DRAFT INTERNATIONAL STANDARD
ISO/DIS 24517-2.2

ISO/TC **171**/SC **2**

Voting begins on:
2017-01-25

Secretariat: **ANSI**

Voting terminates on:
2017-04-19

Document management — Engineering document format using PDF —

Part 2:
Use of ISO 32000-2 including support for long-term preservation (PDF/E-2)

Gestion de documents — Format de documents d'ingénierie utilisant le PDF

ICS: 35.240.30; 37.100.99

This document is circulated as received from the committee secretariat.

Reference number
ISO/DIS 24517-2.2:2017(E)

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Contents

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Foreword

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

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 171.

ISO 24517-2 was prepared by Technical Committee ISO/TC 171, *Document management applications*, Subcommittee SC 2, *Document file formats, EDMS systems and authenticity of information*. A list of all parts of ISO 24517 can be found on the ISO website.

Introduction

ISO 24517 (all parts) defines a file format known as PDF/E which provides a mechanism for the exchange and archiving of engineering documents based on the PDF format for various communities working with engineering documentation. PDF/E files preserve the visual representation of engineering data over time, independent of the tools and systems used for creating, storing or rendering the files. It is a multi-part standard with subsequent parts expected to address future workflow and data requirements. This standard improves document exchange, collaboration, and print accuracy within engineering workflows, both inside companies and with extended enterprises of partners, suppliers, customers, government organisations, and citizens. It enables organisations to streamline engineering workflows that incorporate diverse sets of complex documents, resulting in improved productivity and the ability to more quickly deliver better products to market. It defines the features of PDF that are required, recommended, restricted, or prohibited when creating, viewing, marking up, printing, analysing, distributing and archiving engineering documents. It takes into consideration the differing needs of both interactive and non-interactive PDF processors.

ISO 24517 specifies the proper use of PDF for on-screen display and printing of engineering documents. Engineering documents are assemblies of a page (or pages) created by different organisations, which can be inter-departmental or inter-company. It also defines a framework for representing the logical structure and other semantic information of engineering documents within conforming files.

PDF/E allows engineering professionals to reliably create, exchange, and review engineering documentation, including large format documents. PDF/E enables organisations to work more effectively when creating or exchanging engineering documentation.

This document is intended to lead to the development of various applications that read, render, write and validate conforming files. Different applications will incorporate various capabilities to prepare, interpret and process conforming files based on needs as perceived by the suppliers of those applications. The inclusive, feature-rich nature of the format requires that additional constraints be placed on its use to make it suitable for engineering workflow documents. However, it is important to note that a conforming application needs to be able to read and process appropriately all files complying with a specified conformance level.

This document introduces two new conformance levels: a "Restricted Attachments" conformance level, otherwise referred to as PDF/E-2r and an "Secured Document" conformance level, otherwise referred to as PDF/E-2s. PDF/E-2 documents are not permitted to be encrypted in order to enable proper archiving, however, there are some engineering workflows where content needs to be encrypted in order to protect the rights of the authors. For this particular use case, a user may choose to use the PDF/E-2s conformance level.

This document extends the capabilities of Part 1. It is based on PDF version 2.0 (as defined in ISO 32000-2) rather than PDF version 1.6 (which is used as the basis of Part 1). These added capabilities are through compliance with ISO 32000-2 and include features such as:

— Support for numerous enhancements to 3D including support for PRC

— Support for Geospatial information (GIS) in both 2D and 3D

The following terms, referring to this specification or parts thereof, are recommended when the full ISO name is not being used:

— "PDF/E" – a synonym for the ISO 24517 family of standards;

— "PDF/E-1" – a synonym for ISO 24517-1;

— "PDF/E-2" – a synonym for ISO 24517-2.

This document (in conjunction with its normative references) provides sufficient information to interpret any conforming PDF/E-2 file.

The PDF Association may maintain an ongoing series of application notes for guiding developers and users of this document. These application notes are available at http://www.pdfa.org/. The PDF Association will also retain copies of the specific non-ISO normative references of this document which are publicly available electronic documents.

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Document management — Engineering document format using PDF —

Part 2:
Use of ISO 32000-2 including support for long-term preservation (PDF/E-2)

1 Scope

This document specifies the use of the Portable Document Format (PDF) 2.0, as formalized in ISO 32000-2, for the creation and preservation of documents used in engineering workflows.

This document does not apply to:

— specific processes for converting paper or electronic documents to the PDF/E format;

— specific technical design, user interface, implementation, or operational details of rendering;

— specific physical methods of storing these documents such as media and storage conditions;

— required computer hardware and/or operating systems.

