G7® System Certification Application Data Sheet

Fiery Color Digital Print Servers with Fiery Color Profiler Suite 5

The Idealliance Print Properties Working Group has established a certification process for G7 Systems. In accordance with this process The G7 System Certification Program is designed to evaluate the ability of a candidate system to calibrate a printing device to meet the G7 greyscale definition using four 1-D Curves within the tolerances outlined in this document. All evaluations are based on the parameters of the G7 Specification (draft 2008). The following information is intended to assist producers and consumers in the use of the vendor system as specified for creating the four 1-D Curves.

Manufacturer

Electronics For Imaging
6750 Dumbarton Circle
Fremont CA 94555

Product

Fiery Color Digital Print Servers with Fiery Color Profiler Suite v5

For Fiery FS150 Pro/FS150, FS200 Pro/FS200, and FS300 Pro/FS300 systems

Testing Instructions (procedures)

Printing the test target(s)

Before you begin

- Have Fiery Color Profiler Suite 5.0 or higher installed on your client workstation.
- Connect an ES-2000 or other supported spectrophotometer that is licensed for Fiery Color Profiler Suite 5.0 to your client workstation.
- Have a Fiery Driven digital print system loaded with a high-quality media coated stock.
- The Print engine must be in good working order and in a stable production environment.

For a single Fiery Driven™ print system:

Create a Fiery Calibration

1. Launch Fiery Color Profiler Suite and select Printer.

2. Click Print Patches.
3. Enter a unique name for the calibration and profile.
4. Select your Fiery server and click Next.
5. Click Create new calibration setting.
6. Select the G7® gray balance calibration target check box and click Next.

7. In the Patch Layout window, select the Instrument. For this example, select EFI ES-2000.
8. Click Patch set and select 51 Random.

9. Click Chart size and choose the paper size that matches your media, letter size in this example.
10. Select the Number of the warmup pages checkbox, increase it to 10 and click Print.
11. In the Job Properties dialog, choose the media properties or paper catalog entry that match your paper and click OK.
12. Retrieve the Fiery calibration page and follow the on-screen wizard to measure the patches.
13. When the measurements are complete, the D Max results will be displayed.
14. You have completed the Fiery Calibration. In the next section you will perform the G7 calibration.

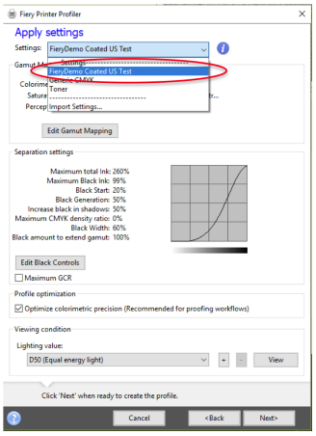
Create a Fiery G7 Calibration

1. Click Next to print the G7 calibration patches.
2. Click Patch set, choose the P2P51 Randomized 2up patch target and click Print.
3. Retrieve the printed target and follow the wizard to measure the patches.
4. Review the results. Results that pass will be displayed in green. Failed results will be displayed in red. The first P2P target printed is printed without G7 calibration applied (the “cal run”) so it is expected that some or all results will fail.
5. Click Next to print a second P2P target with G7 correction applied.
6. Retrieve the printed target and follow the wizard to measure the patches.
7. Review the results. It is expected that the system will now achieve G7 compliance. If the results still show a failure, click Iterate to recalculate optimized NPDC curves, print and measure a refined G7 calibration.
8. When G7 results pass, click Accept to create the output profile.

Create a Fiery Output Profile

1. Click Patch set and choose 1485 random.
2. When creating an output profile for high-quality production grade output, it is recommended to use at least 1485 patches. The random chart is always recommended for output device profiling.

3. Click Chart size and choose the size that matches your media.
4. Retrieve the profile pages and follow the wizard to measure the patches.
5. Review the results to ensure that the ΔE variation is within your shop tolerance.
6. Click Next to create the output profile.
7. In the Apply settings dialog window select the factory default profile On your Fiery server for the paper like the sheet you are profiling on your specific press.



8. Select the Maximum GCR check box and click Next.
9. Click Next to save the profile.
10. You will be prompted with the option to create a Virtual Printer. This can be used to quickly apply the calibration and profile in a print driver workflow. For production printing, Fiery Hot Folders or other means of consistent job submission are recommended over driver workflows.
11. Optional: When the profile is created and installed, select Test print to print a test page on the printer.
12. Click Done.
13. Click Exit to close the Printer Profiler.

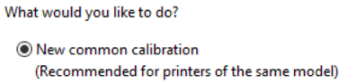
The new G7 calibration and printer profile are now ready for use.

To use the new G7 calibration and printer profile, choose the server preset with the name you specified in step in 3 at the start of this document.

The Server preset and Virtual Printer can be used to apply it in a print driver workflow. For production printing, Fiery Hot Folders or other means of consistent job submission are recommended.

