

Sustainability of Digital Formats: Planning for Library of Congress Collections

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Format Description Properties

- ID: fdd000124
- Short name: PDF/X_family
- Content categories: still-image, text
- Format Category: file-format, encoding
- Other facets: unitary, binary, structured, sampled
- Last significant FDD update: 2024-05-08
- Draft status: Full

Identification and description

Full name	ISO 15930. Graphic technology - Prepress digital data exchange using PDF
Description	<p>PDF/X is a family of ISO standards for constrained forms of the PDF_family of format specifications, designed for prepress digital data exchange. According to the 2003 PDF/X FAQ by Martin Bailey, "The aim for designers is to provide a digital content file that they can be confident will be printed predictably and correctly by the service provider, whether it's a commercial print job printed on one site, or a magazine ad placed in many publications and printed across the world. The aim for service providers and publishers is to receive robust digital content files that they can be confident will run through prepress without requiring rework or causing errors and will allow them to meet (or exceed) customer expectations on press."</p> <p>The first version of PDF/X was published in 1999 as an American National Standard and was based on PDF Version 1.2. In 2001, a very similar specification, but based on PDF 1.3, was published as an international standard, ISO 15930-1. This was the first ISO standard based on Adobe's PDF format. The PDF/X standards are now developed and maintained by a working group with representatives primarily from the printing industry and with active support from Adobe Systems Incorporated. The working group is WG2 of ISO/TC 130 Graphic technology.</p> <p>PDF/X restricts the content in a PDF document, prohibiting elements that do not directly serve the purpose of high-quality print production output, such as annotations, scripting actions, and embedded multimedia. PDF/X in a Nutshell, a brochure published by the PDF Association in 2017, stated, "One principle of PDF/X is that conforming files must be complete, i.e. fully self-contained. In addition, nothing may appear on a PDF/X page that is either not printable at all (such as video or 3D) or where print output is not fully defined (for example, if</p>

a font is not embedded)." For more specific and more technical principles and constraints for PDF/X from the same brochure, see [Notes](#) below.

The PDF/X family of formats includes variants that combine both chronological versions and functional profiles. The PDF/X specifications use the term "conformance level" to refer to such combinations. Some PDF/X conformance levels are intended to support complete or "blind" exchange of graphics files with all required elements within a single file. Some conformance levels are partial, assuming that the two parties share some information, for example an ICC color profile, through other means.

Key constraints for blind exchange include:

- All fonts and images must be embedded
- Boxes that specify the print and trim areas must be explicitly defined
- Trapping status must be explicit. [Trapping controls overlap of elements that are in different layers and applied through separate printing processes; a small degree of overlap is desirable to allow for imprecise registration in the printing process. Trapping can be applied before or after exchange; but should not be applied more than once. See [Wikipedia entry for Trap_\(printing\)](#).]
- Colorspaces must be specified in a device-independent manner, using an [OutputIntent](#) and the colorspace definition (e.g., ICC profile) must be embedded.
- Encryption is disallowed in all PDF/X files compliant with versions other than PDF/X-1.

For more specifics on constraints for PDF/X in relation to the underlying PDF format, see [Notes](#) below.

Starting in 1999, a number of specifications of PDF/X have been published, with new versions taking into account both new versions of the underlying PDF specification and new demands of the printing industry based on technological innovations, particularly in color printing. Listed below are specification variants, using identification strings as found in the PDF metadata of compliant files. For more on self-identification of PDF/X versions and conformance levels, see [Notes](#) below. The annotations for the PDF/X variants listed below are drawn largely from the PDF/X FAQ, compiled by Martin Bailey and released with updates through 2005 and from "PDF/X in a Nutshell" from the PDF Association. See [Useful References](#) below. A summary table of PDF/X conformance levels is included in the introduction to ISO 15930-7:2010, online via [ISO's online browsing platform](#).

PDF/X-1:1999: Prior to ISO standardization. Specified in *ANSI CGATS.12/1-1999, Graphic technology— Prepress digital data exchange — Use of PDF for composite data — Part 1: Complete exchange (PDF/X-1)*. Based on PDF 1.2. Permitted encryption. Supported references to embedded stream objects using OPI (Open Prepress Interface) references. This "internal OPI" mechanism allowed PDF/X to serve as a wrapper for [TIFF/IT](#) images. Very few implementations of *PDF/X-1:1999* were ever released by vendors.

