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Graphic technology — Colour data exchange format (CxF/X) —

Part 2:
Scanner target data (CxF/X-2)

Technologie graphique — Échange des données de couleur en utilisant CxF —

Partie 2: Données cibles du scanner entrantes

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Foreword

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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. www.iso.org/directives

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 130.

ISO 17972 consists of the following parts, under the general title *Graphic technology — Colour data exchange format (CxF/X)*:

Part 1: Relationship to CxF3 (CxF/X)

Part 2: Scanner target data (CxF/X-2)

Part 3: Output target data (CxF/X-3)

Part 4: Spot colour characterisation data (CxF/X-4)

Introduction

ISO 17972 (all parts) defines methods for the use of CxF3 to exchange measurement data and associated metadata within the graphic arts industry and for the exchange of these files between graphic arts users. It is a multi-part document where each part is intended to respond to different workflow requirements. The goal throughout the various parts of ISO 17972 has been to maintain the degree of flexibility required while minimizing the uncertainty of the data exchanged.

ISO 17972-1 defines the use of the publicly available Color Exchange Format, version 3 (CxF3), for prepress data exchange and verification.

This part of the 17972 series covers the use of CxF when exchanging data from ISO 12641 *Prepress digital data exchange — Colour targets for input scanner calibration.* This document is not designed to replace ISO 12641 but to define an updated, verifiable, method of data exchange using CxF, acting as a supplement to Sections 4.6 and 4.7. X-Rite Inc. the original creator of The CxF file format claims no intellectual property rights to the materials used in this document.

Scanner targets are one of the earliest defined data exchange use cases in the Graphic Arts and continue to be used for calibration and characterization of scanners and other devices. Traditionally data has been provided in ACSII format using a keyword file. The direct mapping of existing data to the updated CxF/X-2 encoding was one of the primary concerns in writing this standard.

The following files are part of ISO 17972-2, and are included as electronic inserts:

- CxF3_Core.xsd,
- CxF3_Schema_Diagram.pdf,
- Scannertarget CxF/X-2.cxf,
- Scannertarget.txt

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

1 Scope

This part of ISO 17972 defines an exchange format for target input values, colour and process control data relating to scanner targets (and the associated metadata necessary for its proper interpretation) in electronic form. This document includes the use of a CustomResource element within the CxF framework to define a minimum of set of data for exchange and identify the data as being part of 12641.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 17972-1, Graphic *technology — Colour data exchange format — Part 1: Relationship to CxF3 (CxF/X)*

ISO 12641, *Graphic technology — Prepress digital data exchange — Colour targets for input scanner calibration*

Color Exchange Format v3.0 documents. Available from the Internet
http://www.colorexchangeformat.com

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply

3.1
term
For the purposes of this document, the following terms and definitions apply.

Note 1 to entry: The spelling of terms taken from Color Exchange Format v3.0 is not altered from that used in the normative reference. A specific example is the word color instead of colour.

3.1.2

ColorSpecification

information about the ColorValue including its source (measurement specifications), illuminant/observer calculation method (tristimulus specifications), and physical attributes of the objects (size, quantity, finish, etc.).

3.1.3
ColorValue
one of a number of defined color space types that can hold values and associated information related to that specific type of device independent colour space. [SOURCE: Color Exchange Format v3.0]

3.1.4
CustomResources
“extensible” part of CxF3, additional information not included in the CxF3 Core about colour objects and the file itself that is considered application specific in nature and not generally of use to all other applications. [SOURCE: Color Exchange Format v3.0]

3.1.5
DeviceColorValue
One of a number of defined colour space types that can hold values and associated information related to that specific type of device dependent colour space. [SOURCE: Color Exchange Format v3.0]

3.1.6
object
used to identify each specific “Colour item” that is being described

3.2 Definitions

3.2.1
profile
set of mathematical values or binary structure that allows transformation to/from one device colour space to another

NOTE 1 to Entry: Profiles are stored in the ProfileCollection and are shared and referenced by the ColorValues.

3.2.2
resources
information about each colour object that is of interest to all readers of the CxF file

NOTE 1 to Entry: Also referred to as the “CxF3 Core” – it is defined by the CxF3-Core namespace schema.

3.2.3
schema
an XML document that, conforming to the specifications established by the World Wide Web Consortium, defines the structure of a class of XML documents

3.2.4
XML
<Extensible Markup Language>
set of rules for encoding documents electronically

3.2.5
XSD
XML Schema Definition

4 Symbols and abbreviated terms

The following documentation conventions are used.

Names of XML elements are shown in bold type, for example **Resources**.

Names of XML attributes are shown in italics, for example *SpotColorName*.

