

How to check Print Standards

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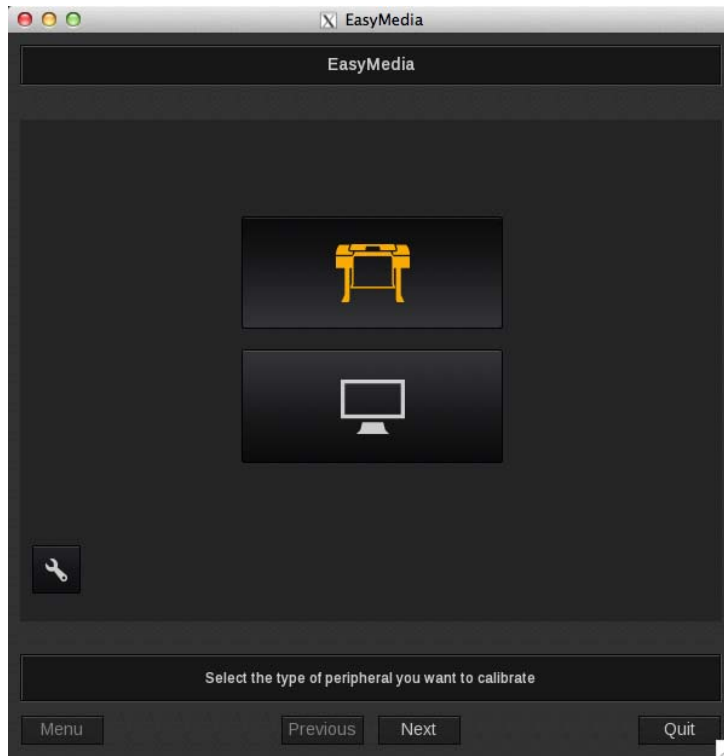
The **Print Standard Verifier** allows the user to punctually check its printing process and to ensure that it is conform to the ISO standards and to the certifications posed by FOGRA and IDEAlliance.

Be careful, the standards control is not a certification. The printing process can only be certified by a specialist who has an accreditation from the certification organization. Caldera allows you to check if your process is, at the time of the verification, conform to the standards and if it probably can successfully pass the certification or not.

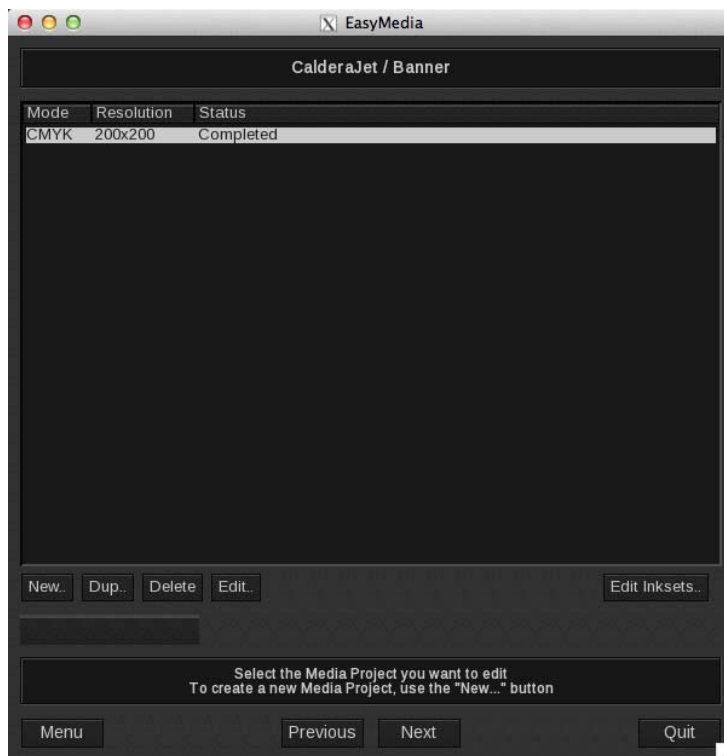
▶ Launch the checking process

Be aware that the calibration must be completed prior to start this process. If it is not the case, please create one first.

1. Open **EasyMedia** and select the printer calibration.



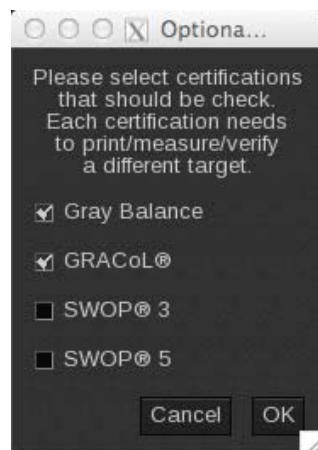
2. Search your printer in the list then select the medium and the printing configuration you want to check (mode, resolution and quality). Click then on **Next** to open your project.



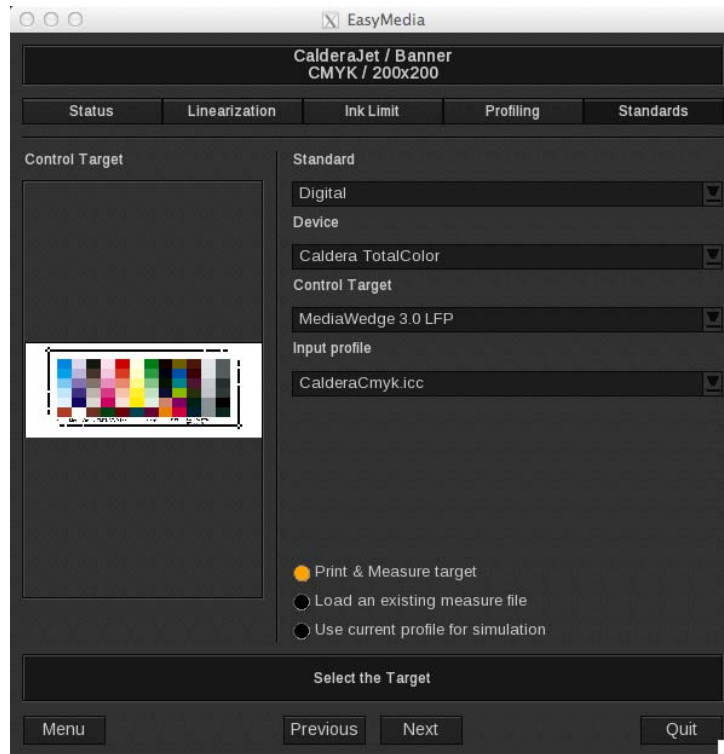
3. It opens on the Status tab. Move to the Standards tab then select *Control compliance to standards*. Click on **Next**.



