaveInk-DeviceLink profile works.

Example:

- Open the same large test chart layout (e.g. IT8.7-4) twice via **File/Open Predefined**. The CMYK reference values of this test chart are opened.
- Select one of the two opened reference files. Apply the original printer profile with which you created your SaveInk profile or which have available on the reference file in the **ICC Transformation** window. Convert the reference file to Lab with the **absolute colorimetric** rendering intent.

- Now select the other reference file. First apply the SaveInk-DeviceLink profile and secondly the original printer profile with the absolute colorimetric rendering intent. In addition to converting the reference file to Lab, the CMYK values are also changed with the SaveInk profile.

- The objective of a SaveInk conversion is to keep the color impression of the original printer profile as exact as possible, despite modified (reduced) CMYK values, i.e. to achieve the lowest possible color deviations. Compare both files in the **Color Comparison** window. Open it via the **Compare** checkbox. In the **Graph** tab you see that the average deviation (**Average**) is 0.1 Delta E and the maximum deviation (**Maximum**) is 1.2 DeltaE in this example. 90% of the deviations (**90% percentile**) do not diverge by more than 0.2 DeltaE.



3.11 Averaging

When several measurement files from the same test chart layout available and you wish to average these, *basICColor IMProve* offers different averaging methods. In most cases, it is not best to select the arithmetic method, especially if there are irregular values in the measurement data that could prevent the formation of a suitable average result. Different methods are used via the **Auto** method depending on the color patches to be averaged. For example, if only two color patches have to be averaged, **Arithmetic** is used. If more than three color patches exist, the **Auto** method uses **Weighted** or **Median**.

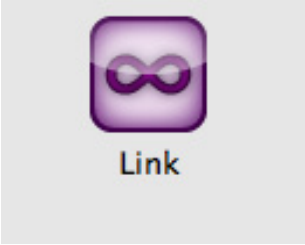
- Load the measurement values that you want to average and select these in the **Data Set** list. Make sure that the number of color patches in all of the selected measurement files is identical, as otherwise you cannot use the averaging function directly.

- Click on the **Averaging** button.

- You have various averaging methods available in the **Averaging** configuration dialog. Specific methods are recommended depending on the number of measurement files and color patches. In most cases you are making the right choice by selecting the **Auto** method, which is selected by default.

- By clicking on **OK** the selected measurement files will be merged to form an averaged file (Averaged.txt).

- You save the averaged file with **Save as**.



3.12 Link

The Link tool is specifically designed to combine multiple sized test charts and merge the data in one large measurement file.

- Open all measurement data and select all in the Data Sets area.

- Click the Link tool then select OK

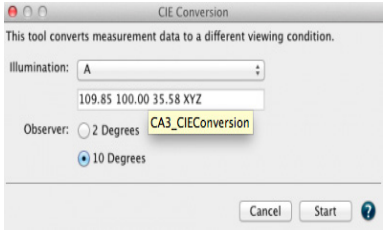
- The measurement data a combined into a new file: Link.txt.

Then average the redundant color patches with the **Redundancies** tool. You delete redundant color patches by activating the **Remove duplicate Patches** checkbox next to the averaging method. The methods for averaging redundant color patches are the same as in the **Averaging** tool.

3.13 CIE Conversion

The CIE Conversion tool allows changes to the Observer from a standard 2 Degrees to a 10 Degrees observer and changes the Illumination from the standard D50 light source.

Note: *The CIE Conversion tool can only be used with spectral data.*

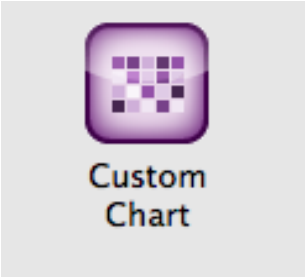


The Illumination drop-down menu contains several options. Printer profiles are typically created for the D50 viewing condition. However, if it is required to set up photos in a gallery illuminated by the light of incandescent lamps (corresponding roughly to light source A), or displays at an exhibition where the lighting conditions might be challenging (e.g. fluorescent light), you can take the lighting conditions into account. You can either select one of the three predefined viewing conditions, or enter the measured viewing condition manually in the form of a Kelvin or an XYZ value. The Emission option is a powerful tool to customize illuminations. The Emission option allows the user to select spectral emissions readings of a specific light source by either loading a CxF3 or text file. To simplify it even more, you may drag-n-drop a measurement file with the measured light onto the value field, where upon *basICColor IMProve* extracts the white point from the file and displays the value.

