BS ISO 20616-2:2020

BSI Standards Publication

Graphic technology — File format for quality control and metadata

Part 2: Print Quality eXchange (PQX)

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National foreword

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Part 2: Print Quality eXchange (PQX)

Technologie graphique — Format de fichier pour le contrôle qualité et les métadonnées —

Partie 2: PQX (Print Quality eXchange)

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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*.

A list of all parts in the ISO 20616 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

ISO 20616 defines standard XML schemas designed to enable the digital exchange of print quality data and metadata between trading partners within the graphic arts supply chain. In the past, a number of different non-standard data formats have been used to communicate print quality metrics. It is a general observation that many of these existing non-standard data formats describe similar types of information. Existing standard data formats cover either too much or too little scope to address industry requirements. Hence, there is an industry need for a single, standard concise set of data formats for the communication of print quality.

Each part of ISO 20616 is intended to stand alone, but may be used in conjunction with each other, should that option be chosen. The goal of ISO 20616 is to maintain the degree of flexibility required by print buyers for all kinds of print generated for all purposes from any print device while minimizing the uncertainty of the data exchanged.

This document is intended to facilitate the one-way transmission of performance data for one or more printed samples, for one or more brands or products from a single press run from print service providers to relevant stakeholders and print buyers; thus, allowing them to assess and track relevant business, production, colour and quality data of printed materials of all forms. PQX is only intended to transmit raw quality data. The PQX file intentionally excludes tolerance and evaluative information, allowing the receiver to determine acceptability by applying their own scale and tolerance values. PQX incorporates colour using the same data containers that are defined in ISO 17972-4 (CxF3_Core.xsd). While PQX and CxF are different formats with different parsing requirements, developers can use the same strategies for reading and writing colour data in a PQX file that they use for reading and writing colour data in a CxF file. PQX is compatible with both spectral and non-spectral colour data.

Some portions of this document are available as electronic files at http://standards.iso.org/iso/20616/-2/ed-1/en

— ISO20616-2PQX.xsd

— ISO20616-2pqx_lines.pdf (a printable version of the PRX XML schema with reference line numbers)

— ISO20616-2SchemaDoc.pdf (Schema diagrams and documentation)

— PQX_MasterSampleA.pqx

— PQX_MasterSampleA.pdf (a printable version of Sample A with reference line numbers)

— PQX_MasterSampleB.pqx

— PQX_MasterSampleB.pdf (a printable version of Sample B with reference line numbers)

NOTE The spelling of fields in PQX were designed to match the spelling of fields taken from ISO 17972-1 and are not altered from that used in the normative reference. A specific example is the use of the word “color” instead of “colour”.

It should be noted that Idealliance, Inc. the original creator of the PQX file format, claims no intellectual property rights, neither patent nor copyright, to the materials used in this document.

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Graphic technology — File format for quality control and metadata —

Part 2:
Print Quality eXchange (PQX)

1 Scope

This document specifies an extensible file format in conformity with W3C Extensible Markup Language (XML) 1.0, for the exchange of print quality data and metadata between quality control applications including but not limited to colour measurement, process control and quality management systems.

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

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

Extensible Markup Language (XML) 1.0 (Fifth Edition), World Wide Web Consortium (W3C), W3C Recommendation, 26 November 2008. Available at https://www.w3.org/TR/2008/REC-xml-20081126/

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
CxF
electronic exchange format for colour and process control data (and the associated metadata necessary for its proper interpretation)

3.2
press run
continuous operation of a printing press for a single job

3.3
print buyer
name of the customer or entity purchasing printing services and products

3.4
print defect
imperfection that impairs worth or utility of a printed item that stems from a wide array of potential causes and varies from printing method to printing method

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3.5
printer
name of the print service provider responsible for printing items purchased by a *print buyer* (3.3)

3.6
XML
Extensible Markup Language
set of rules recommended by the World Wide Web Consortium (W3C) for encoding documents in a digital format which is both human-readable and machine-readable

3.7
XML attribute
attribute
XML construct included within the start tag of an *XML element* (3.8) that modifies, or provides descriptive metadata about, that element's content

3.8
XML element
element
data structure including a start tag, an end tag, data between these tags, and, possibly, a set of *XML attributes* (3.7)

[SOURCE: ISO 13584-32:2010, 3.22, modified — Added admitted term.]

