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International Standard

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FDIS
29500-1

Document description and processing languages — Office Open XML File Formats —

Part 1: Fundamentals and markup language reference

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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 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 or www.iec.ch/members_experts/refdocs).

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This document was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 34, *Document description and processing languages*.

This fifth edition cancels and replaces the fourth edition (ISO/IEC 29500-1:2016), which has been technically revised.

The main changes are as follows:

- Corrections and clarifications have been made throughout the text, but no new functionality has been added.
- Hanging paragraphs have been moved to new introductory subclauses at the top of the major collecting clause or subclause, which caused renumbering of some subclauses.
- Where appropriate, normative and bibliographical references have been added, removed, or updated to use undated or more recent versions.
- Uses of BNF or EBNF have been changed to ABNF.
- Clarifications and corrections have been made to separations between Strict and Transitional and some content has been moved from this document to ISO/IEC 29500-4.
- Clause 3 (Terms and definitions) has been revised by reorganizing terms into groups.
- Subclauses containing ML-specific glossaries of terms have been integrated into Clause 3.
- Clause 10 (Markup Compatibility and Extensibility) has been expanded and revised in its entirety.
- The printed schemas in Annexes A and B have been removed; schemas exist in digital form only.
- The following annexes have been removed:
    - Additional syntax constraints
    - Namespace prefix mapping in examples
    - WordprocessingML custom XML data extraction
    - Root element locations (This information has been merged into Clause 16.)

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  - Primer (Some information has been integrated into the main text or annexes.)
  - Differences between ISO/IEC 29500 and ECMA-376:2006
- The following annexes have been added:
  - WordprocessingML page layout
  - DrawingML coordinate systems and transformations

A list of all parts in the ISO/IEC 29500 series can be found on the ISO and IEC websites.

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 and www.iec.ch/national-committees.

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Introduction

The ISO/IEC 29500 series specifies a family of XML schemas, collectively called Office Open XML, which define the XML vocabularies for word-processing, spreadsheet, and presentation documents, as well as the packaging of documents that conform to these schemas.

The goal is to enable the implementation of the Office Open XML formats by the widest set of tools and platforms, fostering interoperability across office productivity applications and line-of-business systems, as well as to support and strengthen document archival and preservation, all in a way that is fully compatible with the existing corpus of Microsoft® Office[1] documents.

[1] Microsoft Office is the trademark of a product supplied by Microsoft Corporation. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO or IEC of the product named. Equivalent products may be used if they can be shown to lead to the same results.

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Document description and processing languages — Office Open XML File Formats —

Part 1:
Fundamentals and markup language reference

1. Scope

The goals of ISO/IEC 29500 are to be capable of faithfully representing the pre-existing corpus of word-processing documents, spreadsheets and presentations that had been produced by the Microsoft Office applications, from Microsoft Office 97 to Microsoft Office 2008, inclusive, at the date of creation of ISO/IEC 29500 and to facilitate extensibility and interoperability by enabling implementations by multiple vendors and on multiple platforms.

This document specifies the features of Office Open XML documents that, in their semantics, syntax, and packaging, satisfy the requirements of conformance class Office Open XML Strict, as specified in Clause 7. This document also specifies requirements for Office Open XML consumers and producers.

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 8601-1, *Date and time — Representations for information interchange — Part 1: Basic rules*

ISO/IEC 8859-1, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1*

ISO/IEC 9075-1, *Information technology — Database languages — SQL — Part 1: Framework (SQL/Framework)*

ISO/IEC 9075-3:2023, *Information technology — Database languages — SQL — Part 3: Call-Level Interface (SQL/CLI)*

ISO/IEC 10118-3, *IT Security techniques — Hash-functions — Part 3: Dedicated hash-functions*

ISO/IEC 14496-22, *Information technology — Coding of audio-visual objects — Part 22: Open Font Format*

ISO/IEC 29500-2:2021, *Document description and processing languages — Office Open XML file formats – Part 2: Open packaging conventions*

ISO/IEC 29500-3:2015, *Information technology — Document description and processing languages — Office Open XML File Formats – Part 3: Markup Compatibility and Extensibility*

ISO/IEC 60559:2020, *Information technology — Microprocessor Systems — Floating-Point arithmetic*

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3. Terms and definitions

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

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

- ISO Online browsing platform: available at https://www.iso.org/obp
- IEC Electropedia: available at https://www.electropedia.org

3.1 General

3.1.1
package
ZIP archive conforming to the Open Packaging Conventions defined in ISO/IEC 29500-2

3.1.2
application
consumer or producer

3.1.3
consumer
piece of software or device that reads packages through a package implementer

Note 1 to entry: A consumer is often designed to consume packages only for a specific physical package format.