PDF/X-1:2001: Specified in ISO 15930-1:2001. Generally similar to *PDF/X-1:1999*, except based on [PDF 1.3](#) rather than PDF 1.2. For complete exchange for CMYK data. Identical to *PDF/X-1a:2001* except that *PDF/X-1:2001* supported the "internal OPI" mechanism and allowed encryption. In November 2003, there were no known implementations of *PDF/X-1:2001* and vendors were discouraged from implementing it.

PDF/X-1a:2001: Specified in ISO 15930-1:2001. For complete exchange for CMYK data. Based on PDF 1.3. Disallowed encryption and any use of OPI. By November 2003, *PDF/X-1a:2001* was widely adopted. A special case for the self-identification of conformance level; see [Notes](#) below. Still widely used as of 2019.

PDF/X-1a:2003: Specified in ISO 15930-4:2003. For complete exchange for CMYK data. A minor update to *PDF/X-1a:2001*, based on PDF 1.4. In 2005, Martin Bailey's PDF/X FAQ recommended continued use of (*PDF/X-1a:2001*), observing that "the benefits to a user of creating or receiving files using the

2003 standards are outweighed by the disadvantage of the extra confusion that supporting them may cause."

PDF/X-3:2002: Specified in ISO 15930-3:2002. For complete exchange for both color-managed and CMYK workflows, based on PDF 1.3. Functionally, a superset of PDF/X-1a:2001, which only supports CMYK workflows. Disallows encryption and any use of OPI. Widely used, but steadily superseded by use of PDF/X-4.

PDF/X-3:2003: Specified in ISO 15930-6:2003. For complete exchange for both color-managed and CMYK workflows, based on PDF 1.4. Of features introduced in PDF 1.4, PDF/X-3:2003 disallows JBIG2, Transparency, and Referenced PDF. Not widely used.

PDF/X-2:2003: Specified in ISO 15930-5:2003, which was withdrawn in 2011. For partial data exchange of both color-managed and CMYK workflows, based on PDF 1.4. ISO 15930-5:2003 was expressed as a modification of the specification in ISO 15930-6:2003 for complete exchange, which was published at the same time. Introduced a non-OPI mechanism for referring to external content for printing and required all such external content to be in files compliant to one of the then current PDF/X specifications. Of features introduced in PDF 1.4, PDF/X-2:2003 disallowed JBIG2 and transparency.

PDF/X-4: Specified in ISO 15930-7:2010 (a minor revision of ISO 15930-7:2008). For complete exchange for both color-managed and CMYK workflows, based on PDF 1.6. Permits transparency. The use of optional content (often referred to as "layers") is allowed, enabling regional versioning, for example. Also supports JPEG2000, OpenType fonts, and 16-bit images. The document *info* directory previously used for metadata is optional. PDF/X-4 files require an XMP-based document metadata stream instead. If the *info* directory is present, its values must match those in the XMP-based metadata. Uses PDF/X identification schema, with namespace URI <http://www.npes.org/pdfx/ns/id/> and prefix *pdfxid:* to declare PDF/X conformance level within the document metadata stream. Widely used.

PDF/X-4p: Specified in Annex A of ISO 15930-7. Based on PDF 1.6. Identical to *PDF/X-4*, except that *PDF/X-4p* allows its *OutputIntent* to refer to an external ICC profile.

PDF/X-5g: Specified in ISO 15930-8 (originally published in 2008, with minor revision in 2010). For partial exchange, based on PDF/X-4 and PDF 1.6. Allows external graphical content in PDF/X files conforming to *PDF/X-1a:2001*, *PDF/X-1a:2003*, *PDF/X-3:2002*, *PDF/X-3:2003*, *PDF/X-4*, *PDF/X-4p*, *PDF/X-5g* or *PDF/X-5pg*. Not widely used.

PDF/X-5n: Specified in ISO 15930-8. For partial exchange, based on PDF/X-4 and PDF 1.6. Supports external n-colorant ICC profile conforming to ISO 15076-1.

PDF/X-5pg: Specified in ISO 15930-8. For partial exchange, based on PDF/X-4 and PDF 1.6. Supports external ICC profile and external graphical content. Not widely used.

