INTERNATIONAL STANDARD

ISO 32000-1

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Document management — Portable document format —

Part 1: **PDF 1.7**

Gestion de documents — Format de document portable —

Partie 1: PDF 1.7

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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

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

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

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 32000 was prepared by Adobe Systems Incorporated (as PDF Reference, sixth edition: Adobe Portable Document Format version 1.7, November 2006) and and was adopted, under a special “fast-track procedure”, by Technical Committee ISO/TC 171, *Document management application*, Subcommittee SC 2, *Application issues*, in parallel with its approval by the ISO member bodies.

ISO 32000 consists of the following parts, under the general title *Document Management — Portable document format*:

— *Part 1: PDF 1.7*

Introduction

ISO 32000 specifies a digital form for representing documents called the Portable Document Format or usually referred to as PDF. PDF was developed and specified by Adobe Systems Incorporated beginning in 1993 and continuing until 2007 when this ISO standard was prepared. The Adobe Systems version PDF 1.7 is the basis for this ISO 32000 edition. The specifications for PDF are backward inclusive, meaning that PDF 1.7 includes all of the functionality previously documented in the Adobe PDF Specifications for versions 1.0 through 1.6. It should be noted that where Adobe removed certain features of PDF from their standard, they too are not contained herein.

The goal of PDF is to enable users to exchange and view electronic documents easily and reliably, independent of the environment in which they were created or the environment in which they are viewed or printed. At the core of PDF is an advanced imaging model derived from the PostScript® page description language. This PDF Imaging Model enables the description of text and graphics in a device-independent and resolution-independent manner. To improve performance for interactive viewing, PDF defines a more structured format than that used by most PostScript language programs. Unlike Postscript, which is a programming language, PDF is based on a structured binary file format that is optimized for high performance in interactive viewing. PDF also includes objects, such as annotations and hypertext links, that are not part of the page content itself but are useful for interactive viewing and document interchange.

PDF files may be created natively in PDF form, converted from other electronic formats or digitized from paper, microform, or other hard copy format. Businesses, governments, libraries, archives and other institutions and individuals around the world use PDF to represent considerable bodies of important information.

Over the past fourteen years, aided by the explosive growth of the Internet, PDF has become widely used for the electronic exchange of documents. There are several specific applications of PDF that have evolved where limiting the use of some features of PDF and requiring the use of others, enhances the usefulness of PDF. ISO 32000 is an ISO standard for the full function PDF; the following standards are for more specialized uses. PDF/X (ISO 15930) is now the industry standard for the intermediate representation of printed material in electronic prepress systems for conventional printing applications. PDF/A (ISO 19005) is now the industry standard for the archiving of digital documents. PDF/E (ISO 24517) provides a mechanism for representing engineering documents and exchange of engineering data. As major corporations, government agencies, and educational institutions streamline their operations by replacing paper-based workflow with electronic exchange of information, the impact and opportunity for the application of PDF will continue to grow at a rapid pace.

PDF, together with software for creating, viewing, printing and processing PDF files in a variety of ways, fulfils a set of requirements for electronic documents including:

- preservation of document fidelity independent of the device, platform, and software,
- merging of content from diverse sources—Web sites, word processing and spreadsheet programs, scanned documents, photos, and graphics—into one self-contained document while maintaining the integrity of all original source documents,
- collaborative editing of documents from multiple locations or platforms,
- digital signatures to certify authenticity,
- security and permissions to allow the creator to retain control of the document and associated rights,
- accessibility of content to those with disabilities,
- extraction and reuse of content for use with other file formats and applications, and
- electronic forms to gather data and integrate it with business systems.

The International Organization for Standardization (ISO) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning the creation, modification, display and processing of PDF files which are owned by the following parties:

- Adobe Systems Incorporated, 345 Park Avenue, San Jose, California,95110-2704, USA

ISO takes no position concerning the evidence, validity and scope of these patent rights.

The holders of these patent rights have assured ISO that they are willing to negotiate licenses under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patent rights are registered with ISO. Information may be obtained from those parties listed above.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. ISO shall not be held responsible for identifying any or all such patent rights.

