G7 System Certification Application Data Sheet

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

ONYX Media Manager with G7 is a production of:

Onyx Graphics, Inc.
6915 South High Tech Drive
Midvale, UT 84047
1-800-828-0723
www.onyxgfx.com

Product

"ONYX Media Manager with G7 version 18.5"

Testing Instructions (procedures)

G7® Grayscale Correction and Verification are incorporated as part of the profiling process in ONYX Media Manager with G7. With these options enabled on your key, a "G7 ICC" workflow will be available when creating a new media that will contain steps for curve creation and validation. G7 Grayscale correction and validation are done after the ink limit step in the workflow. If these steps do not appear in your workflow, see "Customize Workflows" in the online help.
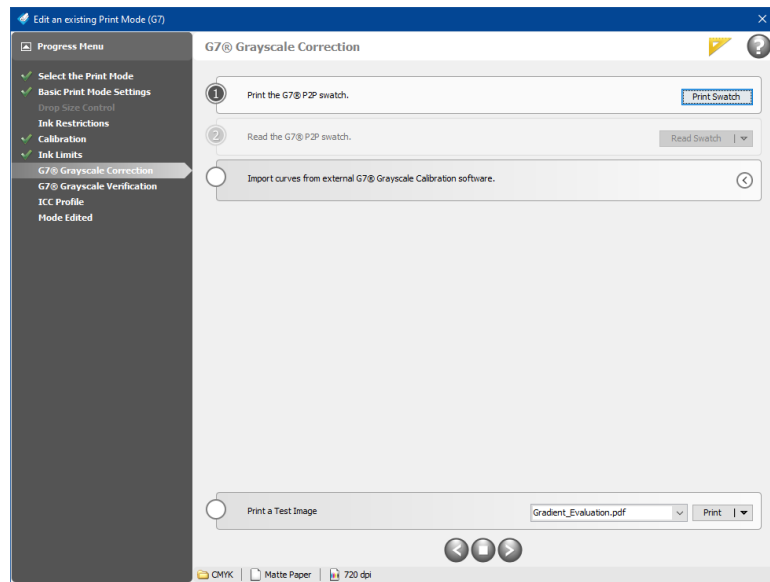

Printing the test target(s)

Create a media profile as usual up to setting an ink limit. After setting an ink limit, click the Next arrow to proceed to the G7 Grayscale Correction step. This step is used to automatically create correction curves to adjust your device output to the G7 Grayscale specification.

Click the Print Swatch button to print a G7 P2P swatch using all previous media settings. After selecting a color device to use, there are several options to consider when printing the P2P swatch:

- Use "G7 Native CMY": in the large-format inkjet industry, CMY ink combinations often do not produce a balanced gray when profiles are not applied. The G7 Grayscale specification allows for this Native CMY option, which reduces the importance of the grayscale balance at the high end. This is enabled by default.
- P2P Swatch selection: determines the balance of ink used for the printed swatches. Standard P2P51 Swatch is the default and uses the official
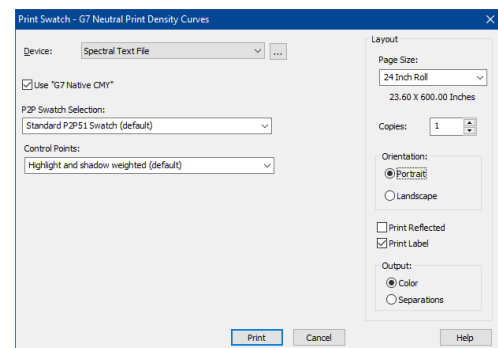
G7 patch definitions. The Less Cyan setting reduces the balance of cyan in the P2P patches, improving the success of correctly calculating balancing curves.
- Control Points: allows you to set the frequency of control points to adjust the curves. Highlight and Shadow Weighted is the default, and has control points in 5% increments, with extra points in the highlight and show areas.

After making your selections, click the Print button to send the swatch to RIP-Queue. Print the swatch in the normal fashion using the UI within RIP-Queue. Once the swatch has been printed, prepare it as needed for measurement. If the darker patches have wet or uncured ink, you may need to adjust your ink limit settings and reprint the swatch.

Measuring the target(s)

Click the Read Swatch button to measure the P2P swatch using the selected color device. When finished, press OK to accept the measurements.

Loading measurement files into "ONYX Media Manager with G7"

After the measurements are accepted, the G7 Grayscale correction curves are built automatically. For simplicity, the correction curves are not displayed in the dialog.

Optionally, calibration curves can be imported from external G7 Grayscale Calibration software. The files must be in CMYK CGATS format with a .txt extension.
After the curves are built or imported, click the Next button to continue to the G7 Grayscale Verification step.

