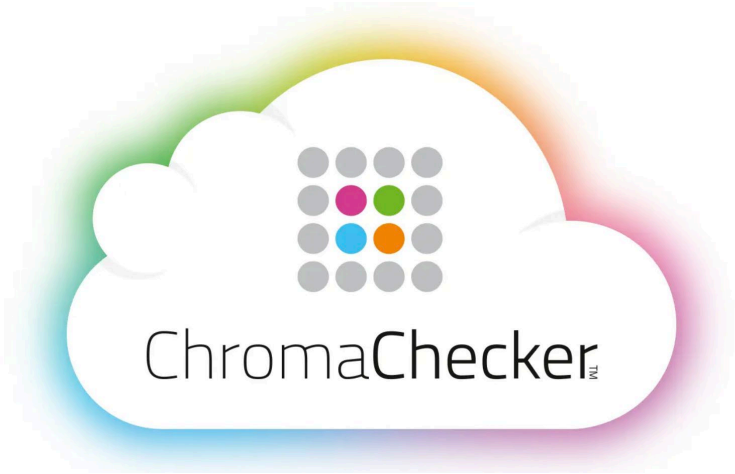
ChromaChecker™

Idealliance®

G7® System Certification Application Data Sheet



The Idealliance Print Properties Committee has established a certification process for G7 Calibration Systems. The G7 System Certification Program evaluates a candidate system's ability to calibrate a printing device using only four 1-D Curves, according to the G7 formulae contained in ANSI CGATS TR015 and tolerances in this document. This Application Data Sheet (ADS) provides step-by-step instructions for evaluating the calibration accuracy of **ChromaChecker**. For detailed instructions, see the *ChromaChecker User Guide* or *ChromaChecker e-learning system*.

Manufacturer

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Product

ChromaChecker
Version 2020.0

ChromaChecker™

ChromaChecker Testing Instructions – Physical Method

Printing the test target(s)
Print at least one P2P51 target on the printing device to be calibrated. Assumption in this procedure is that the printing device does not have any calibration curves to start with.

Measuring the target(s)
Use the ***CC Capture*** client to measure your printed target

- Connect your *Instrument,* and enter your *Operator Credentials*
- Select the appropriate *Printing Device*, *Track,* and *Template*
- Measure the target(s) – Measurements can be averaged

Building G7® Calibration curves
Once the target is measured, click on the G7® icon to initiate the G7® calibration process

- Define Calculation parameters: ***Curve Name, Black Aimpoint (300% CMY)*** *and* ***Gray Balance threshold*** (see Manual or e-learning for more information)
- Click on the ***Calculate*** button

The curve is automatically exported in your output folder based on pre-defined settings associated with your Track (file format and control points).

Applying G7® Calibration curves
ChromaChecker can export G7® Calibration in various file formats allowing to be importable by most RIP manufacturers. Otherwise, simply type the numbers in manually.

Verification by Physical Print Testing

Printing a "Verification" target
Print one or more P2P targets (or G7® Verifier target) on the same printing device and conditions, but through the G7® Calibration Curves created before.

Measuring the Verification target
Use the ***CC Capture*** client to measure your printed target

- Connect your *Instrument,* and enter your *Operator Credentials*
- Select the appropriate *Printing Device*, *Track,* and *Template*
- Measure the target(s) – Measurements can be averaged

Checking Pass/Fail result

Once the measurement of the target is done, a Pass/Fail report is automatically displayed in the CC Capture interface.

ChromaChecker Tolerances

Using the 2010 G7 System Certification sample test files and the Analysis Instructions (see above) or the Idealliance Validation Process (see below), ChromaChecker will achieve tolerances equal to or lower than the following.

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

Table 1: ChromaChecker 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, ChromaChecker 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 DeltaCh 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 ΔCh must not exceed the Idealliance Tolerance values in **Table 2**, below.

Idealliance Tolerances

Metric	Average	Maximum
wΔCh (CMY only)	≤1.5	≤3
wΔL* (CMY & K)	≤1.5	≤3

Table 2: Idealliance required tolerances

ChromaChecker

Appendix A:

P2P patch values

Column 4 (K only)

C%	M%	Y%	K%
0	0	0	0
0	0	0	2
0	0	0	4
0	0	0	6
0	0	0	8
0	0	0	10
0	0	0	15
0	0	0	20
0	0	0	25
0	0	0	30
0	0	0	35
0	0	0	40
0	0	0	45
0	0	0	50
0	0	0	55
0	0	0	60
0	0	0	65
0	0	0	70
0	0	0	75
0	0	0	80
0	0	0	85
0	0	0	90
0	0	0	95
0	0	0	98
0	0	0	100

Table 3: CMYK percentage values in column 4 of the P2P51 target

P2P patch values

Column 5 (CMY only)

C%	M%	Y%	K%
0	0	0	0
2	1.49	1.49	0
4	2.98	2.98	0
6	4.47	4.47	0
8	5.97	5.97	0
10	7.46	7.46	0
15	11.21	11.21	0
20	15.01	15.01	0
25	18.88	18.88	0
30	22.84	22.84	0
35	26.9	26.9	0
40	31.11	31.11	0
45	35.46	35.46	0
50	**40**	40	0
55	44.74	44.74	0
60	49.69	49.69	0
65	54.9	54.9	0
70	60.37	60.37	0
75	66.12	66.12	0
80	72.19	72.19	0
85	78.59	78.59	0
90	84.61	84.61	0
95	92.47	92.47	0
98	96.94	96.64	0
100	100	100	0

Table 4: CMYK percentage values in column 5 of the P2P51 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 weighted Delta L* (wΔL*)

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

$w\Delta L^* = \Delta L^* \times (1 - \max(0, (\% - 50)/50 \times 0.75))$

Calculating weighted delta Ch (wΔCh) (formerly wΔF*)

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

$w\Delta Ch = \Delta Ch \times (1 - \max(0, (\% - 50)/50 \times 0.75))$