How to measure your proofs and press control and calibration bars with i1Pro, i1Pro 2 or i1Pro 3 (Eye-One Pro, Eye-One Pro 2 or Eye-One Pro 3)

Magic_Proof_&_Print_Control   **PLATE**   **MagicPress**   **MagicPrepress**   **SPOT_Color_Manager**

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1) Format of the measurement files processed by Colorsource applications:

Colorsource applications use conventional **CGATS** measurement files format (Committee for Graphic Arts Technologies Standards). This standards text format can be produced using a wide range of 45/0° spectrophotometers (X-Rite **i1Pro**, **i1Pro 2**, **i1Pro 3**, Konica-Minolta **Myiro**, Techkon **SpectroDens** etc.), combined with a wide range of measurement software, most of which are free. X-Rite **i1Pro 1**, **2 and 3** models can be used with **Colorsource** applications in their lowest cost **i1Pro BASIC** versions.

Spectral measurements, the only complete information about colors, allow **Colorsource** applications to compute and display all the instructions you need to properly calibrate, drive and control your CMYK printing presses, and more generally your printing presses using 1 to 10 inks, with or without a CMYK process base.

If a press calibration control bar measurement file only contains colorimetric data (e.g., apparent color such as C.I.E. L*a*b* D50 2° of each patch), **Colorsource** applications can use this data, but the displayed results are sometimes less complete; for example, it is not possible to compute the density corrections to be made on a press, nor to check the formulation of a PANTONE ink, in the absence of spectral measurements data.

2) Proof and press control bars supplied with each Colorsource application:

Each **Colorsource** application offers by default in its distribution .ZIP file, a choice of well-adapted charts. Each proof or press control bar and press calibration bar includes **a printable** image (e.g., a .TIF or .PDF CMYK image), plus a reference text file in **CGATS** format describing this control bar (e.g., the CMYK values of each of the control bar's patches).

The following chart is an example of a CMYK control bar that can be used with **MagicPress** to determine in one scan the optimal CMY and K print densities to be used for matching the CMYK aim colors of any public or private standard:

Hereafter is the associated reference file for measuring it, using **MeasureTool** or **i1Profiler** application:

```
LGOROWLENGTH      1
CREATED  "1/26/2014"  # Time: 14:58
KEYWORD "SampleID"
KEYWORD "SAMPLE_NAME"
NUMBER_OF_FIELDS 6
BEGIN_DATA_FORMAT
SampleID  SAMPLE_NAME      CMYK_C  CMYK_M  CMYK_Y  CMYK_K
END_DATA_FORMAT
NUMBER_OF_SETS    8
Measurement_mode  "gap"
BEGIN_DATA
1      A1      100      0        0        0
2      B1      0        100      0        0
3      C1      0        0        100      0
4      D1      0        0        0        100
5      E1      0        0        0        0
6      F1      0        100      100      0
7      G1      100      0        100      0
8      H1      100      100      0        0
END_DATA
```

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Regardless of the application used for measuring this CMYK chart, the resulting spectral measurement file will contain on one line for each patch: an index number (e.g., 1 for patch **1**), then the name of the patch (e.g., **A1**), then its CMYK values (e.g., **100**, 0, 0, 0), then its spectral values (e.g., 0. **0685**, 0. **119**, 0. **2103**, etc.: for **i1Pro**, 36 reflectance values for the 36 visible wavelengths ranging from 380 to 730 nm in 10 nm steps):

```
LGOROWLENGTH      1
CREATED   "11/16/2020" # Time: 12:10
INSTRUMENTATION   "Eye-One Pro"
MEASUREMENT_SOURCE        "WhiteBase=Absolute  Filter=No"
KEYWORD "SampleID"
KEYWORD "SAMPLE_NAME"
NUMBER_OF_FIELDS 42
BEGIN_DATA_FORMAT
```

SampleID	SAMPLE_NAME	CMYK_C	CMYK_M	CMYK_Y	CMYK_K	nm380	nm390	etc…		nm710	nm720	nm730
END_DATA_FORMAT												
NUMBER_OF_SETS 8												
BEGIN_DATA												
1	A1	100	0	0	0	0.0685	0.119	0.2103	…	0.4778	0.5704	0.669
2	B1	0	100	0	0	0.0959	0.093	0.1027	…	0.1661	0.1828	0.1946
3	C1	0	0	100	0	0.0479	0.0384	0.0314	…	0.0316	0.0315	0.0338
4	D1	0	0	0	100	0.0114	0.0118	0.0137	…	0.0181	0.0191	0.0196
5	E1	0	0	0	0	0.3509	0.3998	0.4931	…	0.9202	0.9836	1.0024
6	F1	0	100	100	0	0.0271	0.0215	0.0183	…	0.0217	0.0222	0.024
7	G1	100	0	100	0	0.0191	0.0226	0.0291	…	0.0411	0.0447	0.052
8	H1	100	100	0	0	0.0271	0.0456	0.0723	…	0.1507	0.1781	0.2051
END_DATA												

If the measurement file does not contain the spectral measurement of each patch, but only a colorimetric measurement such as XYZ and/or Lab, **Colorsource** software dos use the available colorimetric measurements, and informs the user, if necessary, of the absence of spectral measurements in the file.

The following is an example of a measurement file containing only colorimetric data (hereafter XYZ and Lab):

```
LGOROWLENGTH      1
CREATED   "10/15/2011" # Time: 10:35
INSTRUMENTATION   "Unknown"
MEASUREMENT_SOURCE "Illumination=Unknown ObserverAngle=Unknown WhiteBase=AbsFilter=Unknown"
KEYWORD "SampleID"
KEYWORD "SAMPLE_NAME"
NUMBER_OF_FIELDS 8
BEGIN_DATA_FORMAT
```

SampleID	SAMPLE_NAME	XYZ_X	XYZ_Y	XYZ_Z	LAB_L	LAB_A	LAB_B
END_DATA_FORMAT							
NUMBER_OF_SETS 8							
BEGIN_DATA							
1	A1	16.96	25.68	53.81	57.73	-37.67	-46.32
2	B1	34.66	18.66	15.09	50.28	69.81	0.74
3	C1	71.89	77.51	7.96	90.56	-5.90	91.96
4	D1	1.83	1.90	1.48	14.98	-0.25	1.07
5	E1	88.36	91.98	73.80	96.81	-0.59	1.79
6	F1	30.71	17.02	2.25	48.28	64.40	50.63
7	G1	8.60	19.44	6.47	51.20	-66.23	30.24
8	H1	5.11	3.38	13.08	21.51	26.17	-43.57
END_DATA							

![COLORSOURCE logo] *COLORSOURCE*

3) Measurement of a control bar over several copies, for working from average press measurement:

In the previous example, measuring a single chart is enough, since **MagicPress** calculates the four optimal CMYK density corrections from a single measurement of a CMYK chart, printed with any CMYK densities.

But for computing with **MagicPrepress** application, the correction curves allowing to comply with the aim printing standard, we recommend measuring the press control bar not on one, but on several printed copies, in order to take into account, the much more relevant press average measurement.

This is why some control bars are supplied with several reference text files, allowing to measure them on a single copy for **MagicPress,** and then on several printed copies for **MagicPrepress**.

For example, the following control bar is convenient for calibrating web offset presses. It can be used with **MagicPress** (a single scan for computing the optimal CMYK print densities), and then with **MagicPrepress** (Scan 15 printed copies for computing or updating the CMYK plate correction curves based on averaged measurements):

- The reference file named **CMYK_chart_offset_1_line_32_patches_1X** allows measuring this target by one scan, on a single copy, for **MagicPress**,
- The reference file named **CMYK_chart_offset_1_line_32_patches_15X** allows measuring this target 15 times, on 15 copies: (15 x 32 patches = 480 patches in total).

4) Other control bars and charts for use by Colorsource applications:

In practice, **Colorsource** applications can open and process any colorimetric and/or spectral measurement file, of any control bar or color chart of any size, with CMYK or N-Colors (One to ten colors), and with or without a process base.
Sample control bars and calibration bars for presses and proofs, and the associated reference files for measuring them, are provided in the distribution ZIP of each **Colorsource** application, ensuring excellent results.

In addition, experienced users can also create their own control bars of one to ten colors, as well as the associated reference files for measuring them on one or more printed copies.

In practice, the easiest way is to first create the control bar in Excel, as a reference file in CGATS format; then copy and paste it to a text file, and then convert this text file using free **Colorlab** applications into a printable control bar tailored for **i1Pro 1**, **2** or **3**.

Colorlab allows creating and saving a printable chart measurable in scan mode with **i1Pro 1**, **2** or **3**, from any text reference file in CGATS format describing a one to eight colors chart. This chart can be repeated from 1 to N times depending on the number of printed copies you want to measure, and then average using Colorsource applications.

5) Measurement of control bars with X-Rite Eye-One Pro 1, 2 or 3 devices:

The control bars can be measured using **Eye-One Pro 1**, **2** or **3** instruments, using free **measurement software MeasureTool** and/or **i1Profiler**.

The X-Rite **i1Pro**, **i1Pro 2 and i1Pro 3** models can be used in their inexpensive **BASIC** versions:

- **MeasureTool** software can be used with **Eye-One Pro** and **Eye-One Pro 2** spectrophotometers,
- **i1Profiler** software can be used with **Eye-One Pro 2** and **Eye-One Pro 3** spectrophotometers.

6) Convenient measurement of proof control and press calibration bars using MeasureTool (with X-Rite i1Pro and i1Pro 2 models):

MeasureTool is one of the modules of **ProfileMaker** software, dedicated to the measurement of charts and control bars. A pity it is not compatible with **i1Pro 3** model, because **MeasureTool** is an excellent and flexible measurement software. The measurement functions offered by **MeasureTool**, can be used free of charge. More generally, many of the functions offered by **ProfileMaker** software modules are quite useful, even without a license.

Download link for **ProfileMaker** for 32-bit or 64-bit Windows:
https://www.xrite.com/service-support/downloads/p/profilemaker_v5_0_10

Do not interrupt **ProfileMaker** installation too early: Wait for the **ProfileMaker** installation completion message.

If you do not own the **ProfileMaker** license, **MeasureTool** will remind you every time you start, but it will not prevent you from using all measurement functions with your **i1Pro** or **i1Pro 2**:
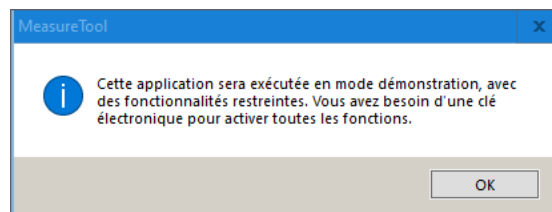
6-1) Charts and reference files installed by default with ProfileMaker:

If you selected the **i1Pro** charts during the installation, the **Reference Files** subdirectory contains the CGATS reference files for measuring the charts proposed in the **Testcharts** subdirectory. For example, on the screenshot below, the reference file **ECI2002CMYK i1(A3).txt** is intended for measuring the CMYK **ECI2002** press characterization chart, with **i1Pro** or **i1Pro 2**:

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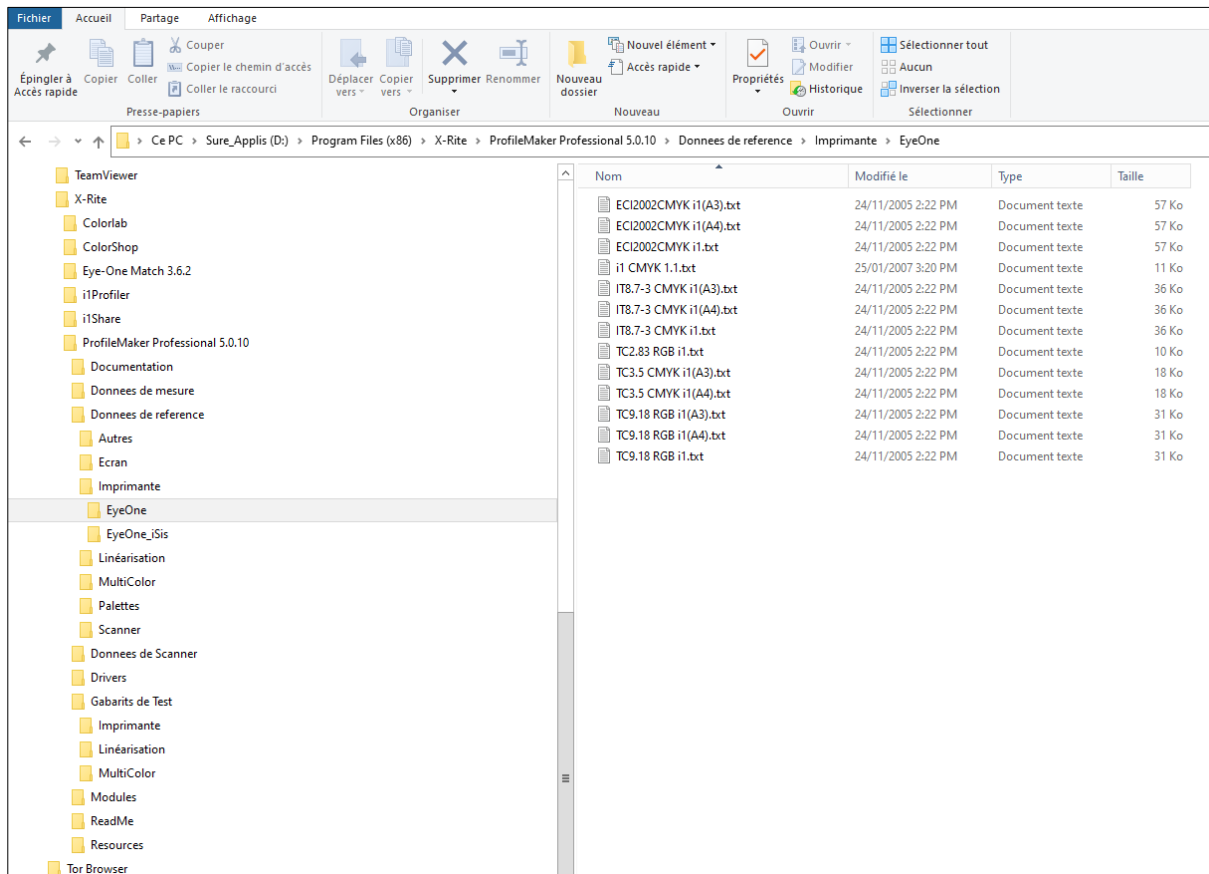
This ECI2002 CMYK chart is present as below in the form of two A3 pages present in the subdirectory **Testcharts/Printer/EyeOne**, as **ECI2002 CMYKi1(A3)_1_2**.**tif** and **ECI2002 CMYKi1(A3)_2_2**.**tif**:

The Testcharts subdirectory: Contains charts to be printed and then measured using the **i1Pro** or **i1Pro 2** (and other X-Rite measuring instruments), classified as **Multicolor**, **Linearization** and **Printer** charts.