For matching multiple Fiery Driven™ print systems:

1. Launch Fiery Color Profiler Suite and select Printer.
2. Click Printer Match.
3. For the same make and model print engines, choose New Common calibration .



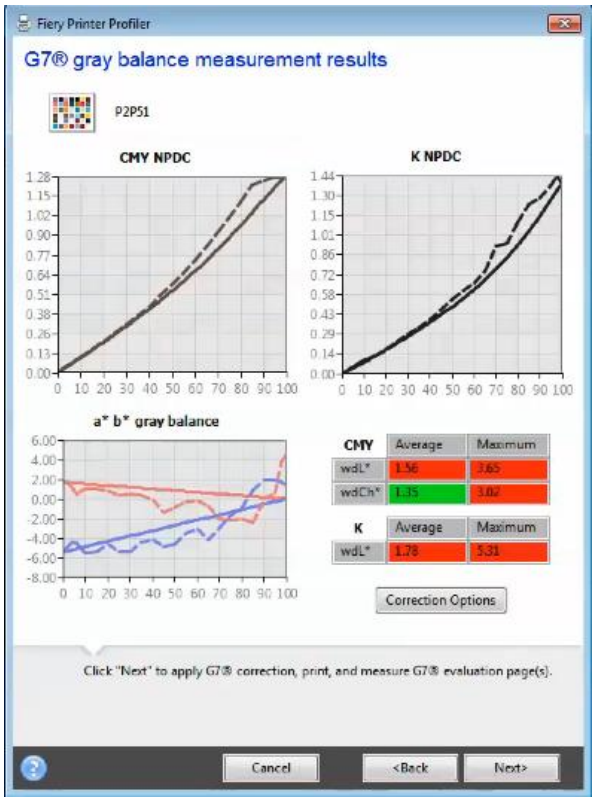
4. Name the matching session.
5. Select the Fiery servers to be matched (up to five).
6. Check the G7® gray balance calibration target option.
7. Print and measure the 51-step calibration page from the first print system.
8. Print and measure the G7 calibration pages as described in the section “Create a Fiery G7 Calibration” above.
9. Repeat for each of the Fiery Driven™ print systems.
10. After G7 calibration is complete, choose the 1485 patch set for profile creation.
11. Measure a profiling target from each system being matched so that a shared profile may be created. See step 7 on page 3 for instructions on how to configure black generation.

To use the new G7 calibrations and printer profile, choose the output profile with the same name used for the matching session in step 4 above on this page.
For production printing, Fiery Hot Folders or other means of consistent job submission are recommended. Make hot folders or virtual printers that use the shared output profile name for matching multiple printers on a particular stock.

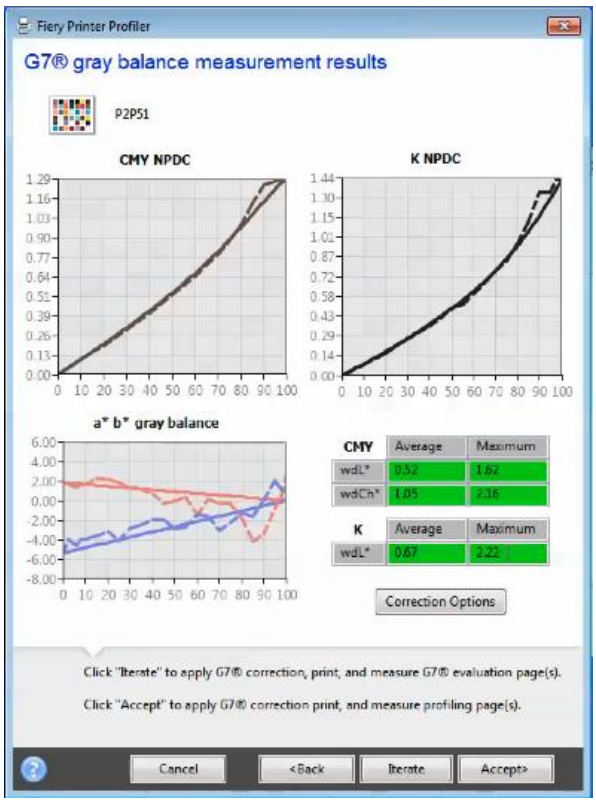
Printing and measuring a Verification target

Because of the wizard-based workflow shown in this ADS, it is not appropriate to validate G7 matching except at the time it is created. Since an ICC profile is subsequently created, printing with the G7 calibration and that profile would not satisfy the criteria for G7 Software Verification which states that the Software must create two-dimensional NPDC curves rather than achieving G7 using multidimensional transformation such as is achieved using color managed workflows. For this reason, the varication happens in the course of the G7 calibration workflow and the software lets the user "iterate" (print again with more refined NPDC curves) until G7 grayscale compliance is achieved.