Note: *If there are multiple readings of the same light source Océ Printing Systems GmbH & Co. KG recommends averaging the measurements by using the* ***Redundancies*** *tool first, save the data and then load the emission reading in the* ***CIE Conversion*** *tool.*

Applying the ***CIE Conversion*** *tool by clicking the* ***OK*** *button will result in a measurement file containing only Lab values. Therefore your spectral data will be converted to Lab data using the observer and illumination of your choice. Use this data to build your printer profile in basICColor DeviL.*

Always apply the ***CIE Conversion*** *tool as the final step due to the conversion to Lab data.*



3.14 Custom Chart

To define a custom test chart for profiling a reference file containing the device data for the color space is required. The **Custom Chart** tool is designed for creating the reference files for test chart generation. **Custom Chart** allows you to generate reference files for the following color spaces:

- Gray, RGB, CMYK
- 1CLR, 2CLR, 3CLR, 4CLR, 5CLR, 6CLR, 7CLR

Afterwards create a pixel file, either in TIFF or PSD format, by using the **Export Chart** tool, print it on your device and measure the test chart with a spectrophotometer using *basICColor catch*.

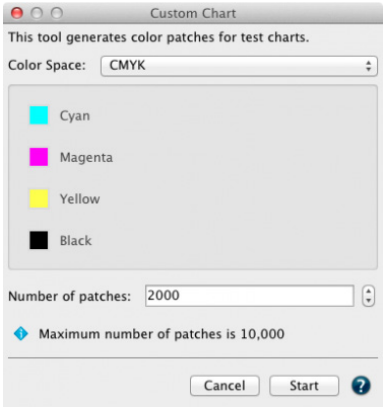
The following description will show you how to generate a reference file by using the **Custom Chart** tool. Depending on the color space different options are available.

3.14.1 Generation of reference file for Gray, RGB and CMYK

Choose between generation of reference file with or without linearizing the primaries.

Note: *A linearization is always helpful if the printing system tends to print unexpected, e.g. colors are far too dark due to strong tone value increase. A linearization helps to distribute color patches in the best possible way for that printing system. In addition, basICColor IMProve generates a very smooth and homogenous linearization, to avoid bumps in the distribution color patches in a test chart.*

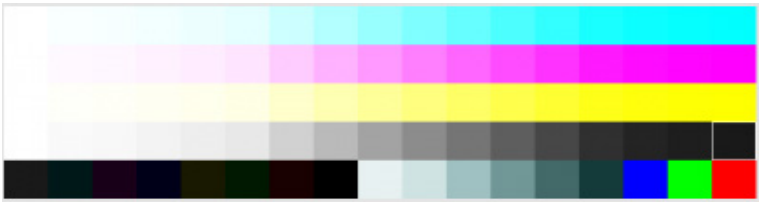
To work without linearization, simply open **Custom Chart** and select the **Color Space** in the pulldown menu.



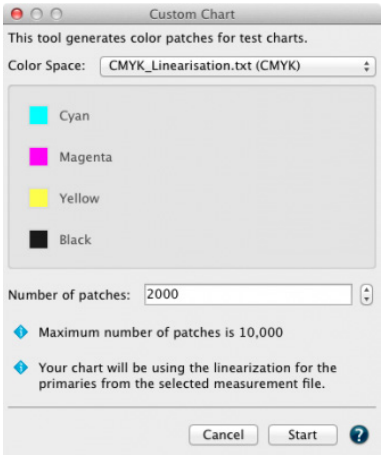
Note: *Only work without linearization if the RIP calibrated your printing system or if a dedicated CtP curve is used or if the printing system doesn't show any irregularities in the output.*

To work with additional linearization measurement data from a linearization test chart is required that was output on your printing system and measured with a spectrophotometer. Load the measurement data in *basICColor IMProve* before opening the **Custom Chart** tool.

Note: *You may use for a CMYK system for example the file Linearization-CMYK-v1.txt (also check screenshot), provided from IMPR under File/Open Predefined or for a 5 color CMYK+X printing system the file Linearization-5CLR-v1.txt.*



Select the previous loaded measurement file in the DropDown menu **Color Space**. *basICColor IMProve* automatically recognizes the color space and visualizes the channel names. In addition an information message regarding linearization will be shown.



Define the Number of patches. This will effect how precisely the device color space will be filled with color patches. Please take into consideration, the available space on your output, required accuracy of the characterization data or characteristic of your printer. Our tool is programmed in a way that even with only a few patches, the color space is covered in the best possible way to allow proper profile creation.