These test charts are not of interest to **Colorsource** software. Keep them (and their associated reference files in the **Reference Files** subdirectory) only if you own the **ProfileMaker** license and also use this excellent software for classic color management operations (Such as making color peripherals I.C.C. profiles etc.).

6-2) Implementation of reference files for measuring control bars for Colorsource applications:

If you are using **MeasureTool** only for **Colorsource** software (measurement of calibration bars for offset plates and printing presses, control bars for proof and prints etc.), delete all reference files from the subdirectories of **Reference Files**, so as not to unnecessarily clutter the **MeasureTool** drop-down menu for designating the chart to be measured.

You can then place the **Colorsource** applications reference files (**PLATE**, **Magic_Proof_&_Print_Control**, **MagicPress**, and **MagicPrepress**) in the **Linearization**, **Others**, and/or **Printer** subdirectories:
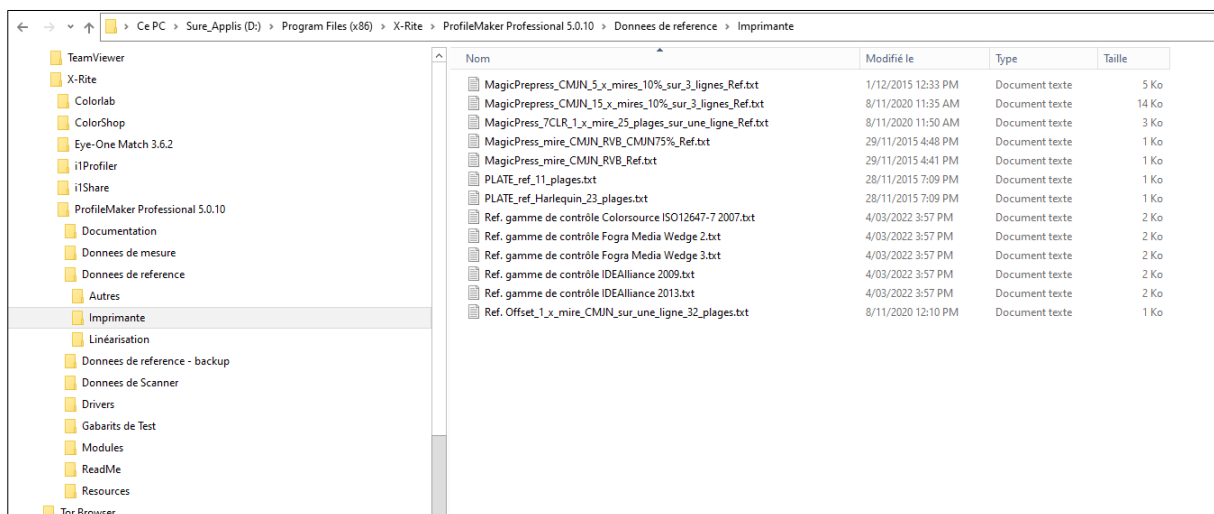
This will allow you to access all useful reference files directly in the **MeasureTool** drop-down menu, which is faster than accessing them by navigating through the subdirectories via the choice **Open**... from the **Test Chart Measurement** menu below:
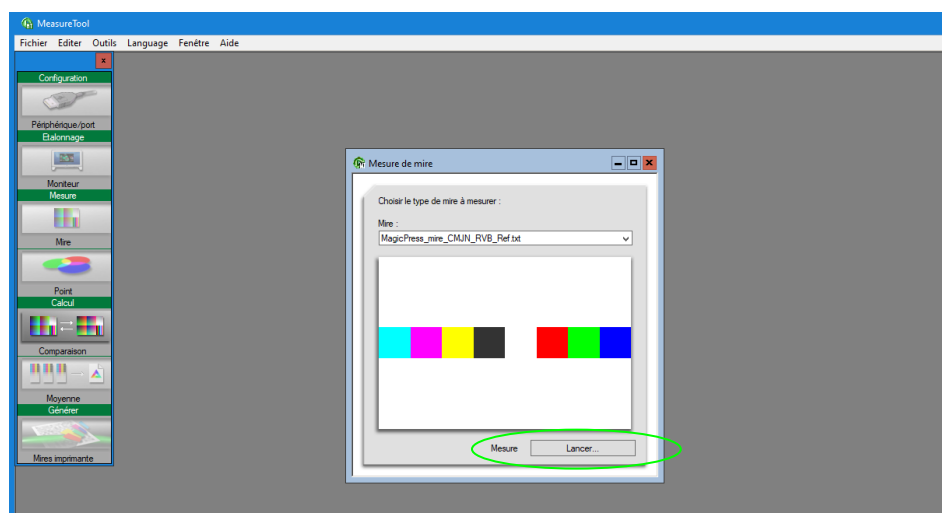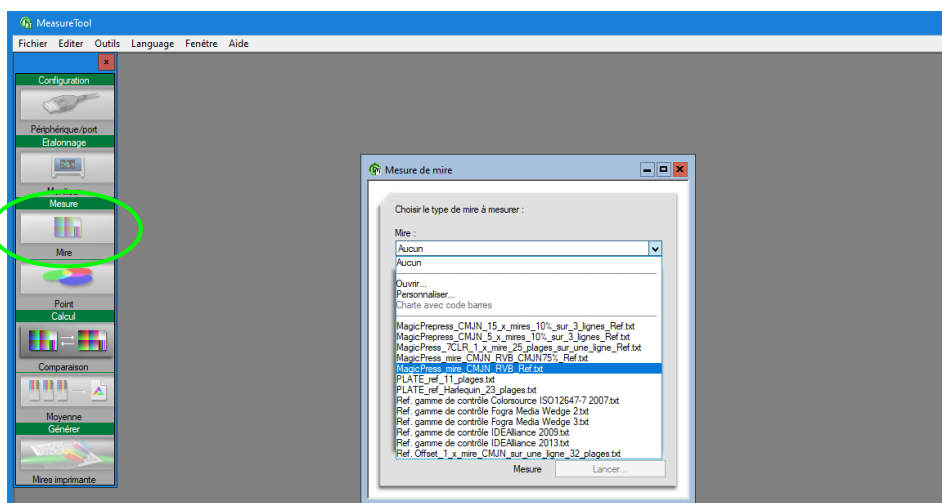
6-3) Making spectral measurements with MeasureTool:

For **i1Pro** and **i1Pro 2**, **MeasureTool** must be configured as follows (**Configuring** toolbar):
Reflection measurements (**Reflection box checked**), and spectral measurements (**Spectral box checked**):
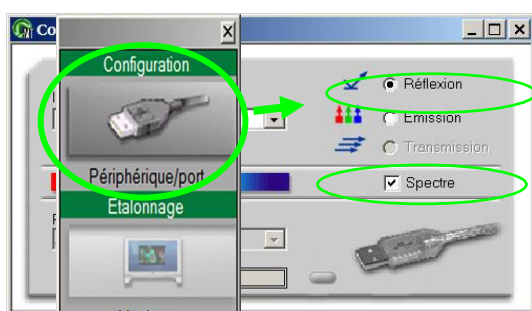
If the Spectral check box is not checked, your measurement files will only contain the C.I.E. XYZ and Lab D50 values of the measured control bars. If necessary Colorsource applications will warn you about this mistake that will prevent them from computing and displaying all the expected results.

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For measuring a test chart, choose **Measuring Chart** from the toolbar, choose the chart from the drop-down menu, press **Launch**, and then calibrate the spectrophotometer as prompted. Performed using the **CMYK_chart_offset_1_line_32_patches_1X**.**txt** reference file, the CMYK chart measurement file will allow **MagicPress** calculating the optimal CMYK print densities:
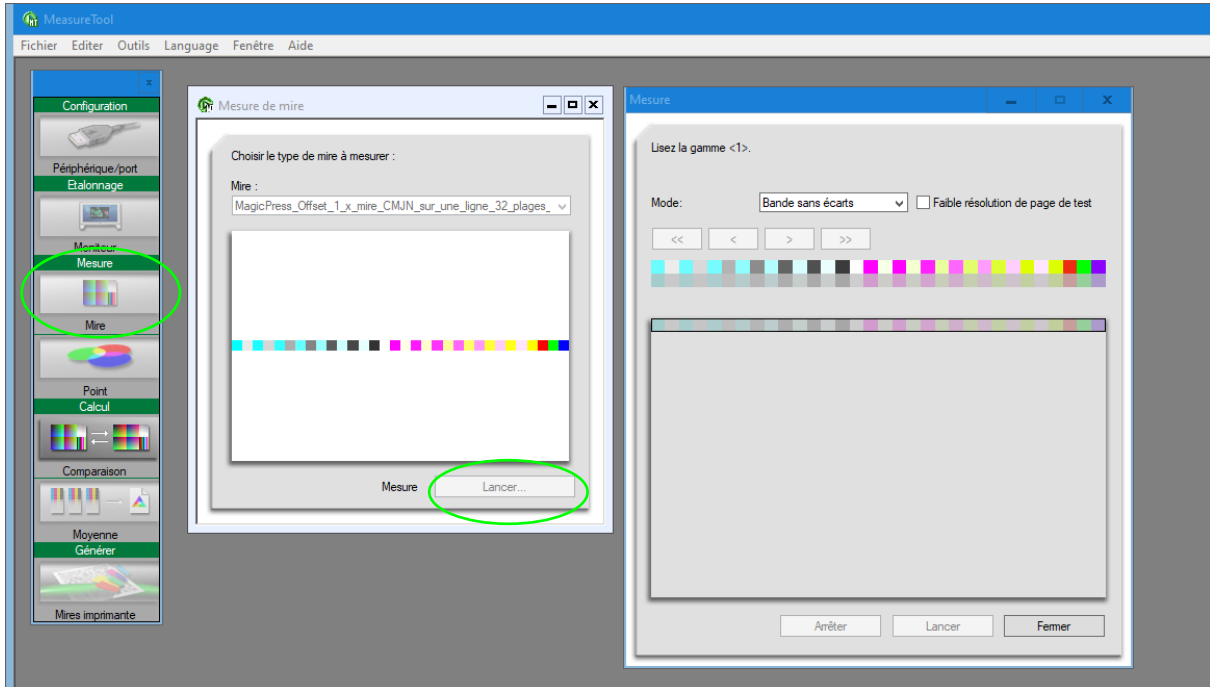
Once the target is scanned using **i1Pro** or **i1Pro 2**, press the **Close** button. **Do not use the** "**Export Lab" button**... (you want spectral measurements), but use **File/Save As**..:

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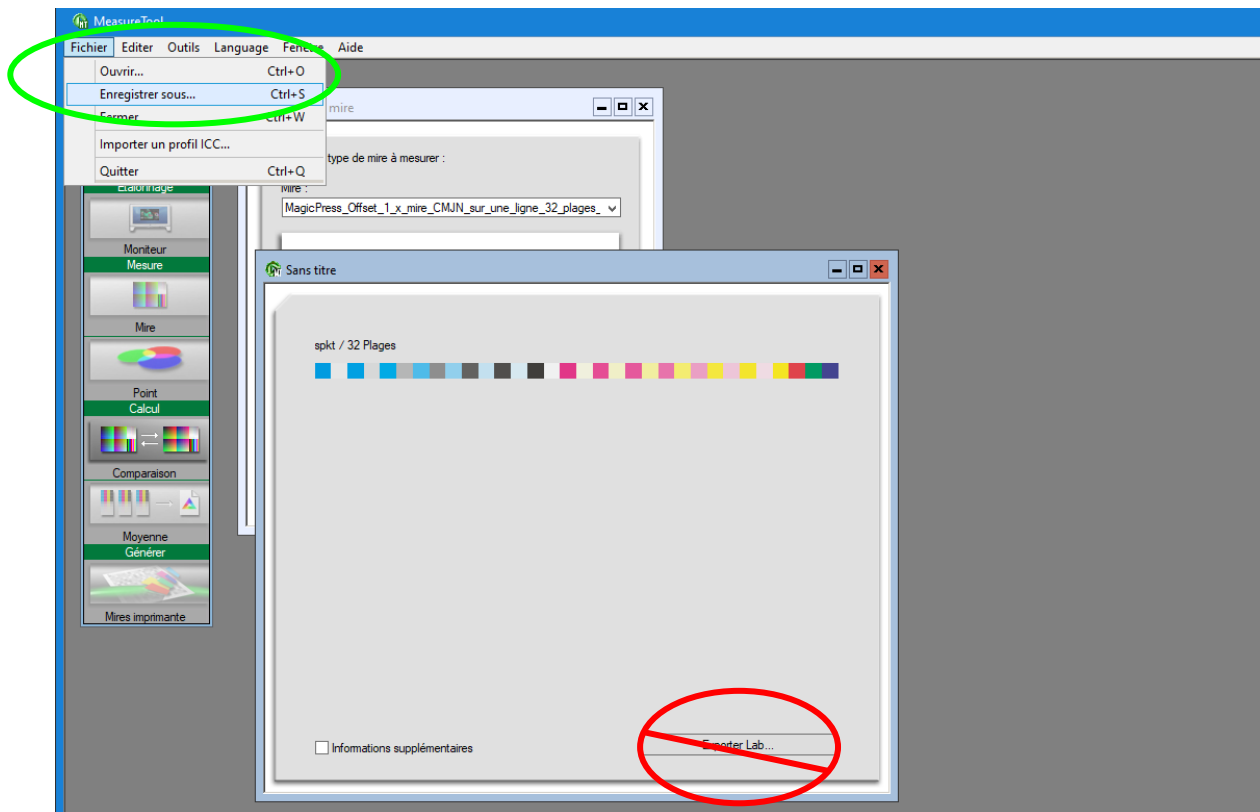
The recorded spectral measurement file could also be used with **MagicPrepress** application for computing or updating the CMYK correction curves on the workflow.

