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**Graphic technology — Prepress digital  
data exchange using PDF —**

Part 9:

**Complete exchange of printing data  
(PDF/X-6) and partial exchange of  
printing data with external profile  
reference (PDF/X-6p and PDF/X-6n)  
using PDF 2.0**

*Technologie graphique — Échange de données numériques de  
préimpression utilisant le PDF —*

*Partie 9: Échange complet de données d'impression (PDF/X-6) et  
échange partiel de données d'impression avec une référence de profil  
externe (PDF/X-6p) utilisant le PDF 2.0*



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

A list of all parts in the ISO 15930 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## Introduction

ISO 15930 (all parts) defines methods for the exchange of digital data within the graphic arts industry and for the exchange of files between graphic arts establishments. It is a multi-part document where each part is intended to respond to different workflow requirements. These workflows differ in the degree of flexibility required. However, increasing flexibility can lead to the possibility of uncertainty or error. The goal throughout the various parts of ISO 15930 has been to maintain the degree of flexibility required while minimizing the uncertainty.

Many printed documents are assemblies of partial pages and/or pages created at different locations and by different organizations. The merging of these individual elements into the final printing form and the subsequent printing can take place at different locations. Some of these elements can also be routed to multiple sites for incorporation into other documents. Each of these elements is referred to in ISO 15930 as a compound entity.

A variety of data formats and structures are used for the creation of this type of material, but with two prevalent kinds of underlying data structures. These are vector-based data for the encoding of line art and textual information and raster-based data for the encoding of image information, including previously rasterized line art and textual information.

Both kinds of data structures are required along with page description information in an open electronic workflow. The subject of ISO 15930 is a format for the exchange of object-based data where individual objects can be in either vector or raster data structures.

The various parts of ISO 15930 define a number of conformance levels intended to address different requirements; all define data formats and their usage to permit the predictable dissemination of a compound entity to one or more locations. These goals are accomplished by defining a specific use of the Portable Document Format (PDF). In order to achieve a level of exchange that avoids any ambiguity in interpretation of the file, a limited set of PDF objects that are permitted to be used is identified and restrictions to the use, or form of use, of those objects, and/or keys within those objects are added.

In some environments, the data exchange needs to be in a form ready for final print reproduction, by transfer of a single file. This file contains all the content information necessary to process and render the document, as intended by the sender, coded inside a single PDF file. No other files, neither external files nor internally embedded files, are required or permitted. This exchange requires no prior knowledge of the sending and receiving environments and is sometimes referred to as “complete” or “blind” exchange. It is platform- and transport-independent. Whereas many production workflows benefit from the exchange of complete material, with all elements present, there are circumstances when this is not appropriate. In certain workflows, some or all of the referenced elements might be more logically present at the receiving site, or might be exchanged at a different time. These include high-resolution contone image files, line-art files, ICC profiles, etc. These exchanges will generally require prior agreement between sender and receiver.

Historically, the exchange needed to be restricted to gray, CMYK (and spot colour) data. In modern workflows, it is more appropriate to convey it as colour-managed, CMYK, gray, RGB, and/or spot colour, or to use alternative process colour models.

Several new versions of the PDF specification have been issued since the publication of ISO 15930-1 in 2001. More recent parts of ISO 15930 expand and extend earlier parts by reference to later versions of the PDF specification.

[Table 1](#) summarizes the conformance levels defined in each part of ISO 15930.

Table 1 — PDF/X conformance levels

| Conformance level | ISO 15930 part number | Complete exchange | Colour-managed data permitted | Print characterization spaces supported | PDF version |
|-------------------|-----------------------|-------------------|-------------------------------|---|-------------|
| PDF/X-1:2001      | ISO 15930-1           | Yes               | No                            | CMYK                                    | 1.3         |
| PDF/X-1a:2001     | ISO 15930-1           | Yes               | No                            | CMYK                                    | 1.3         |
| PDF/X-1a:2003     | ISO 15930-4           | Yes               | No                            | CMYK                                    | 1.4         |
| PDF/X-3:2002      | ISO 15930-3           | Yes               | Yes                           | Gray, RGB, CMYK                         | 1.3         |
| PDF/X-3:2003      | ISO 15930-6           | Yes               | Yes                           | Gray, RGB, CMYK                         | 1.4         |
| PDF/X-4           | ISO 15930-7           | Yes               | Yes                           | Gray, RGB, CMYK                         | 1.6         |
| PDF/X-4p          | ISO 15930-7           | No                | Yes                           | Gray, RGB, CMYK                         | 1.6         |
| PDF/X-5g          | ISO 15930-8           | No                | Yes                           | Gray, RGB, CMYK                         | 1.6         |
| PDF/X-5n          | ISO 15930-8           | No                | Yes                           | n-colourant                             | 1.6         |
| PDF/X-5pg         | ISO 15930-8           | No                | Yes                           | Gray, RGB, CMYK                         | 1.6         |
| PDF/X-6           | ISO 15930-9           | Yes               | Yes                           | Gray, RGB, CMYK                         | 2.0         |
| PDF/X-6p          | ISO 15930-9           | No                | Yes                           | Gray, RGB, CMYK                         | 2.0         |
| PDF/X-6n          | ISO 15930-9           | No                | Yes                           | n-colourant                             | 2.0         |

This document specifies the PDF/X-6 conformance level, which incorporates all of the features available in the PDF/X-1a, PDF/X-3 and PDF/X-4 conformance levels defined in ISO 15930-1, ISO 15930-3, ISO 15930-4, ISO 15930-6, ISO 15930-7 and adds the following.

- The referenced version is PDF 2.0 and therefore supports the additions to the PDF language found there, as modified by this document.
- Annotations, including digital signatures, form fields and videos, are allowed in the printable area of a page.

This document also specifies the PDF/X-6p and PDF/X-6n conformance levels. PDF/X-6 requires that any ICC profile describing the characterization of the printing condition for which a file was prepared be embedded. PDF/X-6p and PDF/X-6n allow these Output Intent ICC profiles to be maintained externally to the exchanged file; the difference being that the profile for PDF/X-6n specifies n-colourants instead of only Gray, RGB or CMYK. This is especially useful in those situations where the size of the ICC profile is large in comparison with the size of the file to be exchanged; where there are a very large number of files to be exchanged that have been prepared for the same printing condition, tone and gamut compression and black generation; or where there are licensing issues that preclude embedding.

Due consideration needs to be given to the increased potential for issues requiring technical discussion between file submitters and receivers when determining whether to use the PDF/X-6p or PDF/X-6n conformance levels in preference to PDF/X-6. In addition, it is likely that a larger proportion of receiving sites will be capable of accepting and correctly processing PDF/X-6 files. PDF/X-6 is preferred to PDF/X-6p or PDF/X-6n where there is no significant benefit in the use of the latter.

It is anticipated that a variety of products will be developed based on PDF/X, such as readers (including viewers) and writers of PDF/X files, 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. A conforming processor of this document is only required to be able to read and appropriately process all files conforming to the specified conformance levels within this document. Of course, a conforming processor can support other PDF standards, be they parts of ISO 15930 or not, but it is not required.

All parts of ISO 15930 define requirements and restrictions on the process of rendering PDF/X files for viewing and print, in addition to the requirements and restrictions of elements and structures within the files themselves. In some circumstances, it might be appropriate to render files without rigid adherence to the provisions of ISO 15930, but it is important to be aware that such renderings do not conform to PDF/X.

## ISO 15930-9:2020(E)

Users of this document are cautioned that they are expected to be familiar with the documents listed as normative references and the terms used within those documents. This document prescribes specific uses of, and limitations on the use of, ISO 32000-2 (PDF 2.0) and its associated supporting documents.