3.1.4
producer
piece of software or device that writes packages through a package implementer

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Note 1 to entry: A producer is often designed to produce packages according to a particular physical package format specification.

3.1.5
Office Open XML document
rendition of a data stream formatted using WordprocessingML, SpreadsheetML, or PresentationML and its related MLs

Note 1 to entry: Such a document is represented as a package, as described in ISO/IEC 29500-2.

3.1.6
WordprocessingML
set of conventions for representing an Office Open XML document of category Wordprocessing

3.1.7
SpreadsheetML
set of conventions for representing an Office Open XML document of category Spreadsheet

3.1.8
PresentationML
set of conventions for representing an Office Open XML document of category Presentation

3.1.9
DrawingML
set of conventions for specifying the location and appearance of drawing elements in an Office Open XML document

3.1.10
document category
one of the three categories of Office Open XML documents (Wordprocessing, Spreadsheet, and Presentation)

Note 1 to entry: A document whose package-relationship item contains a relationship to…:

- …a Main Document part (see 11.3.10) is a document of category Wordprocessing.
- …a Workbook part (see 12.3.23) is a document of category Spreadsheet.
- …a Presentation part (see 13.3.6) is a document of category Presentation.

Note 2 to entry: An Office Open XML document can contain one or more embedded Office Open XML packages (see 15.2.11) with each embedded package having any of the three document categories. However, the presence of these embedded packages does not change the category of the document.

3.1.11
embedded package
package stored as the target of an Embedded Package relationship (see 15.2.11) in an Office Open XML document

3.1.12
relationship
kind of connection between a source part and a target part in a package

Note 1 to entry: Relationships make the connections between parts directly discoverable without examining the content in the parts and without altering the parts themselves.

3.1.13
relationships part
part containing an XML representation of relationships

3.1.14
explicit relationship
relationship in which a resource is referenced from a source part's XML using the Id attribute of a Relationship tag

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3.1.15
implicit relationship
relationship that is not explicit

3.1.16
behavior
external appearance or action

3.1.17
implementation-defined
unspecified behavior where each implementation is expected to document that behavior

Note 1 to entry: Documentation is intended to promote predictability and reproducibility within any given implementation.

3.1.18
unspecified
application-dependent
specific to an implementation with no recommendation made by ISO/IEC 29500

Note 1 to entry: Extensions are properly added using the extensibility mechanisms described by ISO/IEC 29500, not by giving meaning to otherwise unspecified behavior.

3.1.19
byte
sequence of 8 bits treated as a unit

3.1.20
comment
note attached to content in a document

Note 1 to entry: Although a consumer might choose to display comments, they are not considered part of the body of the document. A comment might include the text of the note, the comment author's name and initials, and date of creation, among other things.

3.1.21
content type
media type, subtype, and an optional set of parameters

Note 1 to entry: All instances of the term “content type” in this document are identical in meaning to the term “media type,” as defined in RFC 2046, that is preferred and used in other information technology standards.

3.1.22
extension
XML element, XML attribute, relationship, or part not explicitly included in ISO/IEC 29500, but that uses the extensibility mechanisms described by ISO/IEC 29500

3.1.23
locale-specific
dependent on local conventions of nationality, culture, and language

3.1.24
ODBC
implementation of ISO/IEC 9075-3 or an SQL/CLI-based database connectivity API

EXAMPLE One broadly used SQL/CLI-based database connectivity API is the Open Database Connectivity (ODBC) API.