But for using **MagicPrepress** it is much better measuring the average chart printed on several copies, by using the reference file **CMYK_chart_offset_1_line_32_patches_15X**.**txt**:
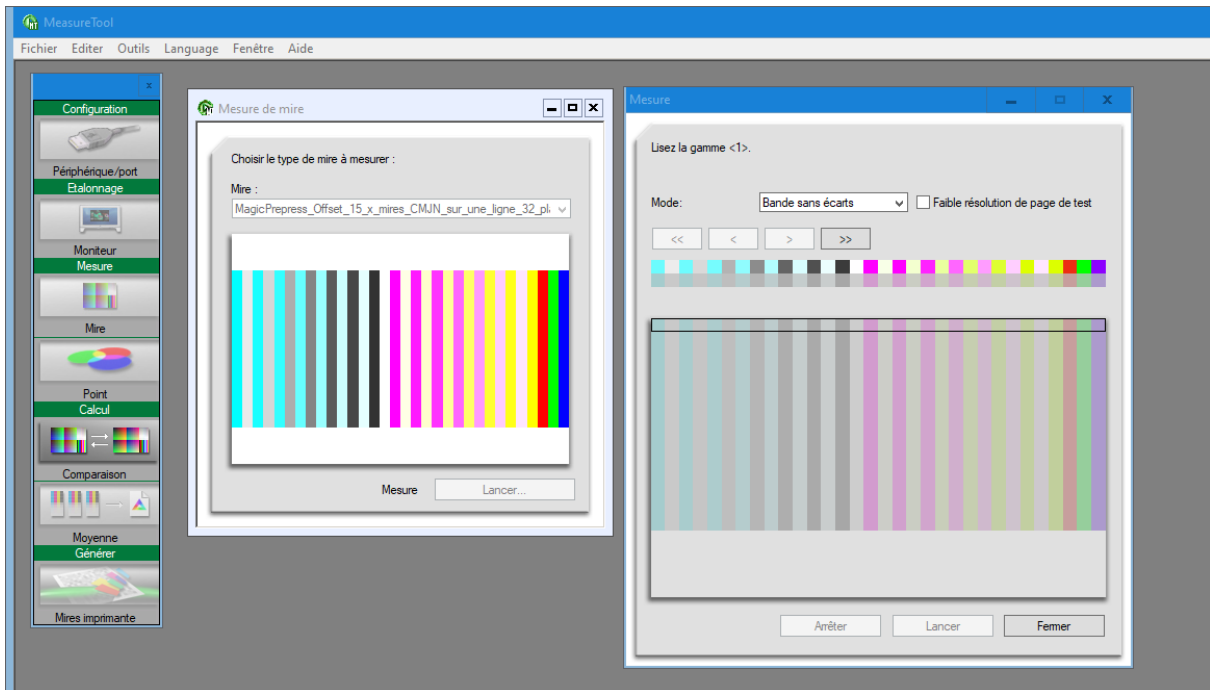
Below, for example, six press control bars were scanned on six copies:
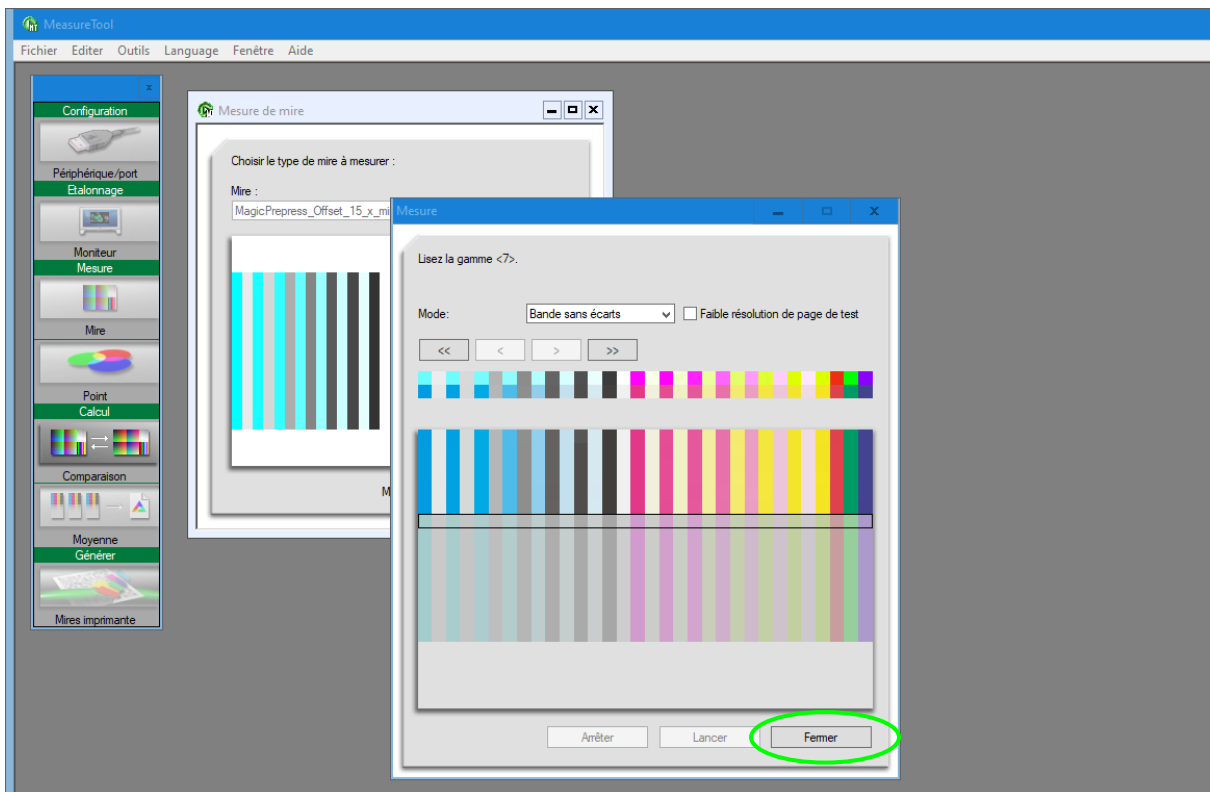
The measurement process can be stopped at any time, by pressing the **Close** button.

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Below is the measurement file obtained after scanning 6 of the 15 targets allowed by the reference file **CMYK_chart_offset_1_line_32_patches_15X.txt**, and then pressing the **Close** button.

Make **File/Save As**... (or "**Ctrl s**"). The spectral values of the unmeasured control bars (displayed in black) will be zeros in the recorded measurement file, and of course **Colorsource** applications will not take them into account for computing the average spectral values of the 6 measured control bars:
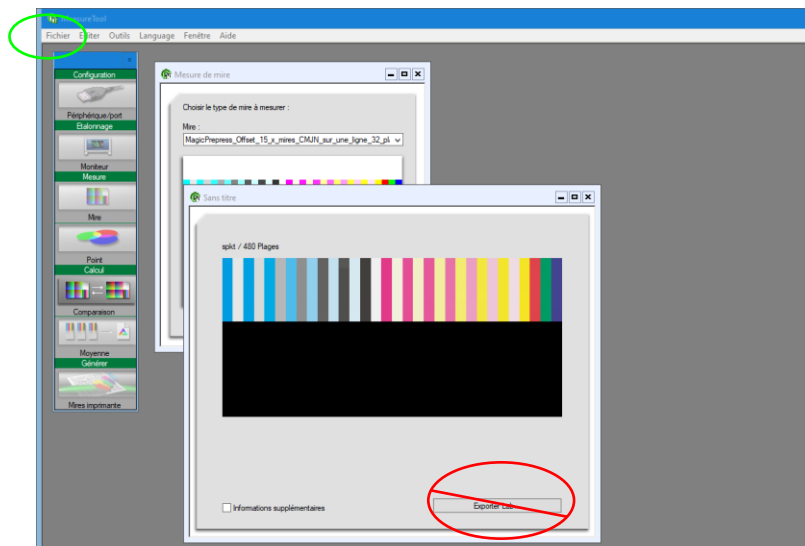
All measurement files can be opened by **Colorsource** applications using their "**Import**" button(s).

The "**Refresh**" button offered by **MagicPress** application allows you to automatically re-import the last imported measurement file with same name, for quickly updating the optimal densities results when the measurement file is updated.

6-4) Example of measuring a 7CLR control bar with MeasureTool:

MeasureTool is used the same way for measuring all test charts, whether they are CMYK or N-Colors. For example, measuring the 7CLR chart below for **MagicPress**, using the **7CLR_chart_25_patches_1_line_1X.txt** reference file:

![COLORSOURCE logo]
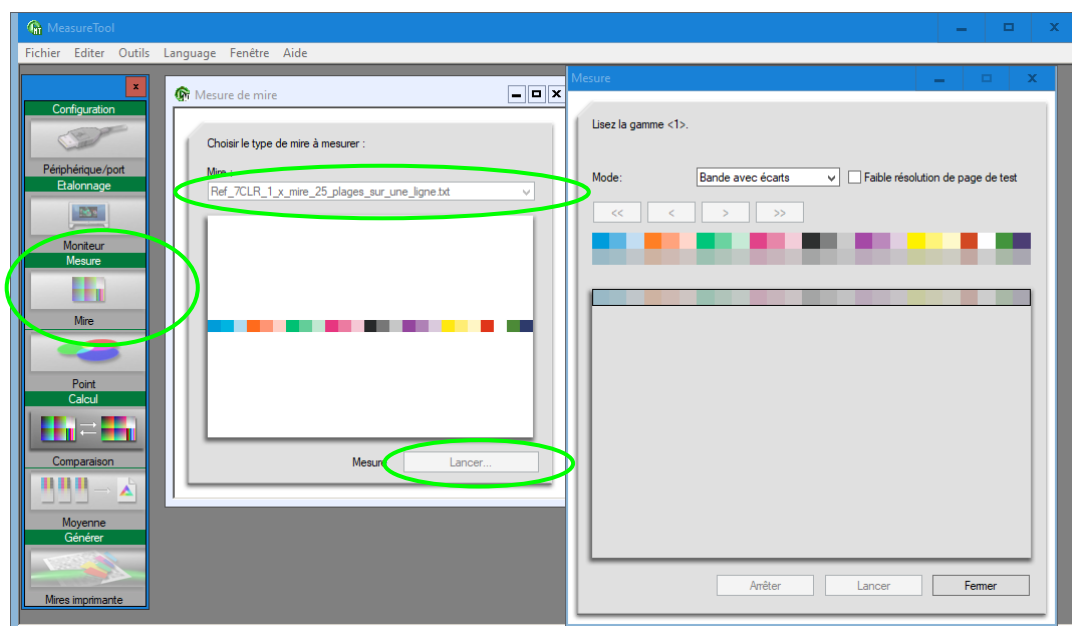
Measuring 12 targets on 12 printed copies for **MagicPrepress** using the **7CLR_chart_25_patches_1_line_12X.txt** reference file:
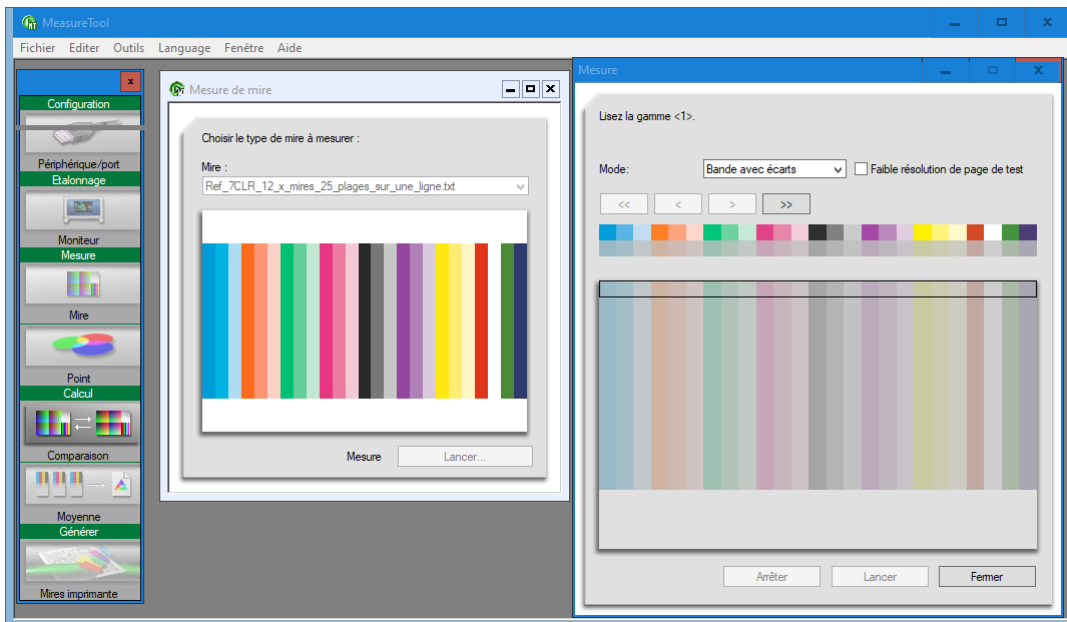
Note that **MeasureTool** always shows a good display of the "colors to be measured" regardless of the arbitrary order of the 7 colors in the reference file (e.g., above **CLR_1** to **CLR_7** = **C**, **Orange**, **Green**, **M**, **K**, **Purple** and **Y**).