Note: *You may use the following table as a recommendation for the required number of patches.*

Use case / Number of Channels	1	2	3	4	5	6	7
Process Control & Profile Update	10	25	60	100	130	180	250
Profiling/small	10	50	200	300	500	700	900
Profiling/medium	10	80	500	900	1000	1100	1300
Profiling/large	20	120	1000	1800	2300	2800	3300

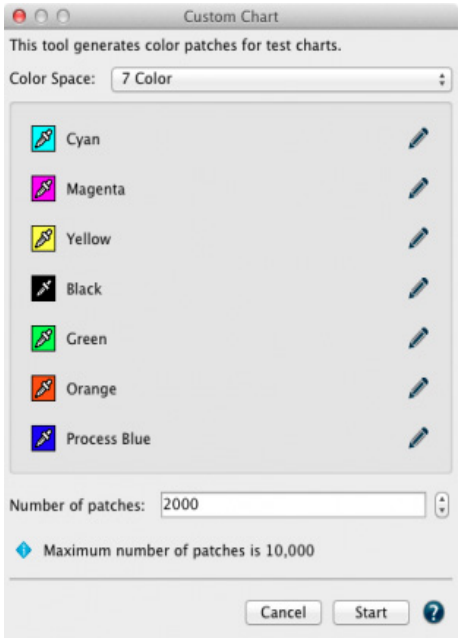
As soon as you click the **Start** button, the reference file will be calculated and shown under **Data Sets**. Device color space and number of patches are included into the file name.

Save the reference data under **Save** if you want to reuse it in other programs for test chart generation. Use **Export Chart** to create the test chart image.

3.14.2 Generation of reference file for multicolor

Similar to the standard color spaces Gray, RGB or CMYK you may choose also in the case of multicolor between generation of reference file with or without linearizing the primaries. The required steps are the same – see the description above.

If you like to work without linearization, simply open Custom Chart and select the Color Space in the DropDown menu, e.g. 7CLR.



basICColor IMProve uses pre-defined colors for the channels, which you may modify as you like. By using the eyedropper tool you can change colors and order of colors. For example, if you like to switch the color Red with Green (see screenshot), click on the red pipette and chose in the context menu under Colors the color you like, in this case Green.

Note: *If you previously opened other measurement data in basICColor IMProve you will also see in the context menu under Color the channel names of those measurement files. Simply chose the required color here.*

To adjust the channel name of a color use the pencil tool on the right side of the dialog box and change the channel name as you like.

As soon as you click the Start button, the reference file will be calculated and shown under Data Sets. Device color space and number of patches are included into the file name.

Save the reference data under File/Save as if you may reuse it in other programs for test chart generation. Use Export Chart in *basICColor IMProve* to create the test chart image.

To generate a generic multicolor test chart decide on the number of channels and their names (with or without CMYK), so that it is as close as possible to the used colors on your printing machine. It is not necessary to define the channel colors in the reference data exactly. Just make sure that you are close to the kind of color so that the correct color combinations will be generated. For example, if you want to print a violet, you may chose blue as the channel color, but not green or red or cyan.

Note: *In basICColor DeviL multicolor profile creation three chromatic colors + optional black + a maximum of three gamut expanding colors are supported. Some examples for possible combinations are: CMYK+Orange, CMY+Green+Blue, CM+Orange+K, CMYK+Red+Green+Violet etc. Other colors positioned within the CMYK color gamut may lead to problems in profile creation. Use the Spider Web in the View dialog to check for problematical color combinations in your measurement data.*

3.15 Export Chart

The **Export Chart** tool allows to create test charts based on device color values, which can be stored as TIFF or PSD files to be printed on a printer.

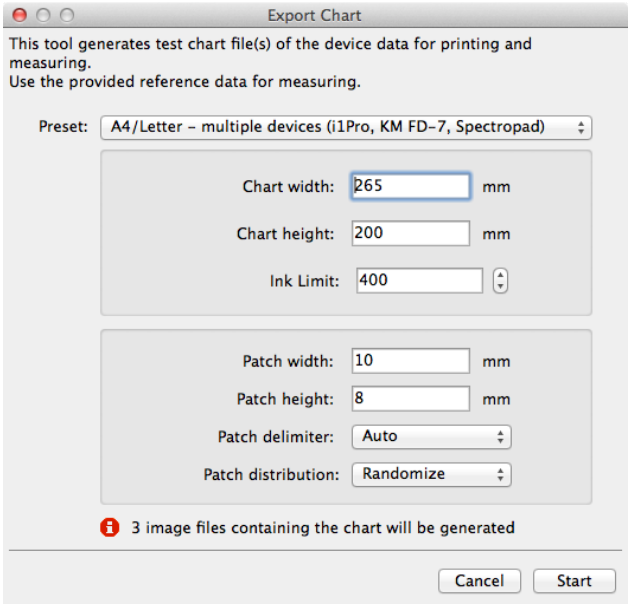
Select the reference file with the required device color values and load this information into measurement data. Available reference data for different color spaces are stored under Data/ Predefined data. Already exising reference data can be created with the **Custom Chart** tool.

Open the tool **Export Chart** to define the proper settings for creating a test chart for the applicable measurement device.