4. First, select the group of **standards** you want to check among:
- **Digital**: displays ISO 12647-7, Fogra PSD Absolute, ISO 12647-8 and Fogra PSD Media relative.
 - **Iso**: displays ISO 12647-2, ISO 12647-7, ISO 12647-8 and Fogra PSO, Fogra PSD Absolute and Fogra PSD relative.
 - **G7®**: choosing this option will opens the following pop-up to allow you to choose the standards. There is another choice here because, depending on the standards chosen, you might have to print and measure several targets.

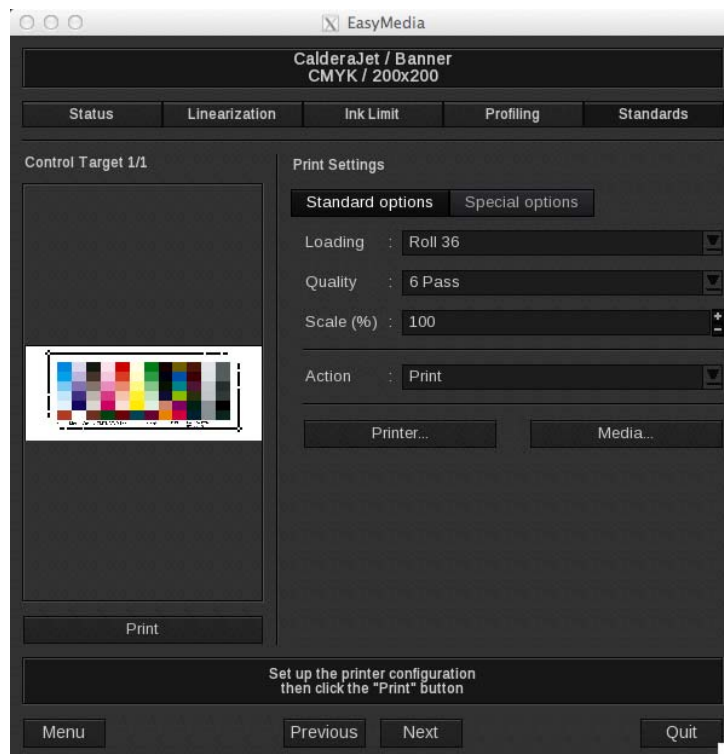


- **Simulation**: choosing this option automatically selects "Use current profile for simulation" at the bottom of the window (see simulate the verification). It displays ISO 12647-7, ISO 12647-8, Fogra PSD Absolute, Fogra PSD Media relative, G7® grayscale, G7® GRACol, G7® Swop V3® and G7® Swop V5.
5. Choose the measurement **device** in the list, the **control target** and the **input profile** (for the Digital group) or the **grayscale target** (for the G7® group) you want to use to do the check. Click on **Next**.



6. Define your **print settings** then, when you are ready, click on *Print*.

For a G7® check, if you choose several standards at the same time, you might have to print several targets one after the other.

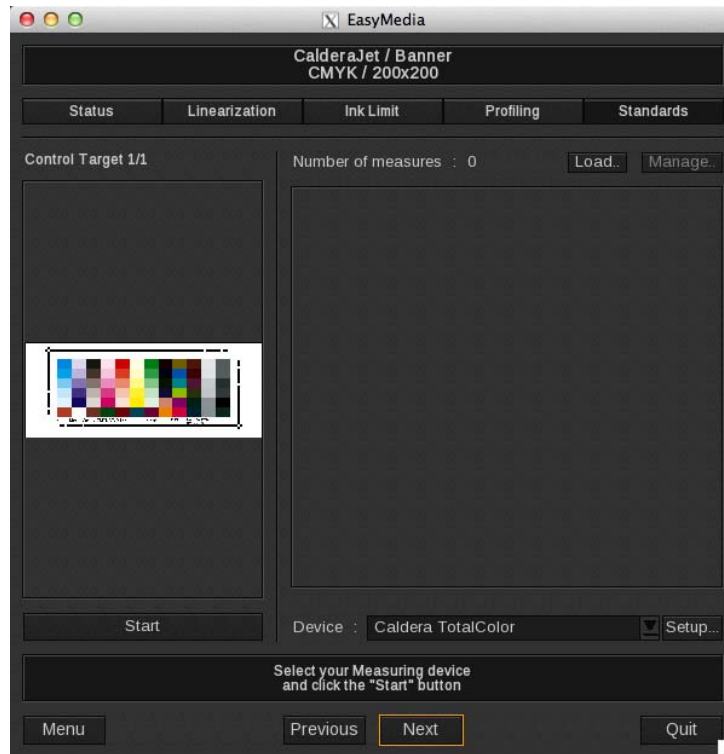


The user can also print the chart while printing any job: since Caldera 9.10 Version, in the page setup, the user is able to add a **print standard verifier**'s color chart to the annotations part by using the new **Control Strip** feature.

The printing process checking can then be done with this chart as it has been printed from **EasyMedia** and not from the Print module.

7. Measure the print target using your spectrophotometer.

For a G7® check, if you choose several standards at the same time, you might have to measure several targets one after the other in this order: Grey balance, GRACoL®, SWOP3® and finally SWOP5®.



