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Graphic technology — Prepress digital data exchange — Use of PDF —

Part 3: Complete exchange suitable for colour-managed workflows (PDF/X-3)

Technologie graphique — Échange de données numériques de préimpression — Emploi de PDF —

Partie 3: Échange de fichiers complets aptes à la gestion des couleurs (PDF/X-3)

Reference number
ISO 15930-3:2002(E)

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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 3.

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 part of ISO 15930 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 15930-3 was prepared by Technical Committee ISO/TC 130, *Graphic technology*.

ISO 15930 consists of the following parts, under the general title *Graphic technology — Prepress digital data exchange — Use of PDF*:

— *Part 1: Complete exchange using CMYK data (PDF/X-1 and PDF/X-1a)*

— *Part 2: Guidelines for partial exchange of printing data (PDF/X-2)*

— *Part 3: Complete exchange suitable for colour-managed workflows (PDF/X-3)*

Annexes A to D of this part of ISO 15930 are for information only.

Introduction

ISO 15930 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 may take place at different locations. Some of these elements may 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 exchange of raster-based data using the TIFF/IT file format is defined in ISO 12639. The subject of ISO 15930 is a format for the exchange of object-based data where individual objects may be in either vector or raster data structures.

This part of ISO 15930 complements the other parts by defining a data format and its usage to permit the predictable dissemination of a compound entity to one or more locations, as colour-managed data and/or CMYK data, in a form ready for final print reproduction, by transfer of a single file. This file must contain all the content information necessary to process and render the document, as intended by the sender, coded inside a single PDF file. No other parts – 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 “blind” exchange. It is platform and transport independent.

These goals are accomplished by defining a specific use of the publicly available Adobe Portable Document Format as specified in Version 1.3. In order to achieve a level of exchange that avoids any ambiguity in interpretation of the file, it identifies a limited set of PDF objects which may be used and adds restrictions to the use, or form of use, of those objects, and/or keys within those objects.

Whereas PDF/X-3 specifies the exchange of complete material, with all elements present, there are occasions where this is not appropriate. In certain workflows some or all of the referenced elements may be more logically present at the receiving site, or may be exchanged at a different time. These include fonts, high resolution contone image files, or line art files. These exchanges will generally require prior agreement between sender and receiver. The requirements for such situations are addressed in other parts of ISO 15930. Other exchanges may be more appropriately restricted to CMYK data only; such exchanges are accommodated in ISO 15930-1.

Although re-purposing of data is not a primary consideration or requirement of this part of ISO 15930, maximum flexibility will be maintained so that future requirements for re-purposing may be accommodated.

It is anticipated that a variety of products will be developed around 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. 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 — Prepress digital data exchange — Use of PDF —

Part 3: Complete exchange suitable for colour-managed workflows (PDF/X-3)

1 Scope

This part of ISO 15930 specifies the use of the Portable Document Format (PDF) for the dissemination of complete digital data, in a single exchange, that contains all elements necessary for final print reproduction. These exchanges will support both colour-managed workflows and traditional CMYK workflows.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 15930. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 15930 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ICC.1:1998-09, *File Format for Color Profiles*, International Color Consortium

Adobe Portable Document Format, Version 1.3, second edition, 2000, Adobe Systems Incorporated (ISBN 0-201-61588-6)

Adobe Technical Note #5413 — *Recording Output Intentions for Color Critical Workflows*, 22 January 2001, Adobe Systems Incorporated

3 Terms and definitions

For the purposes of this part of ISO 15930, the following terms and definitions apply.

3.1
bleed
additional printing area outside the nominal printing area necessary for the allowance of mechanical tolerance in the trimming process

NOTE The bleed area includes the area that may be printed but does not include printers' marks of any kind.

3.2
characterized printing condition
printing condition (offset, newsprinting, publication gravure, flexographic, direct, etc.) for which process control aims are defined and for which the relationship between printing tone values (usually CMYK) and the colorimetry of the printed image is documented

NOTE 1 The relationship between printing tone values and the colorimetry of the printed image is commonly referred to as characterization.

