



Quality Control - Customer

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1 Introduction

The Customer to Quality Control Interoperability Conformance Specification (ICS) defines the exchange of quality control data from *Customer* to *Print Provider*, *CusQC*, using **XJDF** and optionally **PrintTalk**. It enables definition of quality targets from the *Customer* to a *Print Provider* as well as the transport of quality control measurement summaries from the *Print Provider* to the *Customer*.

This ICS is part of a series of ICS documents that define the exchange of quality control data from *Customer* to *Print Provider*, *CusQC*, or *MIS* to device, *MisQC*, using **XJDF**. The ICS documents of the series are designed to enable end-to-end communication of quality targets and results from a conforming measurement device to the *Customer* at the level of detail that is appropriate for each interface. This encompasses both the definition of quality control requirements for the *Worker* as well as the reporting of quality control data by the *Worker*.

The major difference between the *CusQC* and *MisQC* ICS is that *CusQC* assumes that the data have been summarized for a *Customer* quality report whereas the *MisQC* ICS provides an interface for immediate data from quality control measurement devices to an *MIS* or print production system. This ICS provides information about the details of the **XJDF** data for quality control. Dynamic modification of quality control requirements by the *Manager* is out of scope of this ICS.

This ICS requires the use of at least **XJDF** version 2.1.

This initial version limits the scope to defining print quality inspection and color quality control of printed sheets and reels. This ICS has no additional normative ICS dependencies.

1.1 Specification of cardinality

The following table illustrates the notation of manager and worker requirements in ICS tables.

If an attribute, attribute value or element is not provided explicitly or implicitly by a table row of <all other values>, it is assumed to be out of scope. Out of scope values MAY be written and MAY be processed, but a conforming processor NEED NOT support them. The implied cardinality of out of scope values is therefore w? r?.

Table 1.1: Specification of cardinality

NOTATION	NAME	DESCRIPTION
w	Write Required	The element or attribute SHALL be written by the <i>Manager</i> or <i>Worker</i> .
w?	Write Optional	The element or attribute MAY be written by the <i>Manager</i> or <i>Worker</i> .
w←	Write Conditional	The element or attribute SHALL be written by the <i>Manager</i> or <i>Worker</i> depending on conditions. The details of the condition will be specified in the description.
w!	Write Forbidden	The element or attribute SHALL NOT be written by the <i>Manager</i> or <i>Worker</i> .
r	Read Required	The element or attribute SHALL be read by the <i>Manager</i> or <i>Worker</i> .
r?	Read Optional	The element or attribute MAY be read by the <i>Manager</i> or <i>Worker</i> .
r←	Read Conditional	The element or attribute SHALL be read by the <i>Manager</i> or <i>Worker</i> depending on conditions. The details of the condition will be specified in the description.

1.2 General Architecture

Returned reports SHALL be defined as summaries of the press runs or partial press runs in **AuditResource** elements. The transport of **XJDF** from *Print Provider* to and from *Customer* is out of scope for this ICS but can be specified by the automated print procurement ICS. For details, see ▶ [ICS-Cus-APP]. Use of **PrintTalk** is RECOMMENDED but not required.

If **PrintTalk** is used, **ptk:StatusRequest/@ResourceAudit="QualityControlResult"** SHOULD be provided by the *Manager* and the returned **AuditPool** SHOULD be provided in a **ptk:OrderStatusResponse** by the *Worker*. See ▶ [PrintTalk 2.1].

1.3 Glossary

This section defines the terms and definitions that are required for quality measurements. For general **XJDF** terms, please see ▶ [XJDF 2.1].

Table 1.2: Glossary

TERM	DEFINITION
Acceptance	Subjective or active consensus of satisfying the requested quality parameters.
Color Register	Accuracy of ink alignment “color-to-color”, i.e. between the print forms of the individual process colors in 2, 3, 4 or multicolor printing.
CusQC	Interface between an end <i>Customer</i> and the <i>Print Provider</i> .
Customer	Company or person that procures printed material from a <i>Print Provider</i> .
Cutting Register	Register accuracy “print-to-cut”, i.e. between printed pages and cut-off length after the former fold section in rotary presses.
Inline Measurement	Measurement by a measurement device that is tightly coupled to a <i>Production Device</i> .
Lighting Conditions	Quality feature of technical parameters prevailing during a color stimulus or visual assessment; include the illuminant of the light source, the influence of the surroundings and the glare and reflection-free angle of observation.
Measurement System	The device and software that provides the actual measurement, e.g. a spectrophotometer or camera.
MIS	Management Information System or production workflow system. The <i>MIS</i> can receive quality data from a <i>Measurement System</i> and provide a condensed summary of the quality data to the <i>Customer</i> .
MisQC	Interface between a <i>Print Provider's MIS</i> and a <i>Measurement system</i> .
Offline Measurement	Measurement by a <i>Measurement system</i> that is not directly coupled to a <i>Production Device</i> , such as a handheld spectrophotometer.
Print Provider	The company that produces printed or finished goods for a <i>Customer</i> .
Production Device	The device that produces the material that is measured. For color measurements this is typically a printing press.
Recto-verso register	Register accuracy “front-to-back”, i.e. between first and reverse printing on sheetfed and web gravure presses and between blanket-to-blanket printing in web offset presses.
Target Value	Desired value of a quality parameter or setpoint in a control system.
Tolerance	Objective or passive consensus of satisfying requested quality parameters

2 XJDF Instance

The details of quality control SHALL be specified as a **QualityControl** process.

2.1 XJDF

XJDF SHALL specify the setup of the quality control process.

