
**Graphic technology — Colour data
exchange format —**

**Part 1:
Relationship to CxF3 (CxF/X)**

*Technologie graphique — Format d'échange des données en couleur —
Partie 1: Relation avec le CxF3 (CxF/X)*



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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 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, *Graphic technology*.

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 4: Spot color characterisation data (CxF/X-4)*

The following parts are under development:

- *Part 2: Scanner target data (CxF/X-2)*
- *Part 3: Printer target data (CxF/X-3)*

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.

A number of International Standards used by the graphic technology community require the reporting of measured and/or computed data. Several of these standards, e.g. ISO 12642 and ISO 13655, have used the ASCII keyword-value pair approach and have been widely used by some industry segments. However, there has been a large degree of variability in implementation, which has not facilitated good automated data exchange creating uncertainty. ISO 28178 attempted to rectify this situation by creating a bridge between the ASCII Keywords approach and an XML flat file approach, but the flat file approach had limitations and has not been widely used. This part of ISO 17972 advances this process further by identifying the use of the publicly available Color Exchange Format version 3 (CxF3) for prepress data exchange and verification. In order to achieve a level of exchange that avoids any ambiguity in interpretation of the file. Each part defines a required and optional set of CxF elements that are permitted to be used. This first document will outline the mapping of CxF to the existing elements in ISO 28178 (provided in [Annex A](#)) and illustrate the underlying concepts of CxF.

NOTE X-Rite Inc., the original creator of the CxF file format, claims no intellectual property rights to the materials used in this part of ISO 17972.

This part of ISO 17972 is intended to support all existing and future graphic arts standards that require the exchange of measured, computed, or process control data and the associated metadata necessary for its proper interpretation.

In reviewing the needs of such a format, the following requirements were identified:

- existing applications using ISO 28178 formatted documents in ASCII format should not be rendered obsolete by the new standard;
- data needs to be in a form that is both human-readable (once the digital file has been displayed using standard editors or file readers) and machine-readable;
- data needs to be readable by automated programs to extract the necessary information;
- data files need to be extensible by end users in such a way as to allow additional information to be included without breaking automated readers of the file;
- data files need to be capable of being created by automated programs;
- the format needs to allow multiple language representation of data.

The following files are part of ISO 17972-1, and are included as electronic inserts:

- CxF3_Core.xsd;
- CxF3_Schema_Diagram.pdf;
- Scannertarget.cxf;
- Scannertarget.txt;
- Holidays_test.cxf.

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Graphic technology — Colour data exchange format —

Part 1: Relationship to CxF3 (CxF/X)

1 Scope

This part of ISO 17972 defines an exchange format for colour and process control data (and the associated metadata necessary for its proper interpretation) in electronic form. It is the base document for describing the use of CxF3 for data exchange. Where required, this part of ISO 17972 also defines additional requirements for a valid CxF/X file. Using XML, all CxF3 and CxF/X documents also support the exchange of data outside of the graphic arts workflow and can support future standards with an extensible architecture using standard XML Names and Metadata tags which can be used with standard XML tools and pass XML validation.

Additional parts of ISO 17972 will use custom resources in conjunction with CxF3 to define the required and optional data for a particular workflow.

2 Normative references

Color Exchange Format v3.0 documents¹⁾

3 Terms and definitions

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

3.1 Terms

NOTE 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.

3.1.1

ColorSpecification

information about the *ColorValue* (3.1.2) including its source (measurement specifications), illuminant/observer calculation method (tristimulus specifications), and physical attributes of the *objects* (3.1.5) (size, quantity, finish, etc.)

[SOURCE: Color Exchange Format v3.0]

3.1.2

ColorValue

one of a number of defined colour 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]

1) Available at <http://www.colorexchangeformat.com>.

