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Graphic technology — Prepress digital data exchange —

Part 2: Advanced colour targets for input scanner calibration

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Contents

Page

Foreword ..... **iv**

Introduction ..... **v**

1 Scope **1**

2 Normative references **1**

3 Terms and definitions **1**

4 Technical requirements **3**

4.1 General 3

4.2 Target design 3

4.3 Target layout and physical characteristics 3

4.4 Tolerances on patch values 4

4.4.1 Batch targets 4

4.4.2 Calibrated targets 4

4.5 Spectral measurement and colorimetric calculation 4

4.6 Data reporting 4

4.7 Data file format 4

4.8 Usable target life 4

Annex A (informative) **Example of advanced transmission targets — Layout and physical characteristics** **5**

Annex B (informative) **Example of advanced reflection targets — Layout and physical characteristics** **10**

Annex C (informative) **CxF/X file format — Data file format** **15**

Bibliography **18**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

This first edition, together with ISO 12641-1:2016, cancels and replaces ISO 12641:1997, which has been technically revised.

A list of all parts in the ISO 12641 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

More than 1 000 000 targets, both transmissive and reflective, have been produced based on ISO 12641 and used in the past decades for calibrating scanners.

Based on the demands for higher quality from scientific institutions, museums, art and cultural heritage archives, and special public administration applications for ID-documents, a need was recognized to achieve a better scanner colour characterization. Very dark patches (chromatic and achromatic) are nearly unrepresented by the target layout of ISO 12641-1. Advanced target designs require more patches for an enhanced sampling of saturated and pastel colours (especially for archiving applications). They offer chances for improving the analysis of non-linear scanner performance. Such modern or advanced targets however could not be based on any ISO standard, which results in a lack of standardization.

In order to keep consistency and compatibility with the existing legacy targets, ISO 12641 was made as a multipart standard where ISO 12641-1 remains unchanged from the 1997 edition and the new ISO 12641- 2 specifies the requirements for advanced targets.

The discussion revealed that a new standard should also provide a flexible framework for new targets to come. Combining this with the need to reflect modern available targets, this document provides general requirements in the main part and provides exemplary transmissive and reflective targets in the informative Annexes A and B, respectively. Self-emissive targets are covered by this document if they are designed to simulate the targets using transmission of light through an optical filter.

Traditionally, data has been provided in ACSII format using a keyword file. This document however requires the usage of the modern exchange format CxF/X-2.

Traditionally, ISO 12641-1 has been aimed at the colour characterization of input scanning devices. This document continues that tradition but also provides the framework for targets for other input processes such as digital cameras or for quality assurance applications.

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Graphic technology — Prepress digital data exchange —

Part 2:
Advanced colour targets for input scanner calibration

1 Scope

This document defines a framework for advanced reflective and transmissive layouts and colorimetric values of targets for use in the calibration and characterization of image capturing devices.

This document defines a framework for target creation and data reporting. This framework can be used for both ISO defined and custom targets for both reflective and transmissive use.

Self-emissive targets are not covered by this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 12637-1, *Graphic technology — Vocabulary — Part 1: Fundamental terms*

ISO 13655:2017, *Graphic technology — Spectral measurement and colorimetric computation for graphic arts images*

ISO 17972-2, *Graphic technology — Colour data exchange format (CxF/X) — Part 2: Scanner target data (CxF/X-2)*

ISO 17972-3, *Graphic technology — Colour data exchange format (CxF/X) — Part 3: Output target data (CxF/X-3)*

ISO 28178, *Graphic technology — Exchange format for colour and process control data using XML or ASCII text*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 12637-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
CIE tristimulus value
amount of the three reference colour stimuli, in the CIE-specified trichromatic system, required to match the colour of the stimulus considered

Note 1 to entry: In the 1931 CIE standard colorimetric system, the tristimulus values are represented by the symbols X, Y, Z.

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3.2
CIELAB colour space
three-dimensional, approximately uniform, colour space produced by plotting in rectangular coordinates the quantities *L**, *a** and *b**

Note 1 to entry: Refer to ISO 13655:2017 for the description of how to compute CIELAB.

3.3
colour gamut
subset of perceivable colours reproducible by a device or medium

3.4
maximum density
Dmax
density corresponding to the minimum transmittance or *reflectance factor* (3.9) that a photographic product can achieve

3.5
maximum neutral density
density corresponding to the *maximum density* (3.4) that a photographic product can achieve [minimum transmittance or *reflectance factors* (3.9)] and maintain a $C^*ab = 0$

3.6
minimum density
Dmin
density corresponding to the maximum *transmittance factor* (3.10) (film) or *reflectance factor* (3.9) (paper) that a photographic product can achieve

3.7
minimum neutral density
minimum density (3.6) that a photographic product can achieve [maximum transmittance or *reflectance factors* (3.9)] and maintain a $C^*ab = 0$

3.8
proof print
proof prints possible as hard-copy proof and proofs produced as a reflection copy on a proofing substrate

3.9
reflectance factor
ratio of the measured flux reflected from the specimen to the flux reflected from a perfect reflecting diffuser

3.10
transmittance factor
ratio of the measured flux transmitted by the sample material to the measured flux when the specimen is removed from the sampling aperture of the measuring device

3.11
sampled colour area
portions of the test target whose content is specified

3.12
x-y scanner
dual axis electronic device that generates a two-dimensional representation of a photographic (or other hardcopy) sample

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