Table 2.1: XJDF Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>JobId</i>	w r	r w	@ <i>JobID</i> SHALL be used to identify the job for quality control and SHALL define the job identifier that is supplied by the Customer.
<i>Types</i>	w r	r w	See ▶ [XJDF 2.1].
Product	w r	r w	Product SHALL be present.
QualityControl	w r	r w	QualityControl SHALL be present.
<all other values>	w? r?	r? w?	Additional values MAY be specified but are out of scope for this ICS.
<i>ICSVersions</i>	w r	r w	The value of @ <i>ICSVersions</i> SHALL specify the ICS that a conforming XJDF conforms to.
CusQC_L1-2.1	w r	r w	
<all other values>	w? r?	r? w?	Additional values MAY be specified but are out of scope for this ICS.
<i>AuditPool</i>	r	w	Quality reports SHALL be provided as audit elements.
ProductList	w	r	ProductList SHALL contain exactly one root product (Product / <i>@IsRoot="true"</i>). Partial products (Product / <i>@IsRoot="false"</i>) such as cover and body MAY be provided. Note: This ICS describes quality control individual end products. Multiple root products, which are only required for gang jobs in production, are out of the scope of this ICS.
ResourceSet [<i>@Name="Color"</i>]	w	r	A Color SHALL represent all color separations that are present in the print job. One Resource element SHALL be specified for each color separation. A Resource with no Part element MAY be provided as a container for ▶ [ISO 17972-4:2018].
ResourceSet [<i>@Name="ColorantControl"</i>]	w	r	A ColorantControl SHALL represent the print order of color separations that are present on a surface.
ResourceSet [<i>@Name="Component"</i>]	w	r	A Component SHALL represent the end result of the process that is controlled.

Table 2.1: XJDF Element

NAME	MANAGER	WORKER	DESCRIPTION
ResourceSet [@Name="Layout"]	w←	r←	A Layout SHALL define the geometry of the measurement patches. ResourceSet [@Name="Layout"] SHALL be provided if the receiving system is intended to automatically find measurement patches on a Component such as a press sheet and NEED NOT be provided for manually positioned quality measurement systems.
ResourceSet [@Name="QualityControlParams"]	w	r	A QualityControlParams SHALL contain the details of the quality control setup.
ResourceSet [@Name="QualityControlResult"]	r	w	A QualityControlResult SHALL contain the results of the quality control measurements.

2.2 AuditPool

AuditPool is a container for summaries of measurement data that were collected during production.

Table 2.2: AuditPool Element

NAME	MANAGER	WORKER	DESCRIPTION
AuditResource	r	w	Quality reports SHALL be provided as AuditResource elements that contain a ResourceSet [@Name="QualityControlResult"]. Multiple AuditResource elements that contain different subsets of quality reports MAY be provided by the <i>Worker</i> and SHALL be processed by the <i>Manager</i> . Additional, non-conforming, AuditResource elements MAY be present but are out of scope for this ICS.
<all other audits>	w? r?	r? w?	Additional audit elements MAY be present but are out of scope for this ICS.

2.3 AuditResource

AuditResource will typically contain measurement results that were summarized after a production run.

Table 2.3: AuditResource Element

NAME	MANAGER	WORKER	DESCRIPTION
Header	r	w	Header SHALL contain information about the creator of the quality report.
ResourceInfo	r	w	Exactly one ResourceInfo that contains a ResourceSet [@Name="QualityControlResult"] SHALL be present.

2.4 ProductList

Table 2.4: ProductList Element

NAME	MANAGER	WORKER	DESCRIPTION
Product +	w	r	See ▶ [XJDF 2.1].

2.4.1 Product

This ICS only specifies the requirements for quality control.

Note: Complete product descriptions will generally contain additional **Intent** elements and additional details within the specified **Intent** elements which are out of scope for this ICS.

Table 2.5: Product Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>IsRoot</i>	w←	r	Exactly one root Product SHALL be specified, i.e. Product [@IsRoot="true"]
Intent [@Name="ColorIntent"]	w	r	ColorIntent SHALL specify the color and varnishing of the product.
Intent [@Name="MediaIntent"]	w	r	MediaIntent SHALL specify the printing substrate for the product.
<all other Intents>	w?	r?	See ▶ [XJDF 2.1].

3 Product Intent

Specific details of products or product parts are specified in Intent elements.

3.1 ColorIntent

ColorIntent specifies the color and varnishing intent for a product. Each surface SHALL be specified individually in a **SurfaceColor** element.

Note: **ColorIntent** specifies the color properties of the desired product. See **QualityControlParams** for the color measurement setup details.

3.1.1 Intent

Table 3.1: ColorIntent Intent element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Name</i>	w	r	See ▶ [XJDF 2.1].
ColorIntent	w	r	The value of <i>@Name</i> SHALL be "ColorIntent".
ColorIntent	w	r	See ▶ [XJDF 2.1].

3.1.2 ColorIntent

Table 3.2: ColorIntent element

NAME	MANAGER	WORKER	DESCRIPTION
SurfaceColor (Back)	w←	r	At least one of SurfaceColor (Front) or SurfaceColor (Back) SHALL be provided. See ▶ [XJDF 2.1].
SurfaceColor (Front)	w←	r	At least one of SurfaceColor (Front) or SurfaceColor (Back) SHALL be provided. See ▶ [XJDF 2.1].

3.1.3 SurfaceColor

Table 3.3: SurfaceColor element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Coatings</i>	w←	r	<i>@Coatings</i> SHALL be specified if varnish is applied. See ▶ [XJDF 2.1].
<i>ColorsUsed</i>	w	r	See ▶ [XJDF 2.1].
<i>PrintStandard</i>	w	r	See ▶ [XJDF 2.1].
<i>Surface</i>	w	r	See ▶ [XJDF 2.1].

3.2 MediaIntent

MediaIntent describes the substrate of the printed product that SHALL be used.

Table 3.4: *MediaIntent* Intent element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Name</i>	w	r	See ▶ [XJDF 2.1].
MediaIntent	w	r	The value of @ <i>Name</i> SHALL be "MediaIntent".
<i>MediaIntent</i>	w	r	See ▶ [XJDF 2.1].