Once the measurements are made, results are interpreted by EasyMedia. It then displays automatically a summary of the compliances to the standards.

See page 7 for results interpretation.

Simulate the verification

A simulation of the printing process check can be made using the profile data. Indeed, using the theoretical La^*b^* values given by the profile are compared to the expected ones given by the standard.

This tool gives you a theoretical idea of the result you should obtain.

Be careful, this procedure does not guaranty results. It is only theoretical results based on the profile and not on the printing process state at the moment of the test.

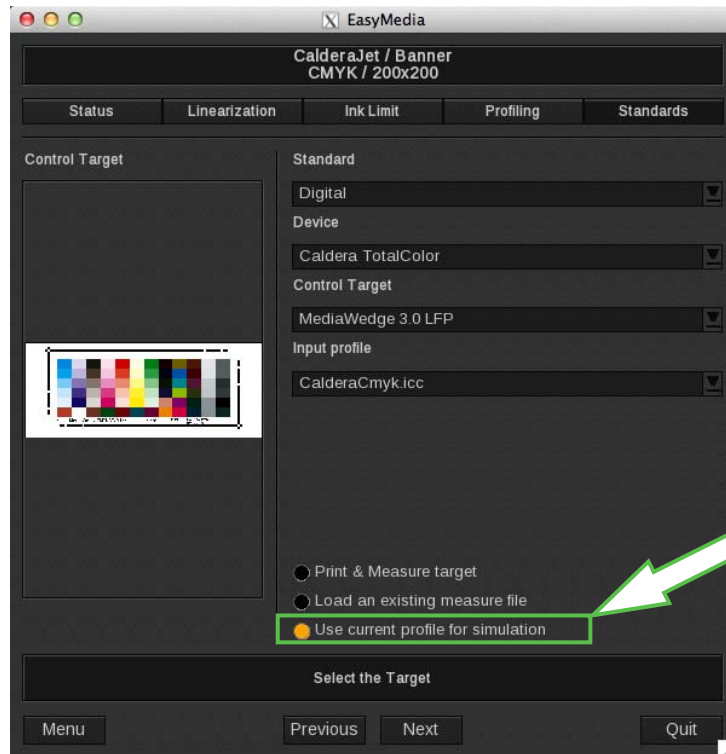
Procedure

To simulate the check, follow the 1, 2 and 3 steps from the previous procedure:

1. Open **EasyMedia** and select the printer calibration.
2. Search your printer in the list then select the medium and the printing configuration you want to check (mode, resolution and quality). Click then on **Next** to open your project.
3. It opens on the **Status** tab. Move to the **Standards** tab then select *Control compliance to standards*. Click on **Next**.
4. First, select the group of **standards** you want to check among: **Digital**, **Iso** and **G7®**.

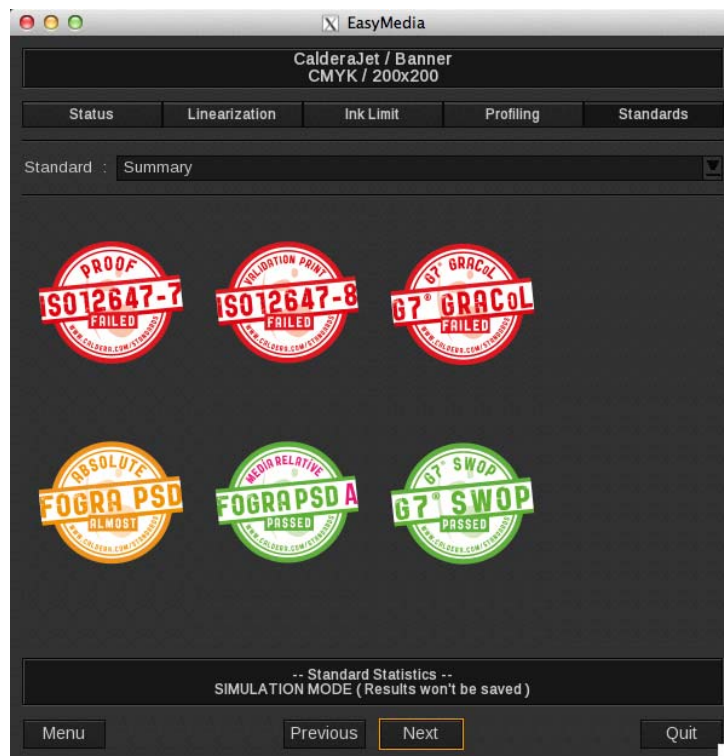
Simulation: you can also choose this group to do the simulation of ISO 12647-7, ISO 12647-8, Fogra PSD Absolute, Fogra PSD Media relative, G7® grayscale, G7® GRACoL, G7® Swop V3® and G7® Swop V5 it will send you automatically to point 6.

5. Choose the measurement **device** in the list, the **control target** and the **input profile** (for the Digital group) or the **grayscale target** (for the G7® group) you want to use to do the check.
6. Select in the bottom menu: *Use current profile for simulation*. Then click on **Next**.



Then EasyMedia calculates the theoretical $L^*a^*b^*$ values and displays the compliances to the standards.

Results interpretation



Once the control target has been measured, a summary of the notes obtained is displayed. The color code is simple:



Green logo = the printed target is conform and the printing process can most likely pass a certification.



