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**Information and documentation —  
Boxes, file covers and other  
enclosures, made from cellulosic  
materials, for storage of paper and  
parchment documents**

*Information et documentation — Boîtes, sous-chemises et autres  
contenants en matériaux cellulosiques, pour le stockage des  
documents sur papier et parchemin*

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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 document 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](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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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](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 46, *Information and documentation*, Subcommittee SC 10, *Requirements for document storage and conditions for preservation*.

This second edition cancels and replaces the first edition (ISO 16245:2009), which has been technically revised.

The main changes are as follows:

- ISO 23404 has been added as a normative reference, and an acceptance limit based on tests carried out in accordance with ISO 23404 has been determined;
- the bleeding test procedure has been improved;
- the different types of boards used for making boxes, file covers and other enclosures have been defined.

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](http://www.iso.org/members.html).

## Introduction

Boxes, file covers and other enclosures are available in several different materials. Those made of cellulosic materials are the most commonly used enclosures for long-term storage of paper and parchment documents. Experience has shown that properties of the enclosure are of great importance to the protection, permanence and durability of the documents. This document specifies a number of basic requirements relevant to the material composition and construction of cellulose based boxes, file covers and other enclosures.

The purpose of boxes, file covers and other enclosures is to hold and contain documents in prescribed order or grouping, to provide a protective container, and to facilitate identification, transport and storage. Preferably, the same file covers and boxes can be used from storage at the place of work to the final archive storage. Moreover, it is possible to transport, handle and lend a related collection of documents as a unit.

Boxes, through their design and construction, protect documents from environmental risks such as light, rapid temperature and moisture changes and dust, as well as from damage related to handling. File covers and folders further protect documents by enclosing them with materials specified for their preservation qualities. However, even high-quality file covers, folders and boxes cannot compensate for poor storage conditions.

This document can be used as a specification. It can also be incorporated as an element into other specifications, used in trade, or in other national or International Standards for more specialized purposes.

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# Information and documentation — Boxes, file covers and other enclosures, made from cellulosic materials, for storage of paper and parchment documents

## 1 Scope

This document specifies requirements for boxes, file covers and other enclosures made of cellulosic material, to be used for long term storage of documents on paper or parchment.

This document is applicable to boxes made of solid or corrugated board and to file covers and other enclosures made of paper or board.

This document can also be applicable to other types of enclosures for long term storage such as cases, portfolios, tubes and envelopes made of cellulosic material.

This document is not applicable to storage of photographic materials.

NOTE ISO 18902 contains requirements on storage materials for photographs.

## 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 5-3, *Photography and graphic technology — Density measurements — Part 3: Spectral conditions*

ISO 5-4, *Photography and graphic technology — Density measurements — Part 4: Geometric conditions for reflection density*

ISO 302, *Pulps — Determination of Kappa number*

ISO 535, *Paper and board — Determination of water absorptiveness — Cobb method*

ISO 536, *Paper and board — Determination of grammage*

ISO 4046-4, *Paper, board, pulps and related terms — Vocabulary — Part 4: Paper and board grades and converted products*

ISO 5626:1993, *Paper — Determination of folding endurance*

ISO 6588-1, *Paper, board and pulps — Determination of pH of aqueous extracts — Part 1: Cold extraction*

ISO 10716, *Paper and board — Determination of alkali reserve*

ISO/CIE 11664-2, *Colorimetry — Part 2: CIE standard illuminants*

ISO 12048:1994, *Packaging — Complete, filled transport packages — Compression and stacking tests using a compression tester*

ISO 23404, *Information and documentation — Papers and boards used for conservation — Measurement of impact of volatiles on cellulose in paper*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4046-4 and the following 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

##### **box**

storage container intended to protect documents and facilitate their shelving and handling

#### 3.2

##### **file cover**

enclosure made of a sheet of paper or board used for housing of and as a separating agent for document(s)

#### 3.3

##### **folder**

sheet of heavy paper stock or cardboard, scored near the middle, its halves bent so they rest side by side, and used as a loose cover to keep documents and other flat materials together, especially for purposes of filing

[SOURCE: SAA Glossary <https://dictionary.archivists.org/>]

#### 3.4

##### **viscosity-average degree of polymerization**

$DP_v$

average number of anhydroglucose units (monomers of cellulose) in the cellulose macromolecule, determined by measuring the viscosity of solutions in cupri-ethylenediamine (CED)

[SOURCE: ISO/TS 18344:2016, 3.3, modified — "Viscosity" has been added to the term, and the determination process has been added to the definition.]