This purely arbitrary order of the 7 colors in the text reference file in CGATS format has no relation to the physical order chosen for laying down the seven inks on the press.

 i1Profiler will also allow correct measurement of these 7 colors' charts by using this same N-Color CGATS reference file, but its display of the "colors to be measured" will only be approximately correct if the CGATS reference file contains the CMYK inks specified respectively as CLR_1, CLR_2, CLR_3 and CLR_4.

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7) M**easurement of proof control and press calibration bars using i1Profiler (with X-Rite i1Pro 2 and i1Pro 3 models):**

i1Profiler allows you performing charts' spectral measurement using the **i1Pro 2** and **i1Pro 3** spectrophotometers: https://www.xrite.com/fr-fr/service-support/downloads/i/ **i1Profiler-i1publish_v3 5 0**

In practice **i1Profiler** is mainly used with **i1Pro 3**, because it does not bring any advantage compared with **MeasureTool**.

The reference text files supplied with **Colorsource** distribution ZIPs allow **i1Profiler** measuring all matching control bars on one or more printed copies, as done with **MeasureTool**.

7-1) Charts and reference files installed by default with i1Profiler:

i1Profiler bizarrely stores all of its auxiliary files in a hidden Windows' subdirectory. To easily access this hidden subdirectory by navigating in Windows File Explorer, simply configure it as follows: Check the **Hidden items** check box on the **Display** tab of the explorer:
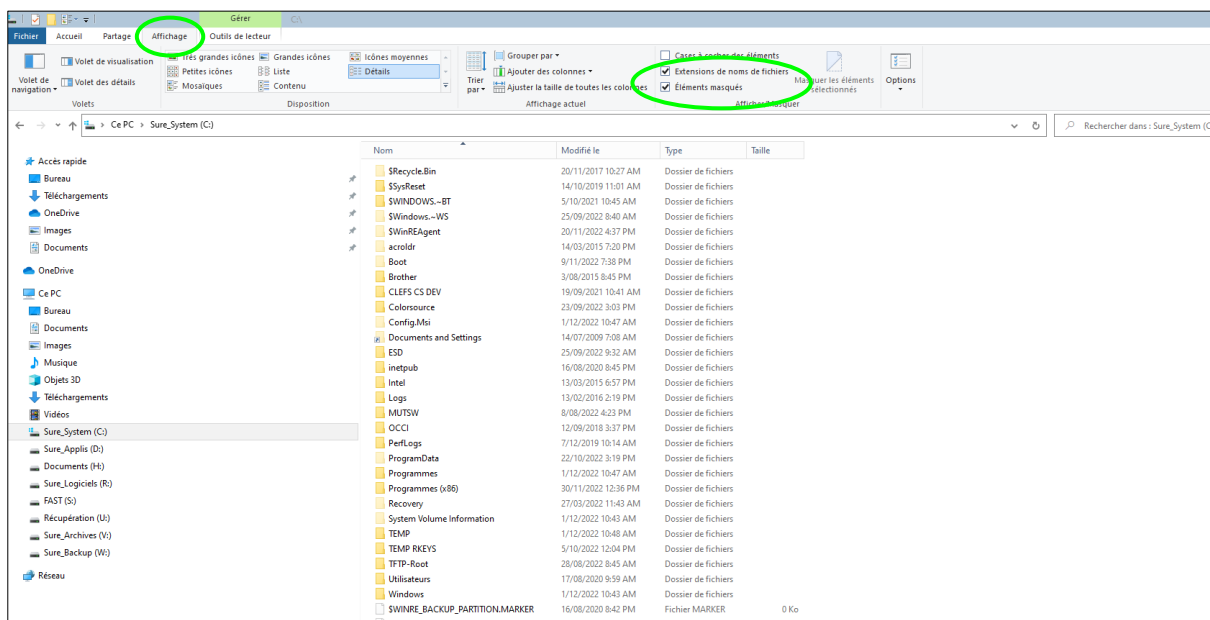
You can then navigate to the **C:\ProgramData\X-Rite\i1Profiler** directory:

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Note that even if you have not configured Windows File Explorer to show the hidden files, you can access this directory by typing **C:\ProgramData\X-Rite\i1Profiler** in the explorer navigation bar as follows: (or in the address bar of a web browser)

7-2) Setting up reference files for measuring charts for Colorsource applications:

i1Profiler allows you measuring any chart or control bar such as **RGB**, **CMYK** or **N-Colors** with **CMYK** base. **N-Color charts** (Five to eight colors) are designated in **i1Profiler's** menus as **CMYK+1**, **CMYK+2**, **CMYK+3**, and **CMYK+4**.
For each type chart, all the data (including the reference files, and the measurement files made for **Colorsource** applications) are stored in the following **ColorSpace** directories:

For example, the **ColorSpaceCMYK** subdirectory contains all the data needed for measuring CMYK control bars and charts, including **PatchSets** (Reference files) and **MeasureReferenceMeasurements** (Measurement files):

- The **PatchSets** subdirectory of **ColorSpaceCMYK**: Should contain the reference files of all the CMYK charts you want to measure. These reference files can be in CGATS universal text format (same as the reference files used by **MeasureTool**). This **PatchSets** directory is chosen by default when you select **CMYK Printer** device in the drop-down menu, and then press the **Measure Reference Chart** button:
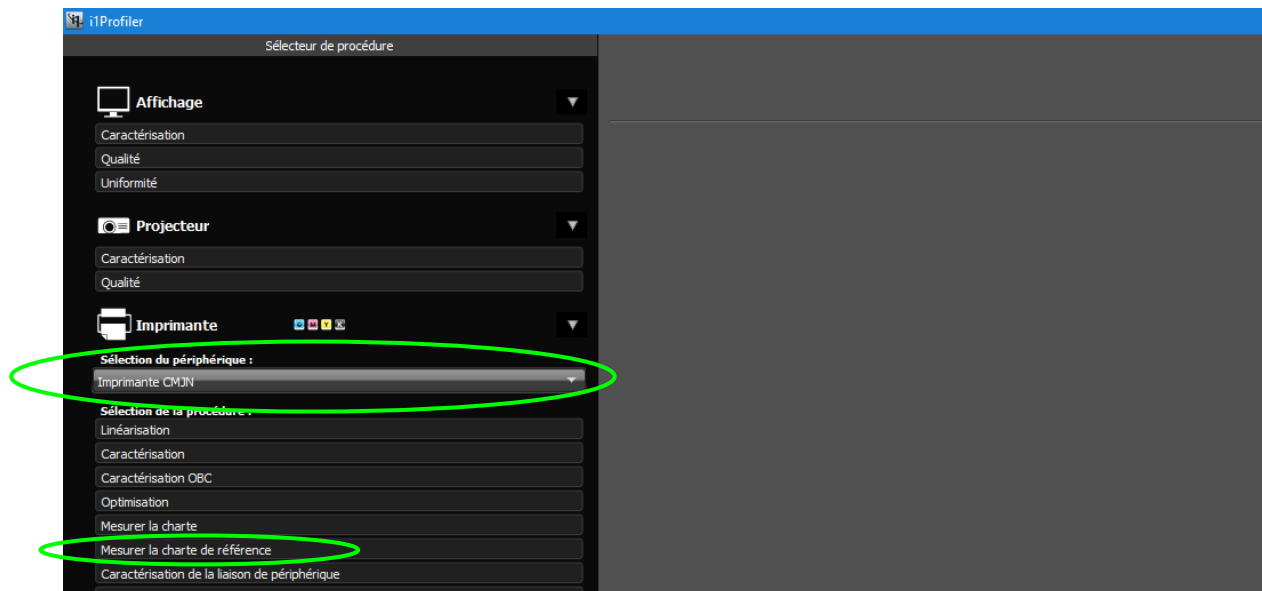
- The **MeasureReferenceMeasurements** subdirectory of **ColorSpaceCMYK**: Will contain the charts' measurement files made using the reference files chosen in the **PatchSets** directory.

Similarly, each ColorSpaceCMYK + i subdirectory (with i ranging from 1 to 4) contains:

- A **PatchSets** subdirectory: That contain the reference files of all **CMYK + i Colors** charts. **i1Profiler** will open by default this **PatchSets** directory when you select the **CMYK+i Printer** device in its drop-down menu, and then press the **Measure Reference Chart** button:
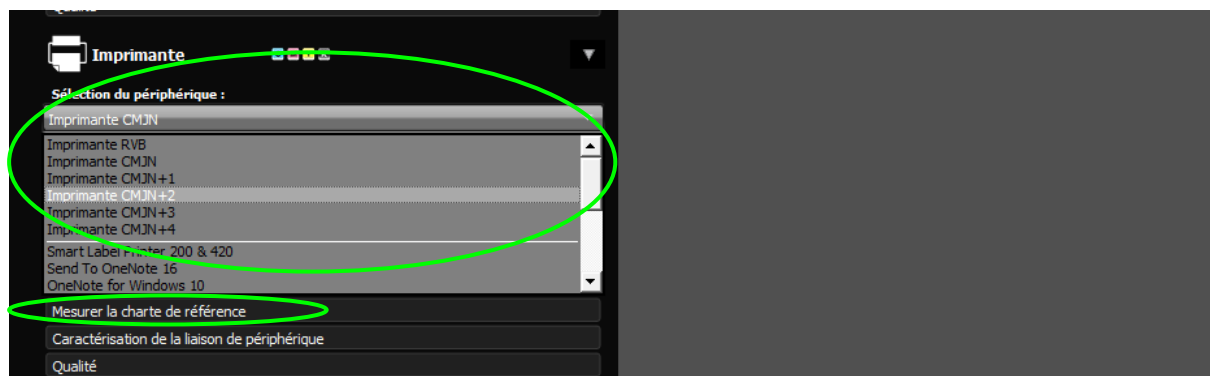
- A **MeasureReferenceMeasurements** subdirectory: That contain all measurement files of all measured **CMYK + i Color(s)** charts.

If a subdirectory (for example **ColorSpaceCMYK+4**) does not contain a **PatchSets** subdirectory, and you want to measure a **CMYK + 4** chart with **i1Profiler**, simply create this **PatchSets** subdirectory manually and place in it all your CGATS reference file(s) describing the **CMYK + 4 Color** chart(s) to be measured.

You can add the reference files of all **Colorsource** applications' charts (**PLATE, Magic_Proof_&_Print_Control**, **MagicPress**, and **MagicPrepress** ...), according to their number of colors, in the **PatchSets** subdirectories of **ColorSpaceCMYK**, **ColorSpaceCMYK+1**, ..., **ColorSpaceCMYK+4**.

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If you use **i1Profiler** only for **Colorsource** applications (Measurement of offset plates, press calibration charts, print and proof control bars etc.), clean up all unnecessary reference files in each **PatchSets** subdirectory of **ColorSpaceCMYK**, **ColorSpaceCMYK+1**, ..., **ColorSpaceCMYK+4**.