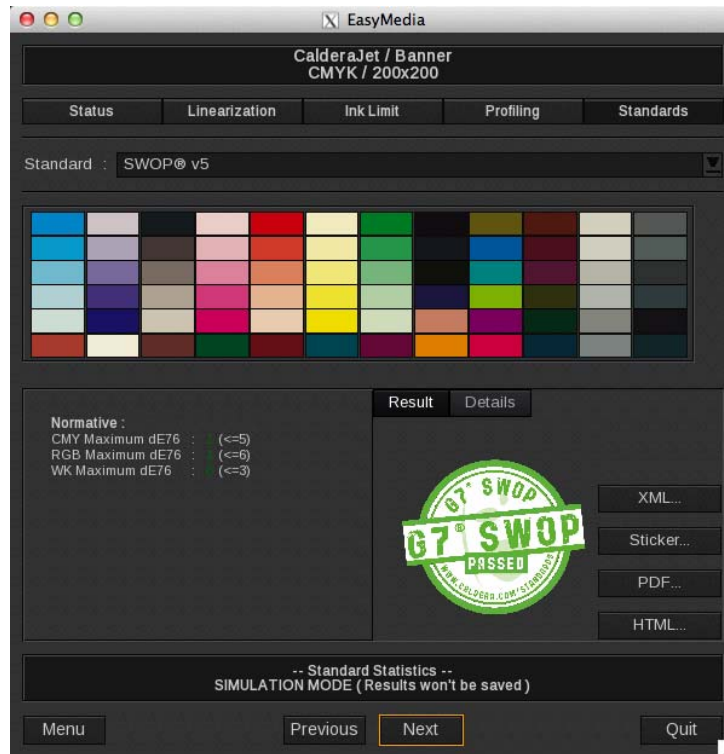
Orange logo = some of the conditions fulfill while others are not too far. However it is not good enough to successfully pass the certification.



Red logo = the certification will fail; the results are too far from the requirements.

Click on one of the logos to get further information about the standard.

You can also use the **standard** list to move from one standard to another or to go back to the *summary*.



Standard constraints

Each standard constraint appears on the left column and is built on the same model:

<Constraint type> <Associated Delta> : <Calculated value> <Reference value>

Constraints of each standard are detailed in the following chapter.

Some constraints are not mandatory to get the certification; they are displayed under the **informative** bloc.

Normative constraints are needed to pass the certification.

Gamut constraints are pre-requirements that are obligatory and tested before normative constraints.

Color code

When the constraint is followed, the calculated value is displayed in green.

WK Maximum dE76 : 1 (<=3)

If the constraint is failed with less than 1 unit, the calculated value is displayed in orange.

CMYK Maximum dH : 2.8 (<=2.50)

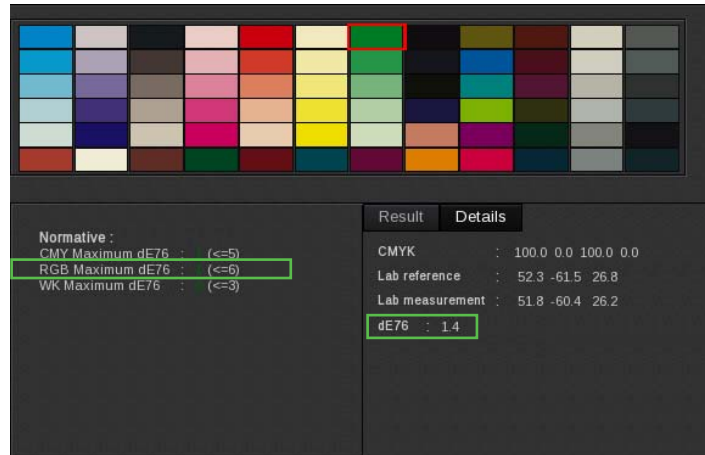
If the constraint is failed, the calculate value is displayed in red and a click on the line displays all the swatches which failed.

Maximum dE76 : 10 (<=6)

Available actions

Depending on the chosen constraint, a click on its line selects the linked swatch/swatches in the control target.

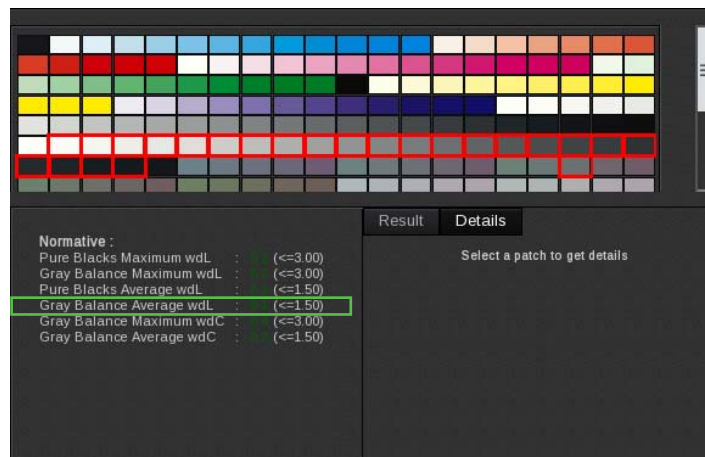
- **Maximum selection:** when a line searching for the maximum is clicked, the corresponding swatch is automatically selected and its information is displayed in the **Details** tab.



We selected the RGB swatch with the Delta E76 maximum.

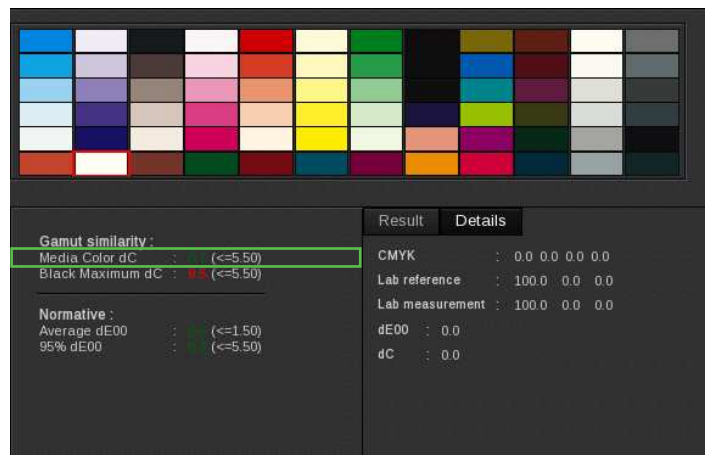
- **Group selection:** when a line calculating an average on a group of swatches is clicked, the corresponding swatches are automatically selected. The "Grey" group contains grey swatches made with only Cyan, Magenta and Yellow, without Black addition.