An ongoing series of Application Notes is maintained for the guidance of developers and users of the PDF/X family of International Standards. These application notes, and other documents relevant to PDF/X, are available from APTech, The Association for PRINT Technologies, in the APTech, Standards Workroom at <<https://www.printtechnologies.org/standards/tools--best-practices/>>.

A number of other International Standards, defining focussed subsets of the Portable Document Format in areas other than the graphic arts, are either published or under development, including PDF/A, and PDF/UA. Where possible, PDF/X has been designed to allow a single file to comply both with PDF/X and with these other standards. The PDF/VT standards for variable data printing require that all conforming PDF/VT files are also conforming PDF/X files.

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# Graphic technology — Prepress digital data exchange using PDF —

Part 9:

## Complete exchange of printing data (PDF/X-6) and partial exchange of printing data with external profile reference (PDF/X-6p and PDF/X-6n) using PDF 2.0

### 1 Scope

This document specifies the use of ISO 32000-2 (PDF 2.0) for the complete and partial exchange of digital data intended for print reproduction.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 15076-1:2010, *Image technology colour management — Architecture, profile format and data structure — Part 1: Based on ICC.1:2010*

ISO 32000-2:—<sup>1)</sup>, *Document management — Portable document format — PDF 2.0*

### 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

#### 3.1

##### characterized printing condition

printing condition for which process control aims are defined and for which the relationship between input data and the colorimetry of the printed image is documented

Note 1 to entry: It is generally preferable that the process control aims of the printing condition and the associated characterization data be made publicly available via the accredited standards process or industry trade associations.

#### 3.2

##### CMYK

subtractive process colour model where the channels are called Cyan, Magenta, Yellow and Black

1) Under preparation. Stage at the time of publication: ISO/FDIS 32000-2:2020.

3.3

**compound entity**

unit of work with all text, graphics and image elements prepared for final print reproduction that might represent a single page for printing, a portion of a page or a combination of pages

3.4

**conformance level**

identified set of restrictions and requirements with which files, processors and writers are required to comply

3.5

**default colour space**

PDF colour space named DefaultGray, DefaultRGB or DefaultCMYK that provides an indirect method of specifying the colour space of elements

3.6

**element**

substructure of a compound entity relative to the current processing environment, such as a block of text, a contone picture or an outline graphic that, by itself, comprises the smallest logical composed unit of a compound entity

3.7

**n-colourant**

process colour model other than gray, *RGB* (3.12) or *CMYK* (3.2), and comprising at least two colourants

3.8

**non-print element**

*element* (3.6) not intended for final print reproduction

3.9

**print element**

*element* (3.6) intended for final print reproduction

3.10

**process colourant**

additive or subtractive colourant whose characteristics (colour, transparency, etc.) make it suitable to combine with other colourants to form secondary or tertiary colours

3.11

**process colour model**

colours, defined in a colour coordinate system, produced by a set of *process colourants* (3.10)

3.12

**RGB**

additive *process colour model* (3.11) where the channels are called Red, Green and Blue

3.13

**spot colour**

single colourant, identified by name, whose values are specified independently from the colour values specified in a colour coordinate system

3.14

**trapping**

modification of boundaries of colour areas to account for dimensional variations in the printing process by overprinting in selected colours at the boundaries between colours that might inadvertently be left uncoloured due to normal variations of printing registration

Note 1 to entry: Trapping is sometimes referred to as chokes and spreads or grips. This is not the same as ink trapping.

## 4 Notations

PDF operators, PDF keywords, the names of keys in PDF dictionaries, and other predefined names are written in bold sans serif font; operands of PDF operators or values of dictionary keys are written in italic font. Some names can also be used as values, depending on the context, and so the styling of the content will be context specific.

EXAMPLE 1 The *Default* value for the **TR2** key.

Token characters used to delimit objects and describe the structure of PDF files, as defined in ISO 32000-2:—, 7.2.1, may be identified by their ISO/IEC 646 character name written in upper case in bold font followed by a parenthetic two digit hexadecimal character value with the suffix “h”.

EXAMPLE 2 **CARRIAGE RETURN** (0Dh).

Text string characters, as defined by ISO 32000-2:—, 7.9.2, may be identified by their ISO/IEC 10646 character name written in uppercase in bold sans serif font followed by a parenthetic four digit hexadecimal character code value with the prefix “U+”.

EXAMPLE 3 **EN SPACE** (U+2002).

## 5 PDF/X-6 conforming files and processors

This document specifies the use of the PDF file format for the exchange of digital data representing a compound entity. Specific requirements for conformance with PDF/X-6p are given in [Annex A](#). Specific requirements for conformance with PDF/X-6n are given in [Annex B](#).

A PDF/X-6 conforming file is a PDF file in which those features necessary for the exchange of a compound entity are in accordance with this document. A PDF/X-6 conforming file may also include other valid PDF features that do not affect final print reproduction of the compound entity.

The proper mechanism by which a file can presumptively identify itself as being a PDF/X-6 file is described in [6.11.3](#).

Conforming PDF/X-6 files shall adhere to all requirements of ISO 32000-2 as modified by this document. A conforming file may include any valid ISO 32000-2 feature that is not explicitly forbidden by this document. Features described in PDF specifications prior to Version 2.0, which are not explicitly described in ISO 32000-2, should not be used.

NOTE A conforming file is not obligated to use any PDF feature other than those explicitly required by ISO 32000-2 or this document.

A PDF/X-6 conforming writer is a software application that is able to write files in accordance with the requirements of the PDF/X-6 conformance level specified in document.

A PDF/X-6 conforming processor is a software application that is able to read and appropriately process, according to the rules defined in this document, all files conforming to the requirements for PDF/X-6 files as defined in this document.

A conforming processor shall comply with all applicable requirements regarding processor functional behaviour specified in this document. The requirements of this document with respect to processor behaviour are stated in terms of general functional requirements applicable to all conforming processors. This document does not prescribe any specific technical design, user interface or implementation details of conforming processors.

The rendering and other processing of conforming files shall be performed as defined in ISO 32000-2 subject to the additional restrictions specified by this document.

To the extent that ISO 32000-2 and this document permit more than one rendering of a conforming file, a conforming processor may use embedded job ticket or metadata information to control the rendering of the file more precisely.

**EXAMPLE 1** (Trapping) If a PDF/X-6 conforming file specifies **pdf:Trapped=False**, a conforming processor might use job ticket information to determine details of how the file is to be trapped. If the file specifies **pdf:Trapped=True**, a conforming processor might ignore any trapping information in an embedded job ticket.

**EXAMPLE 2** (Screening) A PDF/X-6 conforming processor can use embedded job ticket information to determine the screening to be used to render the file. A PDF/X-6 conforming processor can ignore screening information in the PDF/X-6 file. A conforming processor might use screening data from the PDF/X-6 file, from the job ticket, or from local system defaults.

**EXAMPLE 3** (Print product metadata) A PDF/X-6 conforming processor can look for the presence of information that complies with ISO 21812-1<sup>[2]</sup> to determine if there is any print product metadata that would influence the production of the file. A PDF/X-6 conforming can ignore any additional information in the PDF/X-6 file, not mentioned in this document.

## 6 Technical requirements

### 6.1 General

PDF/X-6 is a restricted subset of PDF 2.0, as defined in ISO 32000-2. The features of PDF that shall be required, prohibited or restricted are specified in 6.2 to 6.16 inclusively. These features shall be used as prescribed in ISO 32000-2 and as further restricted by this document. Any feature in ISO 32000-2 that is marked as deprecated should not appear in a PDF/X-6 file, but a conforming processor shall process the file as if the features were not present.