3.1.3

CustomResources

“extensible” part of *CxF3* (3.2.2); 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]

3.1.4

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]

3.1.5

Object

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

3.2 Definitions

3.2.1

CxF/X

CxF3 (3.2.2) file which also conforms to the requirements defined in this part of ISO 17972

3.2.2

CxF3

exchange format for colour and process control data defined in Color Exchange Format v3

3.2.3

profile

set of mathematical values or binary structure that allows transformation to/from one device colour space to another; profiles are stored in the *ProfileCollection* and are shared and referenced by the *ColorValues* (3.1.2)

3.2.4

resources

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

Note 1 to entry: This is also referred to as the “*CxF3* Core”. It is defined by the *CxF3*-Core namespace schema.

3.2.5

schema

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

3.2.6

XML

Extensible Markup Language; a set of rules for encoding documents electronically

3.2.7

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

5 Requirements

5.1 CxF/X specific requirements

A CxF/X file shall comply with all of the requirements specified in CxF3. It shall also comply with any additional requirements specified in this or other parts of ISO 17972. These may include required **Resources** or restrictions on the use of **Resources** or specification of **CustomResources**.

- 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 sA3 Schema (see [Annex B](#)). A CxF/X file that is converted from an ISO 28178 compliant text file should use [Table A.1](#) to map the textual data into CxF/X elements and attributes. Additional parts of ISO 17972 can provide additional requirements for exchanging data from previous standards including ISO 28178.

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 General description of a Color Exchange Format conforming file

5.2.1 General

The standard Color Exchange Format as presented in the CxF 3.0 captures file Information such as creation and ownership, core colour information (the **Resources**), and any extended information (**CustomResources**). A CxF document shall have the extension “.cxf”. A CxF/X file should use the extension “.cxf” for ease of file mapping with existing CxF aware applications.”

By using XML which is a standard for the digital representation of documents, CxF also speeds and simplifies the movement and reporting of data from its database collection to a web-ready representation. A common data exchange format used in the graphic arts is defined in ISO 28178:2008. [Annex A](#) provides the mapping from ISO 28178 to CxF (see [5.1](#) for additional requirements in using this for a CxF/X file).

A CxF3 file shall be structured as shown in [Figure 1](#).

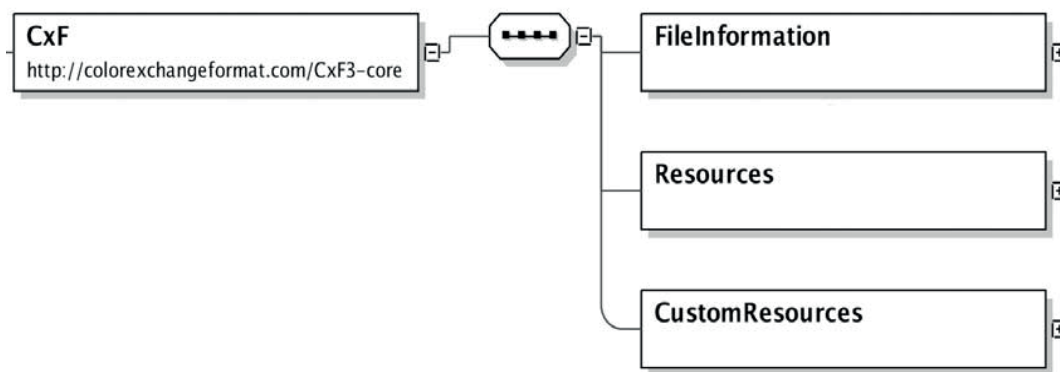


Figure 1 — CxF3 file structure

Every valid Color Exchange Format document shall contain, at a minimum, the required namespace information in the root CxF element.

(<CxF xmlns = "<http://colorexchangeformat.com/CxF3-core>">).

In addition, it can include FileInformation, Resources, and CustomResources. Further information on FileInformation is given in [5.2.2](#), on Resources in [5.2.3](#), and on CustomResources in [5.2.5](#).