A repository of referenced documents has been established by AIIM (http://www.aiim.org/pdfrefdocs). Not all referenced documents can be found there because of copyright restrictions.

Document management — Portable document format —

Part 1:
PDF 1.7

IMPORTANT — The electronic file of this document contains colours which are considered to be useful for the correct understanding of the document. Users should therefore consider printing this document using a colour printer.

1 Scope

This International Standard specifies a digital form for representing electronic documents to enable users to exchange and view electronic documents independent of the environment in which they were created or the environment in which they are viewed or printed. It is intended for the developer of software that creates PDF files (conforming writers), software that reads existing PDF files and interprets their contents for display and interaction (conforming readers) and PDF products that read and/or write PDF files for a variety of other purposes (conforming products).

This standard does not specify the following:

- specific processes for converting paper or electronic documents to the PDF format;
- specific technical design, user interface or implementation or operational details of rendering;
- specific physical methods of storing these documents such as media and storage conditions;
- methods for validating the conformance of PDF files or readers;
- required computer hardware and/or operating system.

2 Conformance

2.1 General

Conforming PDF files shall adhere to all requirements of the ISO 32000-1 specification and a conforming file is not obligated to use any feature other than those explicitly required by ISO 32000-1.

NOTE 1 The proper mechanism by which a file can presumptively identify itself as being a PDF file of a given version level is described in 7.5.2, "File Header".

2.2 Conforming readers

A conforming reader shall comply with all requirements regarding reader functional behaviour specified in ISO 32000-1. The requirements of ISO 32000-1 with respect to reader behaviour are stated in terms of general functional requirements applicable to all conforming readers. ISO 32000-1 does not prescribe any specific technical design, user interface or implementation details of conforming readers. The rendering of conforming files shall be performed as defined by ISO 32000-1.

2.3 Conforming writers

A conforming writer shall comply with all requirements regarding the creation of PDF files as specified in ISO 32000-1. The requirements of ISO 32000-1 with respect to writer behaviour are stated in terms of general functional requirements applicable to all conforming writers and focus on the creation of conforming files. ISO 32000-1 does not prescribe any specific technical design, user interface or implementation details of conforming writers.

2.4 Conforming products

A conforming product shall comply with all requirements regarding the creation of PDF files as specified in ISO 32000-1 as well as comply with all requirements regarding reader functional behavior specified in ISO 32000-1.

3 Normative references

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

ISO 639-1:2002, *Codes for the representation of names of languages -- Part 1: Alpha-2 code.*

ISO 639-2:1998, *Codes for the representation of names of languages -- Part 2: Alpha-3 code.*

ISO 3166-1:2006, *Codes for the representation of names of countries and their subdivisions -- Part 1: Country codes.*

ISO 3166-2:1998, *Codes for the representation of names of countries and their subdivisions -- Part 2: Country subdivision code.*

ISO/IEC 8824-1:2002, *Abstract Syntax Notation One (ASN.1): Specification of basic notation.*

ISO/IEC 10918-1:1994, *Digital Compression and Coding of Continuous-Tone Still Images* (informally known as the JPEG standard, for the Joint Photographic Experts Group, the ISO group that developed the standard).

ISO/IEC 15444-2:2004, *Information Technology—JPEG 2000 Image Coding System: Extensions.*

ISO/IEC 11544:1993/Cor 2:2001, *Information technology—Coded representation of picture and audio information—Progressive bi-level image compression* (JBIG2).

IEC/3WD 61966-2.1:1999, *Colour Measurement and Management in Multimedia Systems and Equipment, Part 2.1: Default RGB Colour Space—sRGB.*

ISO 15076-1:2005, *Image technology colour management - Architecture, profile format and data structure - Part 1:Based on ICC.1:2004-10.*

ISO 10646:2003, Information technology -- Universal Multiple-Octet Coded Character Set (UCS).

ISO/IEC 9541-1:1991, Information technology -- Font information interchange -- Part 1: Architecture.

