Idealliance® G7® System Certification Program

Scope

- 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.
- All evaluations will be based on the parameters of the G7 Specification (draft 2008).

Limits

- The program is only concerned with the ability to meet the G7 greyscale condition.
- The program will not evaluate color solids, color gamut or the ability to simulate a target color space.
- To eliminate variations and noise due to measuring instruments or printing systems, all tests will be digital, requiring no physical print tests.

Basic requirements for a system to be certified

- The system must calculate CMYK calibration curves (RIP calibration percentages) that produce CMY and K-only NPDC curves that fit the nearest FanGraph curve or average of two curves.
- The corrected NPDC curve(s) should match whatever FanGraph curve(s) fit the dynamic range of the test sample.
- The system must be able to calculate individual CMY calibration curves that together produce a neutral grey balance defined by the G7 specification.
- The system must provide reports to IDEAlliance on average and peak NPDC and grey balance deviations in units.
- All references in the user interface or documentation to G7®, GRACoL®, SWOP® or any other IDEAlliance® marks, the IP rights must be accompanied by suitable ® symbol, as appropriate.
- Deliverable (4) 1-D curves, at 1% increments.
- Walk through ADS with the Certification Body (RIT's PAL)

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Testing procedures

- The following procedure will be performed for at least three sets of characterization data from actual production. Deliverables will be from an IT8.7/4 and P2P25 target including CMYK and CIElab data.
- The three test samples must produce a passing result.
- Note that regardless of what method the system uses to calculate calibration curves, results will be tested by applying the resulting calibration curves to the standard G7 NPDC scale (columns 4 and 5 of the P2P25 target) and then converting the resulting calibrated percentages to CIElab for assessment.

    1) A sample measurement file consisting of CMYK input % - Lab pairs from one of several pre-defined custom color spaces will be loaded into the candidate system in whatever format is required by the system.

    2) The system will generate calibration curve points representing separate C, M, Y and K "wanted" values for a selection of calibration "input" percentages.

    3) The number of calibration steps required in 1% increments from zero-100.

    4) The resulting correction curves will be applied to columns 4 and 5 of the P2P25 target in a Microsoft Excel® WorkBook or equivalent software, to produce a text file containing "calibrated percentages".

    5) The calibrated percentages will be converted to "calibrated Lab" in suitable software (e.g. Adobe Photoshop, CHROMiX ColorThink, X-Rite ColorLab, or equivalent) using the same custom color space that produced the sample measurement file.

    6) The resulting calibrated Lab values will be analyzed for conformance to the G7 grey balance and G7 NPDC curves utilizing the official Idealliance NPDC adaptation algorithm.

NPDC evaluation and reporting

NPDC conformance will be expressed in units of Delta L* measured to the G7 NPDC scale (columns 4 and 5 of the P2P25 target).

Where:

Delta $L^* = ABS(L^*_{calibrated} - L^*_{G7})$;

Delta $L\% = ABS(L^*_{calibrated} - L^*_{G7})/ L^*_{G7}$;

Reported data will include some or all of;

Maximum Delta L* in the 23 patches between 0 and 100%.

Maximum Delta L% in the 23 patches between 0 and 100%.

Average Delta L* in the 23 patches between 0 and 100%.

Average Delta L% in the 23 patches between 0 and 100%.

Grey balance evaluation and reporting

Grey balance performance will be expressed in terms of "Delta F*" measured on the CMY scale (column 5) of the P2P target.

Where;

$$\text{Delta } F^* = ((a^*_{calibrated} - a^*_{G7})^2 + (b^*_{calibrated} - b^*_{G7})^2)^{0.5};$$

Reported data will include some or all of;

- Maximum Delta F* in the 23 patches between 0 and 100%.
- Average Delta F* in the 23 patches between 0 and 100%

Pass/Fail tolerances

- Delta L* tolerances are 1.5 average and 3.0 maximum.
- Delta F* tolerances are 1.5 average and 3.0 maximum.

Reference Material: G7 How To ► G7 How To 2009 PDF

Notes: 2/21/11

As of 2/21/11, Delta F* is under review by ISO. Delta F* should not be confused with $Delta_{ab}$ as they are not the same formula. A closer approximation would be $DeltaE_c$, which is defined by ISO document ISO 12646:2008

$$\Delta E_c = \sqrt{\Delta a^2 + \Delta b^2}$$

where
Δa^* is the difference for the CIELAB (red-green opponent) co-ordinate;
Δb^* is the difference for the CIELAB (yellow-blue) co-ordinate.

From ISO DIS 12647-8 which is a pending standard.

ΔC_h is the CIELAB chromaticness difference between two colours of approximately the same lightness projected onto a constant lightness plane in the CIELAB colour space. This is calculated the same way as ΔE_c stipulated in ISO 12646.