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Graphic technology — Variable printing data exchange —

Part 1: Using PPML 2.1 and PDF 1.4 (PPML/VDX-2005)

Technologie graphique — Échange de données d'impression variables —

Partie 1: Utilisant PPML 2.1 et PDF 1.4 (PPML/VDX-2005)

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 16612-1 was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

ISO 16612-1 is based on ANSI/CGATS.20-2002, *Graphic technology — Variable printing data exchange using PPML and PDF (PPML/VDX)*.

ISO 16612 consists of the following parts, under the general title *Graphic technology — Variable printing data exchange*:

— *Part 1: Using PPML 2.1 and PDF 1.4 (PPML/VDX-2005)*

Introduction

ISO 16612 defines a data format and its usage for facillitating methods of exchange of digital data for variable data printing. It focuses on the exchange of files between establishments as well as within an integrated environment that produces variable data printing. In particular, ISO 16612 is concerned with the exchange of content information as well as data representing the final appearance of customized or personalized print products to be manufactured. This part of ISO 16612 is based on the use of PPML version 2.1, PDF version 1.4, and JDF version 1.2. Subsequent parts of ISO 16612 may use later revisions of these reference documents. However, because it will be important to be able to separately identify different versions of PPML/VDX, these will be created as individual parts of ISO 16612.

This part of ISO 16612 is intended to respond to the workflow requirements associated with the efficient and reliable exchange of final form data between one or more senders or receivers. The workflows addressed by this part of ISO 16612 can differ in their degree of optimization, flexibility and level of integration. It is recognized that increasing flexibility can lead to the possibility of uncertainty or error in the interpretation of page appearance data as intended by the originator. Two conformance levels are identified that provide a reasonable balance between flexibility and predictability.

Unlike conventional digital master formats that describe the final appearance of pages of a single document, a variable document format must define many related documents and the final graphical appearance of the pages of each document. Such documents are referred to in this part of ISO 16612 as “instance documents”. It is important to note that instance documents within a job may vary in page count, graphical content, page dimensions and finishing. The pages of instance documents are referred to in this part of ISO 16612 as “compound pages” where all pages of each document are defined in reader order.

Each compound page is an assembly of one or more partial pages or graphical content objects referred to in this part of ISO 16612 as “compound elements”. In most cases, many compound page definitions share a common set of compound element definitions. This part of ISO 16612 takes advantage of this content data sharing by allowing compound element data to be defined once regardless of the number of times it is referenced from the various compound page definitions. This effectively minimizes the overall size of the data that need to be exchanged, to a size that is manageable for most exchange scenarios.

The layout data entity that defines the instance documents and their compound pages is referred to in this part of ISO 16612 as the “layout data” of a PPML/VDX instance, where such a file set is referred to as a “PPML/VDX instance”. The layout data is defined using the *Personalized Print Markup Language* (PPML) data format, which is based on XML syntax.

The PPML layout data can also carry meta-information that characterizes the re-use of specific renderings of compound element data as they appear as graphical marks on compound pages. This re-used information is intended to provide developers and manufacturers of reader software, such as a PPML/VDX conforming print or display rendering system, with opportunities to improve the efficiency of page rasterization.

All compound element data of a PPML/VDX instance referenced from the PPML layout data must be defined in the PDF format as defined in the Adobe *PDF Reference*, or as further restricted by the ISO 15930 family of International Standards (PDF/X). More specifically, the data that define a compound element as laid out on a compound page by the PPML data is a page of a PDF file. To clarify this concept further, the pages of one or more single or multiple page PDF files are used as the compound element data in a PPML/VDX instance.

PPML/VDX enables the sender to identify the rigor with which the data being exchanged is defined and thus also identifies the areas in which the receiver is being asked to assume responsibility. This also enables the recipient of a file to clearly understand the liability assumed in accepting the file.

This part of ISO 16612 does not have a provision for specifying data specific to a given reader process or printing device. Therefore, PPML/VDX has no provision for conveying device control information such as imposition layout, trapping parameters, or any other device-specific information.

This part of ISO 16612 does, however, allow data that describe print product intent to be included in a conforming PPML/VDX instance. “Print product intent” data, as they are referred to in this document, provide information that describes various characteristics of the finished, variable print products to be manufactured in a way that is device-independent. Characteristics such as binding style, media type and folding instructions are allowed to vary per instance document and per compound page. The print product intent data of a PPML/VDX instance is defined by a restricted subset of the *JDF Specification* that is based on XML syntax.

Two conformance levels are defined in this part of ISO 16612 and are referred to as *PPML/VDX-Strict* and *PPML/VDX-Relaxed*.

PPML/VDX-Strict provides the sender with maximum control and portability of the exchanged data and is the conformance level most suitable for blind complete exchange. All information necessary for defining a complete variable data job is included in the exchanged data. All content data must be encoded as either PDF/X-1a and/or PDF/X-3 (see ISO 15930-1 and ISO 15930-3).

PPML/VDX-Relaxed is used where not all information required by the receiver to manufacture the job is required to be included in the exchanged data. Data not provided in the exchange may be submitted separately, or identified through communication between sender and receiver, and it will be the recipient’s responsibility to provide the additional data and properly bind them to the PPML/VDX data. This conformance level may also make use of PDF files not conforming to the PDF/X-1a or PDF/X-3 International Standards.

The two conformance levels of PPML/VDX accommodate multiple exchange modes (including single file single transfer, multiple file single transfer and multiple file multiple transfer) while insuring reliable exchange of all data components. PPML/VDX is therefore suitable for collaborative authoring workflows where more than one sender may exchange data components of the same job with a receiver, where the receiver can reliably determine when all components of the exchanged job are under their local control.

A set of application notes for this part of ISO 16612 may be found at http://www.npes.org/standards/tools.html. In addition, pointers may be found on this site to development tools provided for the assistance of developers and users of applications prepared, based on this part of ISO 16612.

It is anticipated that a variety of products will be developed around PPML/VDX, including readers, writers and viewers of PPML/VDX files, as well as validation pre-flight tools and products that offer combinations of these features. Different products will incorporate various capabilities to prepare, interpret and process conforming files based on the application needs as perceived by the suppliers of the products. However, it is important to note that a conforming reader must be able to read and appropriately process all files conforming to a specified conformance level.

Graphic technology — Variable printing data exchange —

Part 1:
Using PPML 2.1 and PDF 1.4 (PPML/VDX-2005)

1 Scope

This part of ISO 16612 specifies the methods for the use of the Personalized Print Markup Language (PPML) and the Portable Document Format (PDF) for the exchange or identification of all elements necessary to render a variable data imaging job as intended by the sender. This part of ISO 16612 specifies document layout and content data and makes provision for product intent specifications using the Job Definition Format (e.g. paper selection, binding, finishing, etc.).

This part of ISO 16612 is not directly intended to address applications where printing is started before the file creation and transfer is complete (often called streaming applications). However, there are methods that allow it to be used for such applications.

2 Normative references

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

ISO 15930-1:2001, *Graphic technology — Prepress digital data exchange — Use of PDF — Part 1: Complete exchange using CMYK data (PDF/X-1 and PDF/X-1a)*

ISO 15930-3:2002, *Graphic technology — Prepress digital data exchange — Use of PDF — Part 3: Complete exchange suitable for colour-managed workflows (PDF/X-3)*

ISO 15930-4:2003, *Graphic technology — Prepress digital data exchange using PDF — Part 4: Complete exchange of CMYK and spot colour printing data using PDF 1.4 (PDF/X-1a)*

ISO 15930-6:2003, *Graphic technology — Prepress digital data exchange using PDF — Part 6: Complete exchange of printing data suitable for colour-managed workflows using PDF 1.4 (PDF/X-3)*

Extensible Markup Language (XML) 1.0 (Second Edition), 6 October 2000, World Wide Web Consortium, *Available from internet <http://www.w3.org>*

JDF Specification, Release 1.2, 2004, CIP4 Organization, *Available from internet <http://www.CIP4.org>*

PDF Reference: Adobe Portable Document Format Version 1.4, third edition, 2001, Adobe Systems Incorporated (ISBN 0-201-75839-3) and its *errata dated 2003/06/18, available from internet <http://partners.adobe.com/asn/acrobat/docs/PDF14errata.txt>*

Personalized Print Markup Language Functional Specification, version 2.1, Print On Demand Initiative, Dated July 31, 2002, *available from internet <http://www.PODi.org>*

RFC 1321: The MD5 Message-Digest Algorithm, April 1992, Ron Rivest, *available from internet <http://www.IETF.org>*

RFC 2396: Uniform Resource Identifiers (URI): Generic Syntax, 1995, Internet Engineering Task Force, *available from internet <http://www.IETF.org>*

3 Terms and definitions

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

3.1
compound element
single appearance entity that is a composite of one or more content types including text, graphics, line art or image data

3.2
instance document
set of related pages, the exact composition of which will vary with different applications

NOTE Typical applications use JOB elements to represent an instance document.

3.3
JDF
Job Definition Format

3.4
layout data
meta information encoded in **PPML** (3.9) that defines all instance documents and compound page layouts and is stored as a single object either within a **PPML/VDX layout file** (3.13), or within a separate **XML** (3.18) file

3.5
MD5 checksum algorithm
computational procedure defined in RFC 1321

3.6
Portable Document Format
PDF
file format defined in the *PDF Reference*

3.7
PDF/X-1a
conformance level defined in ISO 15930-1:2001 or ISO 15930-4:2003

3.8
PDF/X-3
conformance level defined in ISO 15930-3:2002 or ISO 15930-6:2003

3.9
PPML
Personalized Print Markup Language

3.10
PPML Specification
Personalized Print Markup Language Functional Specification

3.11
PPML/VDX content file
PDF file containing pages that define one or more compound elements of a **PPML/VDX instance** (3.12)

3.12
PPML/VDX instance
set of one or more files constituting the layout, content and product intent data representing a single PPML/VDX job

3.13
PPML/VDX layout file
PDF file that contains a single PPML/VDX data stream object and one or more PDF pages

3.14
reader
software application that is able to read and appropriately process files

3.15
URI
Uniform Resource Identifier defined in RFC 2396

3.16
URL
Uniform Resource Locator defined in RFC 2396

3.17
writer
software application that is able to write files

3.18
XML
data format defined in *Extensible Markup Language (XML) 1.0 (Second Edition)*

4 Notations

PDF operators, PDF keywords, the names of keys in PDF dictionaries, and other predefined names are written in a bold sans serif type font; e.g. the **ID** key.

