

ISO/TC 130

Secretariat: SAC

Voting begins on:  
2021-03-17

Voting terminates on:  
2021-05-12

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## Graphic technology — File format for quality control and metadata —

### Part 1: Print requirements eXchange (PRX)

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

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Partie 1: Print requirements eXchange (PRX)

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Published in Switzerland

# Contents

	Page
Foreword .....	v
Introduction .....	vi
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms and definitions .....</b>	<b>1</b>
<b>4 Documentation conventions .....</b>	<b>2</b>
<b>5 Requirements .....</b>	<b>3</b>
5.1 General .....	3
5.2 Extensibility .....	3
5.2.1 General .....	3
5.2.2 TagCollection .....	3
5.2.3 CustomResources .....	3
5.3 Employing CxF .....	3
5.4 PRX quality specification .....	4
5.4.1 Overview .....	4
5.4.2 PRX element .....	4
5.4.3 PRXInfo element .....	4
5.4.4 BuyerInfo element .....	5
5.4.5 EvaluationInfo element .....	5
5.4.6 PercentAcceptableScores element .....	5
5.4.7 GradingInfo element .....	6
5.4.8 GradingScale element .....	6
5.4.9 Grade element .....	6
5.4.10 ValueRange element .....	6
5.4.11 ZeroBaseline element .....	7
5.4.12 BasisOfCalculation element .....	7
5.4.13 MinimumAcceptableRank element .....	7
5.4.14 DesiredRank element .....	8
5.4.15 QualitySpecification element .....	8
5.4.16 CustomerJob element .....	8
5.4.17 CustomerItem element .....	9
5.4.18 ItemDescription element .....	9
5.4.19 InkGuidelines element .....	9
5.4.20 QualityGoals element .....	10
5.4.21 ComplianceGoal element .....	10
5.4.22 CalculationVariable element .....	10
5.4.23 GradeWeightingFactor element .....	11
5.4.24 ScoringInfo element .....	11
5.4.25 ScoreWeightingFactor element .....	11
5.4.26 ParameterName element .....	11
5.4.27 CustomerItemIdLink element .....	11
5.4.28 SamplingPosition element .....	11
5.4.29 SamplingPositionImageIdLink element .....	11
5.4.30 SamplingPositionMatrix element .....	11
5.4.31 Color element .....	12
5.4.32 Registration element .....	13
5.4.33 Defects element .....	13
5.4.34 Barcode element .....	14
5.4.35 CxFReferenceData element .....	14
5.4.36 SamplingPositionImageData element .....	15
5.4.37 PositionLocationImage element .....	15
5.4.38 TagCollection element .....	15

5.4.39 CustomResources element.....	15
5.4.40 PRX simple types.....	15
<b>Annex A (normative) ISO 20616-1 XML schema.....</b>	<b>23</b>
<b>Annex B (informative) PRX principles and concepts.....</b>	<b>24</b>
<b>Annex C (informative) Samples.....</b>	<b>26</b>
<b>Bibliography.....</b>	<b>29</b>

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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](http://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](http://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](http://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](http://www.iso.org/members.html).

## Introduction

The ISO 20616 series 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 the ISO 20616 series is intended to stand alone, but may be used together, if that option is 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.

ISO 20616-1, PRX, is intended to facilitate the one-way digital transmission of customer expectations (i.e. print quality requirements) for a print job or class of print jobs, from a print buyer to print service providers and other relevant stakeholders. PRX is not designed for ordering print jobs, but rather to establish a buyer's policy for expected quality. PRX is designed to enable the print buyer to specify references, tolerances, scoring/grading scales and the mathematical formula to be employed by the print buyer to assess the quality of their printed materials. PRX may also be used communicate a print buyer's compliance requirements.

Some portions of ISO 20616-1 are available as electronic files found at <https://standards.iso.org/iso/20616/-1/ed-1/en/>:

- ISO-TC130\_N4211\_CD\_\_20616-1\_3\_Electronic\_Files.zip (all 20616-1 support documents);
- ISO20616-1prx.xsd;
- ISO20616-1prx\_lines.pdf (printable PRX schema with reference lines numbered);
- ISO20616-1SchemaDoc.pdf (detailed schema documentation with graphics);
- PRX\_MasterSampleA.pdf (printable sample with reference lines numbered);
- PRX\_MasterSampleA.prx (parsable sample);
- PRX\_MasterSampleB.pdf (printable sample with reference lines numbered);
- PRX\_MasterSampleB.prx (parsable sample);
- PRX\_MasterSampleC.pdf (printable sample with reference lines numbered);
- PRX\_MasterSampleC.prx (parsable sample).

# Graphic technology — File format for quality control and metadata —

## Part 1: Print requirements eXchange (PRX)

### 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 requirements data and metadata between print quality control applications including, but not limited to, print quality management systems.

This document is not intended for automating the loading of print requirement goals into the quality control systems employed by print quality service providers.