NOTE 2 It is generally preferred 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.

3.3
complete exchange
exchange of compound entities in which all elements and element resources are present as part of a single PDF file and all of the information needed to process the compound entity is either in the compound entity or is specified within this part of ISO 15930 and its normative references

3.4
compound entity
unit of work with all text, graphics and image elements prepared for final print reproduction; can represent a single page for printing, a portion of a page or a combination of pages

3.5
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

3.6
font
identified collection of graphics that may be glyphs or other graphic elements

3.7
glyph
recognizable abstract graphic symbol which is independent of any specific design

[ISO/IEC 9541-1:1991, 3.12]

3.8
glyph metrics
set of information in a glyph representation used for defining the dimensions and positioning of the glyph shape

[ISO/IEC 9541-1:1991, 3.16]

3.9
ICC
International Color Consortium
industry association formed to develop standardized mechanisms for colour management

3.10
ICC profile
set of colorimetric transforms prepared in accordance with ICC.1

3.11
PDF
Portable Document Format
file format defined in the *Adobe Portable Document Format*

3.12
PDF dictionary
associative table containing key-value pairs, specifying the name and value of an attribute for objects that is generally used to collect and tie together the attributes of a complex object

3.13
print element
element intended for final print reproduction

3.14
printing tone value
data value corresponding to the relative area of a printing surface that is intended to transfer ink to the substrate being printed

NOTE See 3.2 *characterized printing condition.*

3.15
reader
software application that is able to read and appropriately process files

3.16
spot colour
single colorant, identified by name, whose printing tone values are specified independently from colour values specified in a colour coordinate system

3.17
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 press registration

NOTE This is alternately referred to as chokes and spreads or grips and is not to be confused with the term “ink trapping”.

3.18
writer
software application that is able to write files

4 Symbols and 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; for example, the key **Trapped**.

Operands of PDF operators or values of dictionary keys are written in an italic sans serif font; for example the *False* value for the **Trapped** key.

For the purpose of this part of ISO 15930, references to the “PDF Reference Manual” are to the *Adobe Portable Document Format*, as identified in clause 2, extended by Adobe Technical Note #5413.

5 Conformance

This part of ISO 15930 defines the use of the PDF file format for the exchange of digital data representing a compound entity.

NOTE See 3.4 for a definition of a compound entity.

A PDF/X-3 file is a PDF file in which those features necessary for the exchange of a compound entity adhere to this part of ISO 15930. A conforming file may also include other valid PDF features that do not affect final print reproduction of the compound entity.

Neither the version number in the first line of a PDF file, nor the value of the **Version** key in the **Catalog** of a PDF file shall be used in determining conformance with this part of ISO 15930.

A conforming writer is a software application that shall be able to write files conforming to the requirements of this part of ISO 15930.

A conforming PDF/X-3 reader is a software application that shall be able to read and appropriately process all conforming PDF/X-3 files as defined in this part of ISO 15930.

The PDF Reference Manual states that files complying with previous versions of PDF also comply with version 1.3. It is recommended that features that are described in versions of the PDF specification earlier than 1.3, but which are not described in the PDF Reference Manual, should not be used in a conforming PDF/X-3 file. Such features may be ignored by a PDF/X-3 reader. See Annex D.

All conforming readers shall parse all PDF files but may ignore those features not required by this part of ISO 15930. A reader may ignore an annotation's **Print** flag except for those in a **TrapNet** annotation.

Rendering conforming files shall be performed as defined in the PDF Reference Manual.

6 Requirements

6.1 Data structure

A PDF/X-3 file consists of four sections: header, body, cross-reference table, and trailer. The body of a PDF/X-3 file contains a sequence of numbered objects such as numbers, names, strings, dictionaries and streams representing the text characters, graphics, images and their associated resources describing the compound entity being exchanged. The specific PDF features required by this part of ISO 15930 are summarized in Annex A and are defined in 6.2 to 6.16, inclusive. These features shall be used as prescribed in the PDF Reference Manual and as further specified by this part of ISO 15930.