3.2.1 MediaIntent

Table 3.5: *MediaIntent* element

NAME	MANAGER	WORKER	DESCRIPTION
<i>ISOPaperSubstrate</i>	w←	r	@ <i>ISOPaperSubstrate</i> SHALL specify the type of paper material defined in accordance with the print substrates set forth in ▶ [ISO12647-2:2013], ▶ [ISO12647-3:2013] and ▶ [ISO12647-4:2014]. @ <i>ISOPaperSubstrate</i> SHOULD be specified if scoring is requested from the <i>Worker</i> .
<i>MediaType</i>	w	r	@ <i>MediaType</i> SHALL specify the type of the printed material.
Paper	w←	r	See ▶ [XJDF 2.1].
<all other values>	w?	r	Other media types MAY be specified but are out of scope for this ICS.

4 Resources

4.1 Color

Color SHALL define target properties of individual color separations. Every colorant that is intended to be printed as a separation SHALL be provided as an individual Resource element.

4.1.1 ResourceSet

Table 4.1: Color ResourceSet element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Name</i>	w	r	See ▶ [XJDF 2.1].
<i>Color</i>	w	r	The value of @ <i>Name</i> SHALL be "Color".
<i>Usage</i>	w	r	See ▶ [XJDF 2.1].
<i>Input</i>	w	r	The value of @ <i>Usage</i> SHALL be "Input".
<i>Resource</i>	w	r	See ▶ [XJDF 2.1].

4.1.2 Resource

Table 4.2: Color Resource element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Part</i>	w←	r	<i>Part</i> SHALL be specified if Color is present.
<i>Color</i>	w←	r	Exactly one of <i>Color</i> and <i>cx:CxF</i> SHALL be present.
<i>cx:CxF</i>	w?	r	<i>cx:CxF</i> MAY be provided to describe color target requirements. Not more than one <i>cx:CxF</i> element SHALL be present. If <i>cx:CxF</i> is present, <i>Part</i> SHALL NOT be specified and <i>Color</i> SHALL NOT be specified. The requirements for <i>cx:CxF</i> are out of scope for this ICS. See ▶ [ISO 17972-4:2018] for more information on <i>cx:CxF</i> .

4.1.3 Part

Table 4.3: Color Part element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Separation</i>	w	r	@ <i>Separation</i> SHALL be specified.
< <i>all other attributes</i> >	w!		Additional values SHALL NOT be specified.

4.1.4 Color

Table 4.4: Color element

NAME	MANAGER	WORKER	DESCRIPTION
<i>ActualColorName</i>	w←	r	See ▶ [XJDF 2.1].

Table 4.4: Color element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Density</i>	w←	r	At least one of @ <i>Density</i> or @ <i>NeutralDensity</i> SHALL be provided if neither @ <i>Spectrum</i> nor @ <i>LAB</i> is present.
<i>LAB</i>	w←	r	If either <i>Manager</i> or <i>Worker</i> support colorimetric measurements, @ <i>LAB</i> SHOULD be provided.
<i>NeutralDensity</i>	w←	r	At least one of @ <i>Density</i> or @ <i>NeutralDensity</i> SHALL be provided if neither @ <i>Spectrum</i> nor @ <i>LAB</i> is present.
<i>Spectrum</i>	w←	r	If either <i>Manager</i> or <i>Worker</i> support spectral measurements, the color reflectance spectrum SHOULD be provided.
<i>ColorMeasurementConditions</i>	w?	r	See ▶ [XJDF 2.1].

4.2 ColorantControl

ColorantControl SHALL define the sequence in which individual separations SHALL be printed.

4.2.1 ResourceSet

Table 4.5: ColorantControl ResourceSet element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Name</i>	w	r	See ▶ [XJDF 2.1].
ColorantControl	w	r	The value of @ <i>Name</i> SHALL be "ColorantControl".
<i>Usage</i>	w	r	See ▶ [XJDF 2.1].
Input	w	r	The value of @ <i>Usage</i> SHALL be "Input".
Resource	w	r	See ▶ [XJDF 2.1].

4.2.2 Resource

Table 4.6: ColorantControl Resource element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Part</i>	w?	r	Part MAY be specified if colors vary by press run.
ColorantControl	w	r	

4.2.3 Part

Table 4.7: ColorantControl Part element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Separation</i>	w?	r	@ <i>Separation</i> MAY be specified for all ColorantControl that apply to a print pass of one or more separations if multiple press runs are measured for the same value of @ <i>SheetName</i> and @ <i>Side</i> .
<i>SheetName</i>	w?	r	@ <i>SheetName</i> MAY be specified for all ColorantControl that apply to an individual sheet or impression on a roll.
<i>Side</i>	w?	r	@ <i>Side</i> MAY be specified for a ColorantControl that applies to an individual surface.

Table 4.7: ColorantControl Part element

NAME	MANAGER	WORKER	DESCRIPTION
<all other attributes>	w?	r?	Additional values MAY be specified but are out of scope for this ICS.

4.2.4 ColorantControl

Table 4.8: ColorantControl element

NAME	MANAGER	WORKER	DESCRIPTION
ColorantOrder	w	r	See ▶ [XJDF 2.1].
ColorantParams	w	r	See ▶ [XJDF 2.1].

4.3 Component

Components describe the physical objects such as press sheets of printed finished products that SHALL be controlled.

4.3.1 ResourceSet

Table 4.9: Component ResourceSet element

NAME	MANAGER	WORKER	DESCRIPTION
Name	w	r	See ▶ [XJDF 2.1].
Component	w	r	The value of @Name SHALL be "Component".
Usage	w	r	See ▶ [XJDF 2.1].
Input	w	r	The value of @Usage SHALL be "Input".
Resource	w	r	See ▶ [XJDF 2.1].

4.3.2 Resource

Table 4.10: Component Resource element

NAME	MANAGER	WORKER	DESCRIPTION
Part	w?	r	Part MAY be specified if properties of the physical product vary by press run.
Component	w←	r	Component SHALL be present.