### 6.2 Print and non-print elements

#### 6.2.1 General

A PDF/X-6 conforming file may contain two classes of elements:

- a) those intended for final print reproduction (print elements);
- b) those not intended for final print reproduction (non-print elements).

#### 6.2.2 Print elements

Except as specified below, print elements are those drawn or referenced (directly or indirectly), using keys and values defined in ISO 32000-2, from:

- the Contents stream(s) of Page objects; or
- the appearance stream of any annotation, including those with a Subtype value of Widget (form fields), which has its printable flag set and its invisible and hidden flags clear (see ISO 32000-2:—, 12.5.3).

All optional content that would be regarded as print elements if not contained in an optional content group shall be regarded as print elements, whether rendered in a specific instance or not.

Image XObjects that are only referenced from within the Alternates array of an Image XObject are non-print elements.

#### 6.2.3 Non-print elements

All elements within the file, which are not characterized as print elements, shall be considered non-print elements.

Non-print elements may make use of any PDF feature that does not affect the rendered appearance of print elements.

The requirements of [Clause 6](#) shall not apply to non-print elements, or to any resources referenced exclusively by such elements.

This includes allowing non-print elements to make use of any PDF colour space thus making the provisions of [6.6.2](#) and [6.6.3](#) no longer apply to non-print elements.

### 6.3 Intended visual appearance

A PDF/X-6 conforming file is created such that each page has a specific intended visual appearance. Where a PDF/X-6 file is printed or viewed on a system that differs from that intended by the creator, the PDF/X-6 conforming processor should reproduce that intended visual appearance as closely as possible.

NOTE 1 For example, if the gamut of the viewing device does not contain the whole output intent gamut, an alert can be visually noticed.

This applies to presentation on a screen, to production printing and to hard- and soft-proofing that predicts production print.

NOTE 2 Examples of such systems are those where the device colour space does not match that identified in the output intent (see [6.6.2.1](#)), or where spot-colour separations specified in **Separation** or **DeviceN** colour spaces are printed using process colourants (see [6.6.3.4](#)).

NOTE 3 Among other things, transformations between colour spaces affect colour reproduction, overprints, trapping, transparency and smooth shading.

### 6.4 Complete exchange

All components of a compound entity intended for PDF/X-6-compliant complete exchange that affect rendering shall be contained in the body of a single PDF/X-6 file.

In this context, “complete” means the exchanged files shall include:

- all PDF resources (as listed in ISO 32000-2) used in print elements, including all font programs & encodings, and colour space resources, and
- all print elements, properly prepared for the characterized printing condition of the page(s) on which they are displayed.

In order to achieve complete exchange, a pre-separated PDF file, as defined in ISO 32000-2:—, 14.11.4, shall not be used.

### 6.5 File structure

#### 6.5.1 File header

The file header shall begin at byte zero and shall consist of “%PDF-2.n” followed by a single EOL marker, where ‘n’ is a single digit number between **0** (30h) and **9** (39h).

NOTE 1 This clarifies the requirement in ISO 32000-2:—, 7.5.2

The aforementioned EOL marker shall be immediately followed by a **%** (25h) character followed by at least four bytes, each of whose encoded byte values shall have a decimal value greater than 127.

NOTE 2 The presence of encoded byte values greater than decimal 127 near the beginning of a file is used by various software tools and protocols to classify the file as containing 8-bit binary data that needs to be preserved during processing.

### 6.5.2 File trailer

The **Encrypt** key shall not be present in the trailer dictionary.

NOTE The explicit prohibition of the **Encrypt** keyword has the implicit effect of disallowing encryption and password-protected access permissions.

The **Info** key shall not be present in the trailer dictionary of PDF/X-6 conforming files unless there exists a **PieceInfo** entry in the document catalog dictionary. If a document information dictionary is present, it shall only contain a **ModDate** entry.

### 6.5.3 Cross reference table

The **xref** keyword and the cross reference subsection header shall be separated by a single EOL marker.

Any indirect object whose offset is not referenced in any cross-reference table nor in any cross-reference stream shall be exempt from all requirements of this document and may be ignored by a conforming processor. If a conforming processor chooses not to ignore such indirect objects, they shall never influence the way content is processed and rendered.

NOTE Such objects can be considered as non-print elements (6.2.3).

### 6.5.4 Stream objects

#### 6.5.4.1 General

A stream dictionary shall not contain the **F**, **FFilter**, or **FDecodeParams** keys.

NOTE 1 These keys are used to point to data external to the file. The explicit prohibition of these keys has the implicit effect of disallowing external content that can create external dependencies and complicate production and print.

NOTE 2 Since an inline image dictionary is not a stream object, this provision allows the presence of the **F** key in an inline image dictionary as the abbreviation for **Filter**.

#### 6.5.4.2 Filters

All standard stream filters listed in ISO 32000-2:—, Table 6 may be used, with the exception of *LZWDecode*. Filters that are not listed in ISO 32000-2:—, Table 6 shall not be used.

In addition, the *Crypt* filter shall not be used unless the value of the **Name** key in the decode parameters dictionary is *Identity*.

NOTE The *Crypt* filter is used to apply encryption and access control to the file. Applying encryption means that complete exchange is compromised as additional data (a password) is needed to process the file.

### 6.5.5 Name objects

Font names, names of colourants in Separation and DeviceN colour spaces, and structure type names - after expansion of character sequences escaped with a **NUMBER SIGN** (23h), if any, shall be valid UTF-8 character sequences.

These requirements make the recommendations set out in ISO 32000-2:—, 7.3.5 normative.

All other name objects should adhere to these same restrictions.

### 6.5.6 Permissions

No keys other than **UR3** and **DocMDP** shall be present in a permissions dictionary (ISO 32000-2:—, Table 263).

NOTE These restrictions are present to ensure that functionality such as obsolete versions of the “User Rights” dictionary do not appear in a document conforming to this document.

### 6.5.7 Document catalog dictionary

If the **Version** key is present in the document catalog dictionary, the first character in its value shall be a **2** (32h) and the second character of its value shall be a **PERIOD** (2Eh) (decimal point). The third character shall be a decimal digit. The number of characters of the value of the **Version** key shall be exactly 3.

NOTE This clarifies the requirement in ISO 32000-2:—, 7.5.2

## 6.6 Colour

### 6.6.1 General

Print elements may be exchanged either as output device code values or as colorimetrically defined data. However, both types of data, if present in print elements in a PDF/X-6 file, shall be prepared for the file’s identified characterized printing condition from a PDF/X-6 output intent prior to exchange.

The characterized printing condition shall have one colour channel (grayscale), three colour channels (RGB) or four colour channels (CMYK).

NOTE For the use of n-colourant characterized printing conditions in PDF/X, see the PDF/X-6n conformance level, as specified in [Annex B](#).

Colorimetrically-defined data shall be described either using an ICC profile in an **ICCBased** colour space or using an equivalent mechanism, namely a **CalGray**, **CalRGB** or **Lab** colour space. Device code values may be defined in **DeviceRGB**, **DeviceCMYK**, **DeviceGray**, **Separation**, and **DeviceN** colour spaces as specified and restricted by [6.6.3](#).

### 6.6.2 Identification of characterized printing condition

#### 6.6.2.1 Output intents

The characterized printing condition (i.e. the process colour model for the output device) for which data have been prepared is identified by use of a PDF/X output intent. A PDF/X output intent is defined as an output intent dictionary (ISO 32000-2:—, 14.11.5) which shall contain an **S** key whose value shall be *GTS\_PDFX* and a **DestOutputProfile** key whose value shall be a valid ICC profile stream.