In order to achieve the requirements of a blind exchange (an exchange without recourse to additional technical communication), 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 colorant) shall not be permitted.

NOTE 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.

A PDF/X-3 file may contain two classes of elements: those intended for final print reproduction (print elements), and those not intended for final print reproduction (non-print elements). Non-print elements include such incidental elements as non-printing annotations. All components of a compound entity shall be contained in the body of a single PDF/X-3 file.

"Complete" means the exchanged files shall include:

— all PDF resources (listed in the PDF Reference Manual) used in the file, including all fonts, font metrics, font encodings, and colour space resources (see Annex C);

— all print elements, properly prepared for the intended output condition.

6.2 Colour Spaces

6.2.1 General

A PDF/X-3 file makes provision for exchanging data either as output device code values or as colorimetrically defined data. Colorimetrically defined data shall be described either using a profile in an ICCBased colour space or using an equivalent mechanism, namely a CalGray, CalRGB or Lab colour space.

However, both types of data, if present in a PDF/X-3 file, shall be prepared for a single intended output condition. This intended output condition is defined by either a named condition or an ICC output profile.

6.2.2 Identification of intended output condition

The intended output condition (i.e., the process colour model for the output device) for which data has been prepared shall be identified by use of an **OutputIntents** array in the **Catalog** object as described in Adobe Technical Note #5413. Exactly one of the **OutputIntents** entries shall be a dictionary in which the value of the **S** key is the name **/GTS_PDFX**, henceforth referred to as the PDF/X output intent dictionary. Additional output intents may be present; if so, they shall use different values for the **S** key and shall be ignored by a PDF/X-3 compliant reader.

The PDF/X output intent dictionary shall include the **OutputConditionIdentifier** key.

Where the intended output condition is a characterized printing condition included in the registry of characterizations maintained by the ICC, the value of the **OutputConditionIdentifier** key shall be exactly the same as the name used in the ICC registry.

If the value of the **OutputConditionIdentifier** key matches a characterization name in the ICC registry the **RegistryName** key shall be present with the value (http://www.color.org). If it matches a characterization name in any other registry it is strongly recommended that the **RegistryName** key be present, preferably with a value that provides a URL at which more information regarding the registry may be obtained. See Annex B.

Where all colour data is supplied in the process colour model of the intended output condition, or in **Separation**, **DeviceN**, **Indexed** or **Pattern** colour spaces that only make use of those process colours and/or spot colours, a **DestOutputProfile** key is optional. If some or all colour data is not supplied in the process colour model of the intended output condition or the **OutputConditionIdentifier** key does not match a characterization name in the ICC registry, a **DestOutputProfile** key is required.

If present in the **DestOutputProfile** stream object, the **Alternate** key shall be ignored by a PDF/X-3 compliant reader.

The values of the **profileDescriptionTag** and **charTargetTag**, if present in the ICC profile, shall be ignored.

The PDF/X output intent dictionary should include the **Info** key. If the **Info** key is present its value should be a string describing the intended printing condition in a form that will be meaningful to a human operator at the site receiving the exchanged file.

The profile that is the value of the **DestOutputProfile** key, if present, shall be an Output Device profile (Device Class = 'prtr') as defined in ICC.1.

NOTE If some or all colour data is not supplied in the process colour model of the intended output condition, the intent is that the profile that is the value of the **DestOutputProfile** key is to be used to transform the colour data provided into the process colour model of the intended output condition.

6.2.3 DeviceCMYK

If a PDF/X-3 file includes colour data defined in **DeviceCMYK** and if the intended output device is not CMYK, a **DefaultCMYK** colour space shall be included in the **ColorSpace** dictionary of the **Resources** dictionary of the root object of the marking content. The **DefaultCMYK** shall provide a colorimetric definition.

6.2.4 DeviceGray

If the intended output condition is CMYK, **DeviceGray** shall be taken as referring to the black separation of the intended output condition.