NOTE CxF file structure diagrams use XML symbology.

5.2.2 FileInformation

This element contains the header data for a Color Exchange Format container that supports workflow management. Elements include the following:

- **Creator** - Name of the data creator, for example, program name used to generate file, company name, etc.;
- **CreationDate** - Date and time of the creation of this Color Exchange Format file. Date time format is CCYY-MM-DDThh:mm:ss.SSSZ. Optional time zone can be specified either as UTC or UTC offset;
- **Description** - Of the file or a data manifest;
- **Comment** - User entered comment for additional information;
- **Tag(s)** - Any named tag/value pairs for additional metadata regarding this file.

A valid CxF/X file shall have Creator, CreationDate, and Description in FileInformation. CxF/X and the applicable part shall be included in the Description. If the file is to be used in compliance with an ISO Standard, it shall include the standard number in the Comment text.

5.2.3 Resources

A typical file would include information within the appropriate Collections in the Resources:

The CxF element ObjectCollection stores all of the colour objects contained in the file.

Object elements contain identification attributes and data including ColorValues, DeviceColorValues, ColorDifferenceValues, PhysicalAttributes, and TagCollections. This is illustrated in [Figure 2](#).

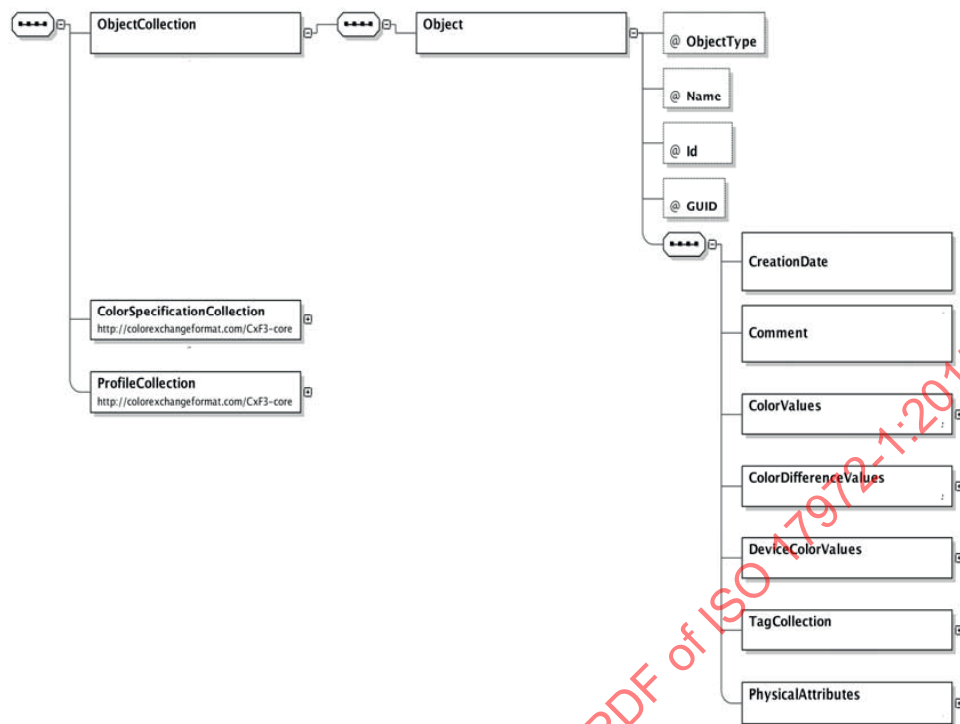


Figure 2 — Object elements

The CxF element ColorSpecificationCollection stores all of the ColorSpecifications contained in the file.

A ColorSpecification element has an id (used to reference this specification from each Object's ColorValue) and elements including TristimulusSpec, MeasurementSpec, and PhysicalAttributes. **MeasurementType and GeometryChoice within MeasurementSpec** are the only required data within MeasurementSpec. This is illustrated in [Figures 3](#) and [4](#).