The screens look like this:



G7 Calibration run results



G7 Verification run results

Analyzing Results

Fiery Color Profiler Suite v5.0 Tolerances

Using the 2010 G7 System Certification sample test files and the Analysis Instructions (see above) or the Idealliance Validation Process (see below), Fiery Color Profiler Suite 5 will achieve tolerances equal to or lower than the following:

Metric	Average	Maximum
ΔF* (CMY only)	≤1.0	≤2
ΔL* (CMY & K)	≤1.0	≤2

Table 1: Fiery Color Profiler Suite tolerances for 2010 sample test files

Note: Because the current G7 System Certification method uses a simulation process that eliminates print-to-print variation, and because the sample data provided by Idealliance for G7 System Certification is highly uniform, Fiery Color Profiler Suite can produce extremely low delta errors with those specific data files. Higher errors should be expected when calibrating live printing devices, depending on the characteristics and variability of each printing system.

Idealliance Validation Process

To validate that the G7 calibration process has been successful, a target consisting of two gray scales having the CMYK patch values listed in ***Appendix A*** shall be printed through the calculated correction curves using the same print settings that were used when creating the calibration.

Validating NPDC (CMY and K scales)

To validate NPDC correction, both the K-only scale and the CMY-only scale shall be measured with a densitometer or spectrophotometer and the relative neutral density (ND) values (measured in the "K" or "Visual" channel) shall be recorded for each patch. To obtain relative ND values, either the measuring device shall be zeroed on the substrate, or the white patch neutral density value shall be subtracted from itself and all other patches.

The (relative) ND values shall be converted to (relative) L* by the standard CIE formula in ***Appendix B.***

The Delta L* (ΔL*) error shall be computed for each patch compared to target values on file with Idealliance by the formula in ***Appendix B.***

The average and maximum ΔL* must not exceed the Idealliance Tolerance values in **Table 2**, below.

Validating Gray Balance (CMY scale only)

To validate gray balance correction, the CMY-only scale shall be measured with a spectrophotometer and the a* and b* values recorded for each patch.

The Delta F* (ΔF*) error shall be computed for each patch compared to target values on file with Idealliance by the formula in ***Appendix B.***

The average and maximum ΔF* must not exceed the Idealliance Tolerance values in **Table 2**, below.

Idealliance Tolerances

Metric	Average	Maximum
ΔF* (CMY only)	≤1.5	≤3
ΔL* (CMY & K)	≤1.5	≤3

Table 2: Idealliance required tolerances

Appendix A:

P2P patch values

Column 4 (K only)

C%	M%	Y%	K%
0	0	0	0
0	0	0	1.96
0	0	0	3.92
0	0	0	5.88
0	0	0	7.84
0	0	0	10.2
0	0	0	14.9
0	0	0	20
0	0	0	25.1
0	0	0	30.2
0	0	0	34.9
0	0	0	40
0	0	0	45.1
0	0	0	49.8
0	0	0	54.9
0	0	0	60
0	0	0	65.1
0	0	0	69.8
0	0	0	74.9
0	0	0	80
0	0	0	85.1
0	0	0	89.8
0	0	0	94.9
0	0	0	98.04
0	0	0	100

Table 3: CMYK percentage values in column 4 of the P2P target

P2P patch values

Column 5 (CMY only)

C%	M%	Y%	K%
0	0	0	0
1.96	1.18	1.18	0
3.92	2.77	2.77	0
5.88	4.15	4.15	0
7.84	5.61	5.61	0
10.2	7.41	7.41	0
14.9	11	11	0
20	14.9	14.9	0
25.1	18.8	18.8	0
30.2	22.91	22.91	0
34.9	26.78	26.78	0
40	30.98	30.98	0
45.1	35.48	35.48	0
49.8	39.82	39.89	0
54.9	44.71	44.71	0
60	49.8	49.8	0
65.1	54.9	54.9	0
69.8	60.16	60.16	0
74.9	66.07	66.07	0
80	71.77	71.77	0
85.1	78.06	78.06	0
89.8	84.61	84.61	0
94.9	92.2	92.2	0
98.04	96.86	96.86	0
100	100	100	0

Table 4: CMYK percentage values in column 5 of the P2P target

Appendix B:

Formulas

Converting ND to L*

$$Y = 1/10^{ND}$$

If: $Y > (6/29)3$

$$L^* = 116 \times Y^{1/3} - 16$$

Else:

$$L^* = 116 \times (841/108 \times Y + 4/29) - 16$$

Calculating Delta L* (ΔL*)

$$\Delta L^* = (L^*_{sample} - L^*_{target})$$

Calculating Delta F* (ΔF*) – also known as Delta-ab

$$\Delta F^* = ((a^*_{sample} - a^*_{target})^2 + (b^*_{sample} - b^*_{target})^2)^{1/2}$$