If you click on one of the group swatch, the group will still be selected while your selected swatch will blink.



We selected the "Grey Balance Average wdL" group.

- **Media swatch selection:** the *Media Color* lines refer to a particular swatch from the control target: the color of the substrate is simulated by the profile and printed. Clicking on a line that begins with *Media Color* selects that particular media swatch.



We selected the media swatch using the Media Color dC line.

Swatches

Each swatch from the control target is displayed and can be clickable. When clicked, its information is displayed in the Details tab.

You can see:

- The colors values depending on the chosen mode: CMYK, CMYKcmk, CMYKOG, etc.
- $L^*a^*b^*$ reference values, the ones that are expected.
- $L^*a^*b^*$ measured values.
- The calculated Deltas.

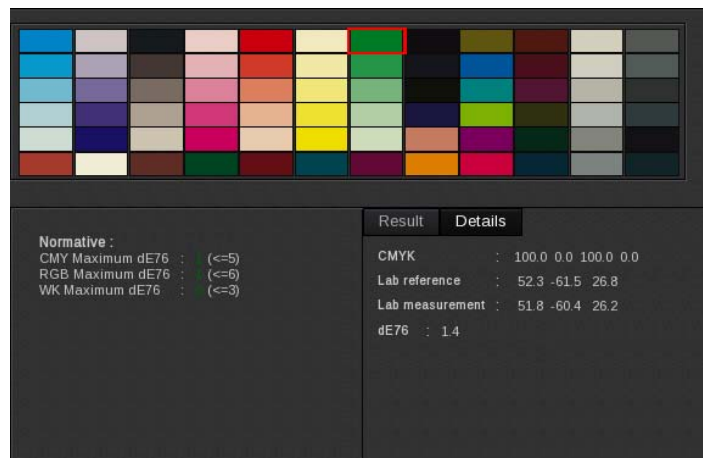
The kind of Delta calculated depends on the targeted standard (ISO, FOGRA, etc.). Don't be surprised if the constraints and the number and Delta types used are different between two standards.

The Delta, whatever it is E76, E00, H, a, b, L represents the distance between the measured color and the attended one.

Delta list:

- dE76 (*CIE dE 1976*): Euclidean distance in the $L^*a^*b^*$ reference.
- dE00 (*CIE dE 2000*): in the $L^*a^*b^*$ reference, distance that takes care about human color perception.
- da: difference between the a values (red-green axis).
- db: difference between the b values (yellow-blue axis).
- dL: difference between the L values (light).
- dC: in the LCH reference, difference between the Chroma values.
- dH: in the LCH reference, difference between the Hue values.
- wdL: check of the grey gradient regularity between the white point and the black point (according to the light)
- wdC: check of the composite grey conformity between the white point and the black point (according to the chroma)

Examples



SWOP@v5



Fogra PSD Media Relative

Failed test: the three most common reasons

There are at least 3 reasons why you might fail a test (or get a lower rating than expected).

The "media white" is too far from the reference one

It happens for standards where there is a rule concerning the media white. It can be for "Side by Side" standards as ISO12647-7 and Fogra PSD Absolute or for Media Relative Standards when the pre rules are not passed (like Fogra PSD Media Relative).

Of course, there is nothing to do but changing the media.

The reference gamut is too big compared to the printer gamut

You can check that quickly in the Gamut Viewer comparing the reference profile with the printer gamut.

The only chance that you have is that you have restricted too much your gamut in one of these steps and can (and want to) change it:

- Linearization step: ink primaries have been set too low, try to increase it to at least the primary colorimetric references
- Global ink limit step: you chose to minimize the artifacts in high coverage colors and you finally miss some colors in the shadows, try to increase the global ink limit to cover the colorimetric shadow colors of the standard you want to pass.
- Profiling step: in the Black separation options you chose a low max ink, try to increase that number.

Of course, for any of these modifications you need to regenerate a profile. But if you have followed the default and advised procedure to maximize your gamut, that means you cannot do much for this print configuration.

The accuracy of the print is too low

You can easily verify that assumption with the use of the profile for simulation (check "Use profile for simulation" instead of "Print & Measure colors"). If you pass the standard in simulation mode, and not in real conditions that means that the ICC profiles do not predict correctly the behavior of your print configuration.

There are a lot of possible errors to check in that case, but the most common are the following 3 issues:

- The spectrophotometer is not accurate enough, you should consider to certify it if it is not the case.
- The printer is not stable enough,
- The profile is not accurate enough because the checked references are far away from the measurements used to make the profiles. In that last case, the first thing to try is to measure a target with 3000 patches. More often than not it makes the difference. If you have a very large gamut (it happens with NColor printers and proofers), you can consider to make a linearization for the specific reference you are targeting but note that you will restrict a lot your gamut and we do not encourage you in doing so if you do not know exactly what you are doing.

Data export

On the standard summary page, four buttons are available to export the information in a specific file format and with a specific layout:

- **XML**: exports the information in an XML file.
- **Sticker**: exports the information in a basic PDF file (criteria, measures, achievement)
- **PDF**: exports the information in a PDF file with all the standard's data
- **HTML**: generate an html file to display the information in a web browser

When you click on one of these buttons, you are then able to select the location for the file save and its name.

Standard interpretation

Below you will see each standard with its constraints. Benchmarked values and their deltas are specifically defined for each standard. Globally the controller will check the compliance of printed control strip to the FOGRA39 dataset (coated paper) with rules and tolerances defined in the standard. Caldera makes you print that particular control target while doing the print process check.