Operands of PDF operators or values of dictionary keys are written in an italic sans serif font; e.g. the (*PPML/VDX:2005)* value for the **GTS_PPMLVDXVersion** key defined in 6.7.

PPML element and XML element names in general are written in a bold sans serif type font, e.g. the **DOCUMENT** element.

Values of attributes of XML elements are written in an italic sans serif font.

Attribute names of PPML and XML elements are written in a bold italic sans serif font; e.g. the ***Subset*** attribute of the **CONFORMANCE** element.

Placeholders for normally variable information are written in an italic serif font.

EXAMPLE PDF and XML fragments are written in a monospaced font and this convention overrides previously defined conventions. Within examples, use of bold font has no technical significance and is used for emphasis only.

5 Conforming files, readers and writers

This document identifies two conformance levels, PPML/VDX-Strict and PPML/VDX-Relaxed.

PPML/VDX-Strict requires that all content information be contained in either PDF/X-1a and/or PDF/X-3 data files as further restricted below. This implies that all data are present and the intended colour is fully defined; this shall be indicated by the value of the ***IntendedColor*** attribute of both the **Self** and **Binding** elements,

which shall be set to *"true"*. It is also required that the **UniqueID** and **MD5_Checksum** attributes of all **Binding** sub-elements of the **ContentBindingTable**, as defined in Annex A, are present. If the optional product intent data are also supplied in the data, the use of the print product intent specification data, as defined in Annex B, is required without the use of the user-defined semantics as defined in B.4. It further requires all XML data, including the **JDF** element and the **PPML** element, to be included in the PPML/VDX layout file as defined in Annex C, where use of either the **JDFRef** or **PPMLRef** elements is prohibited. Use of the ***BaseID*** attribute of the **Binding** element defined in A.2 are also prohibited in PPML/VDX-Strict.

PPML/VDX-Relaxed allows the sender and receiver to agree upon specific relaxations of the specified requirements. Specifically, any PDF file as restricted below may be used in place of PDF/X-1a and/or PDF/X-3. It may not be necessary to transfer all data, but only identify it (***UniqueID*** and ***MD5_Checksum*** attributes of the **Binding** element may not be present), and user-defined print product intent semantics as defined in Annex B may be used. It further allows the **JDF** and **PPML** elements to be defined in separate XML data files as set out in Annex C.

A conforming PPML/VDX instance comprises one or more PDF files and up to two XML files in which those features necessary for the exchange of a PPML/VDX instance adhere to this part of ISO 16612. See Annex D.

A conforming PPML/VDX content or layout PDF file may also include other valid PDF features that do not affect the final rendered appearance of the compound element.

A conforming writer is a software application that shall be able to write files conforming to the requirements of this part of ISO 16612.

NOTE 1 For the most reliable blind exchange, it is suggested that writers generate single file PPML/VDX-Strict conforming instances.

A conforming reader is a software application that shall be able to read and appropriately process all instances conforming to this part of ISO 16612.

NOTE 2 There are no separate conformance levels for PPML/VDX-Strict and PPML/VDX-Relaxed readers.

All conforming readers shall parse all PDF files but may ignore those features not required by this part of ISO 16612.

All conforming readers shall parse all JDF data but may ignore those features not required by this part of ISO 16612.

Rendering conforming files shall be performed as defined in the *PPML Specification* and the *PDF Reference* as extended by ISO 15930-1 and ISO 15930-3. Entries in PDF objects not defined in these references shall not change the rendered result.

6 Technical requirements

6.1 Data structure

6.1.1 PDF

The PDF features not restricted by this part of ISO 16612 shall be used as prescribed in the *PDF Reference*. PDF data restrictions are specified in 6.6.

The PDF file format has a data structure that consists of four sections: header, body, cross-reference table, and trailer. The body of a PDF file contains a sequence of numbered objects such as numbers, names, strings, dictionaries, streams, text characters, graphics, images and their associated resources. The cross-reference table of the PDF file provides a reader process with efficient random access to the various objects defined within the body of the PDF file.

NOTE For more information on the structure of a PDF file refer to the *PDF Reference*.

6.1.2 PPML

The layout data of a PPML/VDX instance shall be defined by a restricted subset of the *PPML Specification* as summarized in Annex E.

Features not restricted in 6.9 and 6.10 shall be used as prescribed in the *PPML Specification*.

The PPML data format itself has a hierarchical tree structure comprising nested node or element definitions and uses a nested XML tag syntax. Within the outermost PPML tag context are nested element definitions that define every unique document, page, and page mark. In PPML parlance, page marks are rendering contexts that describe how compound element source data (defined in this specification as PDF page objects), defined external to the PPML data stream, are to appear on a compound page with respect to location, clipping, size, rotation, and skew. If a compound element is known to occur multiple times with an equivalent appearance, hint information can be stored in the PPML mark-up data to communicate reuse knowledge to an optimized consuming process. Such prior hint information, or meta-data, allows a consuming processor to anticipate content entity reuse and make more efficient use of the computing and memory resources available to it.

NOTE For more information on the definition of the PPML data format refer to the *PPML Specification.*

6.1.3 URI and URL

All URIs and URLs shall be created in accordance with the requirements defined in RFC 2396.

6.2 Components of a PPML/VDX instance

A PPML/VDX instance shall consist of a single PDF format PPML/VDX layout file and zero or more PDF format PPML/VDX content files.

Under the PPML/VDX-Relaxed conformance level, the file set may also include up to two XML data files, one that includes the **PPML** element, and another that includes the **JDF** element.

Under PPML/VDX-Strict all XML data must be embedded in the PPML/VDX layout file.

6.3 PPML/VDX file naming

A PPML/VDX layout file should use the file extension *.vdx*

EXAMPLE MyVariableDataJob.vdx

A PPML/VDX content file should use the file extension .pdf

EXAMPLE `MyContentdata.pdf`

6.4 Structure of PPML/VDX files

6.4.1 Structure of a PPML/VDX layout file

A PPML/VDX layout file shall contain exactly one embedded **PPMLVDX** element as defined in Annex C.

A PPML/VDX layout file shall contain a first PDF page that provides a visual indication that the file is a PPML/VDX layout file that will display in ways not expected by the user. This page shall not be used as a compound element referenced from the PPML data.

A PPML/VDX layout file may contain one or more additional PDF pages that may be used as compound elements referenced by the PPML layout data defined within, or referenced from, the **Layout** sub-element of the **PPMLVDX** element as defined in Annex C.

6.4.2 Structure of a PPML/VDX content file

A PPML/VDX content file is a PDF, PDF/X-1a or PDF/X-3 file that contains content data referenced from a PPML/VDX layout file.

6.5 Placement, orientation and interaction of compound elements

The ***Position*** attribute of the PPML **OBJECT** element shall define the placement of the lower left hand corner of the PDF page object's ***MediaBox*** regardless of the size and location of the ***CropBox***.

A PPML/VDX reader shall ignore the value of the ***Rotate*** entry of the PDF page object.

A PPML/VDX reader shall not automatically clip to the ***BleedBox***, ***TrimBox***, or ***ArtBox*** entry of the PDF page object.

NOTE 1 It is entirely appropriate for an authoring application to specify a PPML **CLIP_RECT** derived from the PDF page ***BleedBox***. Similarly the intent of the ***Rotate*** entry of a PDF page object can be encoded in a PPML **TRANSFORM** element.

A PPML/VDX reader shall interpret each PDF page's ***Contents*** entry independent of any graphic state changes made during the interpretation of the ***Contents*** entry of any other PDF page.

As stated in the *PPML Specification* 2.1, 5.3.1, all painting operations in the PDF content data are considered as marking the conceptual raster of an individual **MARK**. This includes fills, strokes and images, and applies even if the painting operation would have no visible effect if the PDF page comprising the **MARK** were rendered individually rather than in the context of PPML/VDX.

NOTE 2 One example of an operation that would have no visible effect is an object defined in DeviceCMYK, where C=M=Y=K=0, set to overprint, and within a context where the PDF overprint mode parameter of the extended graphics state (**OPM**) is non-zero.

The overprint state of elements within a **MARK** has no effect on the determination of the final page raster when that **MARK** is placed over another.

NOTE 3 In the terminology used in the *PPML Specification* overprinting is a case of partial transparency; thus overprinting between **MARK** elements is not supported.

6.6 PDF data restrictions

A PPML/VDX content file shall have the value for both the permanent and changing unique identifiers of the **ID** key of the PDF **trailer** dictionary set to unique identifier strings derived in accordance to the method specified in the *PDF Reference*.

NOTE 1 While the **ID** key is optional in the *PDF Reference*, it is required by this part of ISO 16612. The value of the **ID** key can be used as an alternate method of identifying the file by reference if the file name itself is changed, e.g. as a result of transmission due to differences in the originating and receiving operating systems. Refer to the *PDF Reference*, 2001, 5.16. The **ID** key and its values are required to be defined in the **trailer** dictionary of all PPML/VDX content files so that the **Binding** sub-element of the **ContentBindingTable** (defined in Annex A) can guarantee a positive binding.

The **SMask** key, if present in an **ExtGState** object or in an Image **Xobject**, shall only have the value *None*.

A **Group** object shall not be included in a **Form XObject** if it includes an **S** key with a value of *Transparency*.

The following keys, if present in an **ExtGState** object, shall have the values shown:

BM Normal or Compatible

CA 1.0

ca 1.0

NOTE 2 These provisions prohibit the use of transparency within the file. The visual effect of partially transparent graphics may be achieved using techniques other than the use of the PDF 1.4 transparency keys, including pre-rendered data or flattened vector objects. The use of such techniques does not prevent a file from being PDF/X compliant.

The use of a pre-separated PDF file (where the separations for each page are described as separate page objects, each painting only a single colourant) shall not be permitted.