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

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### 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

##### **basis of calculation**

formula by which print quality is calculated by the *print buyer* (3.3)

#### 3.2

##### **grade**

*print buyer's* (3.3) evaluation of the overall level of print quality for a printed item

#### 3.3

##### **print buyer**

name of the customer or entity purchasing printing services and products

#### 3.4

##### **rank**

integer value assigned to a print quality *grade* (3.2) or *score* (3.5) based on a scale of zero or more, where the higher the integer, the better the print quality

### 3.5

#### score

print buyer's (3.3) evaluation of the quality for a single quality parameter such as colour or defects

### 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 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

[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

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### 3.10

#### XML schema

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

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[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

## 4 Documentation conventions

The following documentation conventions are used.

- Names of XML elements are shown in bold type; for example, **BuyerInfo**.
- Names of XML attributes are shown in italics; for example, *@DisplayName*.
- Names of XML datatypes are shown in italics; for example, *originType*.

XML XPath's are used to identify XML elements. For example, **BuyerInfo/ParentCompany** refers to an element (**ParentCompany**) that is a child of another element (**BuyerInfo**).

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



## 5 Requirements

### 5.1 General

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

- PRX print quality requirements data should be validated using an XML schema parser employing the ISO 20616-1 XML schema, ISO20616-1PRX.xsd.
- If PRX quality requirements data is exchanged as a standalone file, the file extension shall be ".prx".
- The root element of ISO 20616-1 print quality requirements data shall be a single **PRX** element.
- A valid **PRX** element shall contain the required namespace information in the root element: (<PRX xmlns:prx="https://idealliance.org/prx">) followed by the XML elements and XML attributes specified by the ISO 20616-1 XML schema, ISO20616-1PRX.xsd.
- If colour quality reference data is being exchanged, the PRX root element shall contain the required namespace information for CxF, "xmlns:cc=http://colorexchangeformat.com/CxF3-core".

### 5.2 Extensibility

#### 5.2.1 General

To provide for extensibility in the PRX model, the specification includes two blocks modelled directly from the extensibility provided by CxF: **TagCollection** and **CustomResources**.

#### 5.2.2 TagCollection

**TagCollection** may only be used to insert additional application-specific XML print quality requirements child elements into a PRX data structure at the agreement of all trading partners. Use of **TagCollection** is highly discouraged.

#### 5.2.3 CustomResources

**CustomResources** may only be used to insert additional application-specific XML print quality requirements data models into a PRX data structure at the agreement of all trading partners. 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 CxF to exchange print quality colour requirements data and metadata.

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

- CxF <**PhysicalAttributes**> <**CustomAttributeString**> and <**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 PRX data, but should only be processed by receiving systems if specified by a business agreement among trading partners.

## 5.4 PRX quality specification

### 5.4.1 Overview

The ISO20616-1PRX schema provides the rules for the order, occurrence and datatypes for the fields that make up a print-quality requirements exchange. The PRX schema is the immutable specification. [Annex A](#), a PDF version of the schema printed with reference line numbers, shall be used to provide a line number reference for each element documented in this subclause. Additional requirements that cannot be specified by an XML schema are found in the following subclauses.

NOTE The spelling of fields in PRX were designed to match the spelling of fields taken from ISO 17972-3. A specific example is the use of the word "color" instead of "colour".

See [Annex B](#) for documentation about the principles and concepts underlying the design and usage of this document. See [Annex C](#) for usage samples to help guide implementing this document.

### 5.4.2 PRX element

The **PRX** element is the root element of a print quality requirements data exchange. The **PRX** element shall be used to specify a print buyer's print quality requirements. The **PRX** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 12 to 30). See [Table 1](#).

Table 1 — PRX fields

Field name	Normative description
PRXInfo	See <a href="#">5.4.3</a> PRXInfo element.
BuyerInfo	See <a href="#">5.4.4</a> BuyerInfo element.
EvaluationInfo	See <a href="#">5.4.5</a> EvaluationInfo element.
QualitySpecification	See <a href="#">5.4.15</a> QualitySpecification element.
CxFReferenceData	See <a href="#">5.4.34</a> CxFReferenceData element.
SamplingPositionImageData	See <a href="#">5.4.35</a> SamplingPositionImageData element.

### 5.4.3 PRXInfo element

#### 5.4.3.1 General

The **PRXInfo** element shall be used to identify the instance of print quality requirements being exchanged. The **PRXInfo** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 35 to 47). The **PRXInfo** element is made up of elements described in [5.4.3.2](#) to [5.4.3.4](#).

#### 5.4.3.2 PRXDate element

The **PRXDate** element shall be used to identify date or date/time this PRX data was generated. The **PRXDate** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 51 to 55).

#### 5.4.3.3 PRXId element

The **PRXId** element shall be used to provide an identifier (unique in the context of system generated identifiers assigned on the specified PRXDate) for this print quality requirements specification. The **PRXId** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 59 to 63).