The document shall contain either a document-level PDF/X output intent (present in the **OutputIntents** array of the document catalog dictionary), or each page dictionary shall contain an **OutputIntents** array whose value shall be an array containing a PDF/X output intent, representing a page-level PDF/X output intent, or both. When a page-level PDF/X output intent is present, then it shall be considered the current PDF/X output intent when processing that page, otherwise the document-level PDF/X output intent shall be considered current.

A conforming processor shall use the current PDF/X output intent as the intended output device.

Additional output intent dictionaries may be present in an **OutputIntents** array; if so, they shall use different values for the **S** key and shall be ignored by a PDF/X-6 conforming processor.

NOTE 1 Multiple output intent dictionaries can be required, for instance, if a file is created to conform with both PDF/X-6 and with PDF/A. The PDF/A standard (ISO 19005<sup>[5]</sup>) places restrictions on the value of **DestOutputProfile**, where present, in all output intent dictionaries, and not only in the PDF/A output intent dictionary.

Every PDF/X output intent shall include the **OutputConditionIdentifier** key, the value of which shall be encoded in accordance with ISO 32000-2:—, 14.11.5.

The **OutputConditionIdentifier** key is used to uniquely identify the output device or production condition for which the data in the file is intended. This should be done using the ICC characterization data registry or some other public registry, where possible. Where that is not possible, unique descriptions of the output device or production condition should be included and such terms as *Custom* should not be used.

NOTE 2 The recipient of a PDF/X-6 file is able to validate that the file has been properly prepared for the output device or production condition under which it will be printed, or that it can be appropriately transformed for the output device or production condition in use.

The **RegistryName** key shall be present in a PDF/X output intent only if the output device or production condition is defined in a characterization data registry. If the output device or production condition is defined in the ICC characterization data registry, the **RegistryName** key shall have the value <http://www.color.org>.

NOTE 3 At the time of publication of this document, the registry can be found at <http://www.color.org/registry2.html>.

If the **RegistryName** key is present, the value of the **OutputConditionIdentifier** key shall match exactly the reference name of an entry in that registry.

If the **RegistryName** key is present with a value other than <http://www.color.org/>, then the value should provide a URL at which more information regarding the registry may be obtained.

NOTE 4 The endpoint for the URL need not be computer-readable.

If the **RegistryName** key is not present, then no special meaning should be read into the value of the **OutputConditionIdentifier** key and any match between the name selected and a name in a registry shall be treated as coincidental.

The **DestOutputProfile** key shall be present, and the **DestOutputProfileRef** key shall not be present in any PDF/X output intent.

If some or all colour data are not supplied in the process colour model of the output device or production condition, the profile that is the value of the **DestOutputProfile** key shall be used to transform the colour data provided into the process colour model of the output device or production condition. A conforming processor shall use the specified profile and shall not use the **Alternate** colour space in the stream dictionary.

The profile that is the value of the **DestOutputProfile** key shall be an Output Device Profile (Device Class = "prtr") and shall be interpreted as representing the output device. If present in the **DestOutputProfile** stream object, the **Alternate** key shall be ignored by a PDF/X-6 conforming processor. The values of the **profileDescriptionTag** and **charTargetTag**, if present in the ICC profile, shall not be used to identify the output device or production condition.

The **OutputCondition** key should always be present in a PDF/X output intent, and its value should be a text string concisely identifying the production condition in a form that will be meaningful to a human operator at the site receiving the exchanged file.

NOTE 5 For production conditions in the ICC characterization data registry, more information can be obtained at <http://www.color.org/<condition>.html>, where <condition> is the **OutputConditionIdentifier**, with spaces and other characters prohibited in a URL escaped following normal URL rules. Authors of PDF/X-6 writers might consider using the value of the printing process definition at <http://www.color.org/> for the value of the **OutputCondition** key, after suitable localization.

NOTE 6 ISO 32000-2 specifies that the **Info** key be present if **OutputConditionIdentifier** does not refer to a characterization in the ICC characterization data registry. This document does not recommend any specific use of the **Info** key.

#### 6.6.2.2 Gray characterizations

If the characterized printing condition identified by the current PDF/X output intent dictionary is a gray condition, the restrictions of this subclause apply.

A PDF/X-6 conforming processor shall treat any print elements in the file using a **DeviceGray** colour space as being the same gray as identified by the current PDF/X output intent object.

NOTE Interpretation of device spaces can be amended by the use of indirect colour spaces as described in [6.6.3.1](#).

#### 6.6.2.3 RGB characterizations

If the characterized printing condition identified by the current PDF/X output intent dictionary is an RGB condition, the restrictions of this subclause apply.

A PDF/X-6 conforming processor shall treat any print elements in the file using a **DeviceRGB** colour space as being the same RGB as identified by the current PDF/X output intent object.

If a **DeviceGray** colour space is used for print elements in association with an RGB characterization, it shall be accompanied by a **DefaultGray** colour space as described further in [6.6.3.2](#).

NOTE Interpretation of device spaces can be amended by the use of indirect colour spaces as described in [6.6.3.1](#).

#### 6.6.2.4 CMYK characterizations

If the characterized printing condition identified by the current PDF/X output intent dictionary is a CMYK condition, the restrictions of this subclause apply.

A PDF/X-6 conforming processor shall treat any print element in the file using a **DeviceCMYK** colour space as being the same CMYK as identified by the current PDF/X output intent object.

A PDF/X-6 conforming processor shall treat any print element in the file using a **DeviceGray** colour space as colorimetrically the same as the black channel of the CMYK identified by the current PDF/X output intent object.

NOTE 1 Interpretation of device spaces can be amended by the use of indirect colour spaces as described in [6.6.3.1](#).

NOTE 2 The overprint characteristics of **DeviceGray** and **DeviceCMYK** differ when overprint mode is set to 1. In that state, **DeviceGray** will continue to knock out all of the CMYK channels of any underlying element, whereas an element defined in **DeviceCMYK** (other than an image or smooth shading) will only knock out underlying elements in those process colourants where the colour value in the overprinting element is not zero.

### 6.6.3 Print element colour spaces

#### 6.6.3.1 Indirect colour spaces

The default colour space mechanism is an indirect method of specifying a colour space. Any print elements that are specified using a device colour space, for which a matching default colour space is present, shall be interpreted as if the print elements were specified using the default colour space (ISO 32000-2:—, 8.6.5.6).

NOTE In most cases, a default colour space is defined in a device independent manner, but this is not required by ISO 32000-2.

**Indexed** and **Pattern** colour spaces are also indirect methods of specifying colour. All the requirements of [6.6.3](#) apply to the *underlying* colour spaces of **Indexed** and **Pattern** colour spaces.

#### 6.6.3.2 Device colour spaces

Device colour spaces may be used for print elements only if:

- they match the space specified in the current PDF/X output intent; or
- they are used inside of an isolated transparency group and match the colour space specified in that group's blending colour space or any ancestor of the current group (ISO 32000-2:—, 11.7.2); or
- the current PDF/X output intent specifies a CMYK print characterization, and the device colour space is **DeviceGray**.

NOTE Default colour spaces can be used to provide indirection from device colour spaces to device-independent spaces (see [6.6.3.1](#)).

#### 6.6.3.3 ICCBased colour spaces

A PDF/X-6 conforming processor shall use the ICC profile and shall not use the **Alternate** colour space in the stream dictionary of an **ICCBased** colour space.