3.1.25
OLE
generalized abstraction of embedding and linking objects within a document

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Note 1 to entry: OLE in the context of this document does not refer to any specific technology.

3.1.26
unique identifier
id
exclusive descriptor using one of a variety of different identification schemes

Note 1 to entry: In this document, the term does not imply use of the xsd:ID data type.

3.2 WordprocessingML-specific

3.2.1
document setting
document-level property that affects the handling of a given document and influences the appearance and behavior of the current document as well as the stored document-level state

3.2.2
section
portion of a document in which certain page formatting options can be set

Note 1 to entry: A new section is created to change such properties as line numbering, number of columns, or headers and footers.

3.2.3
document building block
reusable element in a template

Note 1 to entry: Such elements include boilerplate text, cover pages, equations, footers, headers, tables, text boxes, and watermarks.

3.2.4
template
document that is a pattern for creating other documents

Note 1 to entry: A template can contain text, formatting, and graphics, among other things, such that documents based on it automatically have access to these elements.

3.2.5
master document
document that is the parent of one or more subdocuments

Note 1 to entry: A master document can be used to manage a multipart document, such as a book having several chapters. In such a case, the master document might contain the cover page, front matter, table of contents, and cross-reference index, while each chapter and appendix resides in its own subdocument.

3.2.6
subdocument
piece of a master document

Note 1 to entry: A chapter or appendix might be a subdocument in a book.

3.2.7
glossary document
additional WordprocessingML document story used to store reusable fragments of rich WordprocessingML content

Note 1 to entry: It is called the glossary document as this story contains one or more fragments that can be indexed and extracted by name, like items in a glossary.

3.2.8
supplementary document storage location
part within a WordprocessingML document in which fragments of WordprocessingML content can be stored separate from the printed page

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3.3 SpreadsheetML-specific

3.3.1
workbook
collection of worksheets

3.3.2
worksheet
two-dimensional grid of cells organized into rows and columns

3.3.3
cell
location at the intersection of a row and column, in which numeric or textual data or a formula is stored

Note 1 to entry: A cell can have a number of characteristics, such as numeric or text formatting, alignment, font, color, and border.

3.3.4
row
horizontal set of cells in a worksheet

Note 1 to entry: Each row has a numeric heading. Rows are numbered sequentially, starting at 1.

3.3.5
column
vertical set of cells in a worksheet

Note 1 to entry: Each column has an alphabetic heading. Columns are named sequentially, going from A–Z, then AA–AZ, BA–BZ, and so on.

3.3.6
cell reference
individual cell's designation using a combination of its column and row headings

EXAMPLE Cell references include A13, H19, and BX1200.

Note 1 to entry: A relative cell reference in a formula automatically changes when the formula is copied down a column or across a row. An absolute cell reference is fixed and does not change when a formula is copied from one cell to another. A mixed cell reference has either an absolute column and a relative row or an absolute row and a relative column.

3.3.7
formula
recipe for calculating a value

Note 1 to entry: Some formulas are predefined; others are user-defined.

3.3.8
function
predefined formula

Note 1 to entry: A function, such as AVERAGE, MAX, MIN, or SUM, takes one or more arguments on which it operates, producing a result. In the formula =SUM(B1:B4), there is one argument, B1:B4, which is the range of cells B1–B4, inclusive.

3.3.9
table
rectangular-shaped set of related rows and columns that can be sorted, filtered, and totaled as a group

Note 1 to entry: Rows in a table can be hidden by applying AutoFilters to one or more columns.

3.3.10
pivot table
kind of table used to manage and analyze related data that is stored elsewhere

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3.3.11
AutoFilter
SpreadsheetML document state in which only certain rows are displayed, determined via filter criteria applied to the columns

3.3.12
chart
graphical representation of data

EXAMPLE Chart types include bar, column, line, and pie.

3.3.13
connection
means by which external data can be imported into a worksheet

Note 1 to entry: External data is data stored outside of a workbook, such as in a database or on a Web server.

3.3.14
MDX
multi-dimensional expression language

Note 1 to entry: MDX is passed to an OLAP provider. The method of interpreting this is defined by the server-side OLAP provider implementation.