PDF/X-6: Published as [ISO 15930-9](#), for 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. According to [The new PDF 2.0 and subset standards \(December 16, 2020\)](#), PDF/X-6 adds support for new features in PDF 2.0 such as page level output intents, black point compensation, halftone origins and CxF/X-4 spot colour characterisation data. For the first time PDF/X-6 permits PDF/X files to have annotations, including digital signatures, form fields and videos, reducing complexity in multi-channel workflows. If any ICC profile associated with any PDF/X output intent is externally supplied then the file is designated as PDF/X-6p for gray, RGB or CMYK-based profiles or PDF/X-6n for n-colorant profiles. These new optional conformance levels in PDF/X-6 accommodate a wider variety of process optimizations and workflows as they allow ICC profiles to be maintained externally. For discussions about the changes in PDF/X-6, see also the [PDF 2.0 / PDF/X-6](#) thread from early 2017 on the PrintPlanet Forum, the 2020 presentation [PDF/A-4, PDF/X-6 and the other new PDF standards | video](#) by

	<p>Dietrich von Seggern and End-to-End Publishing with PDF 2.0 and PDF/X-6 by Dov Isaacs of Adobe from January 2019.</p> <p>Since the publication of PDF/A-1 in 2005, updates to the PDF/X standard have been aligned to the fullest extent possible with the then current PDF/A family standard. As stated in PDF/A FAQ (2015), "The PDF/A and PDF/X standards are fundamentally compatible; i.e. a PDF file can generally conform to both PDF/A and PDF/X, but for maximum compatibility with modern PDF/X files, PDF/A-2 is highly recommended due to its support for transparency and layers." QuarkXPress 2018 claims to be able to output a pdf file that conforms to both PDF/X-4 and PDF/A-2b or PDF/A-2u. See Guide to QuarkXPress 2019: Output.</p>
Production phase	A middle-state format for exchange during prepress activities. Serves as a final-state digital format to the extent that it is used for online proofing prior to printing.
Relationship to other formats	
Subtype of	PDF family , PDF (Portable Document Format) Family
Has subtype	Various chronological versions and functional profiles ("conformance levels"), not described separately on this website at this time.

Local use

LC experience or existing holdings	The Library of Congress has received some examples of PDF/X files in tests with newspaper content, but is not aware of any PDF files in its permanent collections that conform to any of the PDF/X standards.
LC preference	The Library of Congress Recommended Format Statement (RFS) includes PDF/X as a preferred format for textual works in digital form , electronic serials , and digital musical scores . The RFS also includes PDF/X as an acceptable format for other graphic images - digital and 2D and 3D Computer Aided Design vector images . The RFS does not distinguish between PDF/X versions or profiles but LC will likely prefer those intended for blind exchange. See also PDF family .

Sustainability factors

Disclosure	Open standard. Developed and maintained under the auspices of Working Group 2 of ISO/TC 130 Graphic technology. See ISO/TC 130 committee page and ISO/TC 130 website . See also ISO TC 130 & U.S. Technical Advisory Group . A number of other entities are or have been involved in the standardization of PDF/X; see Notes below for details.
Documentation	<p>Specific PDF/X versions and profiles are documented in various parts of ISO 15930. See Format Specifications below.</p> <p>Note: Another ISO standard related to PDF/X was ISO 15929:2002. Graphic technology - Prepress digital data exchange - Guidelines and principles for the development of PDF/X standards. This standard was withdrawn in 2008, by which time its content had been integrated into current parts of ISO 15930 as appropriate.</p>
Adoption	PDF/X is widely used in prepress workflows to enable correct printing of documents by commercial printing services. See, for example, How PDF changed prepress production dramatically in the last 25 years by Stephan Jaeggi in October 2018. Some PDF/X variants have been adopted more widely than others. According to About PDF/X, PDF/E, and PDF/A standards from Adobe in October 2018, the most widely used standards for a print publishing workflow are PDF/X-1a, PDF/X-3, and PDF/X-4. These are conformance levels for complete exchange. The conformance levels for partial exchange are designed for use when a company is sending many files to the same commercial printing service using the same color configuration and/or some of the same print content. The most widely used conformance levels for partial exchange appear to be PDF/X-4p and PDF/X-5n. Comments welcome .

A slide captioned "The New PDF/X Lineup" in [End-to-End Publishing with PDF 2.0 and PDF/X-6](#) from January 2019 lists PDF/X-1a:2001, PDF/X-3:2002, PDF/X-4 & 4p, PDF/X-5g, 5n, & 5pg, and, as under development, PDF/X-6, 6p, & 6n. By omitting the 2003 updates to PDF/X-1a and PDF/X-3, this echoes the answer to *Should I start using the 2003 revisions?* in the [November 2005 PDF/X FAQ](#), which states, "As a general rule, the benefits to a user of creating or receiving files using the 2003 standards are outweighed by the disadvantage of the extra confusion that supporting them may cause. For both senders and receivers of files the default selection should therefore be PDF/X-1a:2001 or PDF/X-3:2002, rather than the 2003 variants. This matches the decision made by the [Ghent PDF Work Group](#) for their 2005 specifications."