When a four-colour **ICCBased** colour space is used for strokes, fills, text or image masks that are set to overprint, and when the characterized printing condition is CMYK, overprint mode shall be zero.

NOTE 1 This prohibition avoids unpredictable overprinting behaviour when overprint mode is 1 if implicit colour conversion is applied as described in ISO 32000-2:—, 8.6.7.

A four-colour **ICCBased** colour space shall not be used where the profile is identical to that in the currently active PDF/X output intent or the currently active transparency blending colour space.

NOTE 2 This avoids the possibility of output differing depending on whether a renderer applies the implicit colour conversion described on ISO 32000-2:—, 8.6.5.7.

Profiles shall be treated as identical if:

- the **ICCBased** colour space and the output intent use indirect references to the same embedded profile stream; or
- MD5 hash values for the two profiles are the same. MD5 values are read from the value of the **Profile ID** field within each profile, if present and if not set as zero. If no MD5 value is included in each profile, then a value shall be calculated following the methodology set out in ISO 15076-1:2010, 7.2.18.

#### 6.6.3.4 Separation and DeviceN (including NChannel) colour spaces

**Separation** and/or **DeviceN** colour spaces may be used for process colours, for spot colours, and for information that is not colour related (e.g. varnishes, die cutting and other overlays).

A PDF/X-6 conforming processor shall treat process separations, specified using either a **Separation** colour space or as values within the *names* array of a **DeviceN** colour space, as having been prepared for the characterized printing condition identified in the currently active PDF/X output intent object.

In the absence of an agreement between sender and receiver to the contrary, all colour names shall be assumed to be independent colourants on the intended output device.

For any spot colour used in a **DeviceN** colour space, an entry in the **Colorants** dictionary shall be present. All **Separation** arrays within a single PDF/X-6 file (including those in **Colorants** dictionaries) that have the same *name* shall have the same *tintTransform* and *alternateSpace*. In evaluating equivalence, the PDF objects should be compared rather than the computational result of the use of those objects. Compression and whether or not an object is direct or indirect shall be ignored.

NOTE 1 This implies that a PDF/X-6 writer might need to synchronize multiple *alternateSpace* and *tintTransform* entries when creating a PDF/X-6 file. Tools that aggregate PDF/X-6 files in a context where they will be further exchanged as PDF/X-6 also need to take special care with files that contain conflicting *tintTransforms* for spot colours with the same name.

The **Separation** arrays in the **Colorants** dictionary of **DeviceN** colour spaces should be consistent with the *tintTransform* and *alternateSpace* of the **DeviceN** colour space itself. All *NChannel* blending algorithms within a single PDF/X-6 file should produce a similar appearance for colours with the same name when they are used in **Separation** and **DeviceN** colour spaces.

Where a PDF/X-6 processor needs to convert a spot colour to process colours (e.g. for display on a screen or a proof simulation) the processor shall apply either the specified tint transformation function or invoke the same alternative blending algorithm for all **Separation** and **DeviceN** instances in the document using that spot colour.

NOTE 2 In situations where spot-colour separations specified in **Separation** or **DeviceN** colour spaces are to be printed using process colourants, the alternative representation supplied in the **Separation** or **DeviceN** colour space can be used to perform that transformation. Alternatively, PDF/X-6 processors can use other data sources that better approximate the printed result, such as pre-defined look up tables or *NChannel* blending algorithms.

The **ColorSpace** entry of the **Process** dictionary referenced from the *attributes* dictionary of a **DeviceN** colour space shall represent **DeviceRGB**, **DeviceCMYK** or **DeviceGray**, to match the intended printing condition.

The **MixingHints** dictionary referenced from the colour space attributes dictionary of an *NChannel* **DeviceN** colour space shall not contain the **DotGain** key.

All **PrintingOrder** arrays within **MixingHints** dictionaries within a PDF/X-6 file shall be consistent with each other. All entries in all **Solidities** dictionaries within a PDF/X-6 file for the same ink shall have the same value.

A PDF/X-6 writer should only include values for **Solidities** and **PrintingOrder** keys in a **MixingHints** dictionary if specific information regarding the intended printing condition is available; default values should not be included.

The *alternateSpace* of **Separation** and **DeviceN** colour spaces shall be restricted by [6.6.3.2](#).

## 6.7 Graphics

### 6.7.1 Content streams

Content streams shall not contain any operators not defined in ISO 32000-2 even if such operators are bracketed by the **BX/EX** compatibility operators. A PDF/X-6 conforming writer should not use the **BX/EX** operators.

NOTE Contents streams, as defined in ISO 32000-2:—, 7.8.2, are used for page descriptions, Form XObjects, Type 1 Patterns, Type 3 glyph descriptions, as well as for the appearances of annotations.

A content stream that references other objects, such as images and fonts that are necessary to fully render or process the stream, shall have an explicitly associated **Resources** dictionary as described in ISO 32000-2:—, 7.8.3. Such **Resources** dictionary shall define all named resources referenced by this content stream. Any named resource present in the resources dictionary, but whose name is not referenced from the associated content stream, is not used for rendering and therefore shall be exempt from all requirements of this document except 6.5.5 and 6.5.6.

### 6.7.2 Use of transparency

PDF transparency (as described in ISO 32000-2:—, Clause 11) may be used in a PDF/X-6 file.

A conforming processor shall use the current PDF/X output intent as the default blending colour space (see ISO 32000-2:—, 11.3.4).

NOTE This requirement ensures that there is always an explicitly defined transparency blending space specified for any content which has associated transparency.

The value for any **CS** key in any transparency group's attribute dictionary shall conform to the restrictions on colour spaces set out in 6.6. If a transparency group's attribute dictionary does not contain a **CS** key, then an algorithm similar to the one in ISO 32000-2:—, Annex P should be used to determine the blending colour space for that group.

Only blend modes that are specified in ISO 32000-2:— shall be used for the value of the **BM** key in a graphic state dictionary (see ISO 32000-2:2020, 8.4.5) or an annotation dictionary (see ISO 32000-2:—, 12.5.2). A PDF/X-6 compliant processor shall process these blend modes as described in ISO 32000-2:—, 11.3.5.

### 6.7.3 Extended graphics state

#### 6.7.3.1 Transfer functions and halftoning

A graphics state parameter dictionary (see ISO 32000-2:—, 8.4.5) shall not contain the **TR** key. A conforming processor should ignore any instance of the **HT** key in any graphics state parameter dictionary.

The **TransferFunction** key in a halftone dictionary shall be used only as required by ISO 32000-2.

NOTE 1 The general approach envisioned for PDF/X-6 data exchanges is that the receiving system is responsible for the screening of the data consistent with the characterized printing condition specified for the file. However, in some workflows, there is a need to specify specific screening parameters for certain elements. All mechanisms for including elements of any kind within a PDF/X-6 file include the ability to specify screening parameters.

All halftones in a conforming PDF/X-6 file shall have the value 1 or 5 for the **HalftoneType** key.

NOTE 2 By limiting PDF/X-6 conforming files to the value 1 or 5 for the **HalftoneType** key, the use of threshold screens that produce different appearances at different resolutions is prohibited.

#### 6.7.3.2 BlackPointCompensation

A PDF/X-6 conforming processor shall treat the value of *Default* for the **UseBlackPTComp** key as equivalent to the value of *ON*.

NOTE This has the effect of having black point compensation turned on by default in any PDF/X-6 conforming processor.

## 6.7.4 Images

### 6.7.4.1 General

An Image XObject in a PDF/X-6 conforming file that includes alternate images shall have no alternate where **DefaultForPrinting** is set to *True*. Any image dictionary that contains an **Alternates** entry in a conforming PDF/X-6 file shall not contain an **OC** entry.