XML XPaths are used to identify XML elements. For example **container/contained** refers to an element (**contained**) that is a child of another element (**container**).

Similarly XML XPaths are used to refer to XML attributes, for example **element1**/@*Name* refers to an attribute (*Name*) of an element (**element1**).

5 Requirements

5.1 General description of a CxF/X file for data exchange

The standard Colour Data Exchange Format as presented ISO 17972-1 captures file Information such as creation and ownership, core colour information (the Resources), and any extended information (CustomResources). In this standard CustomResources are used to define the minimum required data for 12641 data exchange via CxF/X-2. Any CxF/X file shall meet the following requirements:

The FileInformation. element of a CxF/X file shall include Creator, CreationDate and Description.

The Description element of a CxF/X file shall include "CxF/X" and the number of the applicable International Standard with which the CxF/X file complies.

If the file is to be used in support of an International Standard it shall include the number of the International Standard in the Comment text.

A CxF/X file shall validate against the CxF3 Schema (see annex B). In all cases a CxF/X document should have the extension ".CxF".

A CxF/X file shall be structured as shown in Figure 1.

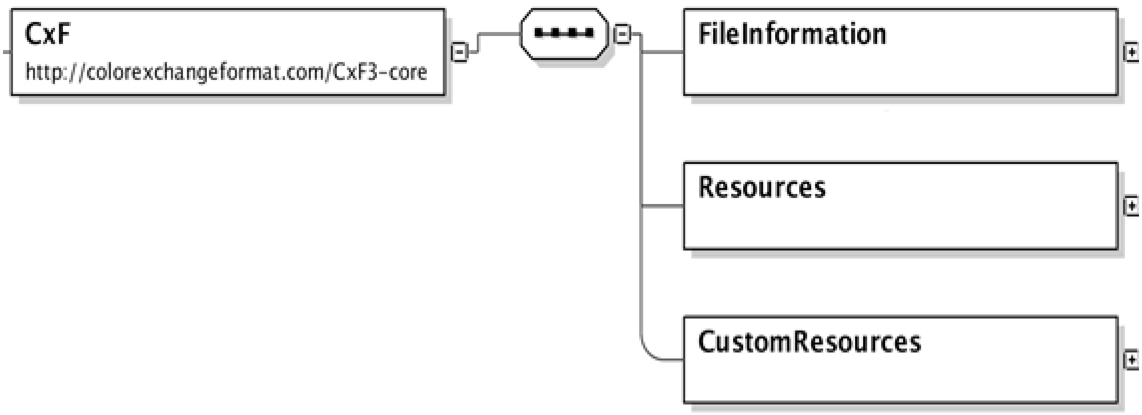

Figure 1

NOTE: The spelling of terms and elements taken from Color Exchange Format v3.0 are not altered from that used in the normative reference. A specific example is the word color instead of colour.

5.2 Requirements of a CxF/X-2 file for ISO 12641 data exchange

There are several data requirements stated in ISO 12641 section 4.6. Originators of targets are required to provide:

- For all targets batch specific Mean and standard deviation colourimetric data shall be available for each patch in the form of corresponding colourimetric values to 2 decimal places
- Calibrated targets shall supply the measured colourimetric data for all target patches

Table 1 enumerates the required elements for CxF/X data exchange of scanner target data. Annex A provides a complete mapping of all keywords from ISO 28178 which is a superset of the keywords used in ISO 12641. An example of the use of these in a CxF/X-2 file is provided in Annex C.

Table 1 / CxF/X-2 required fields

ISO 12641	***CxF/X-2***
Required Fields	
Originator	**FileInformation.Creator**
File Descriptor	**FileInformation.Description**
Created	**FileInformation.CreationDate**
TargetType	**FileInformation.Tag ("12641_TargetType");**
Manufacturer	**FileInformation.Tag ("Manufacturer");**

Prod_Date	**FileInformation.Tag ("Prod_Date");**
Serial	**FileInformation.Tag ("Serial");**
Measurement_Geometry	**MeasurementSpec.GeometryChoice**
Measurement_Source	**MeasurementSpec.Device.DeviceIllumination**
Filter	**MeasurementSpec.Device.DeviceFilter**
Polarization	**MeasurementSpec.Device.DevicePolarization**
Weighting_Function	**TristimulusSpec.Observer**
Sample Backing	**MeasurementSpec.Backing**
Input values	
RGB_R (G,B)	**ColorRGB**
Measured values (Either XYZ or Lab) **One is required**	
XYZ_X (Y,Z)	**ColorCIEXYZ**
LAB_L (A,B)	**ColorCIELab**
Required of Manufacturers only	
MEAN_DE	**Tag ("Mean_DE")**
STDDEV_X (Y,Z)	**Tag ("STDDEV_X")**