A key stimulus for the development of PDF/X was the requirement for a consistent specification for the submission of advertisements to print publications. According to [PDF/X in a Nutshell](#), the first known use of a PDF/X-1 file in live production was for an advertisement in the March 13, 2000 issue of Time magazine. According to the [November 2003 PDF/X FAQ](#) (available via Internet Archive), the first known case of PDF/X-1a being used for the whole of a magazine transmission from publisher to printer was "Wizards of the Coast – Dragon issue 292" in December 2001. In October 2001, the Digital Distribution of Advertising for Publications Association (DDAP) published companion recommendations for [PDF/X as a File Format for Delivery of Digital Advertising](#) and [TIFF/IT as a File Format for Delivery of Digital Advertising](#). By July 2005, the recommendation for [TIFF/IT](#) had been dropped and was not mentioned on the newly designed [DDAP Resource Center](#) page; all the resources related to PDF/X. The 2017 [PDF/X in a Nutshell](#) brochure stated that most newspaper and magazine publishers have adopted PDF/X, requiring all advertising to be delivered as a PDF/X-1a file, and in turn delivering their final pages to the printer as PDF/X-1a files.

PDF/X-1a:2001 remains widely used, despite the fact that PDF/X-4 is judged as superior by many experts, because it supports transparency. See, for example, [PDF/X-4 is the preferred PDF format](#) by Stephan Jaeggi from August 2016. See also a 2017 discussion thread on PrintPlanet, which started as a question about [PDF 2.0 / PDF/X-6](#) and moved into a discussion of adoption of PDF/X-4 vs PDF/X-1a.

PDF/X-3:2002 remains widely used. One reason may be that in MacOS, the Preview application included with the OS can convert a document into a PDF/X-3:2002 file, and no other PDF/X variant. In [PDF/X-4 is the preferred PDF format](#) from 2016, Stephan Jaeggi reported on an informal survey question to the readers of his prepress newsletter, "Which PDF format do you prefer?" He was disappointed by the continued use of PDF/X-3 to the extent revealed by the survey (21.60% compared with 38.89% for PDF/X-4).

Conformance profiles that allowed external graphical content were introduced with PDF/X-5, but have not been adopted in practice. In May 2019, [Future ISO standards based on PDF 2.0](#) from PDFLib, stated that "there are no plans for successors to PDF/X-5g with external graphical content and PDF/X-5pg with external profile and content as these formats didn't find adoption across the industry."

Adobe has added support for new versions of PDF/X intended for complete exchange to Acrobat Pro as new editions were released, on some occasions releasing support for a draft of the next PDF/X version before it was approved. Acrobat 4.0 (2000) and later could render PDF/X-1a:2001 and PDF/X-3:2002 files. Acrobat 6 Professional (2003) offered support for rendering, creating, and validating PDF/X-1a:2001 and PDF/X-3:2002 files. Acrobat 7 (2004) from Adobe could render, create, and validate PDF/X files using the 2003 versions of profiles 1a and 3. By 2008, Acrobat 8 supported PDF/X-1a, PDF/X-3, and PDF/X-4. Acrobat X (2011) supported rendering, creation, and validation for PDF/X-4:2010 and PDF/X-5:2010. Another key Adobe product that supports PDF/X is InDesign. InDesign in Creative Suite 3 and 4 could create PDF/X-4:2008 files. In April 2011, InDesign 2.5 in Creative Suite 5.5 supported PDF/X-4:2010 out of the box and PDF/X-5 via an SDK. In Help for InDesign 14.0 (released in Oct 2018), [Adobe PDF Presets](#) indicates that, by default, Adobe InDesign offers output to PDF/X 1a:2001, PDF/X-3:2002, and PDF/X-4 by default. "Presets" for PDF/X 1a:2003 and PDF/X 3:2003 presets are