Note: *The tool is optimized to work with most of the instruments supported in the basICColor catch measuring tool:*

- Barbieri Spectro LFP
- Barbieri Spectropad
- Datacolor Sypder3Print SR/ 1005
- Konica-Minolta FD9/ FD-7/ FD-5
- X-Rite i1Pro 2 /i1Pro 1

To generate test charts for A4/US Letter format or A3, select a setting in the pulldown menu. For a custom paper size edit one of the two presets. The edited version will be marked as



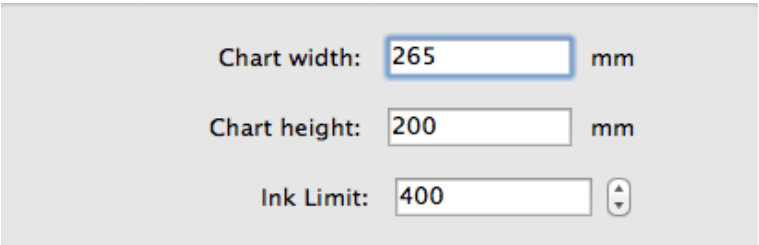
Custom and *basICColor IMProve* will remember your settings for any further creation of test charts.

After defining the settings (more details in the next section) *basICColor IMProve* will display, how many pages the test chart will require. A larger chart height allows more patches per page and reduces the number of pages required.

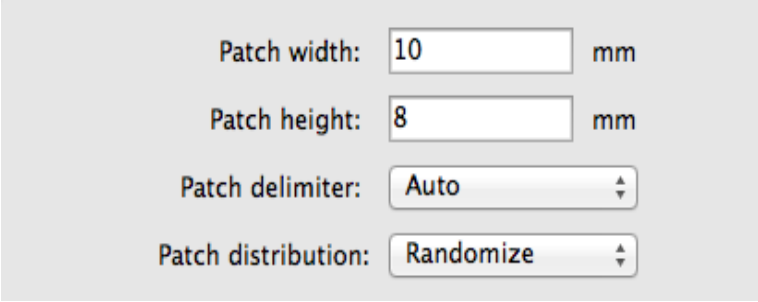
Click on the **Start** button and the test chart will be exported. In the Save dialog define file name and Format (TIFF or PSD). *basICColor IMProve* generates the required test charts and a new reference data fitting the layout you have defined.

Setting details

Measuring instruments may have specific needs regarding patch sizes, the gap between different patches and probably regarding the size of the overall chart. In addition you may respect the requirements of your print process and eventually reduce the Ink Limit (TAC).



In the lower area define **Patch width** and **Patch height** of each color patch. In the DropDown menu if a **Patch delimiter** is required. Use Auto as a default or None if no gaps between patches are needed. For further information consult the documentation for the instrument.



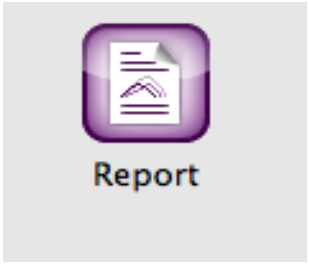
The **Patch distribution** gives the user the option to either print the patches as defined (Normal) or Randomize the patches (better for press profiling). The setting **Sorted** will arrange the color patches from light to dark. This might be helpful to modify a random chart into a well sorted layout or if you may export a color wedge of one single color.

In the upper part you should define image size and TAC of each individual test chart. Enter the desired **Chart width** and **height** to limit the space that might be used for the color patches (minus the space requires for labeling the patches). Do not mix this with the paper size – it is similar to the image size. The exported test charts can be positioned on the required paper size afterwards and then be printed.

Note: *Please consider the documentation of your measurement device. Some measurement devices allow measurement rows of patches by swiping over the rows. Those types of devices use rulers that can measure up to a certain width which need to be taken into consideration when the Chart width is defined, if a patch delimiter is required and will inform you about the minimum patch size.*

The Ink Limit is a specific feature in Export Chart and allows to limit the TAC for the exported test chart.

Note: *Use the exported reference file for measuring and profiling so that reference values and test chart fit to each other. Please note that the reference file will not be ink limited too, otherwise profiling would be leading to incorrect ICC profiles but it might be that third party profiling applications can't handle this. In addition, when building the ICC profile either use the same or a lower ink limit than defined in the test chart.* ***In most cases an ink limit is not necessary for test chart creation.***

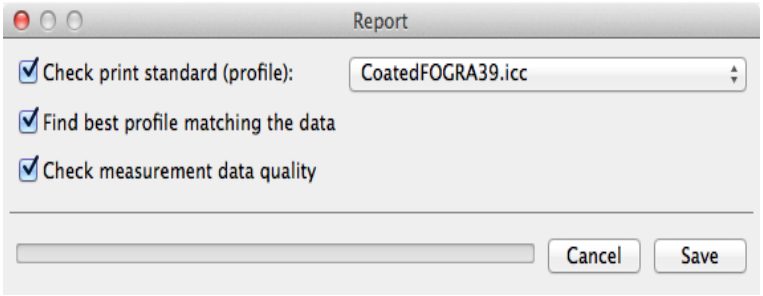


3.16 Creating a Report for a measurement file

If you do not know whether your measurement data is suitable for further processing (e.g. for the creation of profiles) or needs to be corrected, you can produce a Report. This report is used to verify and graphically display the data and to provide recommendations for corrections. The Report is a very powerful feature to document which types of corrections to the measurement data are necessary.