For example, below are sample CGATS reference files of CMYK press control bars, provided with **Colorsource** applications, installed in the **ColorSpaceCMYK/PatchSets** directory:
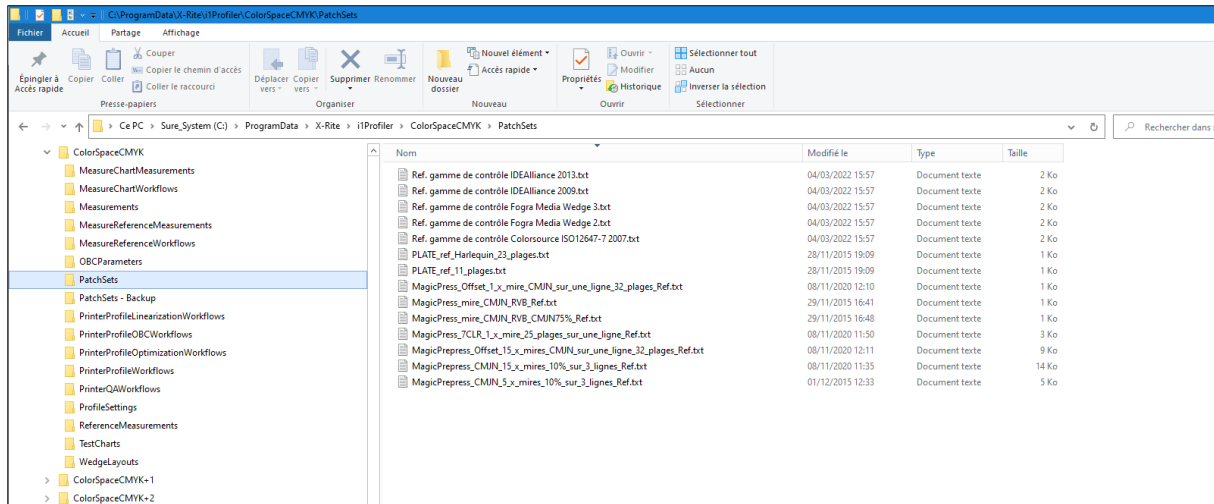
7-3) Performing spectral measurements with i1Profiler:
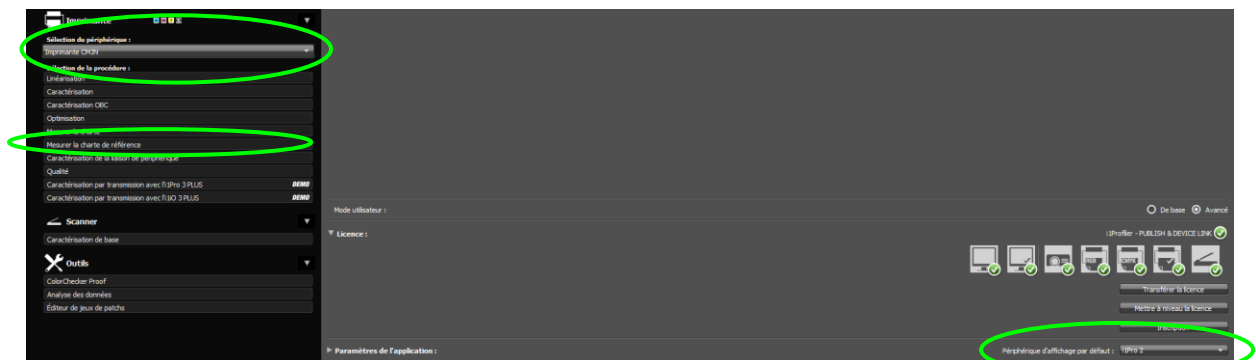
You must declare at the bottom right the model of your spectrophotometer (**i1Pro 2** or **i1Pro 3 / i1Pro 3 PLUS**).

The least expensive **i1Pro BASIC** version are sufficient to use all **Colorsource** software, if you do not need the color management functions offered by **i1Profiler** (Making color peripherals I.C.C. profiles etc.).

If you do not own the **i1Profiler** license, many functions will be marked as *DEMO,* but all the necessary functions for measuring your control bars and press calibration bars will be available.

Choose the type of chart to be measured at the top left, using the **Device Selection** drop-down menu (Above **CMYK Printer**), then press the **Measure Reference Chart** button. (Understand in good English "Measure a chart specified by a reference file").

When pressing the **Load** button, **i1Profiler** opens the following menu allowing you declaring specifying the reference file of the CMYK chart you want to measure, in the Windows subdirectory **C:\ProgramData\X-Rite\i1Profiler\ColorSpaceCMYK\PatchSets**:
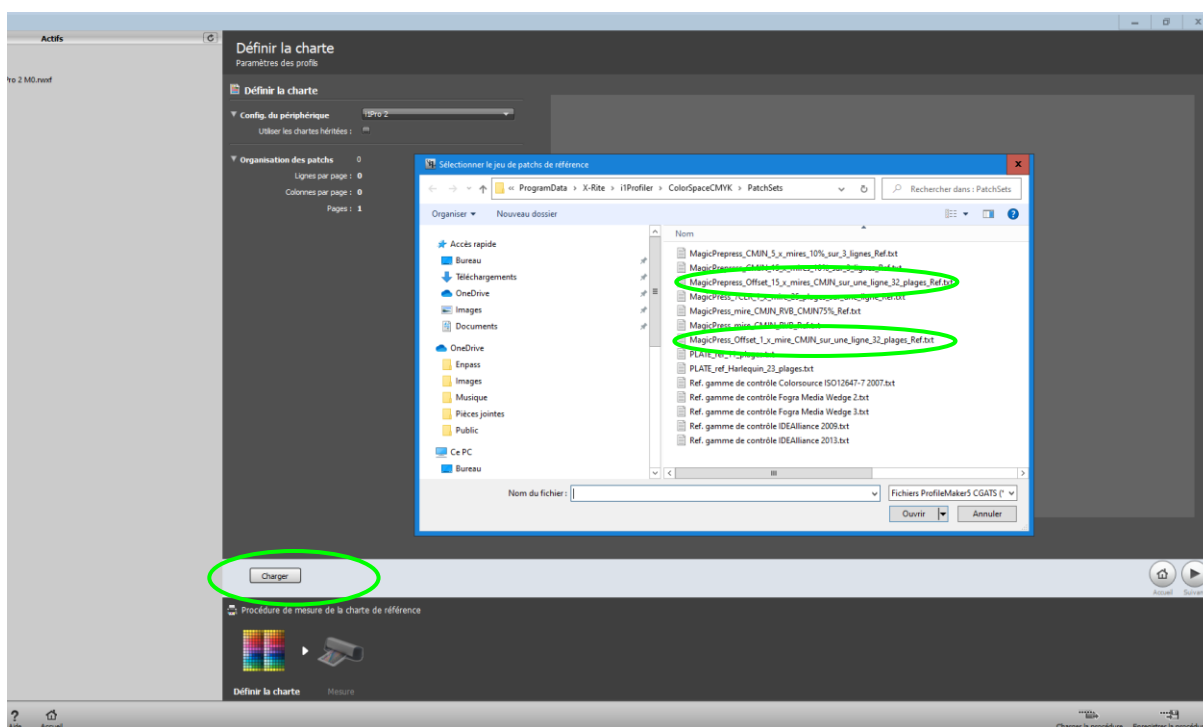
If you choose the **CMYK_chart_offset_1_line_32_patches_1X**.**txt** reference file, **i1Profiler** then proposes to measure the corresponding printed chart on a single copy:
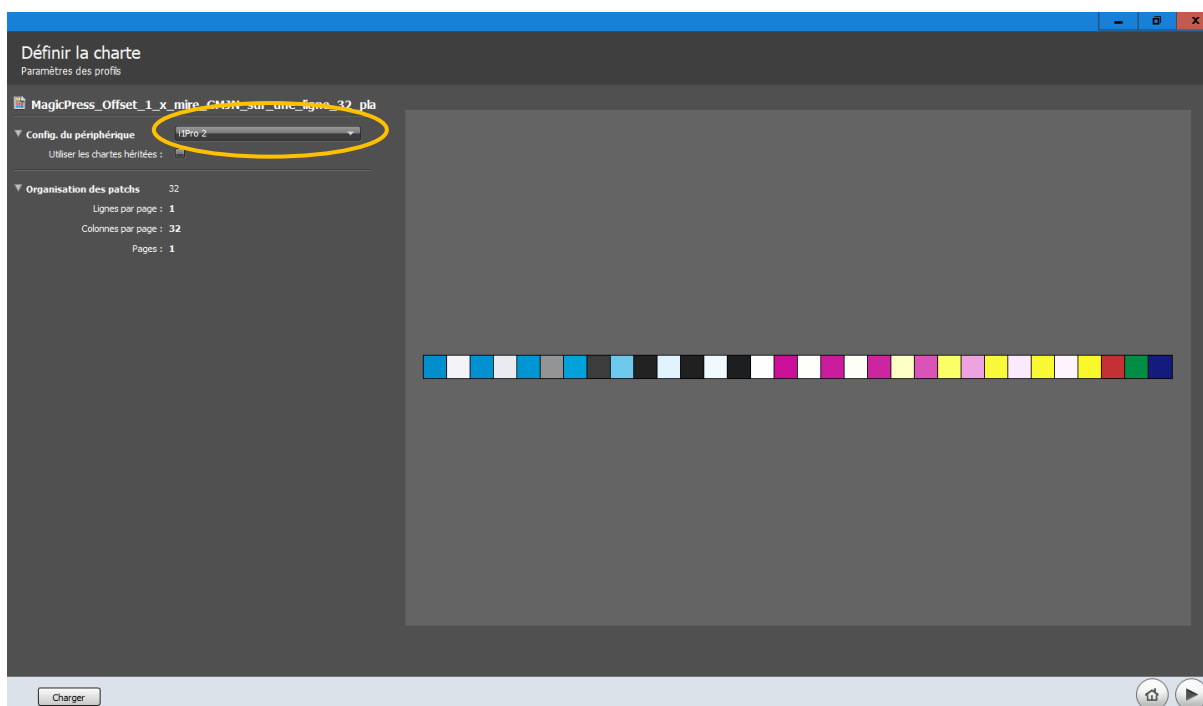
Please note that a bug in the **i1Profiler version 3.5.0** requires here you declare your **i1Pro 2** or **i1Pro 3** spectrophotometer **again**, in the drop-down menu circled in orange above. (**i1Profiler** has accustomed us to a long list of bugs ... for more than 10 years now, while ProfileMaker works perfectly).

Measuring a single CMYK control bar as above is perfect for using **MagicPress**, or for controlling a color proof with **Magic_Proof_&_Print_Control**, but of course we recommend measuring press control bars on multiple copies for calculating or updating the plate's correction curves of a web offset press.

If we choose the **CMYK_chart_offset_1_line_32_patches_15X**.**txt** reference file, **i1Profiler** then proposes to measure the corresponding printed chart on 15 copies:
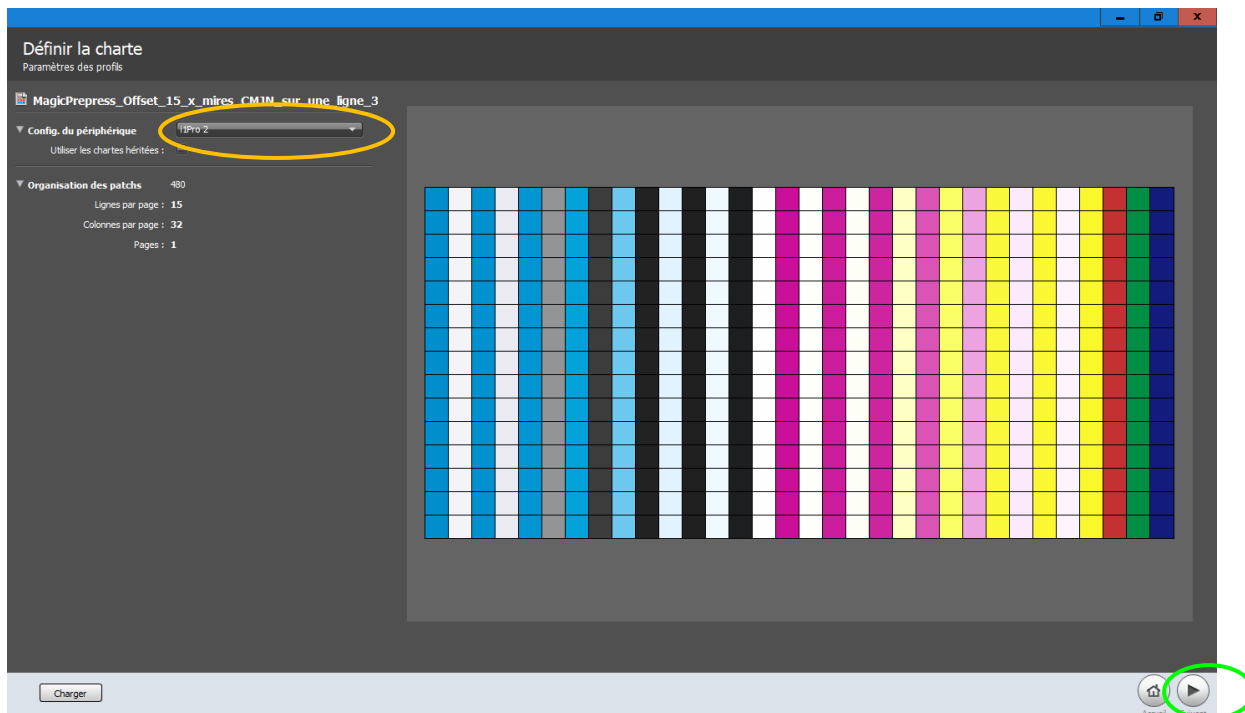
Don't forget to redeclare your **i1Pro 2 or i1Pro 3** instrument in the drop-down menu above circled in **orange** because of the current **i1Profiler** bug. (v3.5.0). And then, use the arrow at the bottom right of the window to open the menu below allowing you to calibrate your spectrophotometer.

