



Idealliance® Hardcopy Proofing System Certification Program

Program Description – version 2.0 *(published August 2022)*

1. Introduction

1.1 Summary

Idealliance® Hardcopy Proofing System Certification program is designed to certify a standalone proofing system consisting of software and hardware components that's capable of generating proof sheets to be used as a simulation to production press sheets in confirming the color reproduction accuracy and the position of page elements. This program is independent of printing technology.

1.2 Background

As the ISO 12647-7 indicated that the purpose of a proof sheet is to simulate the visual characteristics of the production press sheets as closely as possible. The Idealliance Hardcopy Proofing System Certification program focuses on the proof sheet's visual characteristics of the color reproduction accuracy, color repeatability, color uniformity, and the conformity of "shared near-neutral gray-scale" based on CGATS TR 015. In addition to visual characteristics, the colorant rub resistance is also evaluated.

The color reproduction accuracy evaluation portion of the Idealliance Hardcopy Proofing System Certification program utilizes the identical aims and the Colorspace proof tolerances as that of the Idealliance G7 Master Facility Qualification program therefore, the proof sheets generated by an Idealliance certified Hardcopy Proofing System shall have the same shared appearance with print products produced by other Idealliance certified systems; Digital Press Systems and/or G7 Systems when the same reference dataset was used.

This document describes the Characterized Reference Printing Conditions, certification procedures, color measurement conditions, conformance aims and tolerances, and also the application procedures for a vendor to obtain the Idealliance certified Hardcopy Proofing System status.

The attributes listed below are not evaluated in this program.

- Halftone screen types, screen frequency, screen angles, and dot shape
*However, if halftone proofs are used and the dot shape, screen type, screen frequency, or screen angles are different from that of the production press sheets to be simulated, these differences shall be reported.
- Permanence of proofing substrate and printed parts



- Resolution and resolving power
- Image register
- Margin information as to proof identification

1.3 Reference dataset; CRPC (Characterization Reference Printing Condition)

As stated in ISO 15339 Part 1, the relationship between CMYK input data and color measured on the printed sheet for a given set of printing conditions is defined as the characterization data. When these datasets are used as a reference, it is referred to as a characterized reference printing condition (CRPC).

ISO 15339 Part 2 specifies seven (7) CRPCs for six commonly used conventional printing conditions and one large color gamut printing condition for the wide format inkjet printer. The table below listed the CRPC numbers, names, and their typical uses.

CRPC	Name	Typical Use	Common Name
1	Universal ColdsetNews	Small gamut printing (newsprint)	Coldset News
2	Universal HeatsetNews	Moderate gamut printing on improved newsprint type paper	Heatset News
3	Universal PremUncoated	Utility printing on a matt uncoated type paper	GRACoL2013 Uncoated
4	Universal SuperCal	General printing on super-calendared paper	SuperCal
5	Universal PubCoated	Typical publication printing	SWOP2013 Coated #3
6	Universal PremCoated	Large gamut (typically commercial) printing	GRACoL2013 Coated #1
7	Universal Extra Large	Extra large gamut printing processes	Extended Gamut

Additional reference datasets of GRACoL2006 Coated #1, SWOP2006 Coated #3, SWOP2006 Coated #5, SWOP2013 Coated #5, and OEM’s custom reference dataset all could be used in this program. However, the proofing system vendor is required to obtain approval from Idealliance before submission for using custom reference dataset.

1.4 Certification Category and Designation

Category:

- **Idealliance Hardcopy Proofing System Certification**

This program offers one category of certification. The Hardcopy Proofing System submitted for this program has to demonstrate its capability of simulating the colors and page element positions of the production press sheets as defined in the program.

Designation:

- **Idealliance certified Hardcopy Proofing System**

This program offers one designation of certification. The Hardcopy Proofing System submitted for this program must demonstrate its capability of generating proof sheets that conform to the Colorspace proof tolerances of the G7 Master Facility Qualification program. In addition, these proof sheets shall also meet the requirements specified in this document for color repeatability, color uniformity, and the colorant rub resistance.