Before applying any of the tools, select the loaded measurement file and click on the **Report** button.

In addition to the important **Check measurement data quality** function, where necessary, also activate the checkboxes **Check print standard (profile)** to select a comparison profile and/or **Find best profile matching the data** to automatically select the ICC profile that matches the measurement data best for a comparison, from the list of your ICC profiles.

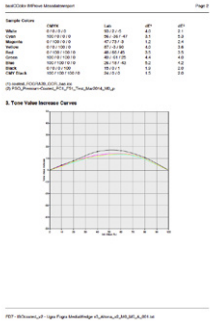


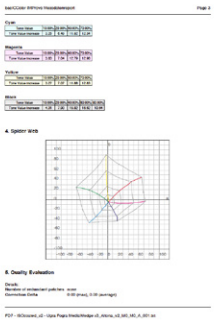
If you click on **Save** a save dialog opens in which you enter the desired filename and specify the location. In addition define the Format of our report.

Note: *basICColor IMProve can create a PDF or a XML report. Use the XML report format to build a customized design for example with Microsoft Excel. Beside the report file an addition file IMProveReport.xsd containing the XML schema will be saved too, that you may use when importing the data in other tools.*

Click on **Save** and for example a PDF report will be generated, saved and opens up in your preferred PDF viewer.
The different report pages provide an insight into the **Tonal Value Increase Curves**, the gamut representation (**Spider Web**) as well as the results of the test on the matching of redundant color patches (**Quality Evaluation** section), measurement or printing errors and the smoothness of the measurement file.

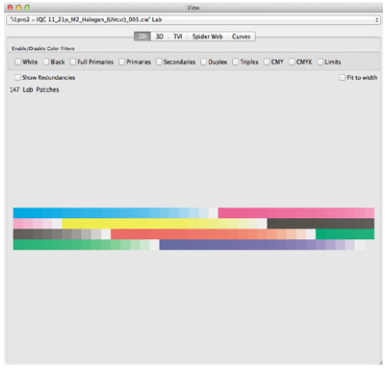
By switching on/off the different layers in the PDF file you can display the individual tone curves. Furthermore, you can switch on/off the color patches highlighted with a red frame and also view color patches before and after correction and smoothing. In addition, text assessments in the individual sections give tips on the correction tools to be used in *basICColor IMProve*. You also get tips about optical brighteners in the paper, which of your available ICC profiles best fits the measurement data or how exactly the measurement data depicts a pre-defined reference profile.





Chapter 4

The View Window

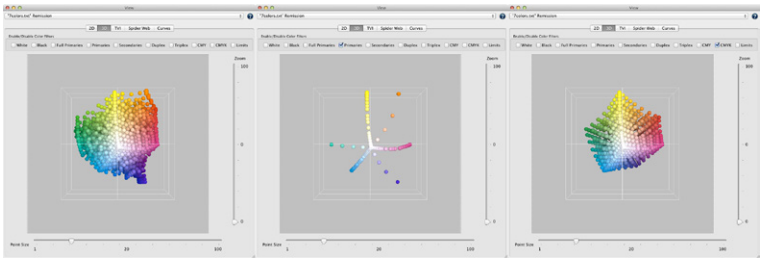


4.The “View” window

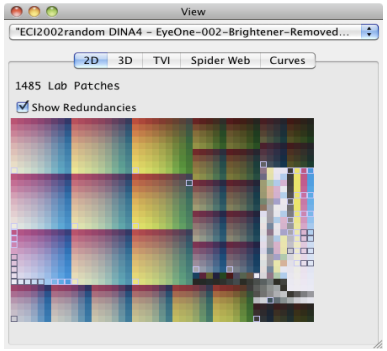
If you wish to view a measurement file more closely, select this in the Data Sets area and open the View window. Five different views allow you to get a quick overview of all color patches in the measurement file: the **2D** view shows the reference and the corresponding Lab values for each patch, a rotating **3D** view of the color space, the **TVI** curves, a 2-dimensional color view (**Spider Web**) and various Curves of gradations.