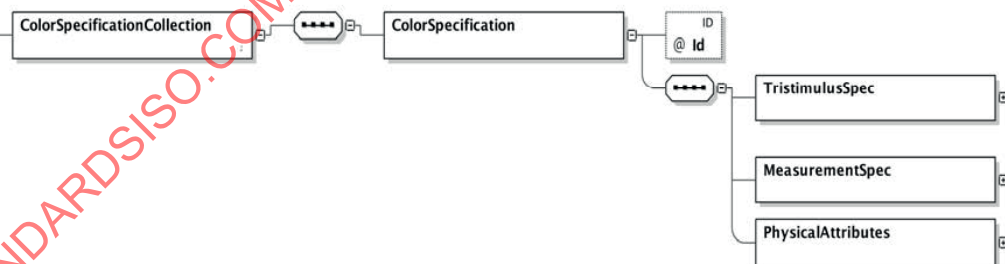


Figure 3 — ColorSpecificationCollection

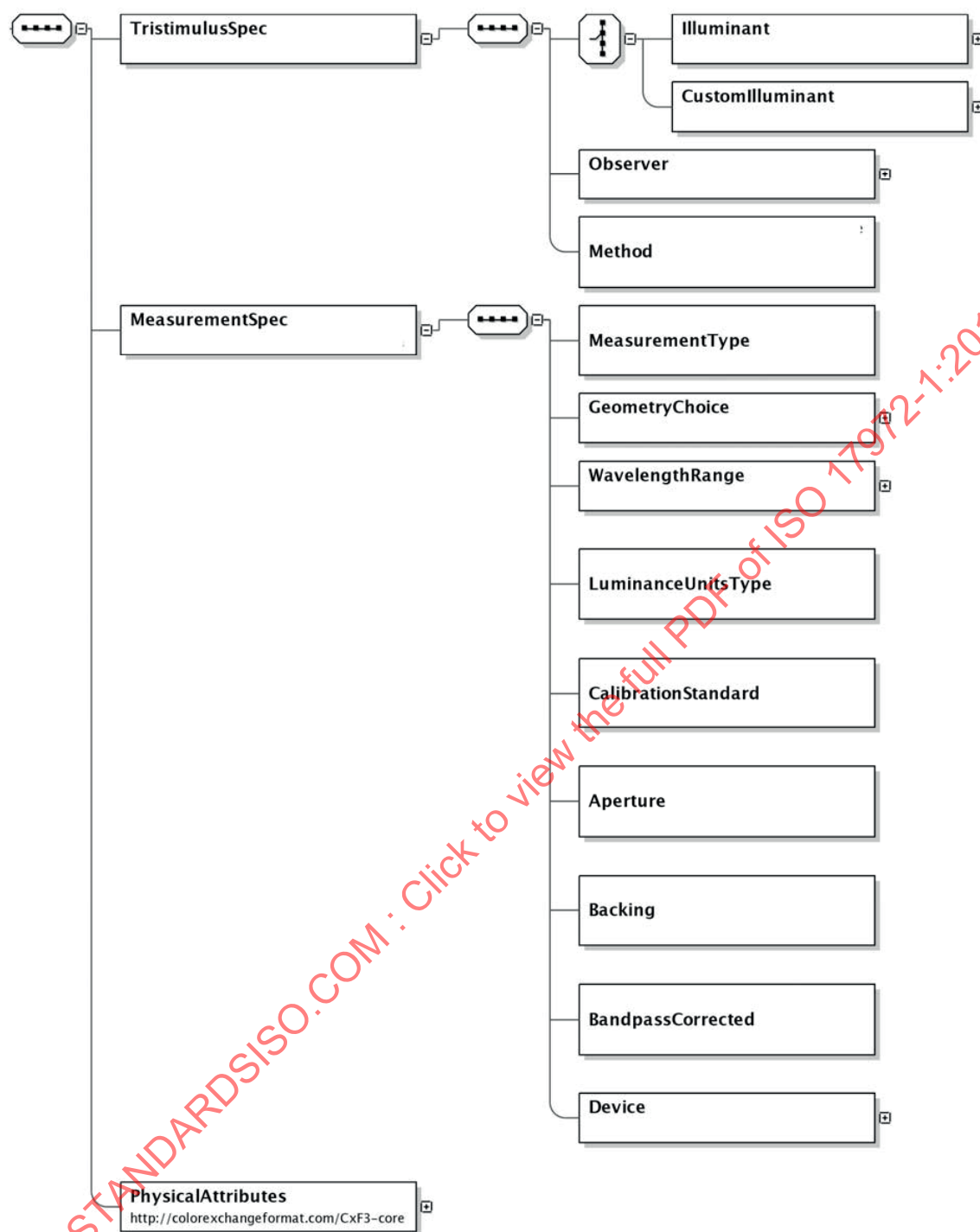


Figure 4 — MeasurementSpec and TristimulusSpec

5.2.4 Example CxF file structure

Figure 5 is an illustration of a CxF file structure with some elements collapsed.

```
<?xml version="1.0" encoding="UTF-8"?>
<CxF xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://colorexchangeformat.com/CxF3-core" xsi:schemaLocation="http://colorexchangeformat.com/CxF3-core CxF3_Core.xsd">
  <FileInformation>
    <Creator>X-Rite - RFW</Creator>
    <CreationDate>2009-08-18T12:15:33-05:00</CreationDate>
    <Description>Example CxF3 file</Description>
  </FileInformation>
  <Resources>
    <ObjectCollection>
      <Object ObjectType="Standard" Id="R1" Name="dark skin" GUID="30453E30-3068-524A-2E4D-917F2E4D917F">
        <CreationDate>2003-09-28T12:15:33-05:00</CreationDate>
        <ColorValues>
          <ReflectanceSpectrum MeasureDate="2003-09-28T12:15:33-05:00" ColorSpecification="CSD65-2">
            0.0580 0.0594 0.0594 0.0584 0.0581 0.0591 0.0599 0.0601 0.0603 0.0610 0.0634 0.0695 0.0760 0.0786 0.0798 0.0826 0.0897 0.1024
            0.1197 0.1350 0.1434 0.1455 0.1499 0.1594 0.1721 0.1842 0.1913 0.1928 0.1878 0.1734 0.1704