4.3.3 Part

Table 4.11: Component Part element

NAME	MANAGER	WORKER	DESCRIPTION
QualityMeasurement	w!		@QualityMeasurement SHALL NOT be specified for QualityControlParams.
Separation	w!		@Separation SHALL NOT be specified Component.
SheetName	w?	r	@SheetName MAY be specified for all QualityControlParams that apply to an individual sheet or impression on a roll.
Side	w!		@Side SHALL NOT be specified Component.
<all other attributes>	w?	r?	Additional attributes MAY be specified, but are out of scope for this ICS..

4.3.4 Component

Table 4.12: Component element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Dimensions</i>	w	r	The size of the measured object SHALL be specified.
<i>MediaRef</i>	w	r	@ <i>MediaRef</i> SHALL reference a <i>Media</i> using the value of <i>ResourceSet/Resource/@ID</i> .

4.4 Layout

This ICS provides normative usage rules for *Layout* as used by a *QualityControl* process. *Layout* SHALL specify the geometry of the press sheets and measurement patches.

Note: *Layout* contains additional information for the *Stripping* and/or *Imposition* processes. The use of this information for imposition purposes is out of scope for this ICS.

4.4.1 ResourceSet

Table 4.13: Layout ResourceSet element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Name</i>	w	r	See ▶ [XJDF 2.1].
<i>Layout</i>	w	r	The value of @ <i>Name</i> SHALL be " <i>Layout</i> ".
<i>Usage</i>	w	r	See ▶ [XJDF 2.1].
<i>Input</i>	w	r	The value of @ <i>Usage</i> SHALL be " <i>Input</i> ".
<i>Resource</i>	w	r	See ▶ [XJDF 2.1].

4.4.2 Resource

Table 4.14: Layout Resource element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Part</i>	w	r	<i>Part</i> SHALL be present.
<i>Layout</i>	w	r	<i>Layout</i> SHALL be present.

4.4.3 Part

Table 4.15: Layout Part element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Separation</i>	w!		@ <i>Separation</i> SHALL NOT be specified for <i>Layout</i> .
<i>SheetName</i>	w	r	@ <i>SheetName</i> SHALL be specified for <i>Layout</i> .
<all other attributes>	w!		Additional attributes SHALL NOT be specified.

4.4.4 Layout

Table 4.16: Layout element

NAME	MANAGER	WORKER	DESCRIPTION
<i>StripMark</i> +			<i>StripMark</i> represents an a set of marks on a sheet.

4.4.4.1 MarkElement

4.4.4.2 StripMark

StripMark SHALL provide an abstract definition of the measurement patches. Additional geometrical information MAY be provided in **StripMark** but is out of scope for this ICS.

Table 4.17: StripMark element

NAME	MANAGER	WORKER	DESCRIPTION
<i>MarkName</i>	w	r	@ <i>MarkName</i> SHALL be present.
<i>ColorControlStrip</i>	w←	r	At least one StripMark with @ <i>MarkName</i> ="ColorControlStrip" SHALL be present.
<i>RegisterMark</i>	w←	r←	A StripMark with @ <i>MarkName</i> ="RegisterMark" SHALL be present to define registration measurements.
<all other values>	w?	r?	Additional StripMark MAY be present, but their usage is out of scope for this ICS.
<i>RelativeHeight</i>	w!		All geometrical information SHALL be specified in absolute coordinates.
<i>RelativeWidth</i>	w!		All geometrical information SHALL be specified in absolute coordinates.
<i>StripMarkDetails</i>	w?	r?	@ <i>StripMarkDetails</i> SHOULD be specified by the Worker. Note: In general @ <i>StripMarkDetails</i> will reference a named control strip such as a vendor specific color bar.
<i>RefAnchor</i>	w!		<i>RefAnchor</i> SHALL NOT be present. All StripMark elements SHALL be provided in the absolute Layout coordinate system.

4.5 Media

Media resources describe physical media e.g. that used by press sheets.

4.5.1 ResourceSet

Table 4.18: Media ResourceSet element

NAME	MANAGER	WORKER	DESCRIPTION
<i>ID</i>	w!		@ <i>ID</i> SHALL NOT be specified for Media resources used by Component .
<i>Name</i>	w	r	See ▶ [XJDF 2.1].
<i>Media</i>	w	r	The value of @ <i>Name</i> SHALL be "Media".
<i>Usage</i>	w	r	See ▶ [XJDF 2.1].
<i>Input</i>	w	r	The value of @ <i>Usage</i> SHALL be "Input".
<i>Resource</i>	w	r	See ▶ [XJDF 2.1].

4.5.2 Resource

Table 4.19: Media Resource element (Sheet 1 of 2)

NAME	MANAGER	WORKER	DESCRIPTION
<i>ID</i>	w←	r	@ <i>ID</i> SHALL be specified for Media resources used by Component .

Table 4.19: Media Resource element (Sheet 2 of 2)

NAME	MANAGER	WORKER	DESCRIPTION
<i>Part</i>	w?	r	<i>Part</i> MAY be specified if properties of the physical product vary by press run.
<i>Media</i>	w	r	<i>Media</i> SHALL be present.

4.5.3 Part

Table 4.20: Media Part element

NAME	MANAGER	WORKER	DESCRIPTION
<i>QualityMeasurement</i>	w!		@ <i>QualityMeasurement</i> SHALL NOT be specified for <i>Media</i> .
<i>Separation</i>	w!		@ <i>Separation</i> SHALL NOT be specified for <i>Media</i> .
<i>SheetName</i>	w?	r	@ <i>SheetName</i> MAY be specified for all <i>Media</i> that apply to an individual sheet or impression on a roll.
<i>Side</i>	w!		@ <i>Side</i> SHALL NOT be specified for <i>Media</i> .
<all other attributes>	w?	r?	Additional attributes MAY be specified, but are out of scope for this ICS..