Color filter

You may use **Color filter** to highlight selected colors in **2D** or **3D** view. All non-selected colors which are not effected by the selected filters, will be hidden. This is an easy way to see immediately the selected colors within the test charts in 2D view. In 3D view the color gamut of the selected colors will be visualized. In that way you may highlight for example **full primaries, limits, primaries, secondaries, paper white** or



black, or you may check **duplex** and **triplex** colors.
This is an outstanding possibility to check the expansion of the color space for multicolor data in comparison with CMY or CMYK, too.

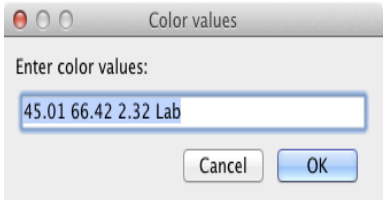


4.1 The 2D View

The 2D view using the feature Show redundancies marks all redundant patches in the selected document providing you inside about the colors and their location. These patches will be adapted when applying the Redundancies tool.

- If you roll over a color patch with your mouse you will see the Lab measurement value and reference value of the patch. Spectral data will also be marked as **Remission**. In case of spectral data you may switch **Show Density** to get the densities of the color patch.

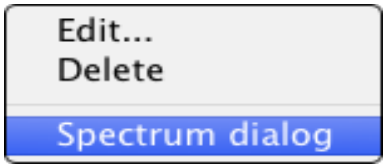
- Clicking on a color patch defines it as reference and the DeltaE index will be reset to zero. Move to another color patch without clicking and the color difference between the two patches will be visualized.



- Double click on a color patch in the **2D** tab will open a separate dialog **Color values**, where the Lab value is displayed. You may change that value and apply the changes by clicking on the **OK** button.

Note: *Even for the manual editing of Lab values we use the spectral data and the spectral characteristic of this data will remain.*

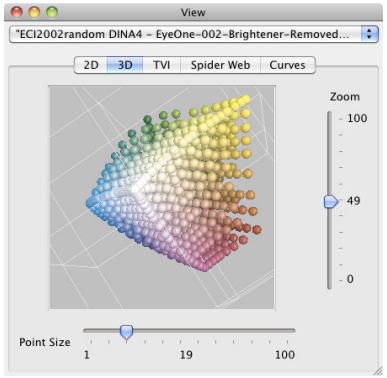
- Delete single patches by selecting a patch in the 2D View dialog, right click with your mouse and then select Delete from the context menu.



- In addition you may use the context menu to open the **Spectrum dialog** with the remission curve of any selected spectral color

Note: *Whenever the Spectrum dialog is opened and you scroll with your mouse over patches in 2D view, the spectral curves of the related color will be visualized.*

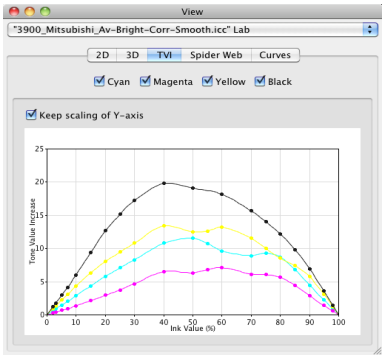
4.2.The 3D View



- You can turn the color patches into the desired direction in **3D** view by clicking and dragging.

- By dragging the gamut the color space is rotated in that direction. A single click will stop the auto rotation or it will stop automatically without user intervention after one minute of rotation.

- You increase or decrease the view by using the right hand side **Zoom slider** and enlarge or minimize the color patches by using the **Point Size slider.**



4.3 Tone value increase curves (TVI)

You may analyze your tone value increase curves (**TVI**) in this view. Whenever the tone value curve tab is opened during editing of curves or any other correction which will effect the **TVI**, you will see its effect immediately.

- The check boxes depend on the primaries of the loaded measurement data. You may use those check boxes for CMYK and multi color files to show or fade out single curves.

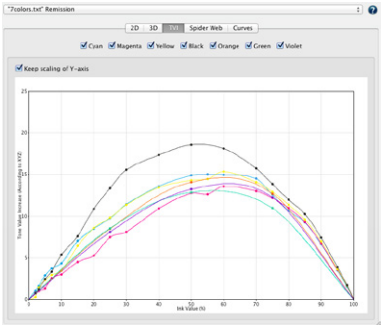
- By activating the check box **Keep scaling of Y-axis** the TVI curves will be visualized in the diagram in the best possible way. The scale factor of the Y axis depends on the measurement data and ensures the most precise and largest view of the curves.

- By deactivating the check box you will prevent the automatic adjustment of the Y axis with each new data. Sometimes this eases comparison of different adjustments.

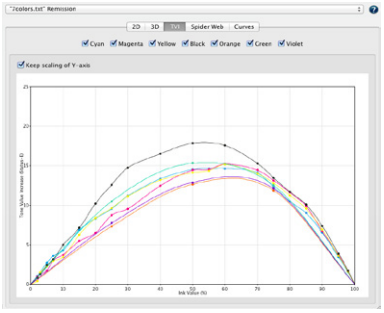
- Measurement data which contains only CMY (no black) or RGB, can be optimized with *basICColor IMProve*, too. Besides the CMY or RGB curves an additional composite gray curve will be visualized in the **TVI** tab.