	<p>distributed as optional extras. The same Help document indicates that Adobe's Illustrator and Photoshop applications can export PDF/X-4:2008 files.</p> <p>Many commercial printing services and applications support PDF/X. The Publish to PDF File dialog box from the User Guide for Kodak's Prinergy Workflow software indicates options for PDF/X-1a:2001 and PDF/X-3. The PDFX-ready association provides tools and guidance for workflows based on PDF/X-1a and PDF/X-4. According to a January 31, 2017 press release from Datalogics (posted on pdfa.org), version 15 of the Adobe PDF Library SDK supports PDF/X conversion for graphic arts, prepress applications, and workflows. Another widely used tool that supports PDF/X is callas pdfToolbox, which can generate files conforming to PDF/X-1a, PDF/X-3, PDF/X-4, PDF/X-4p, and PDF/X-5n. The PDFlib software library supports creation of PDF/X-3, PDF/X-4, PDF/X-5g, and PDF/X-5n. See PDFlib Cookbook PDF/X. GWG Compliant Applications lists applications that have been verified by the GWG to be compliant with one or more of the GWG specifications, which are based on PDF/X. Instructions for successful output of Ghent PDF Output Suite 5.0 lists vendors of print workflow systems who have provided instructions for producing PDF/X-4 output that satisfies the GWG recommendations. Another list of applications is included in the response to Which standalone PDF applications are you using frequently for your prepress files?</p> <p>Some open source applications also support PDF/X. Scribus, an open source desktop publishing application, supports PDF/X-3. Apache FOP (Formatting Objects Processor), for rendering XML to other formats, supports PDF/X-3:2003 and PDF/X-4. The pdfx package for LaTeX facilitates generation of PDFs complying with PDF/X and PDF/A standards. It offers options for all PDF/X conformance levels.</p> <p>PDF/X-6 is a newly published standard as of December 2020. The compilers of this resource have not attempted to assess the adoption of this version of the PDF/X family of formats. Comments welcome.</p>
Licensing and patents	See PDF_family .
Transparency	Depends upon compliant software tools to read. Building tools for rendering requires sophistication. Requires familiarity with color-management standards and specifications to render fully as intended by the creator. See also PDF_family .
Self-documentation	<p>Basic descriptive metadata elements (Title, CreationDate, ModDate) have been required since PDF/X-1:2001, with Creator and Producer recommended. For the profiles published in 2003 based on PDF 1.4, XMP-based document metadata may be present. Starting with PDF/X-4 and PDF/X-5, based on PDF 1.6, the use of embedded XMP-based document metadata has been mandatory, with the following descriptive elements required: xmp:CreateDate, xmp:ModifyDate, xmp:MetadataDate, and dc:title. Recommended are xmp:CreatorTool and pdf:Producer. Also required are a UUID-based identifier for the document (xmpMM:DocumentID) and a version identifier (xmpMM:VersionID), typically a number.</p> <p>Accessibility Features</p> <p>See PDF_family for general notes. PDF/X does not have specific accessibility features. Comments welcome.</p>
External dependencies	PDF/X profiles intended for complete or "blind" exchange are constrained to avoid external dependencies. All necessary fonts and color-management definitions must be embedded. In contrast, PDF/X profiles intended for partial exchange are designed to support publishing workflows that employ repeated use of the same elements in many documents, particularly use of the same colorspace definition. For example, a PDF/X-4p document can only be printed correctly if the external colorspace definition is available.
Technical protection considerations	Encryption is prohibited in all conformance levels of PDF/X other than PDF/X-1:1999 and PDF/X-1:2001.

Quality and functionality factors

Still Image

Normal rendering	Good support.
Clarity (high image resolution)	Excellent in professional tools. Some PDF viewers may not be able to take advantage of features intended to ensure high-quality print output.
Color maintenance	Excellent in professional tools. Some PDF viewers may not be able to take advantage of color management features intended to ensure high-quality print output.
Support for vector graphics, including graphic effects and typography	Excellent.
Support for multispectral bands	See PDF_family .
Text	
Normal rendering	See PDF_family .
Integrity of document structure	See PDF_family .
Integrity of layout and display	See PDF_family .
Support for mathematics, formulae, etc.	See PDF_family .
Functionality beyond normal rendering	See PDF_family .