4.5.4 Media

Table 4.21: Media element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Dimension</i>	w	r	The size of the <i>Media</i> SHALL be specified.
<i>ISOPaperSubstrate</i>	w←	r	@ <i>IsoPaperSubstrate</i> SHOULD be specified if scoring is requested from the <i>Worker</i> . Note: Trade associations define tolerances for measurements based on the paper substrate.
<i>MediaType</i>	w	r	@ <i>MediaType</i> SHALL specify the type of the printed material.
<i>Paper</i>	w←	r	See ▶ [XJDF 2.1].
<all other values>	w?	r	Other media types MAY be specified but are out of scope for this ICS.

4.6 QualityControlParams

QualityControlParams defines the setup for quality control.

4.6.1 ResourceSet

Table 4.22: QualityControlParams ResourceSet element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Name</i>	w	r	See ▶ [XJDF 2.1].
<i>QualityControlParams</i>	w	r	The value of @ <i>Name</i> SHALL be "QualityControlParams".
<i>Usage</i>	w	r	See ▶ [XJDF 2.1].
<i>Input</i>	w	r	The value of @ <i>Usage</i> SHALL be "Input".

Table 4.22: QualityControlParams ResourceSet element

NAME	MANAGER	WORKER	DESCRIPTION
Resource	w	r	See ▶ [XJDF 2.1].

4.6.2 Resource

Table 4.23: QualityControlParams Resource element

NAME	MANAGER	WORKER	DESCRIPTION
Comment	w←	r	Comment SHALL be specified for all manual quality control steps and SHALL specify the requested actions as human readable text. Comment NEED NOT be specified for fully automated quality control.
Part	w?	r	Part MAY be specified if measurement requirements vary by press run.
QualityControlParams	w	r	QualityControlParams SHALL be present.

4.6.3 Comment

Table 4.24: Comment element

NAME	MANAGER	WORKER	DESCRIPTION
Type	w	r	@Type SHALL be present.
Instruction	w←	r	The human readable instructions SHALL be marked with @Type="Instruction".
<all other values>	w?	r?	Other comments with a different type MAY be specified, but are out of scope for this ICS.
<element text>	w	r	The human readable setup and measurement instructions SHALL be provided.

4.6.4 Part

Table 4.25: QualityControlParams Part element

NAME	MANAGER	WORKER	DESCRIPTION
QualityMeasurement	w!		@QualityMeasurement SHALL NOT be specified for QualityControlParams.
Separation	w?	r	@Separation MAY be specified for all QualityControlParams that apply to a print pass of one or more separations if multiple press runs are measured for the same @SheetName and @Side.
SheetName	w?	r	@SheetName MAY be specified for all QualityControlParams that apply to an individual sheet or impression on a roll.
Side	w?	r	@Side MAY be specified for QualityControlParams that apply to an individual surface.
<all other attributes>	w?	r?	Additional attributes MAY be specified, but are out of scope for this ICS..

4.6.5 QualityControlParams

Table 4.26: QualityControlParams element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Position</i>	w?	r	@ <i>Position</i> SHALL NOT be specified if <i>Part</i> / <i>@Side</i> is present.
<i>QualityBase</i>	w?	r	See ▶ [XJDF 2.1].
Absolute	w?	r	Any calculations of <i>QualityControlResult</i> / <i>@Severity</i> SHALL be based on absolute values. See ▶ [XJDF 2.1].
Master	w?	r	Any calculations of <i>QualityControlResult</i> / <i>@Severity</i> SHALL be based on values provided in <i>QualityControlResult</i> [@ <i>MeasurementUsage</i> ="Master"]. See ▶ [XJDF 2.1].
<i>QualityControlMethods</i>	w	r	@ <i>QualityControlMethods</i> SHALL be specified. If a reader encounters an unsupported value, it SHOULD reject the ticket. Values SHOULD be selected from the following:
Barcode	w←	r	Barcode SHOULD be specified for measurements that test the quality of barcodes. Note: This includes linear and 3-d barcodes.
Colorimetry	w←	r	Colorimetry SHOULD be specified for colorimetric measurements that cannot measure spectral data. At most one of Colorimetry , ColorSpectrophotometry and Densitometry SHALL be supplied.
ColorSpectrophotometry	w←	r	A value of ColorSpectrophotometry SHALL be specified for measurement devices that support spectral measurements. At most one of Colorimetry , ColorSpectrophotometry and Densitometry SHALL be supplied.
Densitometry	w←	r	Densitometry SHOULD be specified for color measurements that contain only density measurements. At most one of Colorimetry , ColorSpectrophotometry and Densitometry SHALL be supplied.
Inspection	w←	r	Inspection SHOULD be specified for measurements of general image and product quality.
Registration	w←	r	Registration SHOULD be specified for color separation registration measurements.
<all other values>	r?	r?	Additional methods MAY be specified but are out of scope for this ICS.
<i>SampleInterval</i>	w?	r	@ <i>SampleInterval</i> SHALL specify the number of samples between tests. Not more than one of @ <i>TimeInterval</i> and @ <i>SampleInterval</i> SHALL be specified.
<i>Severity</i>	w?	r←	@ <i>Severity</i> SHALL define the maximum allowed overall severity of all defects on a scale of 0 (no defects present), 1(trivial) to 100 (fatally severe). The definition of severity scoring is implementation dependent and out of scope for this ICS.
<i>TimeInterval</i>	w?	r	@ <i>TimeInterval</i> SHALL specify the time span between tests. Not more than one of @ <i>TimeInterval</i> and @ <i>SampleInterval</i> SHALL be specified.
ColorMeasurement	w←	r←	ColorControlStrip SHOULD be supplied for <i>QualityControlParams</i> that conform to this ICS.

Table 4.26: QualityControlParams element

NAME	MANAGER	WORKER	DESCRIPTION
FileSpec (Image)	w←	r	FileSpec (Image) SHALL be specified by the Manager if @QualityControlMethods="Inspection" and the Measurement System is an automated image inspection system. See ▶ [XJDF 2.1].
FileSpec (Setup)	w!		A reference to a proprietary setup SHALL NOT be provided and is out of scope for this ICS.
RegistrationQuality	w←	r←	RegistrationQuality SHOULD be supplied if @QualityControlMethods contains "Registration".