3.3.15
OLAP
online analytical processing database which uses a multi-dimensional data model

3.4 PresentationML-specific

3.4.1
presentation
collection of slides intended to be viewed by an audience

3.4.2
handout
printed set of slides

Note 1 to entry: This is so named because the printed set is designed to be handed out to an audience for future reference.

3.4.3
slide
frame containing one or more pieces of text and/or images

3.4.4
slide layout
organization of elements on a slide

3.4.5
note
slide annotation, reminder, or piece of text intended for the presenter or the audience

3.5 DrawingML-specific

3.5.1
DiagramML
subset of DrawingML used for diagrams

3.5.2
diagram
picture or graphical representation displayed using a related set of color, data, layout, and style parts

EXAMPLE Diagram types include cycle, organization chart, pyramid, target, and Venn.

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3.6 Shared

3.6.1
control
region of active content within an Office Open XML document

3.6.2
math zone
isolated region of text within which mathematical text is used and outside of which mathematical text is not used

3.6.3
mathematical text
text meant to convey mathematical meaning through OMML

3.6.4
OMML
Office Math Markup Language, a Shared ML of this document

3.6.5
instance of mathematical text
single continuous combination of mathematical text represented by a single `oMath` block and the OMML elements within that block

3.6.6
math paragraph
one or more instances of mathematical text that are in display mode

3.6.7
display mode
mathematical text in one or more `oMath` blocks contained in a display math zone (an `oMathPara` block)

3.6.8
oMath container
`oMath` block that is part of a display math zone but is not itself a math zone

3.6.9
display equation
display expression
display formula
display math
equation in display mode and thus part of a display math zone

3.6.10
inline equation
inline expression
inline formula
inline math
equation in an inline math zone

3.6.11
math alphanumerics
characters with specific math styles, as defined in the Unicode Standard

3.6.12
math accent
character specified as acceptable for use as an accent character by this document

3.6.13
linear format
implementation-defined, plain-text, 1-dimensional representation of mathematical text

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3.6.14
built-down form
implementation-defined linear format that may or may not include additional rich formatting in addition to another plain-text linear format (such as TeX) or the linear format defined in Unicode Technical Note #28

3.6.15
professional form
built-up form
implementation-defined 2-D representation of mathematical text

3.6.16
build down
process of converting mathematical text from an implementation's professional form to an implementation's built-down form

3.6.17
build up
process of converting mathematical text from an implementation's built-down form to an implementation's professional form

3.6.18
limit
expression in a mathematical equation in reduced-size text, in a high position ("upper limit") or low position ("lower limit") relative to either an n-ary operator or text on the baseline of the expression

Note 1 to entry: See n-ary operator for examples of limits in both high and low positions relative to a summation sign operator.

3.6.19
n-ary operator
mathematical operator, typically a single operator character, optionally accompanied by expressions of a lower limit, an upper limit, or both

EXAMPLE The following example uses the summation sign (Unicode character U+2211), which has the official name "N-ARY SUMMATION":

$$\sum_{j=1}^{n} a_j \equiv a_1 + a_2 + \cdots + a_n$$

4. Notational conventions

The following typographical conventions are used in this document:

- The first occurrence of a new term is written in italics. For example: "The text in this document is divided into normative and informative categories."
- The tag name of an XML element is written using a distinct style and typeface. For example: "The `bookmarkStart` and `bookmarkEnd` elements specify …"
- The name of an XML attribute is written using a distinct style and typeface. For example: "The `dropCap` attribute specifies …"
- The value of an XML attribute is written using a constant-width style. For example: "The attribute value of `auto` specifies …"
- The qualified or unqualified name of a simple type, complex type, or base datatype is written using a distinct style and typeface. For example: "The possible values for this attribute are defined by the `ST_HexColor` simple type."

Tag names in code fragments are generally expressed as prefixed names. The main exception is that tag names in SpreadsheetML examples are prefixless (Clauses 12 and 18). Attribute names in code fragments are prefixless unless the name is declared to be in a specific namespace that is different to that of the parent element's tag name, except in WordprocessingML examples in which all attribute names are prefixed.

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