Also optionally, the measurements can be exported, in various formats, for use in third-party G7 calibration software. Click the down arrow on the Read Swatch button open the View Readings dialog, and click the Export button.

Adjusting parameters

Parameters are set at the time of printing the P2P swatch, and cannot be adjusted after.

Applying parameters the printing system

The correction curves are saved automatically as part of the print mode after measuring the P2P swatch, or importing external curves. Any printed output with the current print mode will have the correction curves applied.

Saving the "ONYX Media Manager with G7" session

Click the Next arrow to continue on to the G7 Verification step, or the Stop button and Yes to save your progress in the Media Manager workflow.

Verification By Physical Print Testing

The G7 Grayscale Verification step is used to verify that the adjustments made in the G7 Grayscale Correction step are within G7 Grayscale tolerances.

Printing a "Verification" target

Click the Print Swatch button to print a new G7 P2P swatch with the correction curves applied from the G7 Grayscale Correction step. If Use "G7 Native CMY" was selected in the G7 Correction step, it should also be enabled here. The other settings are automatically used. Click the Print button to send the swatch to RIP-Queue.
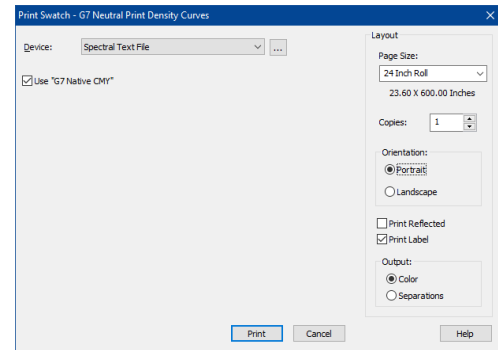
Measuring the Verification target

Click the Read Swatch button to measure the swatch using the selected color device. When finished, click OK to accept the measurements.

Analyzing Results

Once the swatch is measured, a report will display indicating if there is conformance to the G7 Grayscale specification.

If the initial verification fails, you can click the Iterate button to automatically create new correction curves based on the previous curves. You then reprint and measure a new verification swatch that will assess the iterated curves. The report will be updated based on the new measurements.
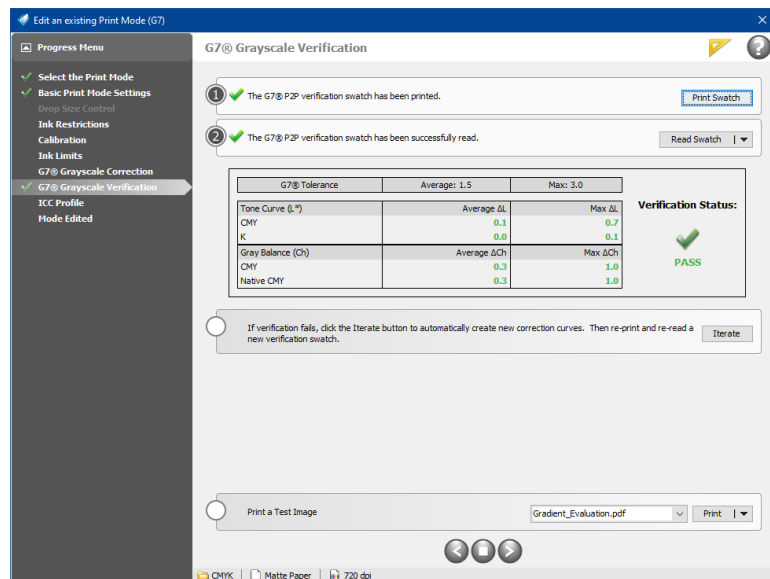
NOTE: Only the current iteration is saved. If you wish to save previous iterations, it is recommended to make a copy of the current mode before you iterate. Normally you should only have to iterate once to see better conformance. If after several iterations you are still not achieving conformance, you may need to adjust the settings used to print the swatch in the G7 Grayscale Correction step (like using the Less Cyan swatch). If this is also unsuccessful, you will likely need to adjust previous settings in your mode, such as lowering the cyan ink restriction, or using a higher ink limit. Since adjusting such settings affect all following profiling steps, it is recommended to begin with a new mode.

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"ONYX Media Manager with G7" Tolerances

Using the 2010 G7 System Certification sample test files and the Analysis Instructions (see above) or the Idealliance Validation Process (see below), "ONYX Media Manager with G7" 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: "Product Name" 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, "ONYX Thrive Media Manger" 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 in use when the calibration was calculated.

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)	$\leq$1.5	$\leq$3
ΔL* (CMY & K)	$\leq$1.5	$\leq$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:

Formulae

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

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