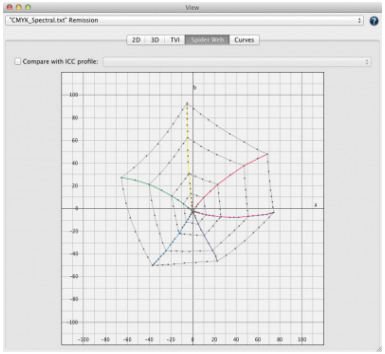
- TVI curves will always be shown with internal redundancy corrections in the ***View*** dialog. This avoids any strange visualization in case that similar color values strongly differ, especially for the paper white.

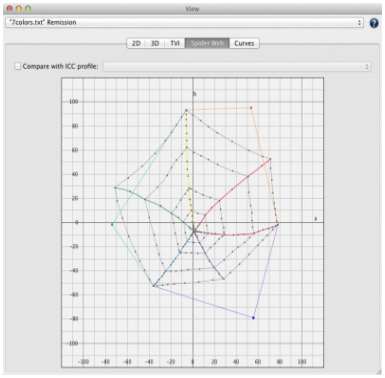
- The visualization of TVIs can be modified with the options at **Tone Value Calculation** in **Preferences** (Chapter 3). Curves may be calculated and visualized by using XYZ or spectral data.



Note: *The standard setting in basICColor IMProve is to calculate the curves based on the XYZ values. This allows a consistent view of curves either based on measurement data or by the ones based on the resulting ICC profile. By disabling the check box in Preferences curves will be calculated by the density method, if spectral data is available. This method is more consistent to the one in print process control. Also the TVI curves for spot colors in multi color printing benefit from the density method because the XYZ method does not suit for non CMYK colors.*







The screenshots show the different TVI curves for a 7 color printing system, using CMYK+Orange+Green+Violet. On page 49 you see curves based on XYZ, where the sophisticated basICColor IMProve already used the correct filters for the different channels. To the left you see the curves based on the density method with Status E.

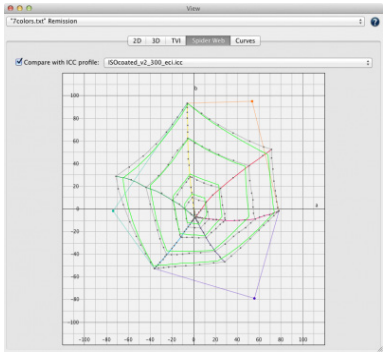
4.4 The Spider Web

This is a top view on the color space in a a*-b* diagram. The measured or optimized color patches are arranged in a kind of spider web. Compatible to the other views, you may check changes in the **View** dialog by selecting one of the adjustments in the **History**.

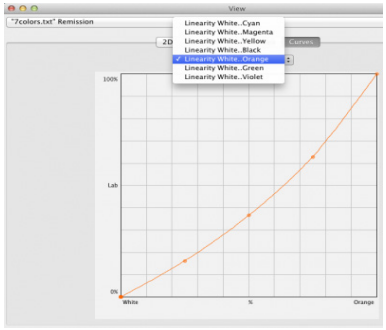
In the spider web all primary and secondary gradations are highlighted in corresponding colors (see also the screen shot of the CMYK data).

The spider web view of a multi color data could look like the next screen shot. It shows the measurement points of the CMYK data and the full tones of the additional primaries. There are straight colorized lines from those primaries to closest two others. These lines only represent a rough view of the final color space. Nevertheless it is a great indicator to see how those additional colors will expand your color space.

Note: *To generate multi color profiles in basICColor IMProve you will need three chromatic colors + optional black + up to three additional, gamut expanding colors. Some examples for possible combinations are: CMYK+Orange, CMY+Green+Blue, CM+Orange+K etc. Other primary colors located within the CMYK color space may lead to problems during profile generation. The spider web view is a great tool to see immediately if some color combinations may cause problems.*



By using **Compare** with ICC profil you may choose a profile for comparison in the DropDown menu. The color space of the selected ICC profile will be visualized in green in addition to your measurement data. This helps you to compare different color spaces and check if your individual house standard will fit to a generally print standard.



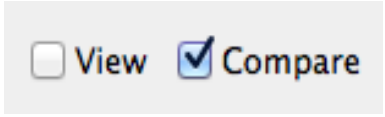
4.5 Curves

In the **Curves** tab you may view the linearity curves from white to all 100% primary colors, also for multi color data. It allows to visualize the linearity of your data and helps to figure out non smooth gradation curves.