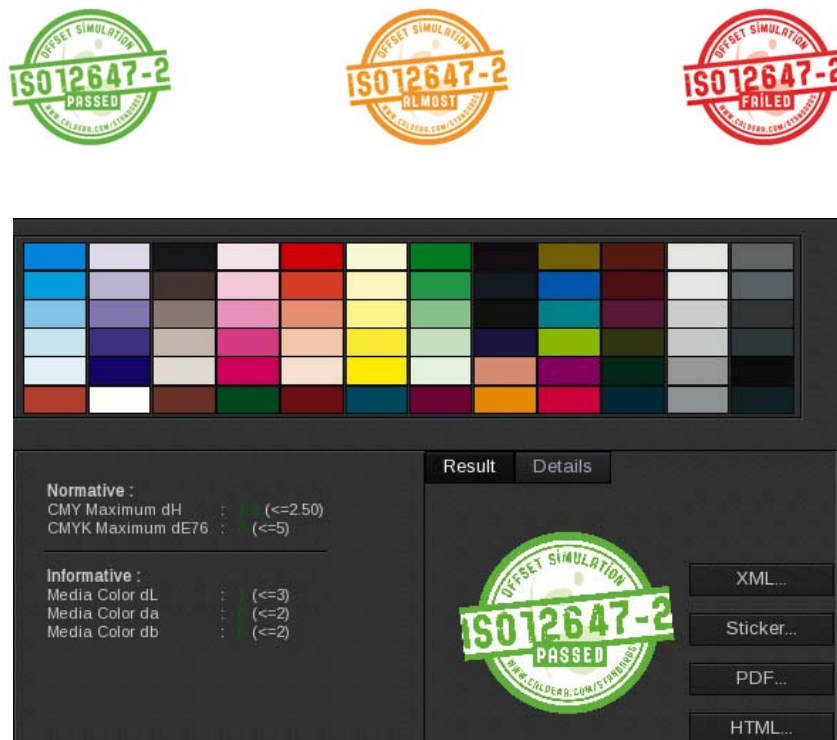
ISO 12647

ISO 12647-2 – Offset Simulation

This standard defines the quality of a CMYK offset printer with heat system.

It will allow you to reproduce an Offset Job on a Digital printer, or to simulate the behavior of an ISO 12647-2 Offset press.

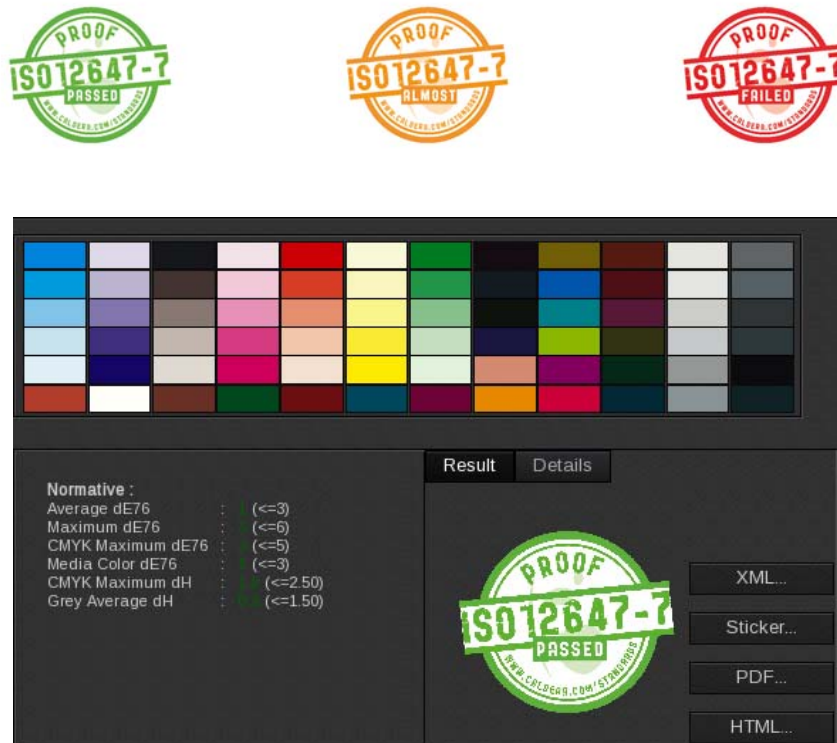
This offset label is intended to do **informative** print evaluation for simulating the behavior of an offset print. Offset certifications shall always take place on **real** offset devices.



Constraint	Benchmark	Details
CMY Maximum dH	<2.5	Hue difference between the CMY swatches and their reference values. Results have to be lower than 2.5.
CMYK Maximum dE76	<5.0	E76 distance between the CMYK swatches and their reference values. Results have to be lower than 5.0.
<i>Media Color dL</i>	<3.0	<i>(Recommended) Distance between the media swatch Light value and its reference value. It has to be lower than 3.0</i>
<i>Media Color da</i>	<2.0	<i>(Recommended) Distance between the media swatch a value and its reference value. It has to be lower than 2.0</i>
<i>Media Color db</i>	<2.0	<i>(Recommended) Distance between the media swatch b value and its reference value. It has to be lower than 2.0</i>

ISO 12647-7 - Proof

This standard defines the quality of a digital proof process and the proof itself. It allows you to certificate a digital proof done for an offset printer.



Constraint	Benchmark	Details
Average dE76	<3.0	E76 average distance between all swatches and their reference values. It has to be lower than 3.0.
Maximum dE76	<6.0	E76 distance between all swatches and their reference values. Results have to be lower than 6.0.
CMYK Maximum dE76	<5.0	E76 distance between the CMYK swatches and their reference values. Results have to be lower than 5.0.
Media Color dE76	<3.0	E76 distance between the media swatch and its reference value. It has to be lower than 3.0.
CMYK Maximum dH	<2.5	Hue difference between the CMYK swatches and their reference values. Results have to be lower than 2.5.
Grey Average dH	<1.5	Hue average difference between Grey swatches and their reference values. It has to be lower than 1.5.
Gamut Average dE76	<4	<i>(Recommended) E76 average distance between the gamut swatches and their reference values. It has to be lower than 4.</i>

ISO 12647-8 – Validation print

This standard defines the quality of a digital validation print process and the validation itself. It can be used to validate a print or a configuration print where the medium is independent.