3.9
XML root element
root element
single XML element that encloses all the other elements and is therefore the sole parent element to all the other elements

3.10
XML schema
language for describing the structure and constraining the contents of XML documents

[SOURCE: ISO 25720:2009, 4.32]

3.11
XML schema parser
application that is capable of validating document schemes (content and structure) and descriptor data types against their schema definition

[SOURCE: ISO/IEC 23001-1:2006, 3.2.71]

4 Symbols and abbreviated terms

The following documentation conventions are used.

— Names of XML elements are shown in bold type; for example, **SampleCollection**.

— Names of XML attributes are shown in italics; for example, *@DisplayName*.

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

Similarly, XML XPaths are used to refer to XML attributes. For example, **CustomerItem**/*@Id* refers to an attribute (*Id*) of an element (**CustomerItem**).

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5 Requirements

5.1 General

The following general requirements shall be met when using PQX XML to exchange print quality data and metadata.

— The exchange of PQX print quality data and metadata shall conform to Extensible Markup Language (XML) 1.0 (Fifth Edition).

— If PQX quality data are exchanged as a standalone file, the file extension shall be ".pqx".

— The root element of ISO 20616-2 print quality data shall be a single **PQX** element.

— A valid **PQX** element shall contain the required namespace information in the root element: (<PQX xmlns:pqx = "http://idealliance.org/pqx" >) followed by the XML elements and XML attributes specified by ISO20616-2PQX.xsd.

— If colour quality data are being exchanged, the PQX root element shall contain the required namespace information for CxF, "xmlns:cc="http://colorexchangeformat.com/CxF3-core".

PQX quality data should be validated using an XML schema parser employing the XML schema file ISO20616-2PQX.xsd. The requirements for utilization of the ISO20616-1PQX schema shall be as specified in Annex A.

5.2 Extensibility

5.2.1 General

To provide for extensibility for this document, the specification includes two blocks modelled directly from the extensibility provided by CxF/X; **TagCollection** and **CustomResources.**

5.2.2 TagCollection

TagCollection may only be used to insert additional application-specific child elements into a PQX data structure at the agreement of all trading partners. See 5.4.32.

NOTE Use of **TagCollection** is highly discouraged.

5.2.3 CustomResources

CustomResources may only be used to insert additional application-specific data models into a PQX data structure at the agreement of all trading partners. See 5.4.33.

NOTE Use of **CustomResources** is highly discouraged.

5.3 Employing CxF

ISO 17972-1 shall be used to exchange print quality colour data and metadata. The following requirements shall be met when using the CxF schema.

— Only Core CxF data shall be employed as the data store for colour requirements data.

— CxF shall be employed as a complete CxF hierarchy.

NOTE Retaining **<cc:CxF>** as the root element ensures direct importability from colour measurement devices.

— CxF **<cc:Tags>** should only be used to customize CxF if specified by a business agreement among trading partners.

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— CxF **<cc:CustomResources>** should only be used to customize CxF if specified by a business agreement among trading partners.

— CxF < **cc:PhysicalAttributes** > < **cc:CustomAttributeString** > and < **cc: CustomAttributeValue** > should only be used to customize CxF if specified by a business agreement among trading partners.

— Non-appropriate CxF elements (listed above) may be written into a PQX quality report but should only be processes by receiving systems if specified by a business agreement among trading partners.

5.4 PQX quality reporting

5.4.1 Overview

The ISO20616-2PQX schema provides the rules for the order, occurrence and datatypes for the fields that make up a print quality report. The ISO20616-2PQX schema is the immutable specification. Additional requirements that cannot be specified by an XML schema are found in the following subclauses.

NOTE A printable version of the ISO20616-2PQX schema with reference line numbers is available at http://standards.iso.org/iso/20616/-2/ed-1/en) to enable referencing of element definitions by this document. See Annexes B and C for additional information.