          </ReflectanceSpectrum>
          <ColorSRGB ColorSpecification="CSD65-2">
            <MaxRange>254</MaxRange>
            <R>115</R>
            <G>82</G>
            <B>68</B>
          </ColorSRGB>
          <ColorCIELab ColorSpecification="CSD50-2">
            <ColorValues>
              <DeviceColorValues>
                <TagCollection Name="iQC_Tags">
                  <PhysicalAttributes>
                </Object>
              </Object>
            </Object>
            <Object ObjectType="Standard" Id="R2" Name="light skin" GUID="30453E30-3068-524A-3E4D-917F2E4D917F">
              <Object ObjectType="Standard" Id="R3" Name="blue sky" GUID="30453E30-3068-524A-4E4D-917F2E4D917F">
                <Object ObjectType="Standard" Id="R4" Name="foliage" GUID="30453E30-3068-524A-5E4D-917F2E4D917F">
                  <Object ObjectType="Standard" Id="R5" Name="blue flower" GUID="30453E30-3068-524A-7E4D-917F2E4D917F">
                    <Object ObjectType="Standard" Id="R6" Name="bluish green" GUID="30453E30-3068-524A-2E4D-917F2E4D917F">
```

Figure 5 — Illustration of CxF file structure

Additional example files are provided as electronic files in [Annex C](#). These files do not use CustomResources and are thus, compliant with the CxF core schema.