NOTE 1 This means that the image that is viewed by default is also printed by default as per ISO 32000-2:—, 8.9.5.4.

All images included in the **Alternates** array of an Image XObject, and the base image, shall represent the same area of the same master image, and may differ only in colour space, bit depth, resolution, compression, and encoding.

NOTE 2 Images referenced only from the **Alternates** array of an Image XObject are non-print elements (see 6.2), and therefore the colour space restrictions set out in 6.5 are not applicable.

### 6.7.4.2 Inline image dictionaries

The value of the **F** key in the Inline Image dictionary shall not be *LZW*, *LZWDecode*, *Crypt* or a value not listed in ISO 32000-2:—, Table 6 or an array containing any such value.

Any inline image dictionary shall contain a **L** key whose value is the length of the data as it appears in the stream, before applying the filters, if any.

### 6.7.4.3 JPEG2000 images

When used, JPEG2000 compression shall be used as specified in ISO 32000-2. Only the JPX baseline set of features, as restricted or extended by ISO 32000-2, and this subclause, shall be used.

NOTE 1 The JPX baseline set of features is defined in ISO/IEC 15444-2:—, M.9.2.

The number of colour channels in the JPEG2000 data shall be 1, 3 or 4.

If the number of colour space specifications in the JPEG2000 data is greater than 1, there shall be exactly one colour space specification that has the value 0x01 in the **APPROX** field. If the specified colour space specification uses an ICC profile, then that profile shall conform to the requirements of ISO 32000-2:—, 8.6.5.5.

NOTE 2 The value 0x01 in the **APPROX** field identifies the colour space with the best colour fidelity available.

The value of the **METH** entry in its "colr" box shall be 0x01, 0x02 or 0x03. A conforming processor shall use only that colour space and shall ignore all other colour space specifications.

JPEG2000 enumerated colour space 19 (*CIEJab*) shall not be used.

JPEG2000 enumerated colour space 12 (*CMYK*) which is part of JPX but not JPX baseline, may be used.

Where the JPEG2000 image effectively uses **DeviceGray**, **DeviceRGB** or **DeviceCMYK** – whether through the **ColorSpace** entry in the Image XObject or in the absence thereof through the colour space definition in the JPEG2000 data, the provisions of 6.6.2 shall apply.

NOTE 3 s-YCC and es-YCC - the two YCC flavors allowed in baseline JPX - are just alternative representations of sRGB and esRGB. Details can be found in ISO/IEC 15444-2.

NOTE 4 ISO 32000-2 states that a **ColorSpace** entry in an Image XObject containing JPEG2000-compressed data overrides any colour space defined within the JPEG2000 data stream itself. It further requires that the number of colour channels in the JPEG2000 data match the number of components in the colour space defined in the **ColorSpace** entry of the Image XObject.

The bit-depth of the JPEG2000 data shall have a value in the range 1 to 38. All colour channels in the JPEG2000 data shall have the same bit-depth.

Images compressed using the JPEG2000 compression method shall be created and read as described in ISO/IEC 15444-2:2004.

NOTE 5 This subclause provides for a subset of JPEG2000 that is also aligned with ISO 19005-2, ISO 19005-3 and ISO 19005-4<sup>[5]</sup> (PDF/A-2, PDF/A-3, PDF/A-4).

### 6.7.5 XObjects

**Image** and **Form XObjects** shall not contain the **OPI** key. **Form XObjects** shall not contain the **Ref** key.

## 6.8 Fonts

### 6.8.1 General

The intent of the requirements in this subclause is to ensure that the rendering of the textual content of a conforming file matches, on a glyph by glyph basis, the static appearance of the file as originally created. Unless a requirement specifically states that it shall only apply to text that would be rendered by a conforming processor, they shall apply to any font including those used exclusively with text rendering mode 3.

NOTE As discussed in ISO 32000-2:—, 9.3.6, text rendering mode 3 specifies that glyphs are not stroked, filled or used as a clipping boundary. A font referenced for use solely in this mode is therefore not rendered and is thus exempt from the requirements that impact the visual representation of the glyphs of a font.

### 6.8.2 Embedded fonts

#### 6.8.2.1 General

The font programs for all fonts used for rendering within a conforming file shall be embedded within that file, as defined in ISO 32000-2:—, 9.9. A font is considered to be used if at least one of its glyphs is referenced from a content stream (see 6.7.1) and used with a text rendering mode other than 3 (see 6.8.1).

NOTE 1 Embedding the font programs allows any conforming processor to reproduce correctly all glyphs in the manner in which they were originally published without reference to external resources.

Only font programs that are legally embeddable in a file for rendering shall be used.

Embedded fonts shall define all glyphs referenced for rendering within the conforming file.

NOTE 2 As stated in 6.8.2.2, subsets of a font are acceptable as long as the embedded font provides glyph definitions for all characters referenced within the file.

All conforming processors shall use the embedded fonts, rather than other locally resident, substituted or simulated fonts, for rendering.

NOTE 3 There is no exemption from the requirements for the 14 standard Type 1 fonts.

#### 6.8.2.2 Subset embedding

ISO 32000-2:—, 9.6 and 9.7 permit the embedding of subsets of font programs.

NOTE The use of subsets of a font and its associated font program allows a potentially substantial reduction in the size of conforming files.

### 6.8.3 Use of .notdef glyph

A PDF/X-6 compliant document shall not contain a reference to the **.notdef** glyph from any of the text drawing operators, regardless of text rendering mode, in any content stream.

**NOTE** According to all applicable font specifications, the **.notdef** glyph is always required but only to be used as a fallback during rendering if the proper glyph is not available. This means that for any well-formed PDF file, there is never a need to use the **.notdef** glyph. At the same time, under certain circumstances, it can happen that a PDF file is not created properly, or that the necessary fonts are not properly embedded, which can lead to PDFs that happen to directly reference and thus use the **.notdef** glyph. Such instances of using the **.notdef** glyph are typically a clear indication that something went wrong.

### 6.8.4 Font metrics

For every font embedded in a conforming file, the glyph width information in the font dictionary and in the embedded font program shall be consistent for every glyph referenced for rendering. Glyphs that are referenced only with rendering mode 3 are exempt from this requirement.

If a Type 3 font is used for rendering, then as described in ISO 32000-2: —, Table 111, the operands of the **d0** and **d1** operators of each **CharProc** shall be consistent with the glyph's width.

If a composite (Type 0) font is used for rendering in vertical writing mode (ISO 32000-2: —, 9.7.4.3) and if the associated embedded font program contains information about vertical metrics of the glyphs, this information shall also be consistent with values of the **DW2** and **W2** keys in the font descriptor dictionary.

For this document, consistent is defined to be a difference of no more than 1/1 000 unit in text space (ISO 32000-2: —, 9.2.4).

**NOTE** This requirement ensures predictable font rendering, regardless of whether a given processor uses the metrics in the font dictionary or those in the font program.

### 6.8.5 Character encodings

For all non-symbolic TrueType fonts used for rendering, the embedded TrueType font program shall contain at least Microsoft Symbol (3,0 - Platform ID=3, Encoding ID=0), or Macintosh Roman (1,0 - Platform ID=1, Encoding ID=0) "cmap" subtables such that all necessary glyph lookups can be carried out.

All non-symbolic TrueType fonts shall have either *MacRomanEncoding* or *WinAnsiEncoding* as the value for the **Encoding** key in the Font dictionary or as the value for the **BaseEncoding** key in the dictionary that is the value of the **Encoding** key in the Font dictionary.