NOTE 3 This does not prohibit the use of pre-separated workflows in which the separations of a page are combined into a single PDF page object.

6.7 PPML/VDX file identification

The version of a conforming PPML/VDX layout file shall be so identified by the value of the **GTS_PPMLVDXVersion** key present in its **Info** dictionary. The type of the value of the **GTS_PPMLVDXVersion** key is string. The value of this key for files prepared in accordance with this part of ISO 16612 is (*PPML/VDX:2005*).

A PPML/VDX layout file shall be further identified by the value of the **GTS_PPMLVDXConformance** key in its **Info** dictionary. The type of the value of the **GTS_PPMLVDXConformance** key is string.

The **GTS_PPMLVDXConformance** key for files prepared in accordance with the PPML/VDX-Strict conformance level of this part of ISO 16612, as defined in Clause 5, shall have a value of (*PPML/VDX-Strict:2005*).

The **GTS_PPMLVDXConformance** key for files prepared in accordance with the PPML/VDX-Relaxed conformance level of this part of ISO 16612, as defined in Clause 5, shall have a value of (*PPML/VDX-Relaxed:2005*).

NOTE 1 In the following example, the **GTS_PDFXVersion** key is defined because the PPML/VDX layout file is also identified as conforming to PDF/X-3.

EXAMPLE

```
1 0 obj
<<
/Creator (VDP Mega-Merge)
/Author (John Smith)
/GTS_PPMLVDXVersion (PPML/VDX:2005)
/GTS_PPMLVDXConformance (PPML/VDX-Strict:2005)
/GTS_PDFXVersion (PDF/X-3:2003)
/CreationDate (D:200106231952-08'00')
/ModDate (D:200107051952-08'00')
/Title (Acme VDP job)
>>
endobj
```

A PPML/VDX content file does not require explicit identification as a component of a PPML/VDX instance.

A PPML/VDX content file shall not have either a **GTS_PPMLVDXConformance** key or **GTS_PPMLVDXVersion** key defined in its **Info** dictionary.

NOTE 2 Because a PPML/VDX layout file must contain a **GTS_PPMLVDXConformance** key and **GTS_PPMLVDXVersion** key, it cannot be referenced as a PPML/VDX-Content file.

6.8 Embedding the PPMLVDX element in a PPML/VDX layout file

The **PPMLVDX** element defined in Annex C shall be encoded as a PDF stream object within the body of a PPML/VDX layout file using the following method of embedding:

The **Catalog** dictionary of the embedding PPML/VDX layout file shall contain the tag entry **GTS_PPMLVDXData**. This tag shall have the value of an indirect reference to a stream object (refer to the *PDF Reference*) containing the **PPMLVDX** element data.

EXAMPLE

```
1 0 obj
<<
/Type /Catalog
/Pages 2 0 R
/GTS_PPMLVDXData 13 0 R
>>
…
13 0 obj
<< /Length 272435 >>
stream
<?xml version="1.0" encoding="UTF-8"?>
<PPMLVDX>
    <ContentBindingTable> …</ContentBindingTable>
    <ProductIntent>
        <JDF…> …</JDF>
    </ProductIntent>
    <Layout>
        <PPML …>…</PPML>
    </Layout>
</PPMLVDX>
endstream
endobj
```

NOTE In files conforming to the PPML/VDX-Relaxed conformance level, encryption as allowed by the *PDF Reference* can be applied to PDF data and the embedded **PPMLVDX** element data stream.

The use of compression with the **PPMLVDX** element is specified in 6.11.

6.9 PPML layout data restrictions

6.9.1 PPML layout data identification

A **CONFORMANCE** sub-element of the **PPML** element shall be defined and its ***Subset*** attribute shall be set to a string value of "*GTS_ PPML/VDX:2005*".

EXAMPLE `<PPML …> <CONFORMANCE Subset="GTS_PPML/VDX:2005"/> … </PPML>`

6.9.2 PPML element restrictions

A **PPML** element shall contain at least one **JOB** element.

A **PPML** element shall not contain any **DOCUMENT_SET** elements.

NOTE 1 The *PPML specification* notes that within a PPML file, the **JOB** element is a synonym for the **DOCUMENT_SET** element and that they can be used interchangeably. However, to avoid confusion, this part of ISO 16612 only uses the element **JOB** and does not treat these elements as interchangeable.

A PPML element shall not contain a **TICKET** element.

A conforming PPML/VDX reader may ignore the ***ResourcesIncluded*** attribute of the **PPML** element.

The ***Label*** attribute of the **PPML** element shall be set to a string value that uniquely identifies it.

If the **PPML** element is defined in an XML file external to the PPML/VDX layout file, the value of the ***Label*** attribute shall exactly match the value of the ***UniqueID*** attribute of the referencing **PPMLRef** element, as set out in C.5.

NOTE 2 The ***Label*** attribute of the **PPML** element is used for positive identification of the **PPML** element when it is defined external to the PPML/VDX layout file in a separate XML data file, as permitted in PPML/VDX-Relaxed only. Refer to Clause C.5 for requirements relating to the **PPMLRef** element that is used to bind to PPML data when it is stored external to the PPML/VDX layout file.

EXAMPLE

PPML element data stored in a separate XML data file identified by the URI `http://vdxjobserver/vdxjobs/myvdxjoblayout.ppml` contains the data:

```
<PPML Label="875323935" …> … </PPML>
```

An example **PPMLRef** element that references the PPML element defined above:

```
<PPMLVDX>
    <ContentBindingTable> … </ContentBindingTable>
    <ProductIntent> … </ProductIntent>
    <Layout>
        <PPMLRef Src="http://vdxjobserver/vdxjobs/myvdxjoblayout.ppml"
            UniqueID="875323935" MD5_Checksum="1a3623e8901c34145654f67898573934"/>
    </Layout>
</PPMLVDX>
```

NOTE 3 PPML/VDX has no provision for specifying imposition layout and disallows use of PPML elements used to define imposition layout.

6.9.3 SOURCE element restrictions

The **SOURCE** element shall contain exactly one **EXTERNAL_DATA_ARRAY** element.

The **SOURCE** element shall not contain **EXTERNAL_DATA** or **INTERNAL_DATA** elements.

NOTE This requirement forces all compound element data to be defined external to the PPML data. This effectively disallows embedding of binary compound element data within the PPML XML data. This better segregates the storage context of the content element source data from that of the PPML layout data, allowing the PPML data to be lightweight. The PPML layout data can, therefore, be more efficiently parsed and manipulated (analysed, subdivided, optimized, etc.) by workflow tools concerned with manipulating the PPML layout data.

The ***Format*** attribute of all **SOURCE** elements shall have a value of "*application/pdf*".

6.9.4 EXTERNAL_DATA_ARRAY element restrictions

The ***Src*** attribute of the **EXTERNAL_DATA_ARRAY** element shall always be set to a valid URI that uniquely identifies PPML/VDX data and can be resolved to a uniquely identified PPML/VDX Layout or Content file. The value of that ***Src*** attribute shall also appear as the value of the ***Src*** attribute of a **Binding** or **Self** sub-element of the **ContentBindingTable** as described in Annex A.

The ***Index*** attribute of the **EXTERNAL_DATA_ARRAY** element shall be allowed to have a value no larger than the number of PDF page objects defined in the PPML/VDX layout or Content file referenced by the element's ***Src*** attribute.

6.9.5 Compound page size definition restrictions

A **PAGE_DESIGN** element shall be defined as a sub-element of the **PPML** element prior to the definition of any **JOB** elements.

NOTE 1 In accordance with the *PPML Specification*, the dimensions of a compound page are communicated by the ***TrimBox*** attribute of the **PAGE_DESIGN** element. This required **PAGE_DESIGN** element establishes the default page size for all pages. Overriding **PAGE_DESIGN** elements can, of course, also be defined in subordinate **DOCUMENT** and **PAGE** elements. Its ***BleedBox*** attribute communicates the bleed area as specified by the designer.

NOTE 2 The ***TrimBox*** or ***BleedBox*** attributes, as defined in the *PPML Specification*, do not require content data to be clipped to those respective rectangles. Such clipping behaviour is left to the discretion of the PPML/VDX reader application and is not defined by this part of ISO 16612. This information is useful, for example, to a downstream imposition process that defines imposition layouts and sheet marks where the processor may decide to use the **BleedBox**

information as a specification of the maximum rectangular extent of the marked graphical content when placing a compound page on an imposition layout.

The ***Dimensions*** attribute of a **PAGE** element or **DOCUMENT** element shall not be defined.

The orientation of the compound page image, as specified in the PPML data, shall be considered to be in the final orientation of the finished page as intended by the originator and shall be consistent with the orientation of page mark placement.

6.9.6 SEGMENT_ARRAY element restrictions

SEGMENT_ARRAY and **SEGMENT_REF** elements shall not be used.

NOTE The **SEGMENT_ARRAY** element is defined in PPML to enable more efficient use of compound element data defined as multiple page PostScript files. Since this part of ISO 16612 does not allow the use of any file format other than PDF, and since PDF defines pages as independently addressable objects, the **SEGMENT_ARRAY** and **SEGMENT_REF** elements offer no advantage and are therefore not allowed.

6.9.7 OCCURRENCE element restrictions

Environment and ***Overwrite*** attributes of an **OCCURRENCE** element shall not be used.

The optional ***Scope*** attribute of an **OCCURRENCE** element shall not take a value of *"Global"*.

NOTE The *PPML Specification* implies that it is illegal to redefine an **OCCURRENCE** with the same ***Name*** if that name is currently in use by an **OCCURRENCE** that is in the current scope unless the value of its ***Scope*** attribute has a value of *"Global"*. Since the use of "Global" for the value of ***Scope*** is prohibited by this part of ISO 16612, it is illegal to define an **OCCURRENCE** with a ***Name*** attribute value already in use in the current scope regardless of whether or not the **OCCURRENCE**'s scope is explicitly promoted.

The optional **TICKET_STATE** sub-element of an **OCCURRENCE** element shall not be present.

6.9.8 OCCURRENCE_REF element restrictions

The ***Environment*** attribute of an **OCCURRENCE_REF** element shall not be defined.