File type signifiers and format identifiers

Tag	Value	Note
Filename extension	pdf	The PDF/X standards do not indicate that a different extension should be used to distinguish PDF from PDF/X.
Internet Media Type	See note.	See PDF_family .
Magic numbers	See note.	The PDF/X standards indicate that the first characters in the PDF header should not be used to identify files as compliant with any PDF/X specification. See also PDF_family .
Wikidata Title ID	Q1423339	See https://www.wikidata.org/wiki/Q1423339 for information for the entire PDF/X family of formats.
Indicator for profile, level, version, etc.	PDF/X-1:1999 PDF/X-1:2001 PDF/X-1a:2001 PDF/X-1a:2003 PDF/X-3:2002 PDF/X-3:2003 PDF/X-2:2003 PDF/X-4 PDF/X-4p PDF/X-5g PDF/X-5n PDF/X-5pg PDF/X/6 PDF/X/6p PDF/X/6n	Each conformance level has a value for the <i>GTS_PDFXVersion</i> entry in the <i>info</i> directory or XMP-based document metadata. See Notes below for more information on the self-identification of PDF/X conformance levels.
Other	NF00851 NF00374 NF00375 NF00376 NF00377 NF00459 NF00378 NF00379	The NARA File Format Preservation Plan ID for unspecified versions of PDF/X is NF00851 . Other versions are listed here: NF00374 - version 1:1999 ; NF00375 - version 1:2001 ; NF00376 - version 1a:2001 ; NF00377 - version 1a:2003 ; NF00459 - version 2:2003 ; NF00378 - version 3:2002 ; NF00379 - version 3:2003
Pronom PUID	fnt/144 fnt/145 fnt/157 fnt/146 fnt/158	There is no PRONOM entry for the PDF/X family of formats; entries exist for individual PDF/X conformance levels. Listed here are PUIDs for conformance levels PDF/X-1:1999 , PDF/X-1:2001 , PDF/X-1a:2001 , PDF/X-1a:2003 , PDF/X-3:2002 , PDF/X-3:2003 , PDF/X-2:2003 , PDF/X-4 , PDF/X-4p , PDF/X-

	fmt/148 fmt/147 fmt/488 fmt/489 fmt/490 fmt/492 fmt/491	5g , PDF/X-5n , and PDF/X-5pg , respectively. Links in this note are to the PRONOM entries.
Wikidata Title ID	Q29946692 Q29946713 Q29946726 Q29946771 Q29946829 Q29946845 Q29946810 Q29946866 Q29946883 Q29946898 Q29946914 Q29946937	Listed here are Wikidata Title IDs for conformance levels PDF/X-1:1999 , PDF/X-1:2001 , PDF/X-1a:2001 , PDF/X-1a:2003 , PDF/X-3:2002 , PDF/X-3:2003 , PDF/X-2:2003 , PDF/X-4 , PDF/X-4p , PDF/X-5g , PDF/X-5n , and PDF/X-5pg , respectively. Links in this note are to the Wikidata entries.

Notes

General	<p>Self-identification of PDF/X Conformance Levels: PDF/X profiles are known as "conformance levels." For PDF/X profiles based on PDF versions prior to PDF 1.6, self-identification of the conformance level was via the <i>GTS_PDFXVersion</i> key in the <i>info</i> directory, which was mandatory for conforming PDF/X files through PDF/X-3. The value is a specified string that identifies both the conformance level and the year the specification was published and is enclosed in parentheses, e.g., "(PDF/X-3:2002)".</p> <p>There is one special case: a <i>PDF/X-1a:2001</i> file must have a <i>GTS_PDFXVersion</i> key with value "(PDF/X-1:2001)" and also have a <i>GTS_PDFXConformance</i> key in the <i>info</i> directory with value "(PDF/X-1a:2001)". Adopting the pattern used in all other cases, a <i>PDF/X-1a:2003</i> file simply requires a <i>GTS_PDFXVersion</i> key with value "(PDF/X-1a:2003)".</p> <p>Beginning with PDF/X-4 and PDF/X-5, first published by ISO in 2008, a new mechanism for self-identification as compliant to a particular PDF/X profile was introduced. These profiles, based on PDF 1.6, require an XMP-based document metadata stream. Within that stream there is a mandatory <i>pdfxid:GTS_PDFXVersion</i> entry with a value that is a specified string that identifies the conformance level (without the year and without enclosing parentheses), e.g., "PDF/X-5g". Formally, this uses a PDF/X identification schema, with namespace URI http://www.npes.org/pdfx/ns/id/ and prefix <i>pdfxid:</i>.</p> <p>Entities involved in PDF/X standardization:</p> <ul style="list-style-type: none"> ISO/TC130, Graphic technology is responsible for a number of specific areas, covered by separate working groups. Working Group 2 (ISO/TC 130/WG 2) covers <i>Prepress Data Exchange</i> and has been responsible for TIFF/IT since around 1998 and PDF/X since 2000. National standards bodies, such as the American National Standards Institute (ANSI) can appoint or accredit other bodies as Technical Advisory Groups (TAGs). These groups develop and transmit, via ANSI, U.S. positions on activities and ballots of specific ISO Technical Committees. TAGs are also a source of experts to participate in ISO technical committees, subcommittees, and working groups. See ISO TC 130 & U.S. Technical Advisory Group, and its Roster. This TAG consists of industry experts and provides guidance to ANSI on the development of the U.S. position on International Standards relating to the graphic arts. CGATS (Committee for Graphic Arts Technology Standards) provides a vehicle for other industry organizations that have specifications to work under the CGATS "umbrella" to move their work into the standards arena, and have the work developed and approved as an American National Standard. CGATS was formed in 1987 by the Image Technology
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Standards Board (ITSB) of the American National Standards Institute (ANSI), and received ANSI accreditation in 1989 as the U.S. TAG to ISO/TC130. CGATS has working groups for different areas in scope for ISO/TC130. See [CGATS Roster \(2020\)](#). CGATS, in collaboration with DDAP (Digital Distribution of Advertising for Publications), developed the first version of PDF/X (based on PDF 1.2) as the ANSI standard [CGATS.12/1, Graphic technology—Prepress digital data exchange—Use of PDF for composite data—Part 1: Complete exchange \(PDF/X-1\)](#). CGATS then submitted the standard to ISO/TC130 and steered it through the approval process. The CGATS working group that works on PDF/X is Working Group 1 of CGATS Subcommittee 6. However, most of the detailed technical work on PDF/X maintenance and development now happens in ISO/TC130/WG2/TF2 with international participation.

