INTERNATIONAL STANDARD

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Graphic technology — Prepress digital data exchange using PDF —

Part 9: Complete exchange of printing data (PDF/X-6) and partial exchange of printing data with external profile reference (PDF/X-6p and PDF/X-6n) using PDF 2.0

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

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

Reference number
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Foreword

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

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

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

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

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

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

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

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

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Introduction

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

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

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

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

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

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

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

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

Table 1 summarizes the conformance levels defined in each part of ISO 15930.

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Table 1 — PDF/X conformance levels

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

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

— The referenced version is PDF 2.0 and therefore supports the additions to the PDF language found there, as modified by this document.

— Annotations, including digital signatures, form fields and videos, are allowed in the printable area of a page.

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

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

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

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

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

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

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

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Graphic technology — Prepress digital data exchange using PDF —

Part 9:
Complete exchange of printing data (PDF/X-6) and partial exchange of printing data with external profile reference (PDF/X-6p and PDF/X-6n) using PDF 2.0

1 Scope

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

2 Normative references

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

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

ISO 32000-2:—[1)], *Document management — Portable document format — PDF 2.0*

3 Terms and definitions

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

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

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

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

3.1
characterized printing condition
printing condition for which process control aims are defined and for which the relationship between input data and the colorimetry of the printed image is documented

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

3.2
CMYK
subtractive process colour model where the channels are called Cyan, Magenta, Yellow and Black

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

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