#### 5.4.3.4 PRXSoftware-Version

**PRXSoftware-Version** shall be used to identify the software and version that generated this PRX file. **PRXId** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 67 to 71)

NOTE Concatenation of the **PRXDate**, **PRXId** and **PRXSoftware-Version** make up a unique identifier for this print quality data report.

#### 5.4.4 BuyerInfo element

##### 5.4.4.1 General

The **BuyerInfo** element shall be used to identify the business entity buying print and specifying print quality requirements. The **BuyerInfo** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 76 to 89). The **BuyerInfo** element is made up of elements described in [5.4.4.2](#) to [5.4.4.5](#).

##### 5.4.4.2 ParentCompany element

The **ParentCompany** element shall be used to identify the company that controls an entity such as a print buyer. The **ParentCompany** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 93 to 97).

##### 5.4.4.3 CompanyName element

The **CompanyName** element shall be used to identify the print buyer's business entity. The **CompanyName** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 101 to 105).

##### 5.4.4.4 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 the rules specified by ISO20616-1PRX.xsd (lines 109 to 113).

NOTE **LocationDesignator** can be a unique identifier, city/state/country designation, postal code, geographic coordinates or simply be a designator code employed by the print buyer. This element is purposefully flexible to facilitate broad print buyer adoption.

##### 5.4.4.5 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 the rules specified by ISO20616-1PRX.xsd (lines 117 to 121).

NOTE **ContactDesignator** can be email, street address, phone, fax, etc. or simply be a designator code employed by the print buyer. This element is purposefully flexible to facilitate broad print buyer adoption.

#### 5.4.5 EvaluationInfo element

The **EvaluationInfo** element shall be used to provide information about the evaluation method that the print buyer intends to use. The **EvaluationInfo** element shall conform to the rules specified by the ISO20616-1PRX.xsd (lines 227 to 238). The **EvaluationInfo** element is made up of elements described in [5.4.6](#) to [5.4.7](#).

#### 5.4.6 PercentAcceptableScores element

The **PercentAcceptableScores** element shall be used to provide the calculated percent of all scored parameters that shall be within the print buyers acceptable scoring range. The **PercentAcceptableScores** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 389 to 393).

### 5.4.7 GradingInfo element

The **GradingInfo** element shall be used to provide grading criteria that the print buyer intends to use to evaluate overall print quality as a formal grade. The **GradingInfo** element shall be as specified by the ISO20616-1PRX.xsd (lines 242 to 255). The **GradingInfo** element is made up of elements described in [5.4.8](#) to [5.4.14](#).

### 5.4.8 GradingScale element

The **GradingScale** element shall be used to provide the print buyer's method to assign grades for overall print quality. The **GradingScale** element shall be as specified by the ISO20616-1PRX.xsd (lines 446 to 457). The **GradingScale** element is made up of elements described in [5.4.9](#) to [5.4.11](#).

### 5.4.9 Grade element

The **Grade** element shall be used to provide the print buyer's indicator for the overall print quality of a printed item. The **Grade** element shall be as specified by the ISO20616-1PRX.xsd (lines 461 to 473).

The **Grade** element is made up of elements described in [5.4.10](#).

The **@DisplayLabel** attribute shall be used to provide the print buyer's name for a grade and the **@Rank** attribute shall be used to standardize the meaning of a grade based on a positive integer value.

NOTE 1 Grade labels include A, B, C, D, F; Platinum, Gold, Silver, Bronze; Superior, Excellent, Good, Poor; Pass and Fail or a print buyer's custom labels.

NOTE 2 The greater the value of the **Rank** attribute, the higher the print quality.

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### 5.4.10 ValueRange element

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#### 5.4.10.1 General

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The **ValueRange** element shall be used to provide a mechanism to construct a logical expression that the print buyer intends to use to assign a numeric rank to a print quality grade or score. The **ValueRange** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 477 to 493). The **ValueRange** element is made up of elements described in [5.4.10.2](#) to [5.4.10.4](#).

When using the ValueRange element to assign a rank for a grade or score, a result fulfilling 2 or more evaluation definitions shall be assigned the grade/score with the higher rank.

NOTE The **ValueRange** element uses a series of logical operators and logical connectors to construct value statements that are assigned to rankings.

#### 5.4.10.2 LogicalOperator element

The **LogicalOperator** element shall be used to specify the mathematical operation to be used by the print buyer for calculation. The **LogicalOperator** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 497 to 502).

#### 5.4.10.3 LogicalConnector element

The **LogicalConnector** element shall be used to specify a mathematical connector to be used by the print buyer to combine complex functions used for calculations of print quality grades or scores. The **LogicalConnector** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 515 to 520).

#### 5.4.10.4 CalculatedValue element

The **CalculatedValue** element shall be used to specify the result of a print quality calculation. The **CalculatedValue** element shall conform to the rules specified by ISO20616-1PRX.xsd (lines 506 to 511).