If a PDF/X-3 file includes colour data defined in **DeviceGray**, and if the intended output device is not CMYK or Gray, a **DefaultGray** colour space shall be included in the **ColorSpace** dictionary of the **Resources** dictionary of the root object of the marking content. The **DefaultGray** shall provide a colorimetric definition

6.2.5 DeviceRGB

If a PDF/X-3 file includes colour data defined in **DeviceRGB** and if the intended output device is not RGB, a **DefaultRGB** colour space shall be included in the **ColorSpace** dictionary of the **Resources** dictionary of the root object of the marking content. The **DefaultRGB** shall provide a colorimetric definition.

6.2.6 ICCBased colour spaces

A compliant PDF/X-3 reader shall use the ICC profile and shall not use the **Alternate** colour space in the stream dictionary of an **ICCBased** colour space or other defaults.

6.2.7 Separation and DeviceN colour spaces

Printing tone values of spot colours shall be specified using **Separation** or **DeviceN** colour spaces. “Black” may be printed using the **DeviceGray** colour space or by using the Black **Separation** colour space. For the alternateSpace colour space of **Separation** or **DeviceN** colour spaces all restrictions in 6.2.3, 6.2.4 and 6.2.5 shall apply.

NOTE 1 The use of the Black **Separation** colour space may cause a different overprinting behaviour than does that of the **DeviceGray** colour space unless the **OPM** key in the extended graphics state has a value of 1.

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

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

NOTE 2 It is the responsibility of the originator of the PDF/X-3 file to assure consistent use of spot colour names across all objects in the file. Industry-recognized names should be used wherever possible.

6.2.8 Indexed and Pattern

For the base colour space of **Indexed** and **Pattern** colour spaces, 6.2.3 through 6.2.6 apply.

6.2.9 Annotations and non-printing elements

Annotations (both printing and non-printing) and all non-printing elements may make use of any colour space.

NOTE Thumbnails are an example of a non-printing element.

6.3 Fonts

Fonts that contain glyphs, related metrics, and font encodings for at least all the characters used shall be embedded within the file. The receiver shall use the embedded fonts (rather than other locally resident, substituted, or simulated fonts) for rendering and display. Unless special agreements are in place with the font copyright holder, only fonts that are publicly identified as legally embeddable in a file for display and rendering shall be used.

6.4 Data compression

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

6.5 Trapping

The **Trapped** key contained in the **Info** dictionary shall be used when exchanging files. The **Trapped** key indicates the state of trapping within the file. If the entire file has not been trapped then the value of the **Trapped** key shall be set to *False*. Otherwise, the entire file shall have been trapped as necessary, and the value of the **Trapped** key

shall be set to *True*. Partially trapped files are not permitted. A value of *Unknown* for the **Trapped** key is prohibited in PDF/X-3 files.

If a file contains a **TrapNet** annotation, the value of the **Trapped** key in the **Info** dictionary shall be *True*.

NOTE If the page contents are edited after the creation of the **TrapNet** annotation the **TrapNet** annotation will no longer be valid.

The **FontFauxing** key in a **TrapNet** annotation shall either not be present, or shall be an empty array. In a PDF/X-3 file, the value of the **PCM** key in the appearance dictionary of a **TrapNet** annotation shall match the process colour model of the intended output device.

6.6 PDF file identification

A PDF/X-3 file shall be so identified using the **GTS_PDFXVersion** key in the **Info** dictionary. The type of the value of the **GTS_PDFXVersion** key is string.

The value of the **GTS_PDFXVersion** key for files prepared in accordance with this part of ISO 15930 is *(PDF/X-3:2002)*.

All PDF/X-3 files shall contain the following key-value pairs in the **Info** dictionary, and their values shall be filled in prior to exchange: **CreationDate**, **ModDate**, and **Title**.

The values for the **Creator** and **Producer** keys in the **Info** dictionary should be filled in prior to exchange.