NOTE Disallowing the ***Environment*** attribute here, as well as the restrictions defined in 6.9.7, means that a PPML/VDX instance cannot depend upon the existence of occurrences present in the receiver's environment. Therefore, a PPML/VDX reader is not required to store and serve up all globally scoped **OCCURRENCE** elements.

6.9.9 PPML production specification restrictions

PRINT_LAYOUT, **IMPOSITION**, and **IMPOSITION_REF** elements shall not be used.

NOTE This part of ISO 16612 does not support the definition of device-specific information.

6.9.10 PPML resource management element restrictions

The following elements shall not be present in the PPML data of a PPML/VDX instance:

— SUPPLIED_RESOURCES

— SUPPLIED_RESOURCE

— SUPPLIED_RESOURCE_REF

— REQUIRED_RESOURCES

6.9.11 DOCUMENT element restrictions

The ***DocumentCopies*** attribute in a **DOCUMENT** element shall be ignored if the number of copies requested for a document is specified by an external means (e.g. JDF job ticket).

6.10 Specifying print product intent specifications in the PPML/VDX layout file

This part of ISO 16612 makes provision for, but does not require, the specification of print product intent information. When included, it shall be defined using JDF data as defined in Annex B and associated with the PPML/VDX layout file as specified in Clause C.3.

The print product intent information defined in the **JDF** element shall be referenced from the PPML layout data by the **TICKET_REF** element defined in the PPML Specification. **TICKET_REF** elements shall not be defined within a PPML **PAGE, OBJECT**, **MARK**, **REUSABLE_OBJECT**, or **OCCURRENCE_LIST** element.

The **TICKET_SET** element shall not be used.

The value of the ***ExtIDRef*** attribute, if present, of the **TICKET_REF** element shall match the value of the ***UpdateID*** attribute of a product intent resource sub-element or partition sub-element of the resource sub-element of the **ResourcePool** sub-element of the **JDF** element.

A PPML **TICKET** element shall not be defined in the PPML layout data. The product intent data shall be inherited from an ancestor element unless a **TICKET_REF** is defined that overrides it by referencing product intent information of an equivalent type (e.g. Media, Layout, Folding, Binding).

NOTE 1 The PPML **TICKET** element is not required since the identification and location of the **JDF** element data, as well as the format of the referenced data, is defined by this part of ISO 16612.

NOTE 2 The type of product intent information referenced by a **TICKET_REF** sub-element is implicit in the product intent resource element of the **JDF** element to which it points.

EXAMPLE

```
<PPML …>
    <JOB …>
        <!- Specify binding style: ->
        <TICKET_REF ExtIDRef=”B0005”/>
        <!- Specify two sided layout: ->
        <TICKET_REF ExtIDRef=”L0003”/>
        <DOCUMENT …>
            <!- Specify media type for front side of the cover page:  ->
            <TICKET_REF ExtIDRef=”M0001”/>
            <PAGE…> … </PAGE>
            <!- Re-specify two sided layout to indicate printing on the ->
            <!- front side of the next finished page: ->
            <TICKET_REF ExtIDRef=”L0003”/>
            <!- Specify different media type for inside pages: ->
            <TICKET_REF ExtIDRef=”M0002”/>
            <PAGE…> … </PAGE>
            <PAGE…> … </PAGE>
            <PAGE…> … </PAGE>
            <!- Specify media type for back cover page:  ->
            <TICKET_REF ExtIDRef=”M0001”/>
            <PAGE…> … </PAGE>
            <PAGE…> … </PAGE>
        </DOCUMENT>
        …
    </JOB …>
<PPML>
```

NOTE 3 Refer to the example in Clause B.2 for the definition of the elements referenced by the **TICKET_REF** elements shown in the above example.

6.11 Compression

Data compression may be used as defined in the *PDF Reference* except for LZW compression, which shall not be used.

Lossless compression, as allowed by the *PDF Reference*, may be applied to the embedded **PPMLVDX** element data stream.

6.12 MD5 string encoding

The 128-bit value result of a message digest computation using the MD5 checksum algorithm shall be encoded as an ASCII string. This 128-bit value of the MD5 checksum is written as a sequence of 32 hexadecimal digits, where each digit is encoded as an ASCII character from the set ‘0’ to '9' and letters 'A' to 'F' and 'a' to 'f'. Leading zeros shall be included.

6.13 Encryption

If an encryption dictionary is present in the **Trailer** dictionary of a PPML/VDX layout or PPML/VDX content file, then the value of the ***Filter*** key of the encryption dictionary shall be the name *Standard.*

NOTE Although PPML/VDX-Relaxed permits the use of encryption, requiring a conforming reader to process individual passwords for multiple files comprising a PPML/VDX instance will have adverse affects on productivity. Worklfows need to be constructed to avoid such situations.

Annex A
(normative)

The ContentBindingTable element definition

A.1 General

The **ContentBindingTable** element, through the use of pre-flight tools, enables a receiving application to verify the integrity and completeness of an exchanged variable data job. These data may also be used in the determination of completeness of the colour specification.

Early binding, as used in this part of ISO 16612, refers to PPML layout data references to PPML/VDX content files that are established by the sender when the referenced file exists and may be verified prior to transfer. With early binding, it is also possible to define what is referred to in this document as a positive binding. A positive binding includes meta-information along with the file reference that describes characteristics unique to the referenced file, including a checksum of the file and a unique identifier published within it. Positive bindings allow the recipient of a multiple file PPML/VDX job to validate all file references and thus verify that all the files, as intended by the sender, have been transferred.

Late binding, as used in this part of ISO 16612, refers to PPML layout data references to PPML/VDX content files that are established by the sender when the referenced file does not exist and therefore may not be verified prior to transfer. Hence, characteristics of the referenced PDF file are not known to the sender so both the checksum of the file and its unique identifier are unknown and are not published with the file reference. Therefore, late bindings cannot be positively bound and verified by the receiver post exchange with information included in the exchanged PPML/VDX data. Use of late binding is useful in exchange workflows where there is a more formal and trusted working relationship between the data originator and print provider. This part of ISO 16612 does not define a mechanism for determining when a late-bound PPML/VDX instance is complete.

This Annex defines an XML sub-element of the **PPMLVDX** element defined in Annex C named **ContentBindingTable**. This element provides the additional meta-information about PPML/VDX content files referenced from the **EXTERNAL_DATA_ARRAY** elements of the PPML data that enables a verification process in both the sending and receiving environment to determine the validity of referenced data files. From these data, it can also be determined exactly which references are late bound so that the receiver is made aware that the integrity of the data may be suspect and depend on other information not included in the exchange.

In this way, this part of ISO 16612 provides a mechanism by which the integrity of a variable data print job comprised of multiple content files can be positively verified. Thus, the sender has the option of maintaining maximum control or some incremental level of control over the data of a given job, and the receiver can ascertain from the exchanged data the liability assumed in accepting the job.

A.2 ContentBindingTable element definition

The **ContentBindingTable** element shall contain a **Self** sub-element if PDF pages of the PPML/VDX layout file are referenced by the PPML layout data. The **Self** sub-element, if present, shall appear as the first sub-element in the **ContentBindingTable.**

The **Self** sub-elements shall have an ***Src*** attribute of type string, which shall have a value that is interpreted as a URI that identifies the PPML/VDX layout file that contains the **PPMLVDX** element containing the **ContentBindingTable** sub-element. The value of this ***Src*** attribute shall exactly match the URI value of any **EXTERNAL_DATA_ARRAY** element ***Src*** attribute intended to indicate reference to PDF pages used as compound element data defined in the PPML/VDX layout file.

NOTE 1 This URI is an unambiguous identifier of the PPML/VDX layout file that the receiver is able to use to resolve the PPML/VDX layout file that contains the **ContentBindingTable** that contains the referencing **Self** sub-element. Since this URI is actually self-referential to the containing PPML/VDX layout file, it is used as the means by which a PPML/VDX reader determines that the value of the ***Src*** attribute of an **EXTERNAL_DATA_ARRAY** refers to pages of the containing PPML/VDX layout file. This identification is valid even if the name of the PPML/VDX layout file is changed.

There shall be exactly one **Binding** sub-element defined within the **ContentBindingTable** element for every unique ***Src*** attribute value of the **EXTERNAL_DATA_ARRAY** elements defined in the PPML data that refer to PPML/VDX content files.

The **Self** sub-element may have an ***IntendedColor*** attribute of type Boolean which, if present, shall take a value of either *"true"* or *"false"*. If not present, the implied default value of this attribute shall be *"false"*. If a value of *"true"* is asserted, the PPML/VDX layout file identified by the **Self** element's ***Src*** attribute shall conform to either of the PDF/X-1a or PDF/X-3 International Standards. In files conforming to the PPML/VDX-Strict conformance level, the ***IntendedColor*** attribute shall be present with a value of *"true"*.

If the ***IntendedColor*** attribute of the **Self** sub-element has a value of *"true"* and the referenced PPML/VDX layout file does not conform to PDF/X-1a or PDF/X-3 then the value of the ***IntendedColor*** attribute is invalid.

If ***IntendedColor*** has a value of "*false*" then the receiver should make no assumptions about the condition of the colour data defined in that PPML/VDX layout file, and thus should not blindly accept the subjective quality of its data without some level of colour verification.

The **Binding** sub-element shall have an ***Src*** attribute of type string, which shall have a value that is interpreted as a Uniform Resource Identifier (URI) that identifies a PPML/VDX content file of the PPML/VDX instance. The value of this ***Src*** attribute shall exactly match the URI value of any **EXTERNAL_DATA_ARRAY** element ***Src*** attribute that refers to the same external PPML/VDX content file. This URI is an unambiguous identifier of a PPML/VDX file that the sender guarantees can be resolved by the receiver into a URL that references a specific PPML/VDX file instance. If the receiver cannot resolve a PPML/VDX content file then the URI is considered invalid.

NOTE 2 The URI value of the PPML **EXTERNAL_DATA_ARRAY** element's ***Src*** attribute is usable as a unique search key for identifying the corresponding **Binding** element stored in the **ContentBindingTable** element.