4.7 QualityControlResult

4.7.1 ResourceSet

Table 4.27: QualityControlResult ResourceSet element

NAME	MANAGER	WORKER	DESCRIPTION
Name	r	w←	See ▶ [XJDF 2.1].
QualityControlResult	r	w←	The value of @Name SHALL be "QualityControlResult".
Usage	r	w←	See ▶ [XJDF 2.1].
Output	r	w←	The value of @Usage SHALL be "Output".
Resource	r	w←	See ▶ [XJDF 2.1].

4.7.2 Resource

Table 4.28: QualityControlResult Resource element

NAME	MANAGER	WORKER	DESCRIPTION
Part	r	w←	Part SHALL define the context of the measurement. The values of Part SHALL be retained from QualityControlParams to QualityControlParams. Missing partition keys SHALL be added to Part to provide additional context of the measurement.
QualityControlResult	r	w	QualityControlResult SHALL be present.

4.7.3 Part

Table 4.29: QualityControlResult Part element

NAME	MANAGER	WORKER	DESCRIPTION
QualityMeasurement	r	w←	@QualityMeasurement SHALL be specified for all QualityControlParams measurements where multiple measurements types are made for a single press run. QualityControlResult/@Sample SHALL NOT overlap if @QualityMeasurement differs.
Separation	r	w←	@Separation SHALL be specified for all QualityControlParams measurements that apply to a print pass of one or more separations if multiple press runs are measured for the same values of @SheetName and @Side.

Table 4.29: QualityControlResult Part element

NAME	MANAGER	WORKER	DESCRIPTION
SheetName	r	w←	@SheetName SHALL be specified for all QualityControlParams measurements that apply to an individual sheet or impression on a roll.
Side	r	w←	@Side SHALL be specified for all QualityControlParams measurements that apply to an individual surface.
<all other attributes>	r?	w?	Additional partition keys MAY be specified, but are out of scope for this ICS..

4.7.4 QualityControlResult

Table 4.30: QualityControlResult element

NAME	MANAGER	WORKER	DESCRIPTION
End	r	w	Date and time when the measurement was completed.
Failed	r	w←	@Failed SHALL be specified, if any measurement was detected that did not pass the criteria as specified in QualityControlParams .
Measurements	r	w	Total number of measurements.
MeasurementUsage	r	w	See ▶ [XJDF 2.1].
Master	r	w←	A value of "Master" SHALL NOT be specified if the value of QualityControlParams/@QualityBase="Absolute" . See ▶ [XJDF 2.1].
Standard	r	w←	See ▶ [XJDF 2.1].
Passed	r	w←	@Passed SHALL be specified, if any measurement was detected that passed the criteria as specified in QualityControlParams .
Position	r	w?	@Position SHALL NOT be specified if Part/@Side is present.
QualityControlMethods	r	w	@QualityControlMethods SHALL be specified and contain copies of the supported values specified in QualityControlParams/@QualityControlMethods . Values SHOULD be one of the following:
Barcode	r←	w←	Barcode SHOULD be specified for measurements that test the quality of barcodes. Note: this includes linear and 2-d barcodes.
ColorDensitometry	r←	w←	ColorDensitometry SHOULD be specified for measurements that contain only density measurements.
Colorimetry	r←	w←	Colorimetry SHOULD be specified for measurements that cannot measure spectral data.
ColorSpectrophotometry	r←	w←	A value of ColorSpectrophotometry SHALL be specified for measurement devices that support spectral measurements. Additional values MAY be supplied.
Inspection	r←	w←	Inspection SHOULD be specified for measurements of general image quality.
Registration	r←	w←	Registration SHOULD be specified for color separation registration measurements.
<all other values>	r?	w?	Additional methods MAY be specified but are out of scope for this ICS.

Table 4.30: QualityControlResult element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Sample</i>	r	w←	@ <i>Sample</i> SHALL be specified and SHALL not overlap if multiple measurements occur during one press run. Note: @ <i>Sample</i> will typically be based on job good counters or device counters.
<i>Severity</i>	r←	w←	@ <i>Severity</i> SHALL define the overall severity of all defects on a scale of 0(no defects present) ,1(trivial) to 100 (fatally severe).
<i>SourceDeviceID</i>	r	w←	@ <i>SourceDeviceID</i> SHALL contain the identifier of the device if it is an <i>Inline Measurement</i> device. @ <i>SourceDeviceID</i> SHOULD contain the identifier of the device if it is an <i>Offline Measurement</i> device.
<i>Start</i>	r	w	Date and time when the measurement was started.
<i>ColorMeasurement</i>	r←	w←	<i>ColorControlStrip</i> SHALL be supplied if the <i>Manager</i> provided <i>QualityControlParams/ColorMeasurement</i> . <i>ColorControlStrip</i> SHOULD be provided otherwise.
<i>Inspection</i>	r←	w←	<i>Inspection</i> SHALL be supplied if the <i>Manager</i> provided <i>QualityControlParams/@QualityControlMethods="Inspection"</i> .
<i>RegistrationQuality</i>	r←	w←	<i>RegistrationQuality</i> SHALL be supplied if the <i>Manager</i> provided <i>QualityControlParams/RegistrationQuality</i> .
<i>FileSpec</i>		w!	A reference to proprietary data SHALL NOT be provided in the scope of this ICS.

4.7.5 Inspection

Inspection SHALL contain the details of an automated or visual inspection.

Table 4.31: Inspection element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Defect</i> *	r	w←	One <i>Defect</i> element SHALL be provided for each detected defect. The detection threshold is implementation dependent.