ANSI X3.4-1986, Information Systems - Coded Sets 7-Bit American National Standard Code for Information Interchange (7-bit ASCII).

NOTE 1 The following documents can be found at AIIM at http://www.aiim.org/pdfrefdocs as well as at the Adobe Systems Incorporated Web Site http://www.adobe.com/go/pdf_ref_bibliography.

PDF Reference, Version 1.7, – 5th ed., (ISBN 0-321-30474-8), Adobe Systems Incorporated.

JavaScript for Acrobat API Reference, Version 8.0, (April 2007), Adobe Systems Incorporated.

Acrobat 3D JavaScript Reference, (April 2007), Adobe Systems Incorporated.

Adobe Glyph List, Version 2.0, (September 2002), Adobe Systems Incorporated.

OPI: Open Prepress Interface Specification 1.3, (September 1993), Adobe Systems Incorporated.

PDF Signature Build Dictionary Specification v.1.4, (March 2008), Adobe Systems Incorporated.

Adobe XML Architecture, Forms Architecture (XFA) Specification, version 2.5, (June 2007), Adobe Systems Incorporated.

Adobe XML Architecture, Forms Architecture (XFA) Specification, version 2.4, (September 2006), Adobe Systems Incorporated.

Adobe XML Architecture, Forms Architecture (XFA) Specification, version 2.2, (June 2005), Adobe Systems Incorporated.

Adobe XML Architecture, Forms Architecture (XFA) Specification, version 2.0, (October 2003), Adobe Systems Incorporated.

NOTE 2 Beginning with XFA 2.2, the XFA specification includes the Template Specification, the Config Specification, the XDP Specification, and all other XML specifications unique to the XML Forms Architecture (XFA).

Adobe XML Architecture, XML Data Package (XDP) Specification, version 2.0, (October 2003), Adobe Systems Incorporated.

Adobe XML Architecture, Template Specification, version 2.0, (October 2003), Adobe Systems Incorporated.

XML Forms Data Format Specification, version 2.0, (September 2007), Adobe Systems Incorporated.

XMP: Extensible Metadata Platform, (September 2005), Adobe Systems Incorporated.

TIFF Revision 6.0, Final, (June 1992), Adobe Systems Incorporated.

NOTE 3 The following Adobe Technical Notes can be found at the AIIM website at http://www.aiim.org/pdfnotes as well as at the Adobe Systems Incorporated Web Site (http://www.adobe.com) using the general search facility, entering the Technical Note number.

Technical Note #5004, Adobe Font Metrics File Format Specification, Version 4.1, (October 1998), Adobe Systems Incorporated.

NOTE 4 Adobe font metrics (AFM) files are available through the Type section of the ASN Web site.

Technical Note #5014, Adobe CMap and CID Font Files Specification, Version 1.0, (June 1993), Adobe Systems Incorporated.

Technical Note #5015, Type 1 Font Format Supplement, (May 1994), Adobe Systems Incorporated.

Technical Note #5078, Adobe-Japan1-4 Character Collection for CID-Keyed Fonts, (June 2004), Adobe Systems Incorporated.

Technical Note #5079, Adobe-GB1-4 Character Collection for CID-Keyed Fonts, (November 2000), Adobe Systems Incorporated.

Technical Note #5080, Adobe-CNS1-4 Character Collection for CID-Keyed Fonts, (May 2003), Adobe Systems Incorporated.

Technical Note #5087, Multiple Master Font Programs for the Macintosh, (February 1992), Adobe Systems Incorporated.

Technical Note #5088, Font Naming Issues, (April 1993), Adobe Systems Incorporated.

Technical Note #5092, CID-Keyed Font Technology Overview, (September 1994), Adobe Systems Incorporated.

Technical Note #5093, Adobe-Korea1-2 Character Collection for CID-Keyed Fonts, (May 2003), Adobe Systems Incorporated.

Technical Note #5094, Adobe CJKV Character Collections and CMaps for CID-Keyed Fonts, (June 2004), Adobe Systems Incorporated.