The **Binding** sub-element may have a ***LocalSrc*** attribute of type string. If present, ***LocalSrc*** shall have a value that is a Uniform Resource Locator (URL) that identifies a PPML/VDX content file of the PPML/VDX instance. The file name used shall match the name of the PPML/VDX content file shipped by the sender of the file set. If the ***LocalSrc*** attribute is present, the ***Src*** attribute shall not be used in identifying the PPML/VDX content file it references.

NOTE 3 The content binding table can be used to translate between the URI included in the PPML data itself (***Src***), and a URI for the actual file to be used (***LocalSrc***).

The **Binding** sub-element may have an ***IntendedColor*** attribute of type Boolean which, if present, shall take a value of either *"true"* or *"false"*. If not present, the implied default value of this attribute shall be *"false"*. If a value of *"true"* is asserted, the PPML/VDX layout file referenced by the **Binding** element shall conform to either of the PDF/X-1a or PDF/X-3 International Standards. In files conforming to the PPML/VDX-Strict conformance level the ***IntendedColor*** attribute shall be present with a value of *"true"*.

If the ***IntendedColor*** attribute of the **Binding** sub-element has a value of *"true"* and the referenced PPML/VDX content file does not conform to PDF/X-1a or PDF/X-3 then the value of the ***IntendedColor*** attribute is invalid.

If ***IntendedColor*** has a value of "*false*" then the receiver should make no assumptions about the condition of the colour data defined in that PPML/VDX content file, and should not blindly accept the subjective quality of its data without some level of colour verification.

The **Binding** sub-element may have a ***UniqueID*** attribute of type string. If present, the value of this attribute shall be a unique identifier that must be identical to the value of the changing unique identifier entry of the ***ID***

key defined in the referenced PPML/VDX content file's **trailer** dictionary as required in 6.6. This attribute is required in a PPML/VDX-Strict instance.

NOTE 4 This unique identifier is used as meta-information for establishing a verifiable, positive binding for the reference defined by the value of the ***Src*** attribute of the PPML **EXTERNAL_DATA_ARRAY** element and a PPML/VDX content file. When verified in pre-flight, it provides a receiver assurance that the PPML/VDX content file resolved from the URI reference is, in fact, the exact file intended by the sender. If the value of this ***UniqueID*** is not identical to that of the referenced PDF file then the binding is considered invalid.

The **Binding** sub-element may have a ***BaseID*** attribute of type string. If present, the value of this attribute shall be a unique identifier that must be identical to the value of the permanent unique identifier entry of the **ID** key defined in the referenced PPML/VDX content file's **trailer** dictionary as required by 6.6. One, but not both, of ***BaseID*** and ***UniqueID*** may be present in a **Binding** element. This attribute is prohibited in a PPML/VDX-Strict instance.

NOTE 5 In a multiple-exchange PPML/VDX-Relaxed instance the **ContentBindingTable** element can refer to files that are not already available to the receiver and indeed might not yet have been created. In such cases, it is acceptable for a **Binding** sub-element to not contain a ***UniqueID*** and/or ***BaseID*** attribute.

The **Binding** sub-element may have an ***MD5_Checksum*** attribute of type string. If present, the value of this attribute shall specify the checksum of the entire PPML/VDX content file referenced by the ***Src*** attribute as determined by the MD5 checksum algorithm. This checksum value shall be encoded as a hexadecimal ASCII string according to MD5 string encoding as described in 6.12. This attribute is required in a PPML/VDX-Strict instance.

NOTE 6 If the value of the ***MD5_Checksum*** attribute does not match the checksum of the entire referenced file recomputed by the receiver of the referenced data, the referenced PPML/VDX content file is considered invalid.

NOTE 7 The ***MD5_Checksum*** attribute of the **Binding** element is optional. As with the ***UniqueID*** attribute, when not defined, it is assumed that the **Binding** element and the value of its ***Src*** attribute is a *late binding* definition.

The ***Src*** attribute of the **Self** sub-element and the ***Src*** attribute of all **Binding** sub-elements in a **ContentBindingTable** element shall have unique values.

EXAMPLE 1 The following example shows a **ContentBindingTable** intended to conform to PPML/VDX-Strict where positive binding is asserted with both MD5_Checksum and UniqueID attributes being specified, and ***IntendedColor*** being asserted.

```
<ContentBindingTable>
    <Self Src="http://jobserver/job032.vdx" IntendedColor="true"/>
    <Binding Src="http://contentserver/promo02cntnt.pdf" IntendedColor="true"
        UniqueID="5f6e34890357c13741a6253489193486"
        MD5_Checksum=" f67531a623e37848954c654013941938"/>
    <Binding Src="http://contentserver/background01.pdf" IntendedColor="true"
        UniqueID="890357c13741a62534891934865f6e34"
        MD5_Checksum="53489857c65f689013741a623e341934"/>
    <Binding Src="http://contentserver/stockimages31.pdf" IntendedColor="true"
        UniqueID="4865890357c1374193f6e3a625348914"
        MD5_Checksum="623e341934897c65f67534541a013898"/>
</ContentBindingTable>
```

EXAMPLE 2 The following example shows a **ContentBindingTable** intended to conform to PPML/VDX-Relaxed where positive binding is not asserted for all **Binding** sub-elements and the ***IntendedColor*** attribute is not asserted in all **Binding** sub-elements.

```
<ContentBindingTable>
    <Self Src="http://jobserver/job038.vdx"/>
    <Binding Src="http://contentserver/promo05cntnt.pdf"
        UniqueID="5f6e34890357c13741a6253489193486"
        MD5_Checksum="f67531a623e37848954c654013941938"/>
    <Binding Src="http://contentserver/background01.pdf" IntendedColor="true"
        UniqueID="890357c13741a62534891934865f6e34"
        MD5_Checksum="53489857c65f689013741a623e341934"/>
    <Binding Src="http://contentserver/stockimages31.pdf"
        UniqueID="4865890357c1374193f6e3a625348914"
        MD5_Checksum="623e341934897c65f67534541a013898"/>
</ContentBindingTable>
```

EXAMPLE 3 The following example shows a **ContentBindingTable** intended to conform to PPML/VDX-Relaxed with use of the ***LocalSrc*** and ***BaseID*** attributes of the **Binding** sub-element.

```
<ContentBindingTable>
    <Self Src="http://jobserver/job038.vdx"/>
    <Binding Src="http://contentserver/promo05cntnt.pdf"
        LocalSrc="http://mycontentserver/promo05cntnt.pdf"
        BaseID="13741a62534898890357c65f6e341934"/>
    <Binding Src="http://contentserver/background01.pdf" IntendedColor="true"
        LocalSrc="http://mycontentserver/background01.pdf"
        UniqueID="890357c13741a62534891934865f6e34"
        MD5_Checksum="53489857c65f689013741a623e341934"/>
    <Binding Src="http://jobserver/stockimages31.pdf"
        LocalSrc="http://mycontentserver/stockimages31.pdf"
        UniqueID="4865890357c1374193f6e3a625348914"
        MD5_Checksum="623e341934897c65f67534541a013898"/>
</ContentBindingTable>
```

Annex B
(normative)

Specifying print product intent in PPML

B.1 General

This annex defines the syntax and semantics for expressing print product intent information in this part of ISO 16612. The method of binding this print product intent information to the instance document and compound page definitions defined by the PPML layout data is defined in 6.10.

Print product intent, as it is referred to in this document, is information that describes the characteristics of finished print products that are the output of a manufacturing process that takes a PPML/VDX instance as input. All product intent characteristics defined by this part of ISO 16612 are intended to be independent of any particular process or device used in the manufacture of the print products described by them.

Product intent data can provide the recipient of a PPML/VDX job with sufficient information for understanding the characteristics and design of the finished print products as intended by the sender. This includes information such as media type, binding style and folding instructions.

The syntax and semantics used in this document for expressing print product intent require the use of the Job Definition Format as defined in the *JDF Specification* 1.2, 2004. More specifically, it defines a restricted subset and usage of the elements specified in the *JDF Specification*, allowing only the syntax and semantics of JDF that relate to the definition of a JDF product node that can only include print product intent resources. Refer to the *JDF Specification* for more information on the definition of a JDF product node.

This part of ISO 16612 also defines methods of extending JDF to allow for user-defined print product intent data. This is useful when intent semantics not natively defined in the *JDF Specification* are required for defining a particular job. Whereas exclusive use of the JDF product intent semantics specified by this part of ISO 16612 provides an interoperable description of print product characteristics, the use of user-defined, private print product intent semantics does not. Use-defined print product intent syntax always requires formal agreement between the sending and receiving parties as to their meaning.

As stated in Clause 5, user-defined print product intent syntax is prohibited from use in PPML/VDX jobs intended to conform to the PPML/VDX-Strict conformance level, and shall only be allowed in jobs conforming to the PPML/VDX-Relaxed conformance level.

B.2 Use of JDF for specifying print product intent information

This clause defines the use of JDF elements, as defined by the *JDF Specification*, for specifying print product intent information in this part of ISO 16612. More specifically, it defines the subset of JDF elements and attributes of those elements that a conforming PPML/VDX reader is required to validate and appropriately process.

Exactly one **JDF** element may be defined and used in the context of a single PPML/VDX instance and shall be included as part of a PPML/VDX job by the methods set out in Clause B.3 and Clause B.4 (as shown in the example below).

The required ***Type*** attribute of the **JDF** element shall be set to the ASCII string value of *"Product"* to identify it as a JDF product intent type node (as shown in the example below).

The required ***Status*** attribute of the **JDF** element shall be set to an ASCII string value of *"Ready"* (as shown in the example below).

The **JDF** element shall contain a **ResourcePool** sub-element and a **ResourceLinkPool** sub-element as defined in the *JDF Specification.*

A conforming PPML/VDX reader may ignore any sub-elements of the **JDF** element other than the **ResourcePool** sub-element.

A conforming PPML/VDX reader shall validate and appropriately process all **BindingIntent**, **FoldingIntent**, **LayoutIntent**, and **MediaIntent** sub-elements that occur in the **ResourcePool** sub-element.