The **ID** key in the **trailer** shall be used.

6.7 Bounding boxes

Each **Page** object shall include either **TrimBox** or **ArtBox**, but not both. 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, the **ArtBox** or the **TrimBox** shall not extend beyond the boundaries of the **CropBox**.

NOTE 1 Some industry practices may require the use of the **BleedBox**. Appropriate trade practices should be followed.

NOTE 2 The use of **TrimBox** is recommended over the use of **ArtBox**.

6.8 Extended Graphics state

A PDF/X-3 file shall not contain the transfer function key (**TR** or **TR2**) or halftone phase keys (**HTP**) within an **ExtGState** resource.

A conforming reader may ignore the halftone key (**HT**). (See Annex C.)

Use of the halftone key (**HT**) shall be consistent with the intended printing conditions and shall make use of the **TransferFunction** key in a halftone dictionary only as required by the PDF Reference Manual.

All halftones in a PDF/X-3 file shall have the value *1* or *5* for the **HalftoneType** key.

NOTE This prohibits the use of threshold screens that will produce different appearances at different resolutions.

Halftones in a PDF/X-3 file shall not contain a **HalftoneName** key.

6.9 PostScript XObject and the PS operator

A PDF/X-3 file shall not contain instances of the **PostScript XObject** and/or the **PS** operator.

6.10 Use of the Encrypt dictionary

A PDF/X-3 file shall not contain an **Encrypt** dictionary.

6.11 Alternate Images

An **Image XObject** in a PDF/X-3 file that includes alternate images shall have no alternate where **DefaultForPrinting** is set to *true*.

NOTE This means that the image that is viewed by default will also be printed by default.

All images included in the **Alternate** 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.

6.12 Annotations

All annotations other than PDF trapping annotations shall have extensions lying completely outside the **BleedBox** (or the **TrimBox** or **ArtBox**, if no **BleedBox** is present). A PDF/X-3 reader may completely ignore annotations except for PDF trapping annotations.

NOTE 1 A list of annotation types can be found in the section “Annotations” of the PDF Reference Manual.

NOTE 2 This provision guarantees that when a page from a PDF/X-3 file is rendered on a screen by a PDF viewing application, the visual impression of the actual page is not obscured by such annotations. Also, this provision avoids unexpected behaviour of PDF files viewed on screen by using invisible interactive elements inside the page area.

NOTE 3 As Acrobat Forms elements are a special case of annotations, the same rules apply as for other annotation types.

6.13 Actions and JavaScripts

A PDF/X-3 file shall not include Actions or JavaScripts.

6.14 Use of the BX/EX operators

A PDF/X-3 file shall not include operators in a **Contents** stream that are not described in the PDF Reference Manual, even if they are encapsulated between **BX** and **EX** operators.

A conforming PDF/X-3 reader shall process every page operator according to the PDF Reference Manual, even when they are encapsulated between **BX** and **EX** operators.

NOTE 1 The operators **BX** (Begin section where undefined page operators are not reported) and **EX** (End section where undefined page operators are not reported) designate areas in a page description that according to the PDF Reference Manual may be ignored and not rendered by a reader that does not understand some or all of the page operators in between **BX** and **EX**.

NOTE 2 It is recommended that a PDF/X-3 writer does not make use of the **BX**/**EX** operators.

6.15 File specifications

A PDF/X-3 file shall not contain file specifications as described in the section “File specifications” in the PDF Reference Manual.

NOTE File specifications are required in PDF OPI dictionaries and are also used for external streams, both of which are not permitted in a PDF/X-3 file.

6.16 Use of digital signatures

A PDF/X-3 file may contain digital signatures as defined in the section “Signature Fields” in the PDF Reference Manual. A PDF/X-3 reader may ignore digital signatures.

Annex A
(informative)

PDF feature summary

Table A.1 lists those PDF objects, and keys within those objects, for which the requirements of PDF/X-3 vary from those of the PDF Reference Manual. Each record in the table notes the status of the object, or key, and the section of this part of ISO 15930 where the status is defined. Statuses used are:

Required — A PDF/X-3 file shall contain this object or key.