4.7.6 Defect

Table 4.32: Defect element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Box</i>	r	w←	If a defect size is known, the outer bounding box SHALL be specified in @ <i>Box</i> . The details how the size of a defect is calculated are implementation dependent.
<i>DefectType</i>	r	w	@ <i>DefectType</i> SHALL be specified.
<i>ImageDefect</i>	r	w←	<i>ImageDefect</i> SHOULD be specified by automated systems that compare measured and target images.
<all other values>	r	w?	Other defect types MAY be specified, but are out of scope for this ICS.
<i>DefectTypeDetails</i>	r	w	@ <i>DefectTypeDetails</i> SHALL be specified.
<i>ImageMismatch</i>	r	w←	<i>ImageMismatch</i> SHOULD be specified by automated systems that compare measured and target images.
<all other values>	r	w?	Other defect type details MAY be specified, but are out of scope for this ICS.
<i>Face</i>	r	w←	See ▶ [XJDF 2.1].

Table 4.32: Defect element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Severity</i>	r	w?	@ <i>Severity</i> SHOULD be specified if a ranking of defects is implemented by the <i>Worker</i> .
<i>Size</i>	r	w←	If a defect size is known, the area of the defect SHALL be specified in @ <i>Box</i> . The details how the size of a defect is calculated are implementation dependent.
<i>Comment</i>	r	w?	A human readable description of the individual defect MAY be provided. Note: This will typically be useful in manual quality measurement processes.

4.7.7 Comment

Comment SHALL contain a human readable description of the individual defect.

Table 4.33: Comment element

NAME	MANAGER	WORKER	DESCRIPTION
<element text>	r	w?	The <i>Worker</i> SHOULD provide human readable content in the body of the Comment element.

5 Subelements

5.1 ColorControlStrip

ColorControlStrip SHALL provide a detailed definition of the measurement patches. If **ColorControlStrip** is specified as a descendent of **Layout**, geometrical information SHALL be provided by the *Manager* as specified below. If **ColorControlStrip** is specified as a child of **QualityControlParams** it SHALL specify color quality *Target Values*. If **ColorControlStrip** is specified as a child of **QualityControlResult** it SHALL specify color quality measurements results.

Table 5.1: ColorControlStrip Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Center</i>	w← r?	r w?	@ <i>Center</i> SHALL be specified by the <i>Manager</i> if ColorControlStrip is in a descendant of Layout .
<i>Rotation</i>	w← r?	r w?	@ <i>Rotation</i> SHALL be specified by the <i>Manager</i> if @ <i>Center</i> is present.
<i>Size</i>	w← r?	r w?	@ <i>Size</i> SHALL be specified by the <i>Manager</i> if @ <i>Center</i> is present.
<i>StripType</i>	w← r	r w←	@ <i>StripType</i> is the name or type of the ColorControlStrip . At least one of Patch or @ <i>StripType</i> SHALL be specified. Note: The exchange, synchronization and measurement setup for ColorControlStrip elements that are specified by @ <i>StripType</i> is out of scope for this ICS.
ColorMeasurementConditions	w← r	r w	ColorMeasurementConditions SHALL specify the color measurement conditions that SHALL be or have been used for this ColorControlStrip . ColorMeasurementConditions SHALL be provided by the <i>Manager</i> if ColorControlStrip is in a child of QualityControlParams .
Patch *	w← r	r w	Patch provides the descriptions of the individual color patches. Patch NEED NOT be provided by the <i>Manager</i> if @ <i>StripType</i> is present and refers to a standard strip that is known by the <i>Worker</i> . At least one of Patch or @ <i>StripType</i> SHALL be specified.

5.2 ColorMeasurement

ColorMeasurement SHALL provide a detailed definition of the color measurements. If **ColorMeasurement** is specified as a child of **QualityControlParams** it SHALL specify color quality *Target Values*. If **ColorMeasurement** is specified as a child of **QualityControlResult** it SHALL specify color quality measurements results.

Table 5.2: ColorMeasurement Element

NAME	MANAGER	WORKER	DESCRIPTION
ColorControlStrip ?	r← w←	r← w←	Details of the color control strip.

5.3 ColorMeasurementConditions

ColorMeasurementConditions SHALL specify the requested or actual color measurement conditions.

Table 5.3: ColorMeasurementConditions Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>MeasurementMode</i>	w r	r w	Measurement mode SHOULD be a valid mode as specified in ▶ [ISO13655:2017]. Note: The exchange, synchronization and measurement setup for proprietary <i>ColorMeasurementConditions</i> that are not defined by ▶ [ISO13655:2017] is out of scope for this ICS.
<i>WhiteBase</i>	w? r	r← w	See ▶ [XJDF 2.1] for details. <i>@WhiteBase</i> SHALL be provided for actual measurements from the device. If a <i>Measurement System</i> is capable of switching white base modes and the <i>Manager</i> requests a certain value of <i>@WhiteBase</i> , the <i>Worker</i> SHOULD honour the request.

5.4 FileSpec

FileSpec SHALL reference explicit URLs in the context of this ICS.

Table 5.4: FileSpec Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>FileFormat</i>	w!		See ▶ [XJDF 2.1].
<i>FileTemplate</i>	w!		See ▶ [XJDF 2.1].
<i>ResourceUsage</i>	w←	r	<i>@ResourceUsage</i> SHALL be specified if the parent contains multiple <i>FileSpec</i> elements. <i>@ResourceUsage</i> NEED NOT be specified if the parent contains a single <i>FileSpec</i> element. For multiple <i>FileSpec</i> elements with a common parent, values of <i>FileSpec/@ResourceUsage</i> SHALL be unique.
<i>Image</i>	w←	r	A value of " <i>Image</i> " SHALL be specified if the <i>FileSpec</i> element references a master image for image inspection.
<all other values>	w?	r?	Other values MAY be specified, but are out of scope of this ICS.
<i>UID</i>	w!		See ▶ [XJDF 2.1].
<i>URL</i>	w	r	See ▶ [XJDF 2.1].