#### 3.5

##### **loss of $DP_v$**

$\omega DP_v$

arithmetic mean of the  $DP_v$  (3.4) of an exposed sample of reference paper against the  $DP_v$  of an unexposed sample of same paper

[SOURCE: ISO 23404:2020, 3.7, modified — "Viscosity average degree of polymerization" has been replaced by  $DP_v$ ]

#### 3.6

##### **alkali reserve**

compound, such as calcium carbonate, that neutralizes acid that can be generated as a result of natural aging or from atmospheric pollution

[SOURCE: ISO 9706:1994]

#### 3.7

##### **homogenous single-layer board**

board comprising a single furnish layer

Note 1 to entry: This definition is equivalent to a solid board as defined by ISO 4046-4:2016, 4.49.

Note 2 to entry: The term single-ply board can also be used instead of single-layer board.



**3.8****two-layer board**

board consisting of two furnish layers combined together during manufacture, while still moist

Note 1 to entry: The terms two-ply board and duplex board can also be used instead of two-layer board.

[SOURCE: ISO 4046-4:2016, 4.195]

**3.9****three-layer board**

board consisting of three furnish layers combined together during manufacture, while still moist

Note 1 to entry: The outer furnish layers may be of the same composition.

Note 2 to entry: The terms three-ply board and triplex board can also be used instead of three-layer board.

[SOURCE: ISO 4046-4:2016, 4.186]

**3.10****multi-layer board**

board consisting of more than three furnish layers combined together during manufacture

Note 1 to entry: Two or more furnish layers may be of the same composition.

Note 2 to entry: The terms multi-ply board and multiplex board can also be used instead of multi-layer board.

[SOURCE: ISO 4046-4:2016, 4.122]

**3.11****pasted board**

board produced by the operation of pasting two or more boards of similar or different compositions

[SOURCE: ISO 4046-4:2016, 4.135]

**3.12****corrugated fibreboard**

board consisting of one or more sheets of fluted paper glued to a flat sheet of board or between several sheets

Note 1 to entry: Cf. single-face corrugated fibreboard, single-wall corrugated fibreboard, double-wall corrugated fibreboard, triple-wall corrugated fibreboard

Note 2 to entry: In this document, corrugated board is used for corrugated fibreboard.

[SOURCE: ISO 4046-4:2016, 4.49, modified — notes to entry added]

**3.13****plasticizer****external plasticizer**

non-reactive substance incorporated in an adhesive to improve the flexibility and resilience of the bond

Note 1 to entry: A plasticizer gives the adhesive film a greater extension at break, a lower modulus and a lower brittleness temperature. A plasticizer can be soluble in liquids and can migrate from the adhesive film.

[SOURCE: ISO 472:2013, 2.1549]

**4 Symbols**

$Cobb_{60}$  The calculated mass of water absorbed in 60 s by 1 m<sup>2</sup> of paper or board under specified conditions

$D_R$	Visual reflection density
$S_A$	Influx spectrum, standard CIE illuminant A
$s_V$	Visual spectral responsivity (with $V$ , the CIE photopic spectral luminous efficiency function)
$p_{\max}$	Maximum pressure

## 5 Requirements for boxes

### 5.1 General

Materials used shall not contain or form any substances, or have physical characteristics, which can be harmful to the documents being stored.

### 5.2 Boards

#### 5.2.1 General

Various types of boards are used as materials for boxes.

For the purpose of this document, the following terms will be used: “board” and “corrugated board”. The generic term “board” will be used for either “homogenous single-layer board”, “two-layer board”, “three-layer board”, “multi-layer board” or “pasted board”. The generic term “corrugated board” will be used for either “single-face corrugated fibreboard, single-wall corrugated fibreboard, double-wall corrugated fibreboard or triple-wall corrugated fibreboard”.

#### 5.2.2 Criteria of acceptance

Boards and corrugated boards shall:

- produce a loss of  $DP_v$  of the reference paper pieces ( $\omega DP_v$ ) less than 50 %, when tested according to ISO 23404;
- have an amount of alkali reserve capable of neutralizing at least 0,4 mol of acid per kilogram dry-weight of the board as specified in ISO 10716:2022, have a cold aqueous extract pH value in the range from 7,5 to 10,0, determined as specified in ISO 6588-1;
- shall be neutral sized or alkaline sized. Layers of corrugated board and pasted board shall be measured and meet the criteria individually. The separation of the different layers shall not be performed by soaking the board in water.

Two-layer, three layer or multi-layer boards do not need to be separated. The test values of unseparated two-layer, three layer or multi-layer boards, together with the manufacturer's warranty of the use of an alkaline process for all layers are acceptable.

#### 5.2.3 Categories

Two types of board and corrugated board for boxes are specified:

- type A;
- type B.

Boxes made of type A board or corrugated board may be used without file covers. To avoid risk of degradation due to direct contact, boxes made of type B board or corrugated board shall be used together with file covers as specified in [Clause 6](#). These file covers shall protect all the faces and edges of the documents.