Prohibited — A PDF/X-3 file shall not contain this object or key.

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

Recommended — It is recommended that all PDF/X-3 files include this key.

A PDF/X-3 file also conforms to the PDF Reference Manual; that is, it includes all objects, keys and values noted as required in that manual, and may not contain objects, keys or values that are prohibited by the manual singly or in combination. A conforming reader may support all other objects, keys and values as defined in the normative references specifying PDF file structure as desired.

If a reference to a PDF dictionary object is included in the table, but keys within that object are not explicitly listed, then all keys within that object and its descendants (if any) inherit their status from the item which is shown in the table. If any keys within a dictionary object are explicitly listed in the table, then a conforming reader is not required to support any other keys (or their descendants) within that object type unless they are required by the PDF Reference Manual, nor are other keys prohibited.

An object is descendant from another object (called the ancestor) if

a) it is the value of a key in the ancestor object,

b) the ancestor object is an array and the descendant object is an element of that array, or

c) the descendant object is a descendant of a descendant of the ancestor object.

If a key or object is noted as required, all ancestor objects required to access it from the document's **trailer** are also required; e.g. the **Trapped** key in the **Info** object is required, therefore the **Info** object itself is required.

All operators defined in the normative references for use in PDF **Contents** streams may be included in a PDF/X-3 file, except for those listed below:

Operators that are prohibited for use in PDF/X-3 files:

Operator	Effect	Reference
PS	execute in-line PostScript	6.9

Operators that a conforming reader is expected to parse in a **Contents** stream, but is not required to act on beyond removing appropriate numbers of objects from the operand stack:

Operator	Effect
BX	Begin section where undefined page operators are not reported
EX	End section where undefined page operators are not reported
BMC	Begin marked content
BDC	Begin marked content with property list
EMC	End marked content
MP	Mark point
DP	Mark point with property list

Table A.1 — PDF objects for which the PDF/X-3 requirements vary from the PDF Reference Manual

Object	Keys	Status	Reference
Trailer	**ID**	Required	6.6
	Encrypt	Prohibited	6.10
Info	**CreationDate**	Required	6.6
	Creator	Recommended	6.6
	GTS_PDFXVersion	Required	6.6
	ModDate	Required	6.6
	Producer	Recommended	6.6
	Title	Required	6.6
	Trapped	Required	6.5
Page	**ArtBox**	Restricted	6.7
	TrimBox	Restricted	6.7
	BleedBox	Restricted	6.7
Resources	**ColorSpace**	Restricted	6.2
	Fonts	Required if text is used	6.3
	PS XObject	Prohibited	6.9
Alternate image	**Image XObject**	Restricted	6.11
ExtGState	**HTP** (Halftone Phase)	Prohibited	6.8
	HT (Halftone)	Restricted	6.8
	TR (Transfer Function)	Prohibited	6.8
Font	**FontDescriptor**	Required if text in fonts other than Type 3 is used	6.3
FontDescriptor	**FontFile** or **FontFile2** or **FontFile3**	Required if text in fonts other than Type 3 is used	6.3
TrapNet annotation	**FontFauxing**	Restricted	6.5
	PCM	Restricted	6.5
Action Dictionaries	All	Prohibited	6.13
JavaScripts	All	Prohibited	6.13
Annotations	All	Restricted	6.12
File specification	All	Prohibited	6.15
Streams	**Filter**	Restricted	6.4

Annex B
(informative)

Minimal requirements for output intent dictionaries

The International Color Consortium (ICC) has established a registry for characterization data of standard printing processes. Recognized standards organizations may provide data for inclusion in the registry. This registry is maintained by the ICC Secretariat at http://www.color.org/.

The ICC does not endorse any data referenced by the registry.

Each printing process is identified by a short name (the Reference name in the ICC characterization data registry). The registry provides full details of the printing system and indicates where and how measurement data may be obtained. It is anticipated that the target and data format specified in ISO 12642 will be used.