This designation is for all the Hardcopy Proofing Systems of one particular MODEL. A Model is defined as a unique combination of a printing device of any technology and a certain software tool managing the reproduction of colors for this device. The same printing device equipped with a different color management software is considered as a different Model therefore, the certification would apply individually to the Model based on the software attached to it, even if the printing device is the same.

2. Program Overview and Conditions

2.1 Overview of the Certification Program

- Any vendor who produces Hardcopy Proofing System can apply and submit for the Idealliance Hardcopy Proofing System Certification program.
- This program assesses the Hardcopy Proofing System's capability in utilizing its color management software together with the printing device to produce the proof sheets conforming to all seven (7) CRPCs and meeting the requirements of color repeatability, color uniformity, and colorant rub resistance by evaluating the submitted Application Data Sheet (ADS) document and the proof sheets from the Applicant.
- The application procedures and test forms are available on the Idealliance website.
- The ADS document shall contain the following components.
 1. the versions of the software and hardware being certified
 2. the operator maintenance procedures for bringing the printing device to the required operation condition
 3. the validation procedures to ensure the System is at the required operation condition as defined by the vendor
 4. the step-by-step procedures to generate a proof sheet that conforms to the selected CRPC and meeting the requirements of color repeatability, color uniformity, and colorant rub resistance
 5. the validation procedures to ensure the proof sheets generated are meeting all the requirements
- The application is Model specific and the certified performance is valid only when the two conditions listed below are maintained.
 1. The printing device achieved the required operation conditions and validated following the vendor's maintenance and validation procedures.
 2. There is no change in the System's software, hardware, and colorants that would alter the printed colors on substrate as the System was initially certified.
- The online Application Form should be completed and submitted to Idealliance with fees. [Application Form available here.](#)
- Idealliance sends confirmation email to the Applicant.
- All fees are payable irrespective of the certification outcome.
- The online form is communicated internally from Idealliance to a third-party evaluation laboratory. The third-party evaluation laboratory is acting on behalf of Idealliance as the



independent evaluation contractor for receiving and processing the submitted ADS document and proof sheets.

- For each submission, the independent evaluation contractor conducts the evaluation and provides the results to Idealliance and Idealliance notifies the Applicant.
- Applicants who have achieved the passing results and obtained the certification will be provided with a logo and intellectual property rights for usage in their marketing materials and websites by Idealliance.
- Idealliance maintains a list of certified systems on its official Hardcopy Proofing System website and will update the site within ten (10) days of successful certification.
- The passed proof sheets will be recycled after evaluation is completed and the retention time is thirty days for failed submissions.

2.2 Proof Sheets Preparation and Submission

The applicant uses the test targets from the Idealliance website, proofs them without alternation on the submitting Hardcopy Proofing System.

1. Color Reproduction Accuracy
 - a. Utilize Idealliance Hardcopy Proofing System Certification Test Target 1 which incorporates the Idealliance IT8.7/5 target for either i1iSiS or i1iO table
 - b. Generate two proofs for conforming to each of the seven (7) CRPCs of ISO 15339
 - c. Label the proof sheets with date, time, and the CRPC information
2. Color Repeatability
 - a. Utilize Idealliance Hardcopy Proofing System Certification Test Target 1 which incorporates the Idealliance IT8.7/5 target for either i1iSiS or i1iO table
 - b. Twenty-four hours after the completion of 2.2 1., generate two proofs conforming to CRPC6 of ISO 15339
 - c. Label the proof sheets with date, time, and the CRPC information
3. Color Uniformity
 - a. Utilize Idealliance Hardcopy Proofing System Certification Test Target 2, 3, and 4 (*Note: These are the same targets used in the Digital Press certification 3 levels of gray, for multi-application print alignment,*)
 - b. Generate two proofs of each target and label them accordingly
4. Colorant Rub Resistance
 - a. Utilize Idealliance Hardcopy Proofing System Certification Test Target 5 and 6 (*Note: These additionally align with targets used in the Digital Press Certification one is black and the 2nd is cyan, for multi-application print alignment.*)
 - b. Generate two proofs of each target and label them accordingly
5. Visual inspection
 - a. Utilize Idealliance Hardcopy Proofing System Certification Test Target 7 and 8
 - b. Generate one proof of each target and label them accordingly
6. The Applicant mails the proof sheets described above to the independent evaluation contractor as listed below.