For PPML/VDX-Strict, the **ResourcePool** element shall only contain **BindingIntent**, **FoldingIntent**, **LayoutIntent**, and **MediaIntent** sub-elements that are referenced from **TICKET_REF** elements defined in the PPML data. See 6.10 for a description of how the PPML **TICKET_REF** element is used in this part of ISO 16612. For PPML/VDX-Relaxed, other JDF product intent elements, as well as user-defined print product intent sub-elements, may also be defined in the **ResourcePool** element and referenced from the PPML data (refer to Clause B.4 for a description of how to specify user defined print product intent information).

The ***UpdateID*** attribute of **BindingIntent**, **FoldingIntent**, **LayoutIntent**, **MediaIntent** and user-defined print product intent sub-elements of the **ResourcePool** element shall have unique values in accordance with the *JDF Specification*, within the context of the same PPML/VDX instance.

NOTE 1 The ***UpdateID*** attribute's value is used to identify an intent resource element or a partition of an intent resource element for the reference defined in the PPML layout data. For more information on binding print product intent information to layout data refer to 6.10.

The ***Class*** attribute of **BindingIntent**, **FoldingIntent**, **LayoutIntent**, **MediaIntent** and user defined print product intent sub-elements of the **ResourcePool** element shall have a value of *"Intent"*.

The ***Dimensions***, ***FinishedDimensions***, ***FinishedPageOrientation, FolioCount, NumberUp, Pages, PageVariance*** attributes, and **Layout** sub-element of the **LayoutIntent** resource element, shall not be specified. Conforming PPML/VDX readers shall derive a default value for this attribute from the aspect ratio of the **TRIM_BOX** sub-element of the PPML **PAGE_DESIGN** element.

NOTE 2 Refer to the *JDF Specification* for a detailed explanation of the syntax and semantics of the JDF resource elements used in the following example.

EXAMPLE

```
<JDF ID="JT0001" Type="Product" Status="Ready"
    DescriptiveName="First part of the ACME VDP job">
    <Comment> A freeform text comment </Comment>
    <ResourcePool>
        <MediaIntent Status="Available" ID="Medias" Class="Intent"
            UpdateID="M0000" PartIDKeys="Option">
            <Texture DataType="EnumerationSpan" Preferred="Smooth"/>
            <StockType DataType="NameSpan" Preferred="Bond"/>
            <MediaColor DataType="EnumerationSpan" Preferred="White"/>
            <Grade DataType="IntegerSpan" Range="3 4 5" Preferred="5"/>
            <MediaIntent Option="Media1" UpdateID="M0001">
                <FrontCoatings DataType="EnumerationSpan" Preferred="Glossy"/>
                <StockType DataType="NameSpan" Preferred="Cover"/>
                <Texture DataType="NameSpan" Preferred="Calendared"/>
            </MediaIntent>
            <MediaIntent Option="Media2" UpdateID="M0002">
                <BackCoatings DataType="EnumerationSpan" Preferred="Glossy"/>
                <StockType DataType="NameSpan" Preferred="Cover"/>
            </MediaIntent>
            <MediaIntent Option="Media3" UpdateID="M0003">
                <MediaColor DataType="EnumerationSpan" Preferred="Blue"/>
            </MediaIntent>
        </MediaIntent>
        <LayoutIntent ID="TwoSidedLongEdge" UpdateID="L0003" Class="Intent"
            Sides="TwoSidedHeadToHead" Status="Available"/>
        <BindingIntent Status="Available" ID="Bindings" Class="Intent"
            UpdateID="B0003" PartIDKeys="Option">
            <BindingType DataType="EnumerationSpan" Preferred="SaddleStitch"/>
            <SaddleStitching>
                <StitchNumber DataType="IntegerSpan" Range="2 3" Preferred="3"/>
            </SaddleStitching>
            <BindingIntent Option="Bind1" UpdateID="B0004">
                <BindingType DataType="EnumerationSpan" Preferred="CoilBinding"/>
                <CoilBinding>
                    <CoilMaterial Preferred="Steel"/>
                </CoilBinding>
            </BindingIntent>
            <BindingIntent Option="Bind2" UpdateID="B0005">
                <BindingType DataType="EnumerationSpan" Preferred="PlasticComb"/>
                <PlasticCombBinding>
                    PlasticCombType Preferred="USA1"/>
                </PlasticCombBinding>
            </BindingIntent>
        </BindingIntent>
    </ResourcePool>
    <ResourceLinkPool>
        <MediaIntentLink rRef="Medias" Usage="Input"/>
        <LayoutIntentLink rRef="L0003" Usage="Input"/>
        <BindingIntentLink rRef="Bindings" Usage="Input"/>
    </ResourceLinkPool>
</JDF>
```

B.3 Scope of referenced print product intent information

The result of **BindingIntent**, **FoldingIntent**, **LayoutIntent**, and user-defined product intents are applied to a collection of pages rather than a single page. This collection of pages is referred to as the scope of the product intent and is defined as the scope of the **TICKET_REF** element in the *PPML Specification*.

If a PPML **PAGE** is outside the scope of all instances of a particular product intent type, a PPML/VDX-compliant reader may apply local defaults.

NOTE 1 To guarantee predictable printing results, it is suggested that the sender of a PPML/VDX instance ensure that all PPML **PAGE** elements are within the scope of an appropriate set of product intents.

Any reference to a particular intent resource type overrides the previous definition of the intent resource of the same type and does not affect other intent types.

The next PPML **PAGE** defined immediately after a **LayoutIntent, MediaIntent**, **FoldingIntent**, or **BindingIntent** element goes in or out of scope shall be printed on the front of a new finished page, regardless of whether or not the new in-scope intent differs from its previous setting.

NOTE 2 To define a finished page with a blank front side and printed back side, it is necessary to specify a two sided printing context with a reference to a **LayoutIntent** that starts a new finished page followed by a **PAGE** element for the front side and another for the back side of the finished page. The **PAGE** element that maps to the front side would need to be blank where it has no **MARK** sub-elements defined within it.

B.4 Specifying user defined print product intent information

JDF has a provision that uses the XML name space extension mechanism to allow for private extension of JDF data. Refer to the *JDF Specification* for information on how JDF syntax and semantics can be extended. In particular, the XML namespace mechanism shall be used in this document to extend the predefined JDF intent resource elements used in Clause D.2. The XML namespace extension mechanism shall also be used to add user-defined resource intent elements not already defined in the *JDF Specification*.

However, this part of ISO 16612 strongly recommends limited use of private namespace extensions to JDF where such extensions should be limited to defining product intent semantics not already provided by JDF. It is important to point out that print product intent data defined by private extensions to JDF and referenced from the PPML data is not guaranteed to be portable across reader applications that conform to this International Standard, and shall not be allowed in data intended to conform to the PPML/VDX-Strict conformance level.

All private, user-defined print product intent resource sub-elements referenced from the PPML data shall be defined in the **ResourcePool** sub-element of the **JDF** element.

All private, user-defined resource sub-elements shall have a ***Class*** attribute that shall have an XML type and semantic definition equivalent to that of the ***Class*** attribute of the intent resource elements defined in the *JDF Specification* and shall have a string value of *"Intent"* that identifies it as a resource intent element.

All private, user-defined resource sub-elements shall have an ***ID*** attribute that shall have an XML type and semantic definition equivalent to that of the ***ID*** attribute of the intent resource elements defined in the *JDF Specification*.

NOTE Refer to the *JDF Specification* for a detailed explanation of the syntax and semantics of the JDF resource elements used in the following example.

EXAMPLE

```
<JDF xmlns="http://www.CIP4.org/JDFSchema_1" xmlns:extension="extensionschema URI"
        ID="JT0001" Type="Product" Status="Ready"
        DescriptiveName="First part of the ACME VDP job">
        <Comment> A freeform text comment </Comment>
        <ResourcePool>
            <MediaIntent Status="Available" ID="Medias" Class="Intent" UpdateID="M0000"
                PartIDKeys="Option">
                <Texture Preferred="Smooth"/>
                <StockType Preferred="Bond"/>
                <MediaColor Preferred="White"/>
                <Grade Range="3 4 5" Preferred="5" />
                <MediaIntent Option="M1" UpdateID="M0001" Class="Intent"
                    extension:Brand="Eastern Mills">
                    <FrontCoatings Preferred="Glossy"/>
                    <StockType Preferred="Cover"/>
                    <Texture Preferred="Calendared"/>
                </MediaIntent>
                <MediaIntent Option="M2" UpdateID="M0002" Class="Intent"
                    extension:Brand="Eastern Mills"/>
                    <Grade Preferred="5"/>
                    <StockType Preferred="Bond"/>
                    <Texture Preferred="Smooth"/>
                </MediaIntent>
            </MediaIntent>
            <LayoutIntent ID ="L0003" Class="Intent" Sides="TwoSidedHeadToHead"/>
            <BindingIntent Status="Available" ID="Bindings"
                UpdateID="DefaultBinding" Class="Intent"
                PartIDKeys="Option"/>
                <BindingIntent UpdateID="CoilBindSteel" Option="B001">
                    <BindingType Preferred="CoilBinding"/>
                    <CoilBinding> <CoilMaterial Preferred="Steel"/> </CoilBinding>
                </BindingIntent>
                <BindingIntent UpdateID="NailBind" Option="B002">
                    <BindingType Preferred="extension:NailBinding"/>
                    <extension:NailBinding Material="Iron" Size="3" Unit="Inch"/>
                </BindingIntent>
            </BindingIntent>
            <extension:SpecialIntent ID="SI001" UpdateID="DocTypeManual" Class="Intent"
                Usage="Manual"/>
        </ResourcePool>
        <ResourceLinkPool> . . .
        </ResourceLinkPool>
</JDF>
...
```

Annex C
(normative)

The PPMLVDX element definition

C.1 General

All XML data embedded within the PPML/VDX layout file by the method set out in 6.8 is required to be contained within, or referenced from, sub-elements of the **PPMLVDX** element defined in this annex. The **PPMLVDX** element is a hierarchical structure that contains the sub-elements **ContentBindingTable**, **ProductIntent**, and **Layout**. The **PPMLVDX** element is used to aggregate the various XML data components of the PPML/VDX layout file that define the content file binding, print product intent, and layout data of a PPML/VDX instance.