In addition, all non-symbolic TrueType fonts shall not define a **Differences** array unless all of the glyph names in the **Differences** array are listed in the Adobe Glyph List and the embedded font program contains at least the Microsoft Unicode (3,1 - Platform ID=3, Encoding ID=1) encoding in the "cmap" subtable.

Symbolic TrueType fonts shall not contain an **Encoding** entry in the font dictionary and the "cmap" subtable in the embedded font program shall either contain the Microsoft Symbol (3,0 - Platform ID=3, Encoding ID=0) or the Mac Roman (1,0 - Platform ID=1, Encoding ID=0) encoding.

In all cases for TrueType fonts that are to be rendered, character codes shall be able to be mapped to glyphs according to ISO 32000-2:—, 9.6.5.4 without the use of a non-standard mapping chosen by the conforming processor.

## 6.9 Bounding boxes

Each **Page** object of a PDF file includes a **MediaBox**. Each **Page** object in a PDF/X-6 conforming file shall include a **TrimBox**. The **MediaBox** may be included by inheritance.

If the **BleedBox** is present, the **ArtBox** or the **TrimBox** shall not extend beyond the boundaries of the **BleedBox**. If the **CropBox** is present, none of the **ArtBox**, the **TrimBox**, or the **BleedBox** shall extend beyond the boundaries of the **CropBox**.

None of the **ArtBox**, the **TrimBox**, the **CropBox**, or the **BleedBox** shall extend beyond the boundaries of the **MediaBox**.

NOTE Some industry practices require the use of the **BleedBox**.

## 6.10 Trapping

The **pdf:Trapped** property in the document metadata stream shall be present when exchanging files. The **pdf:Trapped** property shall indicate the state of trapping within the file. If the entire file has not been trapped, then the value of the **pdf:Trapped** property shall be set to *False*. Otherwise, the entire file shall have been trapped as necessary, and the value of the **pdf:Trapped** property shall be set to *True*. The **pdf:Trapped** property shall not have a value of *Unknown*. In a file that contains optional content the **pdf:Trapped** property indicates the status of trapping of all combinations of optional content that are intended for print production.

TrapNet annotations shall not be present in a PDF/X-6 file.

NOTE ISO 32000-2 has deprecated TrapNet annotations.

## 6.11 Metadata and document identification

### 6.11.1 General

All content of all XMP packets located in any metadata stream present in a conforming PDF/X-6 file shall be well-formed as defined by XMP (see ISO 16684-1). At the time a conforming writer creates or resaves a conforming file, every XMP packet present in any metadata stream should be validated.

The document catalog dictionary of a PDF/X-6 conforming file shall contain the **Metadata** key whose value shall be a metadata stream as defined in ISO 32000-2:—, 14.3.2 containing document-level metadata that are required by this document.

The **bytes** and the **encoding** attributes shall not be used in the header of any XMP packet.

NOTE Both the **bytes** and **encoding** attributes are deprecated in ISO 16684-1.

All PDF/X-6 conforming files shall contain the following properties in the document metadata stream and their values shall contain appropriate data prior to exchange: **xmp:CreateDate**, **xmp:ModifyDate**, and **xmp:MetadataDate**. A zero-length string shall not be used for any of these three keys.

The **xmp:CreatorTool** and **pdf:Producer** properties should be present in the document metadata stream.

### 6.11.2 Namespaces and prefixes

According to the W3C XML Namespace recommendation, namespace prefixes are shortcuts to namespace URIs. No significance is given to the prefix itself, except where a specific prefix is identified as required, any prefix can be used. The prefixes in [Table 2](#) should be used for all properties using the namespaces identified by the URIs listed in the same table.

In addition, namespace URI's are for identification purposes only and are not required to be actionable links. None of the namespace URI's defined in this document is guaranteed to be an actionable link. Attempting to dereference or follow any of these links may not result in a valid web page.

**Table 2 — Required mappings between namespace URIs and their prefixes**

| URI                              | Prefix        |
|----------------------------------|---------------|
| http://purl.org/dc/elements/1.1/ | <b>dc</b>     |
| http://ns.adobe.com/pdf/1.3/     | <b>pdf</b>    |
| http://ns.adobe.com/xap/1.0/     | <b>xmp</b>    |
| http://ns.adobe.com/xap/1.0/mm/  | <b>xmpMM</b>  |
| http://www.npes.org/pdfx/ns/id/  | <b>pdfxid</b> |

### 6.11.3 Version and conformance level identification

A PDF/X-6 file shall be identified as such using the **pdfxid:GTS\_PDFXVersion** property in the document metadata stream. The **pdfxid** prefix denotes the use of the PDF/X identification extension schema defined in this subclause.

The identification schema defined in [Table 3](#) uses the namespace URI *http://www.npes.org/pdfx/ns/id/*. The required schema namespace prefix is **pdfxid**.

**Table 3 — PDF/X identification schema**

| Property                      | Value type             | Description   |
|-------------------------------|------------------------|---|
| <b>pdfxid:GTS_PDFXVersion</b> | Text                   | (Required) PDF/X conformance level identifier                     |
| <b>pdfxid:rev</b>             | Open choice of Integer | (Required) Four digit year of the date of publication or revision |

The value of the **pdfxid:GTS\_PDFXVersion** property for PDF/X-6 files prepared in accordance with this document is *PDF/X-6*.

The value of the **pdfxid:GTS\_PDFXVersion** property does not in itself determine conformance with this document. The actual determination of conformance shall be performed as specified in [Clause 5](#).

If the file conforms to a version of ISO 15930 that is defined by a dated revision to a part, then the value of **pdfxid:rev** shall be the four digit year of that revision.

The document metadata of a PDF/X-6 file shall not contain any other properties in the **pdfxid** namespace.

### 6.11.4 File identifiers

A conforming file should have one or more document-level metadata properties to characterize, categorize and otherwise identify the file. This document does not mandate any specific identification scheme. Identifiers may be externally based, such as an International Standard Book Number (ISBN) or a Digital Object Identifier (DOI), or internally based, such as a Globally Unique Identifier/Universally Unique Identifier (GUID/UUID) or another designation assigned during workflow operations. Identifiers should be included through the use of properties such as the **xmp:Identifier** property, the **xmpMM:InstanceID**, **xmpMM:DocumentID**, **xmpMM:VersionID** properties.

When the document's name is to be included in the metadata, it should be provided as the value of the **dc:title** property.

### 6.11.5 File provenance information

If only the document's metadata stream is updated, then only the value of **xmp:MetadataDate** should be changed. However, if any other part of the document is modified, then both the values of **xmp:ModifyDate**, and **xmp:MetadataDate** in the document's metadata stream shall be updated.

If a PDF/X-6 conforming file is changed in any way, even if only by the addition or modification of metadata or digital signatures, then the PDF/X-6 writer shall modify the changing identifier part of the file trailer dictionary **ID** key as described in ISO 32000-2:—, 14.4.

## 6.12 Annotations

### 6.12.1 General

This document allows for annotations to be present inside of the visible area of the page. Annotation types not defined in ISO 32000-2 shall not be permitted. In addition, **PrinterMark** and **TrapNet** annotations shall not be permitted.

NOTE ISO 32000-2 has deprecated PrinterMark and TrapNet.

### 6.12.2 Annotation dictionaries

Except for annotation dictionaries whose **Subtype** value is *Popup*, all annotation dictionaries shall contain the **F** key. If present, the **F** key's **Print** flag bit shall be set to 1 and its **Hidden**, **Invisible**, **ToggleNoView**, and **NoView** flag bits shall be set to 0.

Text annotations should set the **NoZoom** and **NoRotate** flag bits of the **F** key to 1.