It is recommended that the short name of a characterized printing condition be used as the value of the **OutputConditionIdentifier** key in a PDF/X output intent dictionary wherever possible.

Annex C
(informative)

Clarifications

C.1 Copydot information included as bilevel data

Copydot scans of pre-screened data (high resolution scans of halftone films) or equivalent electronically generated bit-mapped files are included as bilevel data; that is, as inline images or **Image XObjects**. Unless the resolution of the copydot data has an integer relationship with the imaging device resolution, undesirable imaging artifacts may occur.

The resolution of a bilevel image in a PDF file can be extracted, if desired, for preflight or other verification applications.

The reproduction characteristics of any copydot information should be prepared to conform to the intended printing condition specified for the PDF/X-3 file.

C.2 Specification of screening parameters

The general approach envisioned for PDF/X-3 data exchanges is that the receiving system is responsible for the screening of the data consistent with the intended printing condition specified for the file. However, in some workflows there is a need to specify specific screening parameters for certain elements. As noted in this part of ISO 15930, it may be appropriate for some applications to ignore these parameters if present. Where an originator of a PDF/X-3 file feels that screening parameters are important to achieve a particular imaging requirement, and should not be ignored, that requirement should be communicated to the receiver of the file as part of the business data relating to the particular advertisement or printing job.

C.3 Fonts

This part of ISO 15930 requires the embedding of fonts needed for output. The licence agreements for some fonts do not permit their embedding. This prohibits the use of these fonts in PDF/X-3 files. The creator of the file should ensure that all fonts are used in compliance with their licencing agreements.

Annex D
(informative)

Recommendations regarding transparency

D.1 Introduction

This part of ISO 15930 is based on version 1.3 of the PDF Reference Manual. As this part of ISO 15930 approached completion, PDF version 1.4 was published by Adobe. A later revision of this part of ISO 15930 will provide compatibility with PDF 1.4 (or later).

The PDF 1.4 specification adds a number of features to PDF, including support for partial transparency. Objects are marked as transparent by the addition of new keys to various objects in the PDF file, especially in **ExtGState** objects and **Image XObjects**. Some combinations of values for these keys indicate partial transparency, while other combinations denote “null transparency,” where objects are fully opaque, as is the case for all objects in files compatible with PDF version 1.3 or earlier.

A PDF/X-3 compliant reader processing a file that includes a **GTS_PDFXVersion** key identifying it as a PDF/X-3 compliant file should ignore any keys that are not defined in version 1.3 of the PDF specification or in this part of ISO 15930. They should be treated as private extensions that do not affect the final rendered representation. This means that the presence of keys and values described in version 1.4 of the PDF specification for representing non-null transparency does not prevent a file from being PDF/X-3 compliant.

In such a case there is a potential for significantly different rendering of the file by a PDF/X-3 compliant application compared to what would be generated by applications in common use that are compatible with PDF version 1.4. This is obviously an undesirable state of affairs, therefore:

— PDF/X-3 compliant writers are recommended not to include the keys used for controlling transparency in PDF version 1.4.

— Tools designed to verify or correct PDF/X-3 compliance are recommended to treat the presence of keys and values that would indicate non-null transparency to a PDF 1.4 reader as a condition requiring correction. Key/value combinations indicating null transparency may be accepted.

— Tools that render PDF/X-3 files must render the file according to the PDF 1.3 specification and ignore any implication of partial transparency, rendering all objects as fully opaque.

Note that 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-3 compliant.

D.2 Identification of non-null transparency

A file should be regarded as including non-null transparency if any of the keys shown in Table D.1 is present with any value other than that shown in the table in an **ExtGState** object.

Table D.1 — Key values for ExtGState

Key	Value
BM	*Normal* or *Compatible*
CA	*1.0*
ca	*1.0*

A file containing the **SMask** key in an **ExtGState** object or **Image XObject** should also be regarded as containing non-null transparency.

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