Example:

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Building #78 Room #1425

2.3 Color Measurement Conditions and Backing Materials Specifications

CIELAB system, D5000, two-degree observer, and the M1 measurement conditions are used. Black or white backing is selected based on the opacity of the proof sheet substrate. For black backing, it is spectrally non-selective, diffuse-reflecting no perceptible specular reflection, opaque, with a minimum visual reflection density of 1.30. For white backing, it is opaque with the opacity value equal or greater than 99, diffuse-reflecting, non-fluorescing, CIELAB C^* <2.4, and CIELAB L^* value between 92 and 97.

2.4 Colorimetric Calculations and the use of CIEDE2000

CIE XYZ tristimulus values and other colorimetric quantities are calculated according to ISO 13655:2017. Colorimetric tolerances, unless otherwise stated, are based on the CIEDE2000 color difference formula, abbreviated as ΔE_{00} . This weighted color difference equation provides good correlation to perceived color differences and is specified in ISO 13655:2017.

2.5 Reference ISO Standards

Color measurement and data analysis will be derived from specifications, either wholly or in part, found in the following standards.

CGATS 21:2013 Graphic Technology – Printing digital data across multiple technologies

ISO 3664:2009 Graphic technology and photography – Viewing conditions

ISO 12642-2:2015 Graphic Technology (IT8.7/4) – Input data for characterization of 4-colour process printing – Part 2: Expanded data set

ISO 12647-7:2016 Graphic Technology – Process control for the production of halftone color separations, proof and production prints – Part 7: Proofing processes working directly from digital data

ISO 13655:2017 Graphic Technology – Spectral measurement and colorimetric computation for graphic arts images

ISO 15339 Graphic technology — Printing from digital data across multiple technologies:

— Part 1: Principles

— Part 2: Characterized reference printing conditions, CRPC1–CRPC7

3. Evaluation Procedures

The following sections describe the evaluation procedures of certifying the submission.



3.1 ADS Documentation Evaluation Procedure

ADS documentation is required for every submission and the information and procedures listed below are checked for its correctness, completeness, and clarity.

- a) Printing device and software version information
- b) The operator maintenance procedures
- c) The printing device validation procedure
- d) The operation procedures of generating conforming proof sheets
- e) The proof sheet validation procedure

3.2 Proof Sheets Measurement and Data Analysis

For submitted Proof Sheets

- a) The Idealliance Hardcopy Proofing System Certification Test Target 1 (IT8.7/5) is utilized for evaluating the color reproduction accuracy.
- b) Color Repeatability is evaluated using two Idealliance Hardcopy Proofing System Certification Test Target 1 that were proofed twenty-four (24) hours apart.
- c) Color Uniformity is evaluated at three different lightness levels using the Idealliance Hardcopy Proofing System Certification Test Target 2, 3, and 4 with the specifications listed below in 12" x 18" sheet size.
 - a. C: 65%, M: 50%, Y: 50%, K: 50%
 - b. C: 40%, M: 30%, Y: 30%, K: 30%
 - c. C: 20%, M: 15%, Y: 15%, K: 15%
- d) The Sutherland Rub Tester is used for evaluating the colorant rub resistance and the Idealliance Hardcopy Proofing System Certification Test Target 5 and 6 are to be used.
- e) The Idealliance data analysis tools are used to process the measurement data files.
- f) If the analysis results failed, the independent evaluation contractor notifies Idealliance and the Applicant can submit another set of date/time stamped proof sheets for the second iteration free of charge.
- g) The submission fails if the second sets of proof sheets don't pass.
 1. Idealliance provides technical consulting to the Applicant in identifying a solution to obtain passing results.
 2. This technical consulting is free of charge.
- h) Upon the successful completion of the measurement and data analysis process, the independent evaluation contractor generates the data analysis report of the submission and emails it to Idealliance and this concludes the evaluation process.