***Note**: Colorimetric linearity based on Lab /dE-76 means that 50% of a given primary has the same distance to left value (white) and the right value (full tone). Nowadays RIPs linearize primaries mostly based on colorimetry methods. A fully linear curve (45 degrees) points to a perfect colorimetric linearity.*

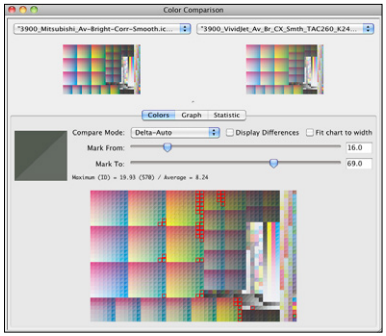
Chapter 5

The Compare Window



5.The Compare Window

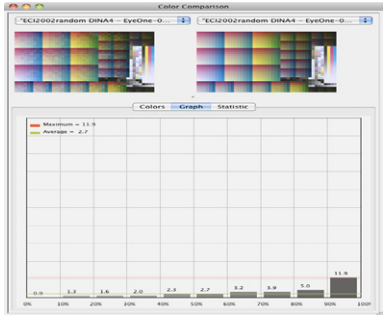
Colors tab
In the **Colors** tab under the **Compare Mode** pulldown menu select the color distance formula.

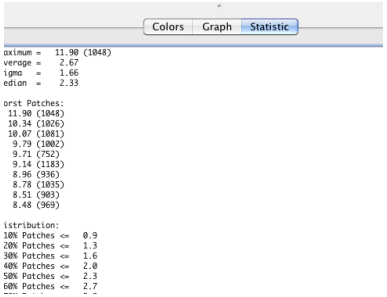


Highlight the color patches that should lie within a specific DeltaE area with the help of the **Mark From** and **Mark To** sliders.
If you select a color patch with the mouse, the two colors (before and after optimization) are shown together with the associated lab values and color distance (Delta) in the field left to the sliders.
Click into an “empty” area outside the color patches and the maximum color distance (Maximum) as well as the average (Average) over all of the color patches are displayed.

Click the checkbox **Display Differences** and the differences in color patches defined with the sliders **Mark From** and **Mark To** are highlighted clearly.

You may chose to display the color patches as large as possible in relation to the size of the window or to display the whole chart by deactivating the option Fit to width.





Graph tab

This grafic shows the user how much the corrections/ optimizations take effect on the measurement data.

In this example you can see that 40% of all the measurement readings are modified by a maximum of DeltaE 2.3.

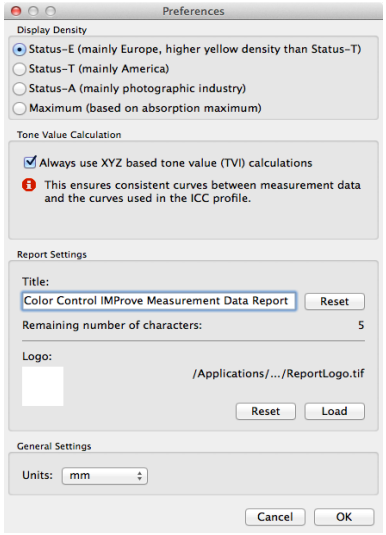
90% of all readings will be modified by a maximum of DeltaE 5.0. And the really strong modification are only done in the last 10% (90-100%) of all measurements with a peak of DeltaE 11.9.

Statistic tab

The **Statistic** window shows a summary in form of text about the most significant DeltaE values and which color patches are affected the most. The **Graph**-View is listed in form of a text block also.

Chapter 6

Preferences



6. Preferences

Use the *basICColor IMProve* Preferences to define the general behavior of the application.

- **Display Density** defines the method for calculating and displaying densities in ***View*** and ***Report***.

- **Tone Value Calculation** checkbox switches calculation and display of the TVI curves in the View dialog.

***Note**: The default setting in basICColor IMProve will calculate the TVI curves based on XYZ values. This mode ensures consistent views of TVI curves between measurement data and the same curves derived from ICC profiles. ICC profiles use colorimetric data. However, when spectral measurement data is present and the checkbox is disabled in **Preferences**, the TVI curves are based on density and the selected density mode is used for the calculation of the curves. TVI curves of spot colors used for multicolor profiling will highly benefit from this option. Calculation based on XYZ does not create the optimum match for non CMYK inks.*

- **Report Settings** defines the **Title** and **Logo** for the generated reports. Supported image formats are TIFF, JPEG or GIF in RGB color space.

- **General Settings** defines the measurement units used (mm or inches) in the **Export Chart** dialog.

Changes are applied after clicking the **OK** button.

Chapter 7

Product Information

7. Product Information basICColor IMProve

Copyright Information

Trademark Information

Version 3.0, December 2015