Choose the **Single Scan** measurement mode, calibrate the spectrophotometer and you are ready to measure your target (Hereafter, 15 times the same pattern of 32 patches spread over a single row):
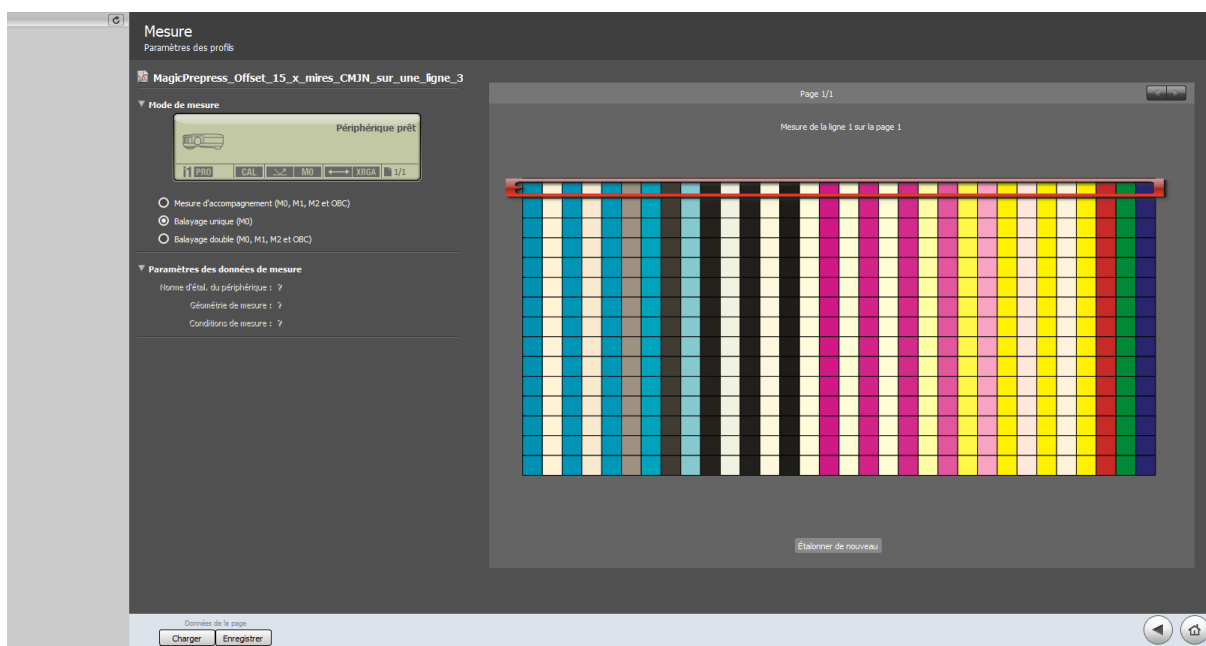
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Note that with **Single Scan** measurement mode, you will record one M0 spectral measurement file with **i1Pro 2** (as with **MeasureTool**), and three **M0**, **M1** and **M2** spectral measurement files with **i1Pro 3**.
No practical use with **Colorsource** software: just don't forget declaring in Colorsource applications' **Preferences** if you are using spectral measurements made in M0 or M1 condition.

To know everything about the above mentioned **M0**, **M1** and **M2** measurement conditions, read our paper at:
https://www.color-source.net/en/Docs_Formation/2021_POINT_ABOUT_ISO_12647_STANDARDS.pdf

After scanning the 15 rows, use the **Save** button. **i1Profiler** then offers you several possible recording formats as follows:
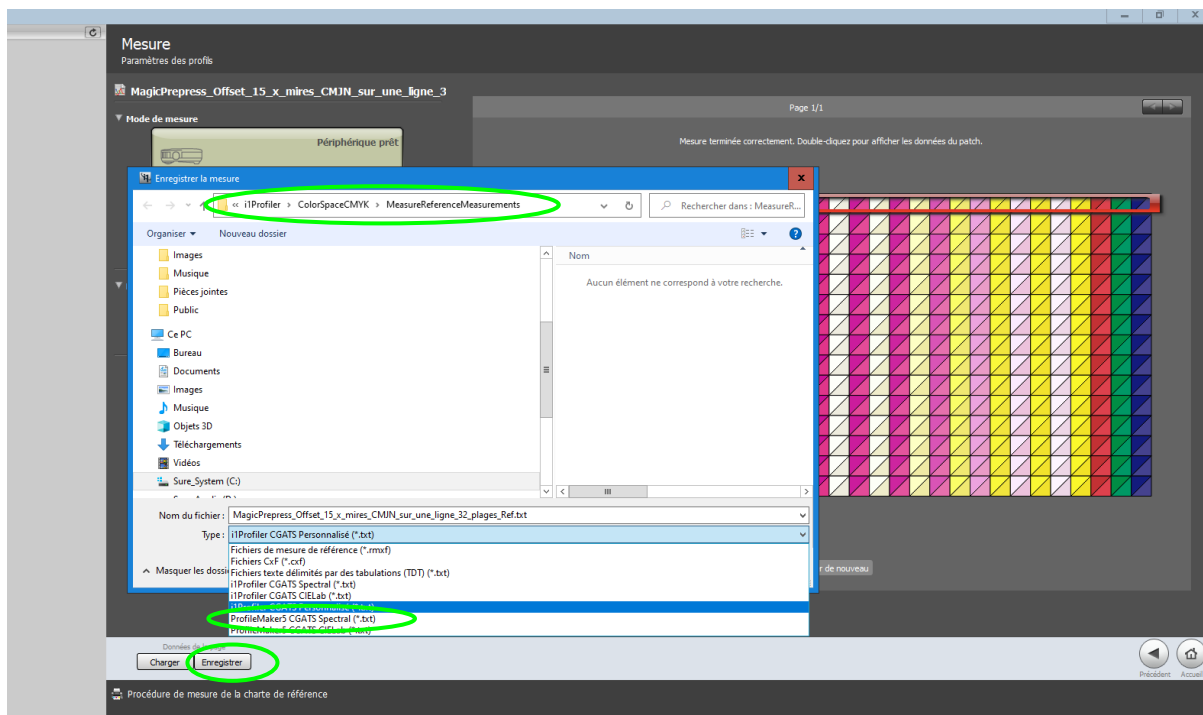
By default, **i1Profiler** saves measurement files in the **MeasureReferenceMeasurements** subdirectory and does not remember the access path if you choose a different directory (Unlike **MeasureTool** and **Colorsource** applications, that do remember access paths).

Tip: To quickly use **MagicPress**, save your successive measurement files always under the **same name:** using the **Refresh** button on **MagicPress** will allow you to instantly refresh the results displayed by **MagicPress** after scanning each sheet. On an excellent press, measuring two sheets is enough: The first one to display the four CMYK density corrections to be made. The second one to verify that the specified densities, and therefore the specified aim colors, are reached.

Among the file recording formats offered, **use the ProfileMaker5 CGATS Spectral format (*.txt)**, **compatible with all Colorsource applications**, **even the oldest ones**.

With **MagicPress**, **MagicPrepress** and **Magic_Proof_&_Print_Control**, you can also use other formats such as **i1Profiler CGATS Custom (*.txt)**, or **i1Profiler CGATS Spectral (*.txt)**.

Do not use **i1Profiler CGATS CIELab formats (*.txt)** or **ProfileMaker5 CGATS CIELab (*.txt)**: **Colorsource** applications can use them, but **MagicPress** and **MagicPrepress** will display incomplete results because they will not know the spectral values of the measured press calibration bars.

We remind you that processing colorimetric measurements with **MagicPrepress** is only interesting for the expertise of colorimetric values contained in press I.C.C. profiles that we wish to analyze, when these profiles do not contain spectral measurements, which is frequent; and also, for other very specific applications.

For example, the same spectral measurement file of 15 charts measured on 15 printed copies, can be recorded with three slightly different file formats:

Mesures_Offset_15_x_mires_CMJN_sur_une_ligne_32_plages_**i1Profiler_CGATS_Personnalisé_M0**.txt
Mesures_Offset_15_x_mires_CMJN_sur_une_ligne_32_plages_**iProfiler_CGATS_Spectral_M0**.txt
Mesures_Offset_15_x_mires_CMJN_sur_une_ligne_32_plages_**PM5_CGATS_Spectral_M0**.txt

These three measurement files will of course give the same results with **MagicPrepress**, but preferably use the universal format of the last file: **ProfileMaker5 CGATS Spectral (*.txt).**
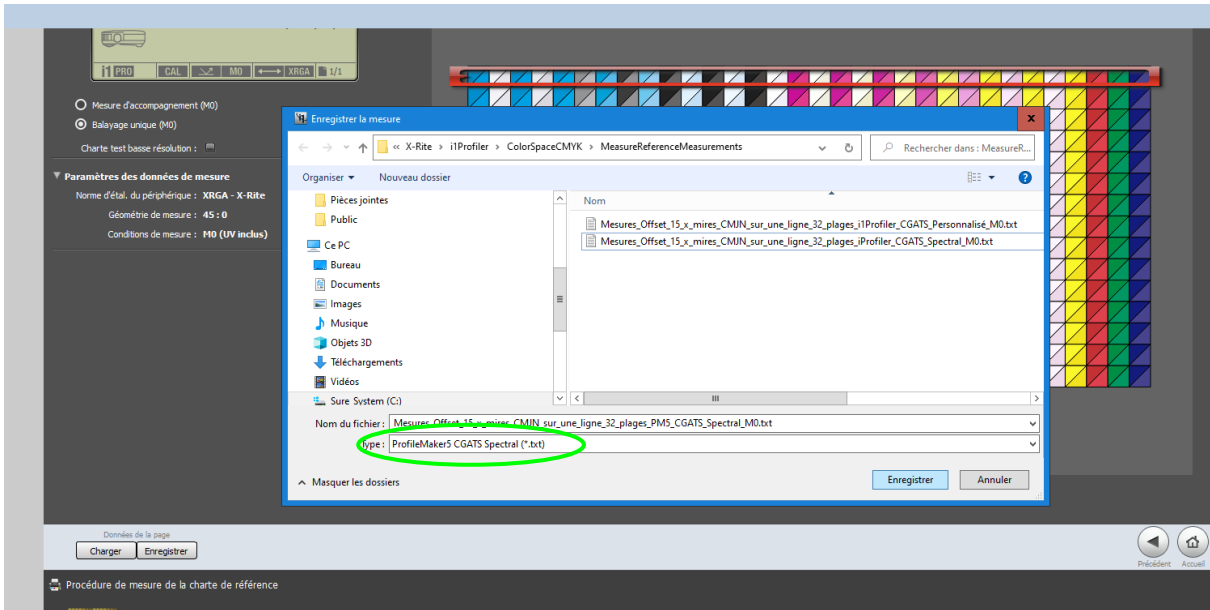
For example, open this spectral measurement's file with **MagicPrepress**:

COLORSOURCE
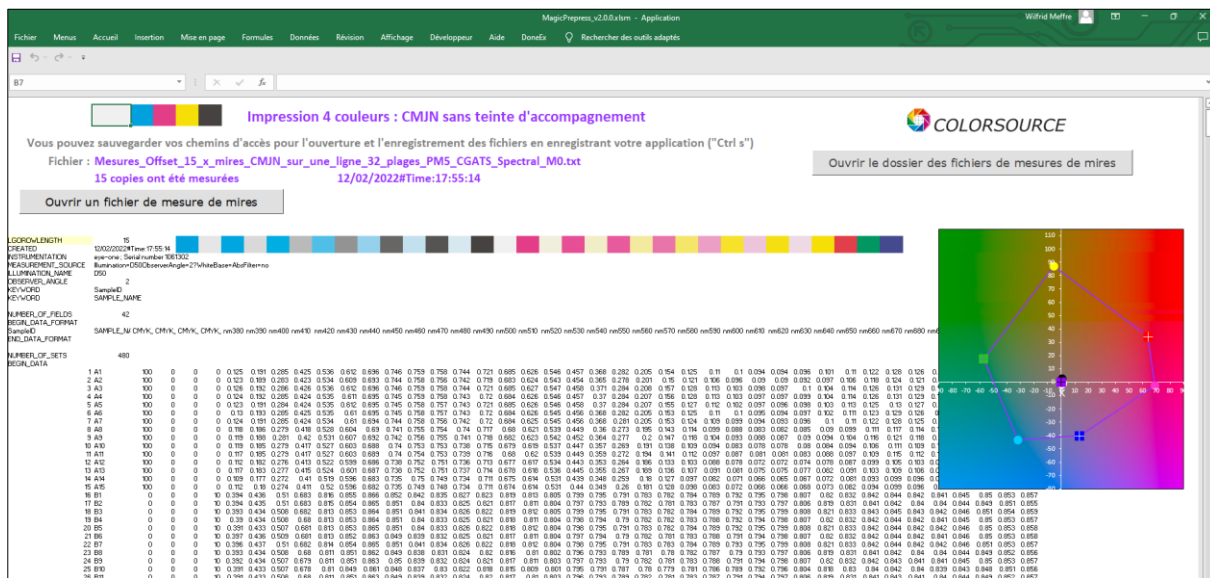
7-4) M**easuring a 7CLR press calibration bar with i1Profiler**:

Of course, place the CGATS text reference files of the 7CLR control bar to be measured in Windows directory C:\ProgramData\X-Rite**i1Profiler\ColorSpaceCMYK+3\PatchSets**.

In the **i1Profiler** home window, choose **CMYK+3 Printer** from the **Device Selection** drop-down menu, and then press the **Measure Reference Chart** button.

