G7® System Certification Application Data Sheet

PRISMAsync Color Print Server V7 for Canon imagePRESS digital color presses

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

Océ-Technologies B.V., a Canon Company

Product

PRISMAsync Color Print Server V7 for Canon imagePRESS digital color presses

Due to the system's closed structure, G7 System certification was obtained by a method that cannot be reproduced directly by users, but similar results should be obtained through the use of the G7 Media Family Calibration from the Local User Interface (LUI) on the PRISMAsync Color Print Server for Canon imagePRESS digital color presses.

Testing Instructions (procedures)

Printing the test target(s)

Prior to printing media family calibration targets, the operator should perform Auto Gradation and Shading Correction. The Auto Gradation routine is initiated at the LUI. Each family of imagePRESS digital color presses has a calibration wizard with the proper routine established. Consult the LUI and user manual for the specific imagePRESS device for details. Upon completion of Auto Gradation and Shading Correction, a G7 media family calibration should be undertaken. Initiation of media family calibration is at the LUI by the operator. Twelve (12) pages are printed. The first four (4) sheets consist of solid block halftone objects in CMYK. These should be visually inspected for print artifact or defect. Any defect should be addressed prior to attempting calibration.

Measuring the target(s)

Method 1: Inline spectrophotometer (if equipped). The option exists at the time of target printing to select the "measure inline" option. This routes the sheets to the internal spectrophotometer and eliminates the need for operator intervention other than initiating the procedure.

Method 2: Using a supported i1Pro series hand held spectrophotometer (supplied with the Color Print Server) measurement of each of the eight (8) target pages should be completed. Visual feedback is given via the LED on the i1 V2 (green indicates a complete measurement, red indicates an incomplete measurement). If the operator believes a row was misread, it can be re-measured, in sequence, without re-starting the calibration procedure. Care should be taken to ensure that 5-10 sheets of white paper are placed between the target sheets and any surface to ensure proper measurement data is gathered.

Evaluation of measurement data

Immediately after measurement, (either in-line or via hand held device), the operator is presented with the calibration evaluation feedback. Feedback consists of 5 elements: Measurement Accuracy, Profile information, three-dimensional plot of the achieved Gamut, Neutral Color Separation, & G7 Grey scale Calibration Accuracy. This

information should be evaluated to establish if additional steps are required to achieve the desired status for the printing system.

Loading measurement files into “PRISMAsync”

At the completion of the measurement process, the operator touches the “Next” button on the LUI. The Color Print Server performs all calculations and installs the calibration curve directly into the proper location. An ICC profile for the media family is created and assigned at the same time. The operator can use this profile or if desired choose another via the Settings Editor > Media Families > “Media Family Name” > Edit function.

Adjusting parameters

There are no parameters for the operator to adjust in the calibration routine. It is recommended that the operator ensures optimal imaging of the calibration media through the use of the media optimization tools. Media optimization is accessible either from the LUI or remotely via a Settings Editor session. Further details on media optimization are available in the user manual.

Applying parameters the printing system

All parameters are automatically applied to the G7 Media Family.

Verification By Physical Print Testing

Printing and Measuring a “Verification” target

PRISMAsync supports 3rd-party G7 Verification methods such as Chromix Curve4 software, but also provides integrated internal G7 Grayscale verification and colorspace validation methods. Operators are free to choose the method they prefer.

Using the Chromix Curve4 method as an example, the operator would submit their target file (P2P) to PRISMAsync/imagePRESS under the proper processing conditions:
PRISMAsync G7 Calibration = Yes
PRISMAsync color management = No.

PRISMAsync provides a streamlined method for configuring print processing settings, and selecting them simply as a group when needed, called *Automated Workflows*. A particular automated workflow option called *"external profiling"* is provided with the system; the P2P target printed via this selection is ready for measurement using Curve4 software.

G7 Greyscale conformance can also be verified directly on the LUI using the PRISMAsync internal G7 verification process. The PRISMAsync G7 Verification menu is located by selecting System > Color Adjustment > G7 Verification. The operator selects the desired G7 Media Family and any individual media assigned to that G7 Media Family. Generation of the verification print target, and selection of the correct print processing parameters is done automatically. If the model imagePRESS used is equipped the in-line spectrophotometer, measurement of the target can also be performed automatically. If not, measurements are made with the hand held i1Pro-series spectrophotometer provided with the system. Upon completion of the selected verification, the results are displayed on the screen for the operator to review.

Analyzing Results

Depending on the verification or validation procedure used, the PRISMAsync Print Server provides on screen reporting at the LUI for some or all of the following: Measurement Accuracy, general Profile information, achieved Gamut results, Neutral Color Separation results, G7 Grayscale Verification, Color Validation. The operator should review these results for deviation from desired state and, if required, remediate as needed.

"PRISMAsync" Tolerances

Using the 2010 G7 System Certification sample test files and the Analysis Instructions (see above) or the Idealliance Validation Process (see below), "PRISMAsync" 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, "Product Name" 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.

Canon

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)	≤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

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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

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

Appendix C:

Verification Instructions (using VPR module)

The optional VPR module allows adjustments calculated by "Product Name" to be tested without making a second physical print. For this a characterization target (e.g. IT8.7/4) must have been printed and measured at the same time as the P2P, ideally on the same sheet of material.

NOTE: Results determined by the VPR process may differ slightly from results obtained by physical print testing, due to printing and measuring variations between the first and second prints, or variations between the characterization target and the P2P target.

1. In the same "Product Name" session used to create the curves being verified, click ***Virtual Print Run*** to launch the VPR module.
2. In the ***Run (curves to be applied)*** tab select the calibration run used to create the calibration curves. (Note that all variables in the ***Create Curves*** window - such as number of control points, ***Gray Balance Options***, etc., must not have changed.)
3. In the ***Target data to be curved:*** list, select the same P2P target data file used to create the curves.
4. In the ***Training Target (Optional):*** list, select the measurement file from the characterization target (e.g. IT8.7/4) printed at the same time as the P2P target. *(When applying VPR to a P2P target, the training target is NOT OPTIONAL).*
5. In the ***Curving Method*** area, select ***Curve Lab values (retains CMYK values and target type)***.
6. Set the ***Precise / Smooth*** slider to ***Precise***.
7. Click ***Curve & Export…*** and save the VPR-adjusted P2P data.
8. Click the + (Plus symbol) at the bottom of the ***Calibration Runs*** list to create a new run (called by default ***Run 2 – Verification***).
9. Either drag the VPR-adjusted P2P data into the ***Measurements*** list, or click on the + (Plus symbol) below the list and browse for the file.
10. Select the ***Analyze*** tab and then select the ***G7*** sub-tab.
11. In the ***Analyze – G7*** window the ***Results*** table shows the average and maximum Delta L* (ΔL*) values for the K-only and CMY gray scales (P2P columns 4 and 5). Also shown are the Delta F* (ΔF*) (also known as Delta-ab (Δab)) for the CMY gray scale (P2P column 5). These values can be compared to the ΔL* and ΔF* tolerances shown in the chart in ***Analyzing Results***.