NOTE The restrictions on annotation flags prevent the use of annotations that are hidden or that are viewable but not printable. The **NoZoom** and **NoRotate** flags are permitted, which allows the use of annotation types that have the same behaviour as the commonly-used text annotation type. By definition, text annotations exhibit the **NoZoom** and **NoRotate** behaviour even if the flags are not set, as described in ISO 32000-2:—, 12.5.6.4; explicitly setting these flags removes any potential ambiguity between the annotation dictionary settings and processor behaviour.

### 6.12.3 Annotation appearances

For all annotation dictionaries containing an **AP** key, the appearance dictionary that it defines as its value shall contain only the **N** key. If an annotation dictionary's **Subtype** key has a value of *Widget* and its **FT** key has a value of *Btn*, the value of the **N** key shall be an appearance subdictionary otherwise the value of the **N** key shall be an appearance stream.

NOTE 1 Appearance dictionaries are required to be present in a file and rendered appropriately according to ISO 32000-2:2020, Table 166 and the following paragraph. This ensures the reliable rendering of the annotations.

NOTE 2 In accordance with the requirements of ISO 32000-2:2020, 12.7.5.2.3 and 12.7.5.2.4 a Button form field will have multiple appearance states, each one associated with the specific values that the button can take.

## 6.13 Interactive forms

### 6.13.1 General

The intent of the requirements of this subclause is to ensure that there is no ambiguity about the rendering of form fields.

The value of a form field shall not be used by a conforming processor when rendering the field. Instead, the conforming processor shall follow the requirements of [6.12.3](#) and render the appearance dictionary.

NOTE 1 The value of a field, except that of a button field, is the value of the **V** key in the field dictionary. A push-button field has no value.

A Screen annotation dictionary, Widget annotation dictionary or Field dictionary shall not contain the **A** or **AA** keys. The **NeedAppearances** flag of the interactive form dictionary shall either not be present or shall be *false*.

NOTE 2 Annotations of type *Widget* are also subject to all provisions of [6.12.2](#) and [6.12.3](#).

### 6.13.2 XFA forms

The document's interactive form dictionary that forms the value of the **AcroForm** key in the document's catalog dictionary, if present, shall not contain the **XFA** key. In addition, a document's catalog dictionary shall not contain the **NeedsRendering** key.

NOTE This prohibits the use of XML-based XFA forms which are deprecated in ISO 32000-2.

### 6.13.3 Digital signatures

As permitted by ISO 32000-2:—, 12.8, a PDF/X-6 conforming file may contain document, certifying or user rights signatures. Such signatures shall be specified in the PDF file through the use of *signature fields* in accordance with ISO 32000-2:—, 12.7.5.5. All annotations associated with signature fields shall meet the requirements of [6.12.2](#) and [6.12.3](#).

When generating signature appearances and any other PDF objects as part of the signing process, a conforming processor shall ensure that it does not invalidate compliance with this document, specifically concerning any content added to the widget's appearance.

## 6.14 Actions

### 6.14.1 General

The **Launch**, **Sound**, **Movie**, **ResetForm**, **ImportData**, **Hide**, **SetOCGState**, **Rendition**, **Trans**, **GoTo3DView** actions shall not be permitted. Additionally, the deprecated **set-state** and **no-op** actions shall not be permitted. Named actions other than **NextPage**, **PrevPage**, **FirstPage**, and **LastPage** shall not be permitted. In response to each of the four allowed named actions, conforming interactive processors shall perform the appropriate action described in ISO 32000-2: —, Table 215.

NOTE 1 Support for multimedia content is outside the scope of this document. **ResetForm** action changes the rendered appearance of a form. The **ImportData** action imports form data from an external file. **Hide** actions set an annotation's Hidden flag.

NOTE 2 Additional requirements for interactive form fields are specified in [6.13](#).

### 6.14.2 Handling of JavaScript actions

While permitted to be present in a conforming file, a conforming interactive processor shall provide special treatment for actions of type *JavaScript*. These actions may only be executed when they are invoked explicitly by a user (such as via Outlines or Buttons). A conforming processor, that is non-interactive, shall not execute them at all.

NOTE **JavaScript** actions permit arbitrary executable code that has the potential to interfere with reliable and predictable rendering.

### 6.14.3 Trigger events

A Widget annotation dictionary or Field dictionary shall not include an **AA** entry for an additional-actions dictionary.

The document catalog dictionary shall not include an **AA** entry for an additional-actions dictionary. Page dictionaries shall not include an **AA** entry for an additional-actions dictionary.

### 6.14.4 Handling of GoToR, GoToE, URI and SubmitForm actions

While permitted to be present in a conforming file, there are four types of actions for which a conforming interactive processor should provide special treatment – the **GoToR**, **GoToE**, **URI** and **SubmitForm** actions. The conforming interactive processor should provide a mechanism to display the

**F** and **D** keys of a **GoToR** or **GoToE** action dictionary, the **URI** key of a **URI** action dictionary, and the **F** key of a **SubmitForm** action dictionary.

In addition, since the actual invocation of these four actions by a conforming interactive processor involves the locating of and interacting with other files that may or may not be conforming, the processor may choose to not allow the actual invocation of these actions.

## 6.15 Use of optional content

Optional content may be used in PDF/X-6 conforming files to allow multiple variants of a document, which are intended to be printed, to be supplied in a single file.

NOTE 1 Common use cases for this include regional versioning, and the ability to easily suppress printing of a die line in an exchange for packaging, such as specified in ISO 19593-1<sup>[6]</sup>.

The document catalog may contain the **OCProperties** key. The presence of **OCProperties** indicates that the file contains variants, and the requirements of this subclause apply.

In the absence of explicit instructions to the contrary a PDF/X-6 processor shall render the file in the default state set by the value of the **D** key in the **OCProperties** dictionary, as specified in ISO 32000-2:—, 8.11.4.5.

NOTE 2 A variant consists of one or more optional content groups (OCGs), which are associated through an optional content membership dictionary (OCMD) and an optional content configuration dictionary. Each optional content configuration dictionary determines which OCGs are grouped together to form a single variant.

The **OCProperties** dictionary may also contain the **Configs** key. If a **Configs** key is present, then each element of the array, that forms the value of the **Configs** key, shall define a single variant.

Each optional content configuration dictionary that forms the value of the **D** key, or is an element in the array that forms the value of the **Configs** key in the **OCProperties** dictionary, shall contain the key **Name**, the identifier of the variant, which shall be unique amongst all optional content configuration dictionaries within the PDF/X-6 file.

NOTE 3 It is good practice to select all values for the **Name** key in such a way as to allow unambiguous identification of the correct content that is to be printed or displayed.

If an optional content configuration dictionary contains the **Order** key, the array which is the value of this **Order** key shall be either empty or contain references to all OCGs in the conforming file.

A conforming interactive processor shall provide a means to display the contents of the **Order** key from any optional content configuration dictionaries (OCCDs) present in the conforming file that contain an **Order** key or that inherit the **Order** key from the default OCCD. In addition, if a conforming file contains OCCDs in addition to the default OCCD, then a conforming interactive processor shall provide a means to display the list of OCCDs from which a user can choose which one to view and print.

NOTE 4 The OCGs in an Order array can be structured using a hierarchy of arrays and not simply a flat list.

The **AS** key may appear in any optional content configuration dictionary but a conforming processor shall ignore it.

NOTE 5 This prevents the automatic adjustment of states based on usage information (ISO 32000-2:—, 8.11.4.4).

The requirements of 6.8 apply for all fonts used in all optional content, even where a particular exchange will not result in some optional content being rendered.