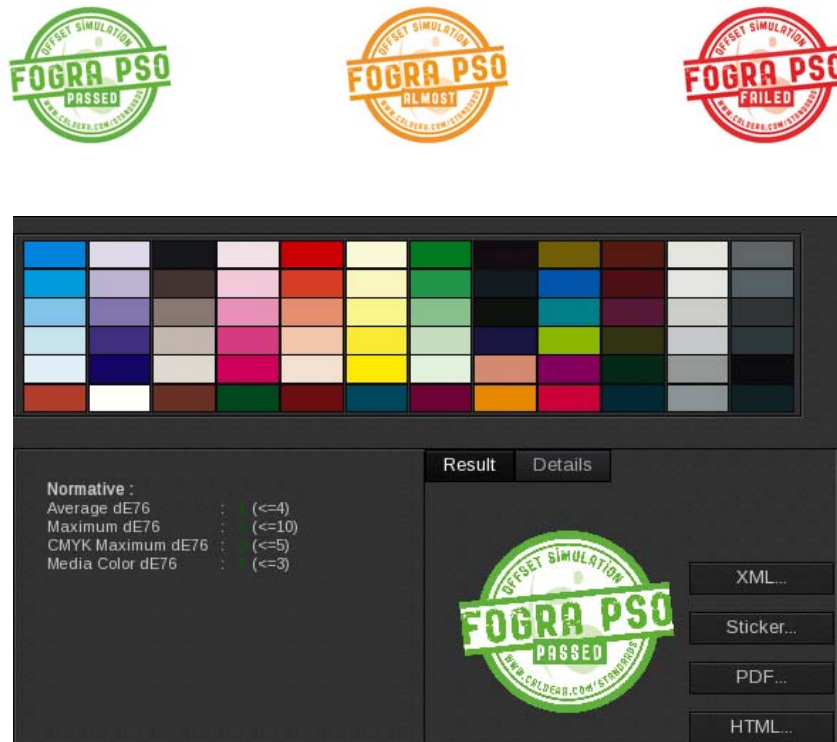


Constraint	Benchmark	Details
Average dE76	<3.0	E76 average distance between all swatches and their reference values. It has to be lower than 3.0.
CMYKRGB 95% dE76	<6.0	The E76 distances between the CMYKRGB swatches and their reference values are calculated. An ascending sort is made and the 95th quantile is picked. It has to be lower than 6.0.
CMYKRGB Maximum dH	<4.0	Hue difference between the CMYKRGB swatches and their reference values. Results have to be lower than 4.0.
Grey Average dC	<2.5	Chroma average difference between Grey swatches and their reference values. It has to be lower than 2.5.
<i>Gamut Average dE76</i>	<i><4</i>	<i>(Recommended) E76 average distance between the gamut swatches and their reference values. It has to be lower than 4.</i>

FOGRA

FOGRA PSO – Offset Simulation

PSO (developed by Fogra and issued by bvdm) bases on ISO 12647-2. It is not a trademarked certification, hence not only Fogra/bvdm but also different organizations, consultants, etc. can provide a certification according to PSO. Details of the Fogra-bvdm certification program can be found at www.PSO-insider.com. This offset label is intended to do **informative** print evaluation for simulating the behavior of an offset print. Offset certifications shall always take place on **real** offset devices.



Constraint	Benchmark	Details
Average dE76	<4.0	E76 average distance between all swatches and their reference values. It has to be lower than 4.0.
Maximum dE76	<10.0	E76 distance between all swatches and their reference values. Results have to be lower than 10.0.
CMYK Maximum dE76	<5.0	E76 distance between the CMYK swatches and their reference values. Results have to be lower than 5.0.
Media Color dE76	<3.0	E76 distance between the media swatch and its reference value. It has to be lower than 3.0.

FOGRA PSD

The FOGRA certification called Process Standard Digital is based on the project of standard ISO 15311. It relies on two types: absolute (accurate color rendering) and relative (adaptation to the medium white point). It possesses three quality types: A, B and C.



Quality type A. Reference applications are full-page color advertisements, large-format professional studio photos (fine art).

This type is equivalent with ISO 12647-2 when printing on paper 1 or 2 (i.e. using coated stock).



Quality type B. Reference applications are product advertising, collaterals, print products with prestigious character for the areas of culture, fashion, art or architecture.



Quality type C. Reference applications are printed matter of a non-luxury nature, editorial section of periodicals and publications.

Information comes from the draft ISO-15311-2.

FOGRA PSD Absolute



Constraint	Benchmark			Details
	Type A	Type B	Type C	
Average dE00	<2	<3	<4	E00 average distance between all swatches and their reference values. It has to be lower than 2.
Maximum dE00	<6	<7	<8	E00 distance between all swatches and their reference values. Results have to be lower than 6.
Media Color dE00	<2	<3	<4	E00 distance between the media swatch and its reference value. It has to be lower than 2.
CMYRGB Maximum dH	<4	<5	<6	Hue difference between the CMYRGB swatches and their reference values. Results have to be lower than 4.
Average dC	<2.5	<3.5	<4.5	Chroma average difference between all swatches and their reference values. It has to be lower than 2.5.

FOGRA PSD Media Relative

The relative standard is production oriented and adapts itself to the white point. It cannot apply for every case; the gamut has to be checked before.

Working in relative will allow to use papers with gamuts that are not so far from the targeted one (here is FOGRA 39).