5.4.2 PQX element

The **PQX** element is the root element of a print quality data exchange. The **PRX** element shall be used to specify a print buyer's print quality report. The **PQX** element shall conform to rules specified by ISO20616-2PQX.xsd (lines 10–30).

Table 1 provides for references to the specifications for fields that make up the PQX element.

Table 1 — PQX field specifications

Field name	Normative specifications
PQXInfo	See 5.4.3.
PrinterInfo	See 5.4.4.
PressRunInfo	See 5.4.5.
InkCollection	See 5.4.6.
ReporterCollection	See 5.4.8.
CustomerItemCollection	See 5.4.10.
SampleCollection	See 5.4.12.
CxFSampleData	See 5.4.29.
CxFReferenceData	See 5.4.30.
DefectImageData	See 5.4.31.
TagCollection	See 5.4.32.
CustomResources	See 5.4.33.

5.4.3 PQXInfo element

The **PQXInfo** element shall be used to identify the instance of the print quality report being exchanged. The **PQXInfo** element shall conform to rules specified by ISO20616-2PQX.xsd (lines 35–47). Table 2 provides definitions and usage rules for each child element of **PQXInfo**.

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Table 2 — PQXInfo element definition and usage rules

Name	Definition	Usage rules
PQXDate	The **PQXDate** element shall be used to identify date or date/time this PQX data was generated.	The **PQXDate** element shall conform to rules specified by ISO20616–2PQX.xsd (lines 51–55).
PQXId	The **PQXId** element shall be used to provide an identifier (unique in the context of system generated identifiers assigned on the specified PQXDate) for this print quality report.	The **PQXId** element shall conform to rules specified by ISO20616–2PQX.xsd (lines 59–63).
PQXSoftware-Version	**PQXSoftware-Version** shall be used to identify the software and version that generated this print quality report.	The **PQXSoftware-Version** element shall conform to rules specified by ISO20616–2PQX.xsd (lines 67–71).
NOTE Concatenation of the **PQXDate**, **PQXId** and **PQXSoftware-Version** can make up a unique identifier for this print quality data report.		

5.4.4 PrinterInfo element

The **PrinterInfo** element shall be used to identify information about the printer generating the print quality report. The **PrinterInfo** element shall conform to rules specified by ISO20616-2PQX.xsd (lines 245–258). Table 3 provides definitions and usage rules for each child element of **PrinterInfo**.

Table 3 — PrinterInfo definition and usage rules

Name	Definition	Usage rules
ParentCompany	The **ParentCompany** element shall be used to identify the company that controls a smaller, entity such as a printer or quality service provider.	The **ParentCompany** element shall conform to rules specified by ISO20616–2PQX.xsd (lines 155–159).
Printer	The **Printer** element shall be used to provide the name of the print service provider responsible for printing items purchased by a print buyer.	The **Printer** element shall conform to rules specified by ISO20616–2PQX.xsd (lines 262–266).
LocationDesignator	The **LocationDesignator** element shall be used to provide a designation for the location of a company or party as a second level of identification for that company or party.	The **LocationDesignator** element shall conform to rules specified by ISO20616–2PQX.xsd (lines 171–175).
ContactDesignator	The **ContactDesignator** element shall be used to provide a designation for information required to communicate with a business entity.	The **ContactDesignator** element shall conform to rules specified by ISO20616–2PQX.xsd (lines 179–183).
NOTE 1 **LocationDesignator** can be a unique identifier, city/state/country designation, postal code, geographic coordinates or simply be a designator code employed by the printer. This element is purposefully flexible to facilitate broad printer adoption. NOTE 2 **ContactDesignator** can be email, street address, phone, fax, etc. or simply be a designator code employed by the printer. This element is purposefully flexible to facilitate broad printer adoption.		

5.4.5 PressRunInfo element

The PressRunInfo element shall be used to provide descriptive information about the press run. The **PressRunInfo** element shall conform to rules specified by ISO20616-2PQX.xsd (lines 270–290). Table 4 provides definition and usage rules for each child element of **PressRunInfo**.

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