4. Tolerances

4.1 Color Reproduction Accuracy

The pass/fail requirements of the proof used for the G7 Master Qualification program listed below are also used for the color conformity of this program when evaluating the color reproduction accuracy of simulating the colors of the seven (7) CRPCs.

Target	Proof Sheet Tolerance
Weighted ΔL^* ($w\Delta L^*$) CMY and K-only scales	Average $w\Delta L^* \leq 1.5$ Maximum $w\Delta L^* \leq 3.0$
Weighted ΔC_h^* ($w\Delta C_h^*$) (CMY scale)	Average $w\Delta C_h^* \leq 1.5$ Maximum $w\Delta C_h^* \leq 3.0$

Target	Proof Sheet Tolerance
Proof Sheet Substrate	CIELAB $\Delta E_{00} \leq 2.0$
CMY Solids	CIELAB $\Delta E_{00} \leq 2.0$
Black Solid	CIELAB $\Delta E_{00} \leq 2.0$
RGB Solids	CIELAB $\Delta E_{00} \leq 2.0$
All Patches of IT8.7/5	Average CIELAB $\Delta E_{00} \leq 2.0$ 95 th percentile CIELAB $\Delta E_{00} \leq 2.0$ Maximum CIELAB $\Delta E_{00} \leq 2.0$
50C, 50M, 50Y, 50K	CIELAB $\Delta E_{00} \leq 2.0$
50/40/40	CIELAB $\Delta E_{00} \leq 2.0$

4.2 Color Repeatability

To evaluate the color repeatability of a Hardcopy Proofing System, two proofs conforming to the same preselected CRPC have to be generated twenty-four (24) hours apart. Both proofs need to pass the Tolerances specified in section 4.1 above and the color differences between these two proofs on the 100% of CMYKRGB and 50% of CMYK patches have to be equal or less than 2.0 CIELAB ΔE_{00} .

4.3 Color Uniformity

The M score implemented in the Idealliance G7 Digital Press Certification is utilized in this program to evaluate the color uniformity with a proof sheet. The M score ≥ 60 is considered pass.

4.4 Colorant Rub Resistance

The printed density loss on both the black and cyan test targets is the metric implemented to evaluate the colorant rub resistance via the Sutherland Rub Tester. If the density loss is less than 50% then it's considered pass.

4.5 Visual Inspection

A set of pictorial images is provided as part of the test targets. This is to be used for visual inspection under D5000 according to ISO 3664:2009. The SCID image set described in ISO 12640:2 are included. These images include memory colors, high-key, low-key, neutrals, vignettes, and so on.

Visual inspection check list:

- Misregistration



- Moiré
- Screen type
- Noise
- Streaks
- Banding
- Haze
- Background
- Satellites
- Missing jet
- Bleed
- Coalescence

5. Print Facilities Equipped with the Idealliance Certified Hardcopy Proofing Systems

For print facilities equipped with the Idealliance certified Hardcopy Proofing Systems, the proof sheets generated by the System are recognized and accepted by Idealliance as valid proof submission materials for the G7 Master Qualification program. The facility's own G7 Experts/Professional or certified vendor G7 Expert can submit applications by following the G7 Master Qualification submission procedures, rules, and fees. See www.idealliance.org/g7 for details.