5.2.5 CustomResources

A CxF file might include application specific information within one or more named CustomResources. CustomResources can reuse elements from the core schema to make them required, but should not create new elements that duplicate existing CxF core resources. Each CustomResource shall have its own namespace and be validated and defined by its own schema. It is expected that additional parts of ISO 17972 will use custom resources to define the required and optional elements of their associated CxF/X file. As a CxF3 element, a CustomResource is available as a string which may be parsed or passed to additional software, libraries, or other programming tools that are configured to work with that CustomResource type. Examples of CustomResources that have already been developed are the following:

- CxF3-ColorPage (defines arrangement of objects in page/column/row format)
- CxF3-QualityControl (defines Standard/sample and tolerance relationships)
- CxF-Fandack-1.0 (defines Fandack arrangement and alternative display names)

An example of a CustomResource (ColorPage) in a CxF3 document is shown in [Figure 6](#).



Figure 6 — CustomResource example

5.3 Document Format

5.3.1 General

The Color Exchange Format supports storing and communicating colour data in a structured manner using XML and XSD. This colour data can be a single colour object or multiple colour objects. The CxF Core Resources do not impose any sort of relationship or hierarchy on the data included. Any such additional relationships or organizational information required should be added with a CustomResource. For instance, a CustomResource of CxF3-QualityControl would contain the information needed to designate the Standard/sample relationships and the tolerances required for each colorspace type. A quality control oriented application might want this additional information, but other applications might only be interested in getting/displaying the set of colours without any such relationships.

5.3.2 CxF 3.0 Major Schema Elements

[Annex B](#) contains applicable schema and documentation. These are required for validation of a CxF/X file. Shown below are some of the major elements defined in the schema.

5.3.3 Object

The following types of elements can be included within an Object.

ObjectType	Id (attribute)	Comment
(attribute)	GUID (attribute)	ColorValues
Name (attribute)	CreationDate	ColorDifferenceValues
DeviceColorValues	TagCollection	PhysicalAttributes

5.3.4 ColorValues

The following types of elements can be included within ColorValues to hold colorspace information.

Reflectance Spectrum	ColorAdobeRGB	ColorEmissiveCIExyY
TransmittanceSpectrum	ColorCIELab	ColorCIELuv
EmissiveSpectrum	ColorCIELCH	ColorDensity
CustomSpectrum	ColorCIEXYZ	PrivateSpectrum
ColorSRGB	ColorEmissiveCIEXYZ	PrivateColorValues
	ColorCIExyY	CustomColorSpace

5.3.5 DeviceColorValues

The following types of elements can be included within DeviceColorValues.

ColorHTML	ColorCMYK	ColorPantoneHexachrome
ColorNotation	ColorCMYKPlusN	ColorRecipe
ColorRGB	ColorCustom	PrivateColorValues
ColorHSL		

5.3.6 PhysicalAttributes

The following types of elements can be included within PhysicalAttributes.

TargetType	FinishType	SubstrateType
Height	Width	Length
Thickness	Quantity	Gloss
Opacity	CustomAttributeString	CustomAttributeValue
Image		

Annex A (informative)

Color Exchange Format mapping to ISO 28178

A.1 General

ISO 28178 is the standard text file format for exchanging colour measurement data and provides mapping in both ASCII and XML. The widely used ASCII text file consists of a Preamble section containing originator information, keyword definitions, etc. followed by one or more data sections, each consisting of header and data subsections. The BEGIN_DATA_FORMAT and END_DATA_FORMAT delimiters define the actual data types contained in the following tables. The BEGIN_DATA and END_DATA delimiters mark the subsection containing the actual colour information in tabular form. ISO 28178 text files can contain device, colorimetric (Lab, XYZ, etc.), densitometric, spectral, naming, and other information.