5.5 Header

Table 5.5: Header Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>ICSVersions</i>	r←	w←	The value of <i>@ICSVersions</i> SHALL specify the ICS that <i>AuditResource</i> conforms to.
<i>CusQC_L1-2.1</i>	r	w	A conforming <i>CusQC</i> document SHALL contain a value of " <i>CusQC_L1-2.1</i> ".
<i>Time</i>	r	w	<i>@Time</i> SHALL define the time when the quality report was generated. Note: Times of measurement are defined in <i>QualityControlResult/@Start</i> and <i>QualityControlResult/@End</i> .

5.6 Patch

Patch SHALL provide a detailed definition of the an individual color measurement patch. The usage of *Patch* as a target or a measurement is identical to the usage of the parent *ColorControlStrip*.

Table 5.6: Patch Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Density</i>	w? r	r? w←	@ <i>Density</i> SHALL be provided by the <i>Worker</i> if the <i>Worker</i> measured the density directly.
<i>Lab</i>	w← r	r? w←	@ <i>Lab</i> SHOULD be provided by the <i>Manager</i> if a target <i>Lab</i> value is known. @ <i>Lab</i> SHALL be provided by the <i>Worker</i> if the <i>Worker</i> is capable of measuring an <i>Lab</i> value. @ <i>Lab</i> SHOULD be provided if @ <i>Spectrum</i> is present.
<i>NeutralDensity</i>	w? r	r? w←	@ <i>NeutralDensity</i> SHALL be provided by the <i>Worker</i> if the <i>Worker</i> measured the neutral density directly.
<i>PatchUsage</i>	w r	r w	See ▶ [XJDF 2.1].
Color	w← r	r w←	A value of @ <i>PatchUsage</i> ="Color" SHALL specify that the patch is present and SHALL be or has been measured.
Ignore	w← r	r w←	A value of @ <i>PatchUsage</i> ="Ignore" SHALL specify that the patch is present but not relevant for measurements. A value of @ <i>PatchUsage</i> ="Ignore" SHALL also be set by the <i>Worker</i> if measurement errors occurred that make the measurement invalid.
<all other values>	w? r?	r? w?	Other uses for the patch MAY be specified, but are out of scope of this ICS.
<i>Spectrum</i>	w← r	r w←	@ <i>Spectrum</i> SHALL be provided by the <i>Manager</i> if a target spectrum is known. @ <i>Spectrum</i> SHALL be provided by the <i>Worker</i> if the <i>Worker</i> is capable of measuring a color reflectance spectrum.
<i>SeparationTint</i>	w? r?	r w?	See ▶ [XJDF 2.1].

5.6.1 SeparationTint

Table 5.7: SeparationTint Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Name</i>	w r	r w	See ▶ [XJDF 2.1].
<i>Tint</i>	w r	r w	See ▶ [XJDF 2.1].

5.7 RegistrationQuality

Table 5.8: RegistrationQuality Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>Offset</i>	w r	r w	See ▶ [XJDF 2.1].
<i>Reference</i>	w r	r w	See ▶ [XJDF 2.1].

5.8 ResourceInfo

This section defines the restrictions for a *ResourceInfo* that pertain to a quality report. *ResourceInfo* elements that are unrelated to quality control MAY be present in other *AuditResource* elements.

Note: For instance, *ConventionalPrintingParams*, *DigitalPrintingParams* and *PrintCondition* can be provided to specify the print method. *Media*, *MiscConsumable* or *Ink* can be provided to specify the paper and other consumables that were consumed. The details of these resources in the context of *ResourceInfo* are out of scope for this ICS.

Table 5.9: *ResourceInfo* Element

NAME	MANAGER	WORKER	DESCRIPTION
<i>ResourceSet</i> [@Name="QualityControlResult"]	r	w	A <i>QualityControlResult</i> SHALL contain the results of the quality control measurements. The value of @Usage SHALL be "Output".

Appendix A

A References

Table A.1: References

TERM	DEFINITION
[ICS-Cus-APP]	<i>Customer to Electronic Publishing</i> Date: April 2014 Version: 1.5 Produced by: CIP4 Organization Available at: http://www.cip4.org
[ICS-MIS-CP]	<i>MIS to Conventional Printing ICS</i> Date: April 2014 Version: 1.5 Produced by: CIP4 Organization Available at: http://www.cip4.org
[ICS-MIS-Fin]	<i>MIS to Finishing ICS</i> Date: April 2014 Version: 1.5 Produced by: CIP4 Organization Available at: http://www.cip4.org
[ISO12647-2:2013]	<i>Graphic technology -- Process control for the production of half-tone color separations, proof and production prints - Part 2: Offset lithographic processes</i> Date: 2013 Produced by: ISO Available at: https://www.iso.org/store.html
[ISO12647-3:2013]	<i>Graphic technology - Process control for the production of half-tone colour separations, proof and production prints - Part 3: Coldset offset lithography on newsprint.</i> Date: 2014 Produced by: ISO Available at: https://www.iso.org/store.html
[ISO12647-4:2014]	<i>Graphic technology - Process control for the production of half-tone colour separations, proof and production prints - Part 4: Publication gravure printing.</i> Date: 2014 Produced by: ISO Available at: https://www.iso.org/store.html
[ISO13655:2017]	<i>Graphic technology -- Spectral measurement and colorimetric computation for graphic arts images</i> Date: 2017 Produced by: ISO Available at: https://www.iso.org/store.html
[ISO 17972-4:2018]	<i>Graphic technology -- Colour data exchange format (CxF/X) -- Part 4: Spot colour characterisation data (CxF/X-4)</i> Date: 2018 Produced by: ISO Available at: https://www.iso.org/store.html

REFERENCES

Table A.1: References

TERM	DEFINITION
<p>[PrintTalk 2.1]</p>	<p><i>PrintTalk</i></p> <p>Date: August 2020 Version: 2.1 Produced by: CIP4 Organization Available at: http://www.cip4.org</p>
<p>[XJDF 2.1]</p>	<p><i>Exchange Job Definition Format</i></p> <p><i>Version 2.1</i></p> <p>Date: August 2020 Version: 2.1 Produced by: CIP4 Organization Available at: http://www.cip4.org</p>

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