Technical Note #5097, Adobe-Japan2-0 Character Collection for CID-Keyed Fonts, (May 2003), Adobe Systems Incorporated.

Technical Note #5116, Supporting the DCT Filters in PostScript Level 2, (November 1992), Adobe Systems Incorporated.

Technical Note #5176, The Compact Font Format Specification, version 1.0, (December 2003), Adobe Systems Incorporated.

Technical Note #5177, The Type 2 Charstring Format, (December 2003), Adobe Systems Incorporated.

Technical Note #5411, ToUnicode Mapping File Tutorial, (May 2003), Adobe Systems Incorporated.

Technical Note #5620, Portable Job Ticket Format, Version 1.1, (April 1999), Adobe Systems Incorporated.

Technical Note #5660, Open Prepress Interface (OPI) Specification, Version 2.0, (January 2000), Adobe Systems Incorporated.

NOTE 5 The following documents are available as Federal Information Processing Standards Publications.

FIPS PUB 186-2, Digital Signature Standard, describes DSA signatures, (January 2000), Federal Information Processing Standards.

FIPS PUB 197, Advanced Encryption Standard (AES), (November 2001), Federal Information Processing Standards.

NOTE 6 The following documents are available as Internet Engineering Task Force RFCs.

RFC 1321, The MD5 Message-Digest Algorithm, (April 1992), Internet Engineering Task Force (IETF).

RFC 1738, Uniform Resource Locators, (December 1994), Internet Engineering Task Force (IETF).

RFC 1808, Relative Uniform Resource Locators, (June 1995), Internet Engineering Task Force (IETF).

RFC 1950, ZLIB Compressed Data Format Specification, Version 3.3, (May 1996), Internet Engineering Task Force (IETF).

RFC 1951, DEFLATE Compressed Data Format Specification, Version 1.3, (May 1996), Internet Engineering Task Force (IETF).

RFC 2045, Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies, (November 1996), Internet Engineering Task Force (IETF).

RFC 2046, Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types, (November 1996), Internet Engineering Task Force (IETF).

RFC 2083, PNG (Portable Network Graphics) Specification, Version 1.0, (March 1997), Internet Engineering Task Force (IETF).

RFC 2315, PKCS #7: Cryptographic Message Syntax, Version 1.5, (March 1998), Internet Engineering Task Force (IETF).

RFC 2396, Uniform Resource Identifiers (URI): Generic Syntax, (August 1998), Internet Engineering Task Force (IETF).

RFC 2560, X.509 Internet Public Key Infrastructure Online Certificate Status Protocol—OCSP, (June 1999), Internet Engineering Task Force (IETF).

RFC 2616, Hypertext Transfer Protocol—HTTP/1.1, (June 1999), Internet Engineering Task Force (IETF).

RFC 2898, PKCS #5: Password-Based Cryptography Specification Version 2.0, (September 2000), Internet Engineering Task Force (IETF).

RFC 3066, Tags for the Identification of Languages, (January 2001), Internet Engineering Task Force (IETF).

RFC 3161, Internet X.509 Public Key Infrastructure Time-Stamp Protocol (TSP), (August 2001), Internet Engineering Task Force (IETF).

RFC 3174, US Secure Hash Algorithm 1 (SHA1), (September 2001), Internet Engineering Task Force (IETF).

RFC 3280, Internet X.509 Public Key Infrastructure, Certificate and Certificate Revocation List (CRL) Profile, (April 2002), Internet Engineering Task Force (IETF).

NOTE 7 The following documents are available from other sources.

Adobe Type 1 Font Format., Version 1.1, (February 1993), Addison-Wesley, ISBN 0-201-57044-0.

OpenType Font Specification 1.4, December 2004, Microsoft.

*TrueType Reference Manual, (*December 2002), Apple Computer, Inc.

Standard ECMA-363, Universal 3D File Format, 1st Edition (U3D), (December 2004), Ecma International.

PANOSE Classification Metrics Guide, (February 1997), Hewlett-Packard Corporation.

ICC Characterization Data Registry, International Color Consortium (ICC).