The table below demonstrates that all significant data contained in an ISO 28178 file can be captured and maintained in a CxF file. A brief description of the definition of the original ASCII keyword is also provided. This demonstration does not use a CustomResource in this case, but a CustomResource could be used to make some of the application specific data more structured with defined enumerations and requirements.

Table A.1 — Field and Element mapping

ISO 28178:2008	CxF 3.0	Description
Required Fields		
Originator	FileInformation/Creator	Identifies the specific system, organization, or individual that created the data file.
File Descriptor	FileInformation/Description	Describes the purpose or contents of the data file.
Created	FileInformation/CreationDate	Indicates the creation date of the data file. The form for this date is CCYY-MM-DDThh:mm:ss[Z ± hh:mm].
Number of Fields	Not Required (inherent in XML structure).	Number of fields (data format identifiers) that are included in the data format definition that follows.
Data Format	Not Required (inherent in XML structure).	Marks the beginning and end of a data format definition. END_DATA_FORMAT shall be preceded by BEGIN_DATA_FORMAT.
Number of Sets of Data	Not Required (inherent in XML structure).	Number of repetitions or sets of data, i.e. the number of rows in the data table. The associated value is an integer.
Data Table	Not Required (inherent in XML structure).	Marks the beginning and end of a data table.

ISO 28178:2008	CxF 3.0	Description
Optional Fields		
Comment	FileInformation/Comments	Comments are ignored by automated readers. Comments indicate to users that the information that follows is of informative interest. Comments need not be enclosed in quotes. Comments can occur anywhere except within a table.
TargetType	FileInformation/Tag	Used to report an enumerated list of IT8 target types.
Instrumentation:	MeasurementSpec/Device...	Used to report the specific instrumentation used (e.g. manufacturer, model number and serial number, etc.) to generate the data reported.
Manufacturer	MeasurementSpec/Device/Manufacturerer	Name of the device manufacturer.
Model	MeasurementSpec/Device/Model	Both device model number and revision can be recorded here.
Serial_Number	MeasurementSpec/Device/SerialNumber	Device serial number.
Measurement Geometry	MeasurementSpec/GeometryChoice	The type of measurement, either reflection or transmission, should be indicated along with details of the geometry and the aperture size and shape.
Measurement Source	MeasurementSpec/Device/DeviceIllumination	Illumination (e.g. incandescent, daylight, colour temperature, etc.) used during spectral measurement.
Filter	MeasurementSpec/Device/DeviceFilter	Identifies the use of physical filter(s) during measurement. This is typically used to denote the use of filters such as none, D65, Red, Green, or Blue.
Polarization	MeasurementSpec/Device/DevicePolarization	Identifies the use of a physical polarization filter during measurement. Allowed values are "yes", "none", or "na".
Weighting Function	TristimulusSpec/Observer	Indicates such functions as the CIE standard observer functions used in the calculation of various data parameters (2 degree and 10 degree), CIE standard illuminant functions used in the calculation of various data parameters (e.g. D50, D65, etc.), density status response, etc.
Computational Parameter	Tag [name]/@value	Parameter that is used in computing a value from measured data. Name is the name of the calculation, parameter is the name of the parameter used in the calculation, and value is the value of the parameter.
Sample Backing	MeasurementSpec/Backing	Identifies the backing material used behind the sample during measurement. Allowed values are "black", "white", "self", or "na".