Constraint	Benchmark			Details
	Type A	Type B	Type C	
Media Color dC	<=5.50	<=7.50	<=10.50	Chroma distance between white media and the reference value. It has to be lower or equal to 5.50
Black Maximum dC	<=5.50	<=10.50	<=15.50	Chroma distance between the maximum black and the reference value. It has to be lower or equal to 5.50.
Average dE00	<1.5	<2.5	<4	E00 average distance between all swatches and their reference values. It has to be lower than 2.5.
95% dE00	<5	<7	<10	The E00 distances between all swatches and their reference values are calculated. An ascending sort is made and the 95th quantile is picked. It has to be lower than 7.0.

G7®

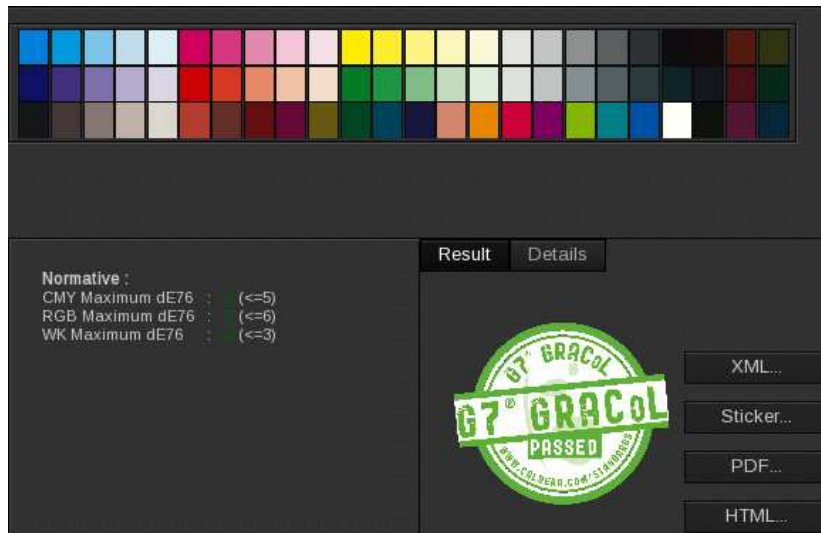
G7® standards have their own checking targets. If you choose to verify several G7® standard, you will have to print and measure several targets on a row.

G7® GrayScale



Constraint	Benchmark	Details
Pure Blacks Maximum wdL	<=3.00	Difference of the light between each patch of grey (only black ink) with its reference value. Results have to be lower or equal to 3.00.
Grey Balance Maximum wdL	<=3.00	Difference of the light between each patch of grey (CMY ink) with its reference value. Results have to be lower or equal to 3.00.
Pure Blacks Moyen wdL	<=1.50	Difference of the light between each patch of grey (only black ink) with its reference value. The results average has to be lower or equal to 1.50
Gray Balance Moyen wdL	<=1.50	Difference of the light between each patch of grey (CMY ink) with its reference value. The results average has to be lower or equal to 1.50
Gray Balance Maximum wdC	<=3.00	Difference of the chroma between each patch of grey (CMY ink) with its reference value. Results have to be lower or equal to 3.00.
Gray Balance Moyen wdC	<=1.50	Difference of the chroma between each patch of grey (CMY ink) with its reference value. The results average has to be lower or equal to 1.50

G7 GRACoL®



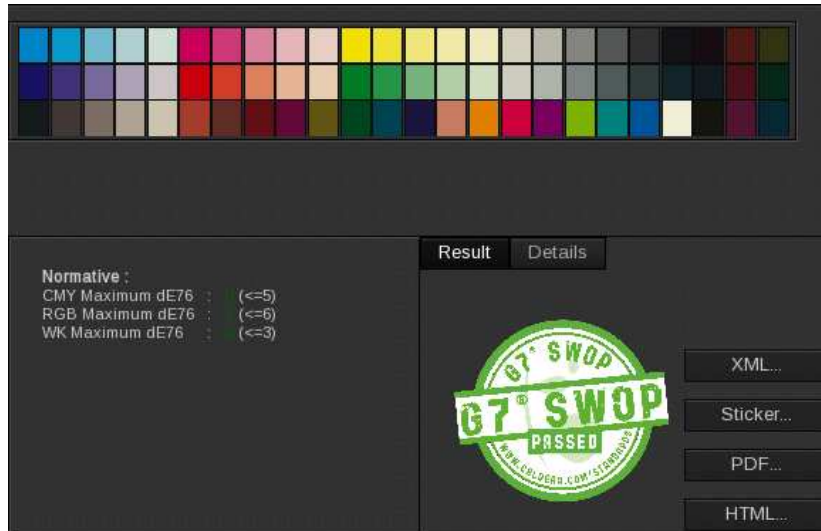
Constraint	Benchmark	Details
CMY Maximum dE76	<=5	E76 distance between the CMY swatches and their reference values. Results have to be lower than 5.0.
RGB Maximum dE76	<=6	E76 distance between the RGB swatches and their reference values. Results have to be lower than 6.0.
WK Maximum dE76	<=3	E76 distance between the White and Black swatches and their reference values. Results have to be lower than 3.0.

G7 SWOP® v3



Constraint	Benchmark	Details
CMY Maximum dE76	<=5	E76 distance between the CMY swatches and their reference values. Results have to be lower than 5.0.
RGB Maximum dE76	<=6	E76 distance between the RGB swatches and their reference values. Results have to be lower than 6.0.
WK Maximum dE76	<=3	E76 distance between the White and Black swatches and their reference values. Results have to be lower than 3.0.

G7 SWOP® v5



Constraint	Benchmark	Details
CMY Maximum dE76	<=5	E76 distance between the CMY swatches and their reference values. Results have to be lower than 5.0.
RGB Maximum dE76	<=6	E76 distance between the RGB swatches and their reference values. Results have to be lower than 6.0.
WK Maximum dE76	<=3	E76 distance between the White and Black swatches and their reference values. Results have to be lower than 3.0.