The **ContentBindingTable** sub-element provides meta-information about referenced files useful for defining verifiable references (as defined in Annex A).

The **ProductIntent** sub-element can contain either a **JDF** sub-element that defines the print product intent resources (as defined in Annex B), or a **JDFRef** sub-element that defines a reference to an external XML data file that contains such a **JDF** element.

The **Layout** element may contain either a **PPML** element that defines the instance documents and their compound pages (as defined in the *PPML Specification* and restricted in Clause 6), or a **PPMLRef** element that defines a reference to an external XML data file that contains such a **PPML** element.

C.2 PPMLVDX element definition

The **PPMLVDX** element shall contain exactly one **ContentBindingTable** sub-element that conforms to the restrictions defined in Annex A. This sub-element shall occur as the first sub-element of the **PPMLVDX** element.

The **PPMLVDX** element may contain exactly one **ProductIntent** sub-element. If specified, this sub-element shall occur following the definition of the **ContentBindingTable** sub-element.

The **PPMLVDX** element shall contain exactly one **Layout** sub-element. If the **ProductIntent** sub-element is specified, this sub-element shall occur following the definition of the **ProductIntent** sub-element; otherwise, it shall occur after the **ContentBindingTable** sub-element.

EXAMPLE

```
<PPMLVDX>
    <ContentBindingTable> … </ContentBindingTable>
    <ProductIntent> … </ProductIntent>
    <Layout> … </Layout>
</PPMLVDX>
```

C.3 ProductIntent sub-element definition

The **ProductIntent** sub-element, if present, shall contain either a single **JDF** sub-element that conforms to the *JDF Specification* and the restrictions set out in Annex B, or shall contain a single **JDFRef** sub-element. In files conforming to the PPML/VDX-Strict conformance level, the **JDFRef** sub-element shall not be used.

EXAMPLE 1

```
<PPMLVDX>
    <ContentBindingTable> … </ContentBindingTable>
    <ProductIntent>
        <JDF…> … </JDF>
    </ProductIntent>

    <Layout> … </Layout>
</PPMLVDX>
```

The **JDFRef** sub-element shall have an ***Src*** attribute of type string, which shall have a value that is interpreted as a Uniform Resource Identifier (URI) that identifies an XML file containing a **JDF** element that conforms to the requirements set out in Clause C.4. This URI is an unambiguous identifier of an XML resource that the sender guarantees can be resolved by the receiver into a URL that references a specific XML file instance that contains a JDF element that conforms to this part of ISO 16612. If the receiver cannot resolve an XML file containing a JDF element, then the URI is considered invalid.

The **JDFRef** sub-element may have a ***LocalSrc*** attribute of type string. If present, ***LocalSrc*** shall have a value that is a Uniform Resource Locator (URL) that identifies the XML file containing the JDF element of the PPML/VDX instance. The file name used shall match the name of the XML file shipped by the sender of the file set.

If the ***LocalSrc*** attribute is present, the ***Src*** attribute shall not be used in identifying the XML file containing the JDF element.

The **JDFRef** sub-element shall have a ***UniqueID*** attribute of type string. The value of this attribute shall be a unique identifier that must be identical to the value of the ***ID*** attribute of the **JDF** element defined in the XML file referenced by the ***Src*** attribute.

The **JDFRef** sub-element shall have an ***MD5_Checksum*** attribute of type string. The value of this attribute shall specify the checksum of the entire XML file referenced by the ***Src*** attribute as determined by the MD5 checksum algorithm. This checksum value shall be encoded as a hexadecimal ASCII string according to MD5 string encoding as described in 6.12.

NOTE If the value of the ***MD5_Checksum*** attribute does not match the checksum of the referenced file recomputed by the receiver of the referenced data, the referenced XML file is considered invalid. In some situations, line end conversions may be applied to the XML data by the transmission mechanism in use. The reading application may wish to attempt to undo possible line end conversions applied to the JDF during transmission. If such a process results in a file for which the checksum now matches, then it may be assumed that the file has been appropriately repaired. It is suggested that binary transport protocols be used when transporting the data.

EXAMPLE 2

```
<PPMLVDX>
    <ContentBindingTable> … </ContentBindingTable>
    <ProductIntent>
        <JDFRef Src="http://vdxjobserver/vdxjobs/myvdxjobproductintent.jdf"
            UniqueID="233875395" MD5_Checksum="341456541a8901cf67898573623e3934"/>
    </ProductIntent>
    <Layout> … </Layout>
</PPMLVDX>
```

C.4 External JDF data file

Use of the **JDFRef** element as defined in Clause C.3 provides a reference to a separate XML data file containing a **JDF** element that would otherwise be stored in the PPML/VDX layout file.

The XML file referenced by the **JDFRef** element shall contain exactly one **JDF** element that conforms to the *JDF Specification* and the restrictions specified in Annex B.

The XML file referenced by the **JDFRef** element should use the file extension *.jdf*.

EXAMPLE `MyProductIntentData.jdf`

C.5 Layout sub-element definition

The **Layout** sub-element shall contain exactly one **PPML** sub-element that conforms to the *PPML Specification* and the restrictions specified in 6.9, or shall contain a single **PPMLRef** sub-element. In files conforming to the PPML/VDX-Strict conformance level, the **PPML** sub-element shall be used.

EXAMPLE 1

```
<PPMLVDX>
    <ContentBindingTable> … </ContentBindingTable>
    <ProductIntent>
        <JDFRef Src="http://vdxjobserver/vdxjobs/myvdxjobproductintent.jdf"
            UniqueID="233875395" MD5_Checksum="cf67898573456541a623e34189019343"/>
    </ProductIntent>
    <Layout>
        <PPML> … </PPML>
    </Layout>
</PPMLVDX>
```

The **PPMLRef** sub-element shall have an ***Src*** attribute of type string, which shall have a value that is interpreted as a Uniform Resource Identifier (URI) that identifies an XML file containing a **PPML** element that conforms to the requirements set out in C.6. This URI is an unambiguous identifier of an XML resource that the sender guarantees can be resolved by the receiver into a URL that references a specific XML file instance that contains a **PPML** element that conforms to this part of ISO 16612. If the receiver cannot resolve an XML file containing a **PPML** element then the URI is considered invalid.

The **PPMLRef** sub-element may have a ***LocalSrc*** attribute of type string. If present, ***LocalSrc*** shall have a value that is a Uniform Resource Locator (URL) that identifies the XML file containing the **PPML** element of the PPML/VDX instance. The file name used shall match the name of the XML file shipped by the sender of the file set.

If the ***LocalSrc*** attribute is present, the ***Src*** attribute shall not be used in identifying the XML file containing the **JDF** element.

The **PPMLRef** sub-element shall have a ***UniqueID*** attribute of type string. The value of this attribute shall be a unique identifier that shall be identical to the value of the ***Label*** attribute of the **PPML** element defined in the XML file referenced by the ***Src*** attribute. Refer to 6.9.2 for the definition of restrictions placed on the ***Label*** attribute of the **PPML** element.

The **PPMLRef** sub-element shall have an ***MD5_Checksum*** attribute of type string. The value of this attribute shall specify the checksum of the entire XML file referenced by the ***Src*** attribute as determined by the MD5 checksum algorithm. This checksum value shall be encoded as a hexadecimal ASCII string according to MD5 string encoding as described in 6.12.

NOTE If the value of the ***MD5_Checksum*** attribute does not match the checksum of the referenced file recomputed by the receiver of the referenced data, the referenced XML file is considered invalid.

EXAMPLE 2

```
<PPMLVDX>
    <ContentBindingTable> … </ContentBindingTable>
    <ProductIntent>
        <JDFRef Src="http://vdxjobserver/vdxjobs/myvdxjobproductintent.jdf"
            UniqueID="233875395" MD5_Checksum="7c65f67534898541a623e34193489013"/>
    </ProductIntent>
    <Layout>
        <PPMLRef Src="http://vdxjobserver/vdxjobs/myvdxjoblayout.ppml"
            UniqueID="875323935" MD5_Checksum="54623f675e341718ac65349801934893"/>
    </Layout>
</PPMLVDX>
```

C.6 External PPML data file

Use of the **PPMLRef** element as defined in Clause C.3 provides a reference to a separate XML data file containing a **PPML** element that would otherwise be stored in the PPML/VDX layout file.

The XML file referenced by the **PPMLRef** element shall contain exactly one **PPML** element that conforms to the *PPML Specification* and the restrictions set out in 6.9.

The XML file referenced by the **PPMLRef** element should use the file extension *.ppml*.

EXAMPLE `MyLayoutData.ppml`

Annex D
(informative)

PPML/VDX notes

D.1 General

A set of application notes relating to the use of PPML/VDX may be found at the web site http://www.npes.org/standards/tools.html.

This part of ISO 16612 defines two conformance levels as defined in Clause 5. They are identified as PPML/VDX-Strict and PPML/VDX-Relaxed. These two conformance levels allow a trade-off to be made between maximizing data integrity in an exchange (use of PPML/VDX-Strict) and enabling a more flexible integrated production workflow (use of PPML/VDX-Relaxed). A summary of the primary differences between these two conformance levels is provided in Clause D.2.

This part of ISO 16612 is suitable for various modes of exchange of variable data including single file single transfer, multiple file single transfer, and multiple file multiple transfer. Both PPML/VDX-Strict and PPML/VDX-Relaxed accommodate these three modes of exchange. Clauses D.3 and D.4 describe how the **ContentBindingTable** (defined in Annex A) should be inspected to determine whether a PPML/VDX instance is defined as a single or multiple file instance. The means to identify late binding references to content data is described in D.5.

The multiple file form of PPML/VDX allows the data of a job to be organized in many ways. Clause D.6 offers one approach to organizing variable and re-used content data are among the various files of a PPML/VDX instance.

D.2 Summary of differences between PPML/VDX-Strict and PPML/VDX-Relaxed

Table D.1 shows the differences between PPML/VDX-Strict and PPML/VDX-Relaxed instances.