2 Normative references

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

ISO 19005-1, *Document management — Electronic document file format for long-term preservation — Part 1: Use of PDF 1.4 (PDF/A-1)*

ISO 19005-2, *Document management — Electronic document file format for long-term preservation — Part 2: Use of ISO 32000-1 (PDF/A-2)*

ISO 32000-2, *Document management — Portable document format — Part 2 : PDF 2.0*

XMP Specification Part 2 : Additional Properties – Adobe Systems - https://www.adobe.com/content/dam/Adobe/en/devnet/xmp/pdfs/XMPSpecificationPart2.pdf

3 Terms and definitions

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

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

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
conformance level
identified set of restrictions and requirements with which files and processors are required to comply

3.2
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

[ISO 32000-2]

3.3
end-of-file marker
five character sequence **%%EOF** marking the end of a PDF file

3.4
end-of-line marker
EOL marker
one or two character sequence marking the end of a line, consisting of a **CARRIAGE RETURN** character (0Dh) or a **LINE FEED** character (0Ah) or a **CARRIAGE RETURN** followed immediately by a **LINE FEED**

3.5
engineering workflow
the process that a document goes through when used by engineers

3.6
interactive processor
processor that requires or allows human interaction with the content and other objects contained in the document during the software's processing phase

Note 1 to entry: A file viewing tool is an example of an interactive processor; a raster image processor is an example of a processor that is not interactive.

3.7
long-term
period of time long enough for there to be concern about the impacts of changing technologies, including support for new media and data formats, and of a changing user community, on the information being held in a repository, which may extend into the indefinite future

3.8
PDF
Portable Document Format
file format defined in ISO 32000-2

3.9
processor
software application that is able to read and process PDF/E files

3.10
writer
software application that is able to write PDF/E files

4 Notation

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

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

Token characters used to delimit objects and describe the structure of PDF files, as defined in ISO 32000-2, 7.2.1-7.24, may be identified by their ISO/IEC 646 character name written in upper case in bold font followed by a parenthetic two digit hexadecimal character value with the suffix "h".

EXAMPLE 2   CARRIAGE RETURN (0Dh).

Text string characters, as defined by ISO 32000-2, 7.9.2, may be identified by their ISO/IEC 10646-1 character name written in uppercase in bold font followed by a parenthetic four digit hexadecimal character code value with the prefix "U+".

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

5   Conformance

5.1   General

This document defines a file format for representing electronic documents known as "PDF/E-2". Conforming PDF/E-2 files shall adhere to all requirements of ISO 32000-2 as modified by this document. A conforming file may include any valid and non-deprecated ISO 32000-2 feature that is not explicitly forbidden by this document. Features described in PDF specifications prior to Version 2.0 which are not explicitly described in ISO 32000-2 should not be used.

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

The proper mechanism by which a file can presumptively identify itself as being a PDF/E-2 compliance file is described in 6.1.2.

Specific requirements for conformance with PDF/E-2s are given in Annex A. Specific requirements for conformance with PDF/E-2r are given in Annex B.

5.2   Conforming processor

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

The rendering and other processing of conforming files shall be performed as defined in ISO 32000-2 subject to the additional restrictions specified by this document. Features described in PDF specifications that are not explicitly described in ISO 32000-2 should be ignored by conforming processors.

Conforming PDF/E-2 processors shall read and process appropriately all PDF/E-2 files.

NOTE   This means that a PDF/E-2 processor need not support PDF/E-1.

6   Technical requirements

6.1   File structure

6.1.1   General

6.1.2 to 6.1.12 address overall file format issues and the base elements that form the general structure of a conforming file.

Any data contained in a conforming file that is not described in ISO 32000-2 or this document should be ignored by a conforming processor and shall not be used to render content on a page.

6.1.2 File header

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

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

6.1.3 File trailer

The **Encrypt** key shall only be present in the trailer dictionary of PDF/E-2s conforming files.

NOTE 1 The explicit prohibition of the **Encrypt** key has the implicit effect of disallowing encryption and password-protected access permissions.

NOTE 2 Encryption is allowed in a PDF/E-2s conforming file (Annex A).

The **Info** key shall not be present in the trailer dictionary of PDF/E-2 conforming files.

NOTE 3 This makes normative the deprecation of this feature in ISO 32000-2, 14.3.3.

6.1.4 Cross reference table

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

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

6.1.5 Document information dictionary

A document information dictionary may only be present in a conforming file as the value of the **I** key in a thread dictionary. When present, the only keys that are permitted to be present are **CreationDate** and **ModDate**.

NOTE This makes normative the deprecation of this feature in ISO 32000-2, 14.3.3, except for the entries **CreationDate** and **ModDate**.

6.1.6 String objects

The number of hexadecimal digits in a hexadecimal string shall always be even.

NOTE This avoids the provision in ISO 32000-2 about the absence of the final hexadecimal digit.

6.1.7 Stream objects

6.1.7.1 General

The value of the **Length** key specified in the stream dictionary shall match the number of bytes in the file following the **LINE FEED** (0Ah) character after the **stream** keyword and preceding the EOL marker before the **endstream** keyword.

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

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