ISO 28178:2008	CxF 3.0	Description
Optional Fields		
Manufacturer	FileInformation/Tag/@ <i>"Manufacturer"</i>	Indicates the manufacturer of the sample from which the data was measured.
Material	FileInformation/Tag/@ <i>"Material"</i>	Identifies the material or substrate on which the target was produced using a code identifying the material.
Target Type	(<i>"28178_TargetType"</i>)	Identifies the type of target being measured, e.g. IT8.7/1, IT8.7/3, user-defined, etc.
Colorant(s)	DeviceColorValues/ColorRecipe	Identifies the colorant(s) used in creating the target.
Production Date	FileInformation/Tag/@ <i>"Prod_Date"</i>	Identifies year and month of production of the target in the form yyyy:mm.
Print Conditions	FileInformation/Tag/@ <i>Print Conditions</i>	Used to define the characteristics of the printed sheet being reported. Where standard conditions have been defined (e.g. SWOP at nominal), named conditions can suffice. Otherwise, detailed information shall be provided.
Serial Number	Object/Id	Uniquely identifies physical samples.
Process colour identification	Object/Object Type and ColorValueType/Name	Uniquely identifies colour and sequence associated with the numerical values assigned to each process colour set.
Spot colour identification	Object/Object Type and ColorValueType/Name	Uniquely identifies colour associated with the numerical value assigned to each spot colour (or line colour).
Copyright	FileInformation/Tag/@Name = <i>"Copyright"s</i>	Identifies any specific copyright information associated with the file.
User-defined tags and keywords	Supplied by use of a Custom Resource.	Declares a user-defined tag or keyword. This is primarily intended for vendor-specific information, but can also be used as a mechanism to add new keywords in the future without breaking automated readers in existence prior to tag/keyword revision.
Data Table Fields		
Table Descriptor	Not Required (inherent in XML structure).	Describes the purpose or contents of a data table.
Table Name	Not Required (inherent in XML structure).	Provides a short name for a data table.
Defined Data Format Identifiers		
SAMPLE_ID	Object/Id	Sample identifier as defined in ISO 12642-1 or ISO 12642-2.
SAMPLE_NO	Not Required (inherent in XML structure)	Sample sequential number assigned based on read order or other user defined criteria.
STRING	Labels not required – XML elements used are already named.	Identifies label or other non-machine readable value. Value shall begin and end with a " symbol.
CMYK_C (M,Y,K)	ColorCMYK	Component of CMYK data expressed as a percentage.
NOTE Full element paths are only shown where necessary to avoid confusion.		

PC m_n	DeviceColorValues/CMYK or CMYKPlusN	Data associated with the process colour identified in tag/keyword Process colour identification (4.2.3.18), expressed as a percentage. The value m represents the number of colours in the process colour set. The value n is used to identify the individual colour within the process colour set and is assigned according to the order of laydown (sequence of printing).
SPOT $_n$	DeviceColorValue/ColorRecipe	Data associated with the spot colour n identified in tag/keyword Spot colour identification expressed as a percentage, where n is a numerical value
D_RED (GREEN,BLUE,VIS)	ColorDensity	Colour filter density.
RGB_R (G,B)	DeviceColorValue/ColorRGB	Component of RGB data expressed as a code value in the range 0–255.
SPECTRAL_NM (DEC,PCT)	ReflectanceSpectrum ...	Wavelength of measurement expressed in nanometers in equal increments of 1, 2, 5, 10 or 20 nm.
XYZ_X (Y,Z)	ColorCIEXYZ	A component of tristimulus data.
XY_Y (X,CAPY)	ColorCIExyY	A component of chromaticity data.
LAB_L (A,B)	ColorCIELab	A component of CIELAB data.
LAB_L (C,H)	ColorLCH	A component of CIELCH data.
LAB_DE (DE94,CMC,2000)	LAB_DE (DE94,CMC,2000)	ΔE using different formula.
MEAN_DE	Tag/Mean_DE	Mean ΔE^*_{ab} (LAB_DE) of samples compared to batch average.
STDDEV_X (Y,Z)	Tag/STDDEV_X	Standard deviation of (tristimulus data X, Y, Z).
STDDEV_L (A,B)	Tag/STDDEV_L	Standard deviation of $L^*a^*b^*$ data.
CHI_SQD_PAR	Tag/@name/@value	Average of the standard deviations of L^* , a^* , or b^* s
NOTE Full element paths are only shown where necessary to avoid confusion.		