Table D.1 — Comparison between PPML/VDX-Strict and PPML/VDX-Relaxed instances

Provision	Allowed in PPML/VDX-Strict	Allowed in PPML/VDX-Relaxed
Permits use of PDF data other then that which conforms to PDF/X-1a or PDF/X-3	No	Yes
Permits one or more PPML/VDX content files per PPML/VDX instance	Yes	Yes
Permits ***IntendedColor*** attributes of **Self** and **Binding** elements to have a value of "*false*"	No	Yes
Permits the ***UniqueID*** attribute of **Binding** elements to be left undefined	No	Yes
Permits the ***MD5_Checksum*** attribute of **Binding** elements to be left undefined	No	Yes
Permits the ***LocalSrc*** attribute of the **Binding** element to be used	No	Yes
Permits the ***BaseID*** attribute of the **Binding** element to be used	No	Yes
Permits late binding to **PPML/VDX** content files	No	Yes
Permits JDF data, if supplied, to be stored external to the PPML/VDX layout file	No	Yes
Permits PPML data to be stored external to the PPML/VDX layout file	No	Yes
Permits font data to be stored external to PDF data files	No	Yes
Permits use of JDF product intents other than **BindingIntent**, **FoldingIntent**, **LayoutIntent**, and **MediaIntent**.	No	Yes
Permits use of user defined extensions to product intent information	No	Yes

D.3 Identifying a single file PPML/VDX instance

A single file representation of a PPML/VDX instance is a PPML/VDX layout file distinguished by all of the following characteristics:

1) the presence of a **PPML** sub-element within the **Layout** sub-element of the **ContentBindingTable** element;

2) the presence of a **JDF** sub-element in the **ProductIntent** sub-element of the **ContentBindingTable** element, if this optional **ProductIntent** sub-element is present;

3) the absence of any **Binding** sub-elements in the **ContentBindingTable** element.

EXAMPLE

```
<PPMLVDX>
    <ContentBindingTable>
        <Self Src="http://www.mycontent.com/PPMLX_JOB001.vdx" IntendedColor="true"/>
    </ContentBindingTable>
    <ProductIntent>
        <JDF…> … </JDF>
    </ProductIntent>
    <Layout>
        <PPML…> … </PPML>
    </Layout>
</PPMLVDX>
```

D.4 Identifying a multiple file PPML/VDX instance

A multiple file PPML/VDX instance can be distinguished by its PPML/VDX layout file having at least one of the following:

1) the presence of a **PPMLRef** sub-element within the **Layout** sub-element of the **ContentBindingTable** element;

2) the presence of a **JDFRef** sub-element in the **ProductIntent** sub-element of the **ContentBindingTable** element, if this optional **ProductIntent** sub-element is present;

3) the presence of one or more **Binding** sub-elements in the **ContentBindingTable** element.

EXAMPLE

```
<PPMLVDX>
    <ContentBindingTable>
        <Self Src="http://www.mycontent.com/PPMLX_JOB001.vdx" IntendedColor="true"/>
        <Binding Src="http://www.mycontent.com/red_car.pdf" IntendedColor="true"
            UniqueID="5401394193f67531a623e37848954c68"
            MD5_Checksum="623e341934897c65f67534541a013898"/>
        <Binding Src="http://www.mycontent.com/blue_car.pdf" IntendedColor="true"
            UniqueID="a623e37f67531848954c941938654013"
            MD5_Checksum="97cf623e34165913893541a486708534"/>
    </ContentBindingTable>
    <ProductIntent>
        <JDFRef Src="http://vdxjobserver/vdxjobs/myvdxjobproductintent.jdf"
            UniqueID="233875395"
            MD5_Checksum="7c65f67534898541a623e34193489013"/>
    </ProductIntent>
    <Layout>
        <PPMLRef Src="http://vdxjobserver/vdxjobs/myvdxjoblayout.ppml"
            UniqueID="875323935" MD5_Checksum="54623f675e341718ac65349801934893"/>
    </Layout>
</PPMLVDX>
```

D.5 Identifying a multiple file PPML/VDX instance with late binding references to content data

A multiple file PPML/VDX instance containing late binding references can be recognized by some or all **Binding** sub-elements of the **ContentBindingTable** element not having a ***UniqueID*** or ***MD5_Checksum*** attribute.

EXAMPLE

```
<ContentBindingTable>
    <Self "Src=http://www.mycontent.com/PPMLX_JOB001.vdx" IntendedColor="true"/>
    <Binding Src="http://www.mycontent.com/orange_car.pdf"/>
    <Binding Src="http://www.mycontent.com/blue_car.pdf" IntendedColor="true"
        UniqueID="a623e37f67531848954c941938654013"
        MD5_Checksum="718ac653543f6734248089315e361949"/>
</ContentBindingTable>
```

D.6 PPML/VDX instance architectures

It is expected that many PPML/VDX instances comprising multiple files will be constructed by dividing content into sets that might be derived from different sources, proofed differently, or used in different ways within the file. Different uses might be as a constant background to pages, as alternatives used in different marks referenced from different PPML documents, or as single-use items.

As an example, a flyer for new car sales might be constructed with a constant page background in one PPML/VDX content file, a set of dealer details in a second, images of various cars in a third, and the PPML and single-use customer data in the PPML/VDX layout file.

Such jobs are often repeated using different customer data. In such cases the same content files for re-usable items may be used. If they are not re-sent with the new layout file in a single file set, this becomes part of a Relaxed exchange, and it is recommended that the **ContentBindingTable** of the layout file include the ***MD5_Checksum, BaseID,*** and/or ***UniqueID*** attributes in all **Binding** elements referring to these re-used content files.

Annex E
(informative)

PPML feature summary

E.1 General

Table E.1 lists those PPML elements, and attributes within those objects, where the PPML layout data of PPML/VDX file conforming to this part of ISO 16612 vary from those of the *PPML Specification*. Each record in the table notes the status of the element or attribute, and the section of this document where the status is defined. Statuses used are:

Required — A conforming PPML/VDX instance's PPML layout data shall contain this element or attribute or attribute value.

Prohibited — A conforming PPML/VDX instance's PPML layout data shall not contain this element or attribute or attribute value.

Restricted — Certain values or combinations of values with contents are required or prohibited. See the section(s) referenced for full details.

The PPML layout data of a conforming PPML/VDX file also conforms to the *PPML Specification* identified in Clause 5; i.e. it includes all elements, attributes and values noted as required in that functional specification, and may not contain elements, attributes or values which are prohibited or restricted by this part of ISO 16612, singly or in combination.

Table E.1 — PPML elements for which the PPML layout data, as restricted by this part of ISO 16612,varies from the *PPML Specification*

Elements	Attribute	Status	References
CELL		Prohibited	6.9.9
CONFORMANCE		Required	6.9.1
CONFORMANCE	***Subset***	Restricted	6.9.1
DOCUMENT	***Dimensions***	Prohibited	6.9.5
DOCUMENT_SET		Prohibited	6.9.2
EXTERNAL_DATA		Prohibited	6.9.3
EXTERNAL_DATA_ARRAY		Required	6.9.3
EXTERNAL_DATA_ARRAY	***Index***	Restricted	6.9.4
EXTERNAL_DATA_ARRAY	***Src***	Restricted	6.9.4
HOR_FOLD_MARKS		Prohibited	6.9.9
HOR_GUTTER		Prohibited	6.9.9
HOR_TRIM_MARKS		Prohibited	6.9.9
IMPOSITION		Prohibited	6.9.9
IMPOSITION_REF		Prohibited	6.9.9
INTERNAL_DATA		Prohibited	6.9.3
OCCURRENCE	***Environment***	Prohibited	6.9.7

Table E.1 (*continued*)

Elements	Attribute	Status	References
OCCURRENCE	***Scope***	Restricted	6.9.7
OCCURRENCE	***Overwrite***	Prohibited	6.9.7
OCCURRENCE_REF	***Environment***	Prohibited	6.9.8
PAGE_DESIGN		Required	6.9.5
PAGE_LAYOUT		Prohibited	6.9.9
PPML		Restricted	6.9.2
PPML	***Label***	Restricted	6.9.2
PRINT_LAYOUT		Prohibited	6.9.9
REPEAT		Prohibited	6.9.9
REQUIRED_RESOURCES		Prohibited	6.9.10
SEGMENT_ARRAY		Prohibited	6.9.6
SEGMENT_REF		Prohibited	6.9.6
SHEET_LAYOUT		Prohibited	6.9.9
SHEET_MARK		Prohibited	6.9.9
TICKET_SET		Prohibited	6.10
TICKET_STATE		Prohibited	6.9.7
SIGNATURE		Prohibited	6.9.9
SOURCE	***Format***	Restricted	6.9.3
SUPPLIED_RESOURCE		Prohibited	6.9.10
SUPPLIED_RESOURCE_REF		Prohibited	6.9.10
SUPPLIED_RESOURCES		Prohibited	6.9.10
TICKET		Prohibited	6.9.2
TICKET_REF		Restricted	6.10
VER_FOLD_MARKS		Prohibited	6.9.9
VER_GUTTER		Prohibited	6.9.9
VER_TRIM_MARKS		Prohibited	6.9.9

Annex F
(informative)

Patents

The Technical Committee is not aware of any patented technology that must be used for compliance with the requirements of this part of ISO 16612. However, during the development of the predecessor to this part of ISO 16612, ANSI CGATS.20:2002, CGATS was alerted that there are existing patents, both approved and pending, in areas that may have application to some implementations of that ANSI standard. A list of the patents identified to ANSI CGATS is provided below for information only. The holders of these patents have indicated their willingness to license these patents on a reasonable and non-discriminatory basis.

However, this list may not be all-inclusive, and implementers must determine any patents that may apply to their implementation. It is not the responsibility of either ISO or the standards committee to determine if such implementations of this part of ISO 16612 employ the use of a patented technology.

U.S. Patents identified to CGATS are the following:

5,729,665

5,937,153

5,963,968

6,088,710

6,209,010 B1

6,243,172 B1

6,327,599

6,332,149

U.S. Patent applications identified to CGATS are the following:

09/229,502

09/818,665

10/118,771

ICS 35.240.30; 37.100.99

Price based on 31 pages