Recommendations T.4 and T.6, Group 3 and Group 4 facsimile encoding, International Telecommunication Union (ITU).

TrueType 1.0 Font Files Technical Specification, Microsoft Corporation.

Client-Side JavaScript Reference, (May 1999), Mozilla Foundation.

The Unicode Standard, Version 4.0, Addison-Wesley, Boston, MA, 2003, Unicode Consortium.

Unicode Standard Annex #9, The Bidirectional Algorithm, Version 4.0.0, (April 2003), Unicode Consortium.

Unicode Standard Annex #14, Line Breaking Properties, Version 4.0.0, (April 2003), Unicode Consortium.

Unicode Standard Annex #29, Text Boundaries, Version 4.0.0, (March 2005), Unicode Consortium.

Extensible Markup Language (XML) 1.1, World Wide Web Consortium (W3C).

4 Terms and definitions

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

4.1
… (ellipsis)
An ellipsis is used within PDF examples to indicate omitted detail. Pairs of ellipses are also used to bracket comments, in italic, about such omitted detail.

4.2
8-bit value
(see byte)

4.3
array object
a one-dimensional collection of objects arranged sequentially and implicitly numbered starting at 0

4.4
ASCII
the American Standard Code for Information Interchange, a widely used convention for encoding a specific set of 128 characters as binary numbers defined in ANSI X3.4-1986

4.5
binary data
an ordered sequence of bytes

4.6
boolean objects
either the keyword **true** or the keyword **false**

4.7
byte
a group of 8 binary digits which collectively can be configured to represent one of 256 different values and various realizations of the 8 binary digits are widely used in today's electronic equipment

4.8
catalog
the primary dictionary object containing references directly or indirectly to all other objects in the document with the exception that there may be objects in the **trailer** that are not referred to by the **catalog**

4.9
character
numeric code representing an abstract symbol according to some defined character encoding rule

NOTE 1 There are three manifestations of characters in PDF, depending on context:

- A PDF file is represented as a sequence of 8-bit bytes, some of which are interpreted as character codes in the ASCII character set and some of which are treated as arbitrary binary data depending upon the context.
- The contents (data) of a string or stream object in some contexts are interpreted as character codes in the PDFDocEncoding or UTF-16 character set.
- The contents of a string within a PDF content stream in some situations are interpreted as character codes that select glyphs to be drawn on the page according to a character encoding that is associated with the text font.

4.10
character set
a defined set of symbols each assigned a unique character value

4.11
conforming reader
software application that is able to read and process PDF files that have been made in conformance with this specification and that itself conforms to requirements of conforming readers specified here [ISO 32000-1]

4.12
conforming product
software application that is both a conforming reader and a conforming writer

4.13
conforming writer
software application that is able to write PDF files that conform to this specification [ISO 32000-1]

4.14
content stream
stream object whose data consists of a sequence of instructions describing the graphical elements to be painted on a page

4.15
cross reference table
data structure that contains the byte offset start for each of the indirect objects within the file

4.16
developer
Any entity, including individuals, companies, non-profits, standards bodies, open source groups, etc., who are developing standards or software to use and extend ISO 32000-1.

4.17
dictionary object
an associative table containing pairs of objects, the first object being a name object serving as the key and the second object serving as the value and may be any kind of object including another dictionary

4.18
direct object
any object that has not been made into an indirect object

4.19
electronic document
electronic representation of a page-oriented aggregation of text, image and graphic data, and metadata useful to identify, understand and render that data, that can be reproduced on paper or displayed without significant loss of its information content

4.20
end-of-line marker (EOL marker)
one or two character sequence marking the end of a line of text, consisting of a CARRIAGE RETURN character (0Dh) or a LINE FEED character (0Ah) or a CARRIAGE RETURN followed immediately by a LINE FEED

4.21
FDF file
File conforming to the Forms Data Format containing form data or annotations that may be imported into a PDF file (see 12.7.7, “Forms Data Format”)

4.22
filter
an optional part of the specification of a stream object, indicating how the data in the stream should be decoded before it is used