- [NPES](#) and its successor, [APTech](#), have provided administrative support and acted as secretariat for CGATS since 1987 and also to the U.S. TAG to ISO/TC130. The NPES acronym derives from *National Printing Equipment and Supply Association*, one of many names used by the association, which in January 2018 became the Association for Print Technologies ([APTech](#)). See also the [NPES.org website](#) from 2015 with announcement of the rebranding.
- [Aptech](#) (Association for Print Technologies). New name for [NPES](#), adopted in January 2018. APTech is a trade association of companies which manufacture and distribute equipment, systems, software, and supplies used in printing, publishing, and document conversion. As of 2020, Aptech serves as the secretariat for both CGATS and the U.S. TAG to ISO/TC130. See [Aptech | Industry Standards](#).
- [DDAP](#) (Digital Distribution of Advertising for Publications). From 1992 to 2005, the DDAP Association was a graphic arts industry group charged with promoting "Universal Exchange of Advertising through Open Process Integration and Accredited Standards". DDAP was an active sponsor of the development of TIFF/IT and the initial specification of PDF/X. See, for example, the Resources page on the DDAP website as of [October 1999](#) and [December 2003](#). DDAP also managed the [PDF-X.com](#) website, launched in 2002. In May 2005, DDAP joined IDEAlliance as a Network Group and updated its acronym to "Digital Directions in Applications for Production." See [IDEAlliance Unveils New DDAP Name, Vision, Mission](#). In April 2004, DDAP had on its website a [recommendation](#) of ISO 12639:1998 TIFF/IT-P1 for the delivery of digital advertising material. As of July 2005, the [DDAP Resource Center](#) on a newly designed website had no mention of TIFF/IT, listing only resources related to PDF/X.

Principles for PDF/X expressed as constraints on PDF: The 2017 [PDF/X in a Nutshell](#) brochure lists the following as core principles of PDF/X, indicating that the listed constraints apply to all parts and conformance levels of PDF/X.

- An OutputIntent must be present that uses an ICC profile to specify the intended printing conditions (print device type, paper type) when colors (or shades of gray) are defined.
- Spot colors may only be used if they have an alternate color, and this alternate color must be the same for all occurrences of the respective spot color.
- Fonts must be embedded (either fully embedded, or as an embedded subset in which all characters used in the text are present).
- Images must be present in the PDF (no external graphical content is allowed).
- No password protection of any type.
- No transfer curves (since they modify appearance of colors).
- No alternate images (e.g. no low-resolution alternates).
- If the bleed zone is defined, the BleedBox must be outside the printable area (the TrimBox).
- No use of LZW compression.
- No annotations in the print area.
- No audio, video or 3D annotations.
- No form fields or JavaScript.
- No embedded files.
- PDF metadata must indicate whether the PDF has been trapped, or not.