Specify the target 7 colors to be measured, as with **MeasureTool** on the previous page, using for example the reference file **7CLR_chart_25_patches_1_line_12X**.**txt** that allows measuring 12 calibration bars on 12 copies:
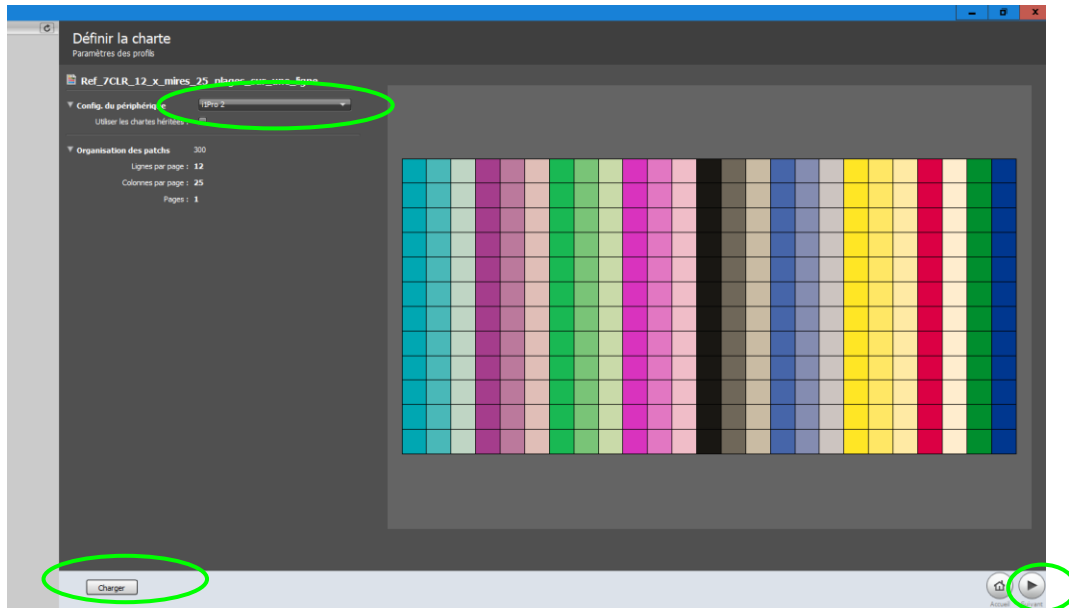
The "colors to be measured" are not displayed above by **i1Profiler** in the order specified by the reference file, because in the 7-CLR reference file we use, the CMYK inks are not placed in columns CLR_1 to CLR_4.

But no worries: The colors patches will be measured properly, in the order specified by the reference file: **C**, **Orange**, **Green**, **M**, **K**, **Purple**, **Y**:
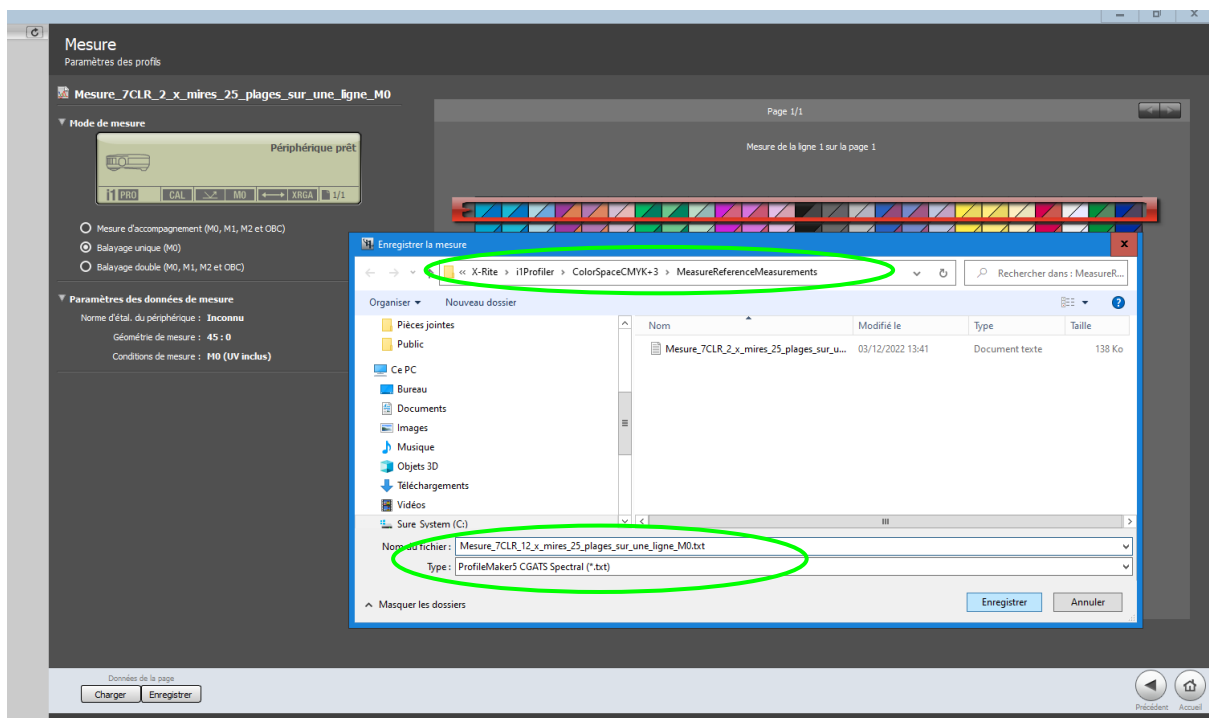
8) Two-color press calibration, using MeasureTool or i1Profiler:

The following test chart can be measured for **MagicPress** by a single scan after the first paper pass, using **MeasureTool** or **i1Profiler** software.

After the first paper pass:

MagicPress will display the **C** and **M** density corrections to be made. The measurement file does not contain the Yellow, Black, Red (M+Y), and Green (C+Y) measurements, but it will allow **MagicPress** determining the optimal densities of **Cyan** and **Magenta**, which will avoid you any problem when printing the second paper pass.

After the second paper pass:

MagicPress will display the **Y** and **K** density corrections to be made.

Note that if you do not use the CMYK calibration chart with Cyan vertical separation bars printed as above, it will not be possible to scan the chart after the first paper pass, but it will still be possible to measure it in manual mode, with **MeasureTool** or **i1Profiler**: With **MeasureTool** choose **Patch** mode, and with **i1Profiler** choose **Spot** mode.

9) Color palette measurements with i1Pro, i1Pro 2 and i1Pro 3:

SPOT_Color_Manager application is intended to check the formulation of spot colors such as PANTONE or else, **before installing them on the printing press**. It is then necessary to measure not a control bar specified by some CMYK or N-Color reference file, but various samples of solid inks and papers that are not structured as a chart. For this purpose, you can use **MeasureTool**, or **i1Profiler** or **i1Share** (**Eye-One Share**) software.

9-1) Measurement of tints using Eye-One Share application, with i1Pro and i1Pro 2:

With **i1Pro** and **i1Pro 2**, the excellent and free **i1Share** application allows you measuring palettes including one or more tints, name each of these measured tints, and export directly to Excel format, each palette with the names of each tint and its reflectance curve.
All you have to do is measuring your solid ink(s) and paper(s) in the form of a palette in CxFv1 format (e.g., a customer's graphic chart), and then export this palette to Excel format (**File Menu/Export** choose **Excel Palette**) in the drop-down menu:
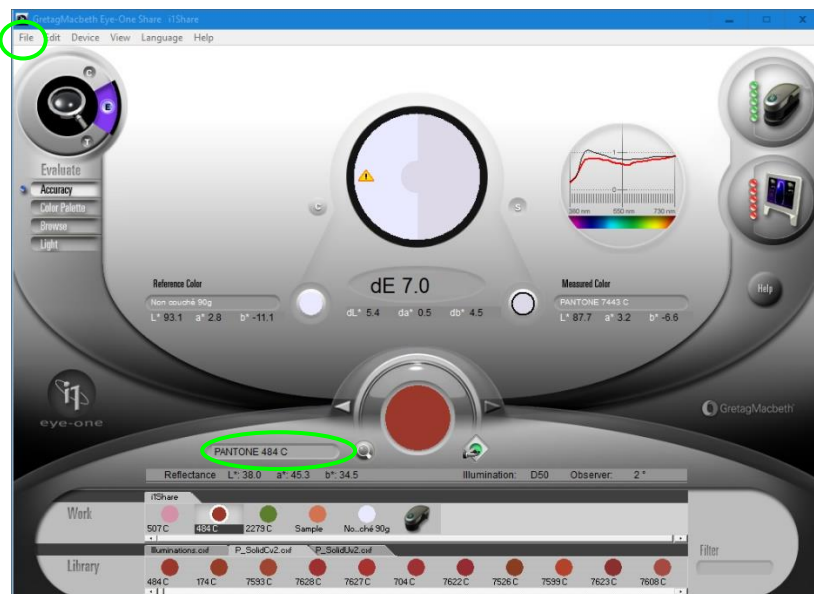
i1Share also allows light source measurements, for controlling the **color temperature** and **Color Rendering Index** (**CRI**) of light sources. (The color rendering index indicates the spectral conformity of the measured light source with incandescent illumination of nearest apparent color, in the C.I.E. Lu'v' space).

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Note that it is possible to convert all PANTONE libraries to modern **CxFv3** format to CGATS text file format, by using **Colorsource** applications; and then, if you own the **MeasureTool** license, you can save the resulting CGATS format PANTONE libraries into **CxFv1** format, for use with **i1Share** application.

Important note for using Eye-One Share with i1Pro or i1Pro 2 on 64-bit Windows versions:

- **i1Share** will only display colors properly **if you make and/or use a monitor I**.**C**.**C**. **profile complying to I**.**C**.**C**. **v2**.**0 standard** and not **I**.**C**.**C**. **v4**.**0** (This is an option in your monitor's calibration application). Using **I**.**C**.**C**. **v2**.**0** monitors profiles does not cause any loss of performance in Graphic Industries, where D50 standard viewing booths are used.

- The **i1Share** installer has not been updated for 64-bit Windows versions. The **EyeOne.dll** library (dated 03/07/2007) supplied in the distribution ZIP of **SPOT_Color_Manager** application should replace the original **EyeOne**.**dll** file dated 2004:
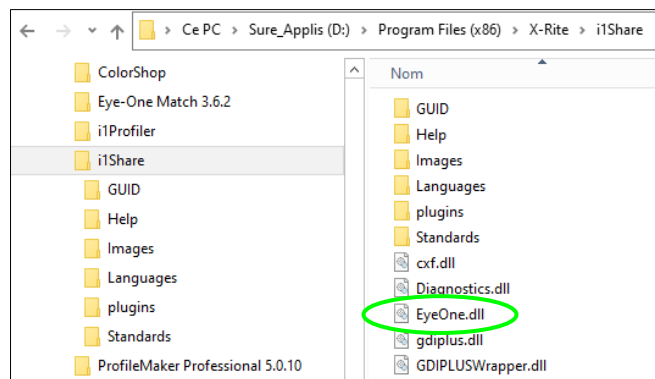
Eye-One Share download link:
https://www.xrite.com/fr-fr/service-support/downloads/i/i1share_v1_4

9-2) Measurement of tints using MeasureTool application, with i1Pro and i1Pro 2:

You can also use **MeasureTool** application by choosing **Measuring Chart**, **Custom**..., then for example, as below, 8 Columns on 1 Row, if you want to measure 8 shades:

COLORSOURCE
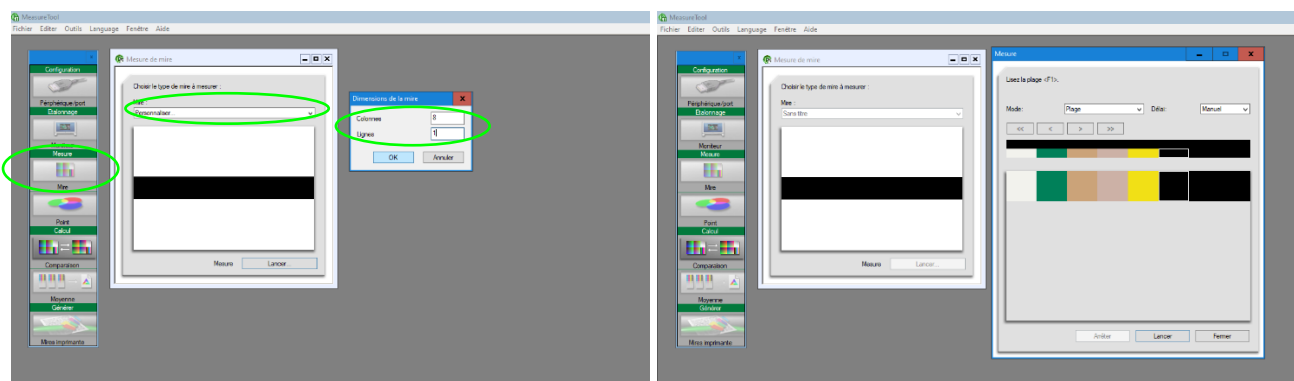
9-3) Color measurement of tints using i1Profiler application, with i1Pro 2 and i1Pro 3:

With **i1Profiler**, do not use the **Measure Reference Chart** button, but the **Measure Chart** button. Then specify on the following menu the number of tints to be measured. For example, as below for 8 shades (for example 1 row of 8 columns):
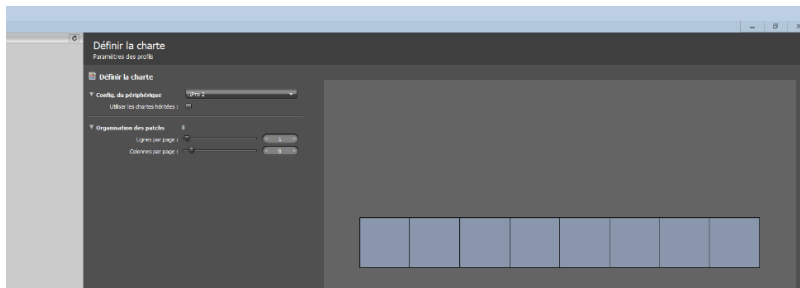
10) Structure of the CGATS reference files:

10-1) Structure of the CGATS reference files of CMYK controls bars:

Consider the following CMYK press calibration bar:

The reference file named **CMYK_chart_offset_1_line_32_patches_1X**.txt, allows you to measure this chart once, on a single copy, for **MagicPress**:

```
LGOROWLENGTH        1  ( = Chart patches are on 1 row)
CREATED    "1/26/2014"  # Time: 14:58
KEYWORD    "SampleID"
KEYWORD    "SAMPLE_NAME"
NUMBER_OF_FIELDS    6 (= Number of columns in the file : index, patch name, C, M, Y, K)
BEGIN_DATA_FORMAT
SampleID   SAMPLE_NAME         CMYK_C    CMYK_M    CMYK_Y    CMYK_K
END_DATA_FORMAT
NUMBER_OF_SETS     32 (= Number of patches)
Measurement_mode   ""
BEGIN_DATA
1          A1        100       0         0         0
2          B1        0         0         0         10
3          C1        90        0         0         0
4          D1        0         0         0         20
5          E1        80        0         0         0
6          F1        0         0         0         40
7          G1        60        0         0         0
8          H1        0         0         0         60
9          I1        40        0         0         0
10         J1        0         0         0         80
11         K1        20        0         0         0
12         L1        0         0         0         90
13         M1        10        0         0         0
14         N1        0         0         0         100
15         O1        0         0         0         0
16         P1        0         100       0         0
17         Q1        0         0         10        0
18         R1        0         90        0         0
19         S1        0         0         20        0
20         T1        0         80        0         0
21         U1        0         0         40        0
22         V1        0         60        0         0
23         W1        0         0         60        0
24         X1        0         40        0         0
25         Y1        0         0         80        0
26         Z1        0         20        0         0
27         2A1       0         0         90        0
28         2B1       0         10        0         0
29         2C1       0         0         100       0
30         2D1       0         100       100       0
31         2E1       100       0         100       0
32         2F1       100       100       0         0
END_DATA
```

The following reference file named **CMYK_chart_offset_1_line_32_patches_15X.txt**, allows to measure 15 times this chart, on 15 sheets: (15 x 32 patches = 480 patches in total):
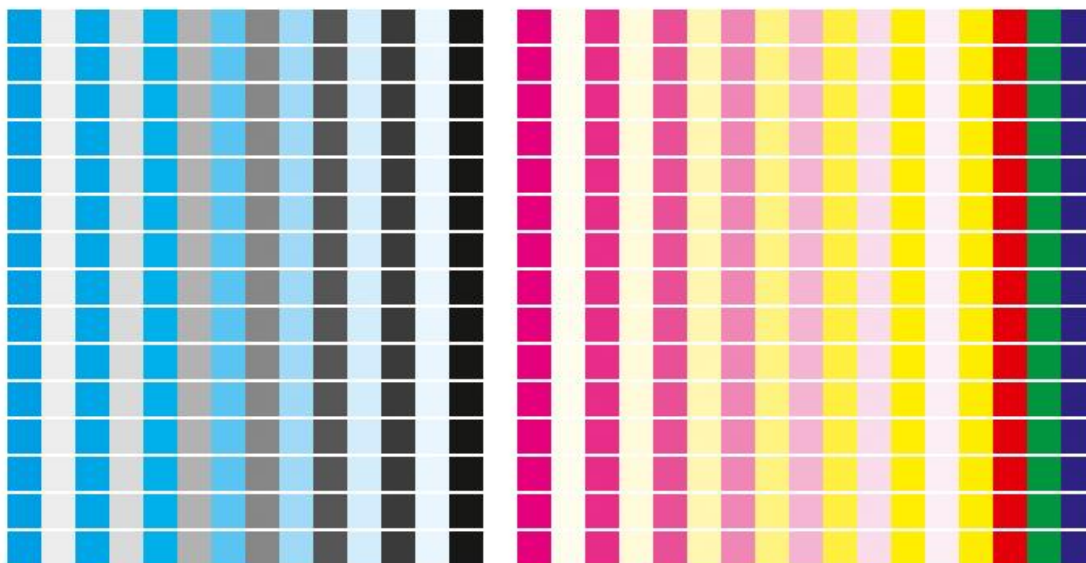

```
LGOROWLENGTH        15  ( = Chart patches are on 15 rows)
CREATED             9/26/2009  # Time: 15:58
KEYWORD SampleID
KEYWORD SAMPLE_NAME
NUMBER_OF_FIELDS    6 (= Number of columns in the file : index, patch name, C, M, Y, K)
BEGIN_DATA_FORMAT
SampleID            SAMPLE_NAME      CMYK_C   CMYK_M   CMYK_Y   CMYK_K
END_DATA_FORMAT
NUMBER_OF_SETS      480 (= Number of patches = 15 x 32)
Measurement_mode ""
BEGIN_DATA
1                   A1         100      0        0        0
2                   A2         100      0        0        0
3                   A3         100      0        0        0
4                   A4         100      0        0        0
Etc…                Etc…       100      0        0        0
14                  A14        100      0        0        0
15                  A15        100      0        0        0
16                  B1         0        0        0        10
17                  B2         0        0        0        10
Etc…                Etc…       0        0        0        10
477                 2F12       100      100      0        0
478                 2F13       100      100      0        0
479                 2F14       100      100      0        0
480                 2F15       100      100      0        0
END_DATA
```

By the way, please note that the patches of above chart (i.e., 15 times a single row of 32 patches), are sorted by column in the reference file, not by rows. And the same will apply to the measured spectral data.

Please note also that, for **i1Profiler** application, (but not for **MeasureTool**), it is strangely compulsory to respect the following nomenclature for the names of each patch (Column 2 of the text reference file):

- The columns of the chart are named from left to right from A, to Z (26th column), and then 2A, 2B … 2Z, and then 3A, 3B… 3Z, etc.
- The rows of chart are named by numbers from 1 to N,
- The patch at **column X** and **row i** is named **Xi**: For example, the patch above N° 478 named 2F13 is located in column 2F (i.e., 26 for A to Z + 6 for 2A to 2F), at row 13.

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10-2) Structure of CGATS reference files of N-Color control bars:

Below is a reference file describing this calibration control bar to be measured on a single copy. This reference file can be used with both **MeasureTool** and **i1Profiler** applications:

```
LGOROWLENGTH        1 ( = Chart patches are on 1 row)
LGOMCCHANNEL01      "InkName = 'Sun-Cyan_015' LabFullToneColor = '59.0 -37.9 -46.0' InkPriority = '-1' IndividualInkLimit = '100'"
LGOMCCHANNEL02      "InkName = 'Sun-Mag_018' LabFullToneColor = '55.1 65.8 -1.9' InkPriority = '-1' IndividualInkLimit = '100'"
LGOMCCHANNEL03      "InkName = 'Sun-Yellow_024' LabFullToneColor = '93.2 -6.8 93.0' InkPriority = '-1' IndividualInkLimit = '100'"
LGOMCCHANNEL04      "InkName = 'Sun-Black_032' LabFullToneColor = ' 18.0 -0.5 -0.8' InkPriority = '-1' IndividualInkLimit = '100'"
LGOMCCHANNEL05      "InkName = 'Sun-Green_hexa' LabFullToneColor = ' 69.5 -65.6 23.4' InkPriority = '-1' IndividualInkLimit = '100'"
LGOMCCHANNEL06      "InkName = 'Sun-Violet_044' LabFullToneColor = ' 47.6 46.2 -32.0' InkPriority = '-1' IndividualInkLimit = '100'"
LGOMCCHANNEL07      "InkName = 'Sun-Orange_072' LabFullToneColor = ' 70.6 55.9 75.4' InkPriority = '-1' IndividualInkLimit = '100'"
LGOMCOPTIONS        "PaperName = 'ShinyWhite' Paper = '[1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1];'
CREATED    "19/02/17 # 09H23m47s"
KEYWORD "SampleID"
KEYWORD "SAMPLE_NAME"
NUMBER_OF_FIELDS 9 (= Number of columns in the file : index, patch name, 7CLR_1, 7CLR_2, 7CLR_3, 7CLR_4, 7CLR_5, 7CLR_6, 7CLR_7)
BEGIN_DATA_FORMAT
SampleID  SAMPLE_NAME      7CLR_1  7CLR_2  7CLR_3  7CLR_4  7CLR_5  7CLR_6  7CLR_7
END_DATA_FORMAT
NUMBER_OF_SETS    25 (= Number of patches)
Measurement_mode      ""
BEGIN_DATA
```

SampleID	SAMPLE_NAME	7CLR_1	7CLR_2	7CLR_3	7CLR_4	7CLR_5	7CLR_6	7CLR_7
1	A1	100	0	0	0	0	0	0
2	B1	80	0	0	0	0	0	0
3	C1	40	0	0	0	0	0	0
4	D1	0	0	0	0	0	0	100
5	E1	0	0	0	0	0	0	80
6	F1	0	0	0	0	0	0	40
7	G1	0	0	0	0	100	0	0
8	H1	0	0	0	0	80	0	0
9	I1	0	0	0	0	40	0	0
10	J1	0	100	0	0	0	0	0
11	K1	0	80	0	0	0	0	0
12	L1	0	40	0	0	0	0	0
13	M1	0	0	0	100	0	0	0
14	N1	0	0	0	80	0	0	0
15	O1	0	0	0	40	0	0	0
16	P1	0	0	0	0	0	100	0
17	Q1	0	0	0	0	0	80	0
18	R1	0	0	0	0	0	40	0
19	S1	0	0	100	0	0	0	0
20	T1	0	0	80	0	0	0	0
21	U1	0	0	40	0	0	0	0
22	V1	0	100	100	0	0	0	0
23	W1	0	0	0	0	0	0	0
24	X1	100	0	100	0	0	0	0
25	Y1	100	100	0	0	0	0	0

```
END_DATA
```

The **LGOMCCHANNEL01** to **LGOMCCHANNEL07** rows respectively assign a name to each ink present in columns **7CLR_1** to **7CLR_7,** and assigns a purely indicative color to each ink, specified either by CIE Lab or spectral data.

These indicative colors present in the reference file are used by **MeasureTool** to display approximately the colors of the reference file, even before any measurement the according chart. But these indicative colors in the reference file are not used by **i1Profiler**, which will not prevent appropriate measurement of the chart.

For **i1Profiler**, it is imperative to respect the nomenclature of patches A1, B1 etc. as mentioned on previous page, which also depends on the number of rows of the measured chart, since the patches are arranged in the reference file by column, and not by row.

10-3) Displaying CGATS reference files in a graphic manner:

Drag and drop your CGATS reference text file onto the main window of **MeasureTool** or **Colorlab** applications: Although your reference files do not contain any colorimetric or spectral measurements, you will immediately see the type of color chart described by your reference file.

11) Drawing CMYK or N-Color printable charts from their CGATS reference file:

Each **Colorsource** application comes with all the necessary CGATS reference files and corresponding printable charts. We recommend that you first use the standard charts and reference files supplied with each application.

You can also specify your own color targets by a CGATS reference file, and then generate from this reference file the corresponding printable color chart:

a) If you own a **ProfileMaker** key, you can use the **MeasureTool** charts' generator to produce a printable chart from any CGATS reference file. However, the generated charts often have an inconvenient and unnecessarily cumbersome geometry for use as a calibration bar on the press, so that the following solution is better, and free of charge:

b) Free **Colorlab** software allows you to generate your CMYK printable chart from any CGATS text reference file (Do **Filter/Layout and Format/Test Chart Define**). **Colorlab** also allows you generating printable N-CLR charts from N-CLR text reference files, with 4 to 8 colors: The generated chart is a TIF with alpha channels to be imported in Photoshop and then converted into multilayer .eps. Simply name each layer and assign it a Lab color for a more pleasant or realistic display.

Download link of the **Colorlab** software:
https://www.xrite.com/service-support/downloads/c/colorlab-utility-freeware-v281x

12) Create custom color targets to be used as Fingerprints by MagicPress, MagicPrepress and Magic_Proof_&_Print_Control, from CMYK or N-Colors I.C.C. profiles:

Colorsource applications allow you choosing for aim standard any of the **ISO 12647-2**, **12647-3**, **12647-4, 12647-6**, **G7/IDEAlliance**, or **WAN-IFRA** public CMYK print standards.

Colorsource applications allow you as well specifying **your own private CMYK or N-Colors aim printing standards** by specifying them by a **Fingerprint**.

A **Fingerprint** is a CMYK or N-CLR press characterization file that can be declared to be the aim standard to be matched. A **Fingerprint** measurement file can be established by measuring a reference press characterization test chart (Averaging a few press' characterization measurement files is even better).

A **Fingerprint** measurement file can also be computed from any existing CMYK or N-CLR press I.C.C. profile, such as for example "**Euroscale.ICC**" or "**USSheetFed_coated.icc**" CMYK profiles.

Colorlab v2.8.13 application allows computing for any CMYK or N-Colors chart specified by its CGATS text reference file, the Lab colors that will be obtained on paper: This makes it easy to obtain the colors in the form of a CGATS text file C.I.E. Lab targets any frame for any ICC profile.

Of course, this also works for the chart reference files supplied with **Colorsource** applications, which allows you to very quickly calculate your **aim** colors according to any ICC profile for **MagicPress**, **MagicPrepress** and **Magic_Proof_&_Print_Control** applications, then use these colors in their <mark>Fingerprint</mark> tab.
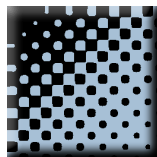
Download link of the **Colorlab** software:
https://www.xrite.com/service-support/downloads/c/colorlab-utility-freeware-v281x

Magic_Proof_&_Print_Control	PLATE	MagicPress	MagicPrepress	SPOT_Color_Manager