	<ul style="list-style-type: none"> • PDF metadata must claim conformance to PDF/X and to which part and conformance level of the PDF/X standard. <p>Note that PDF/X-6 does not retain all these constraints. See The new PDF 2.0 and subset standards (December 16, 2020), which states, "For the first time PDF/X-6 permits PDF/X files to have annotations, including digital signatures, form fields and videos, reducing complexity in multi-channel workflows."</p>
History	<p>The first PDF specification was published in 1993. By 1996 CGATS and DDAP (Digital Distribution of Advertising for Publications) working groups were in dialogue with Adobe to develop a subset of PDF for graphic arts data exchange. The first PDF/X standard was published in 1999 by the Committee for Graphic Arts Technology Standards (CGATS) as CGATS.12/1, Graphic technology—Prepress digital data exchange—Use of PDF for composite data—Part 1: Complete exchange (PDF/X-1) and was based on PDF Version 1.2. This attracted the attention of the international community and a new work item was created in ISO/TC130, Graphic technology, to create an international standard based on the initial work by CGATS. See PDF for Prepress, a 1999 presentation by Stephan Jaeggi.</p> <p>The first standard related to PDF/X published by ISO, was ISO 15930-1, published in December 2001. Since then, additional parts for ISO 15930 have been published, introducing new and updated specifications, based on newer underlying PDF versions and offering different functional profiles (complete or partial exchange; CMYK or colour-managed workflows). See PDF/X in a Nutshell from the PDF Association for more details on the history and different functional profiles.</p>

Format specifications

- ISO 15930. Graphic technology - Prepress digital data exchange using PDF. As of May 2019, the following parts are current: 1, 3, 4, 6, 7, 8, 9. Part 2 was never published. Part 5 (for PDF/X-2) was withdrawn in 2011. The relationship between parts of ISO 15930 and functional profiles of PDF/X is not straightforward.
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 - [ISO 15930-3:2002 Graphic technology -- Prepress digital data exchange -- Use of PDF -- Part 3: Complete exchange suitable for colour-managed workflows \(PDF/X-3\)](#) (<https://www.iso.org/standard/34941.html>). Reviewed and confirmed in 2018.
 - [ISO 15930-4:2003. Graphic technology -- Prepress digital data exchange using PDF -- Part 4: Complete exchange of CMYK and spot colour printing data using PDF 1.4 \(PDF/X-1a\)](#) (<https://www.iso.org/standard/39938.html>). Reviewed and confirmed in 2020.
 - [ISO 15930-6:2003 Graphic technology -- Prepress digital data exchange using PDF -- Part 6: Complete exchange of printing data suitable for colour-managed workflows using PDF 1.4 \(PDF/X-3\)](#) (<https://www.iso.org/standard/39940.html>). Reviewed and confirmed in 2015.
 - [ISO 15930-7:2010 Graphic technology -- Prepress digital data exchange using PDF -- Part 7: Complete exchange of printing data \(PDF/X-4\) and partial exchange of printing data with external profile reference \(PDF/X-4p\) using PDF 1.6](#) (<https://www.iso.org/standard/55843.html>). Specifies PDF/X-4 conformance level, which incorporates all features available in PDF/X-1a and PDF/X-3 conformance levels. Reviewed and confirmed in 2015
 - [ISO 15930-8:2010 Graphic technology -- Prepress digital data exchange using PDF -- Part 8: Partial exchange of printing data using PDF 1.6 \(PDF/X-5\)](#) (<https://www.iso.org/standard/55844.html>). Technical Corrigendum #1 corrects spelling and capitalization of XMP properties. Reviewed and confirmed in 2015.
 - [ISO 15930-9:2020 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-- Part 8:](#) (<https://www.iso.org/standard/77103.html>).
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 - [ISO 15929:2002. Graphic technology - Prepress digital data exchange - Guidelines and principles for the development of PDF/X standards.](#) (<https://www.iso.org/standard/34607.html>). Withdrawn in 2007.
 - [ISO 15930-5:2003 Graphic technology -- Prepress digital data exchange using PDF -- Part 5: Partial exchange of printing data using PDF 1.4 \(PDF/X-2\)](#) (<https://www.iso.org/standard/39939.html>). An extension of PDF/X-3 which allowed for external linked data to be included. Withdrawn in 2011.
- See [PDF_family](#) for links to the specifications for PDF versions that are the basis for different versions of PDF/X.

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URLs

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- The PDF/X FAQ by Martin Bailey of Global Graphics Software was released in several updates. Copies have been available from many sources.
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