ISO/FDIS 18948:2024(en)

Date: 2024-11-07

ISO/TC 42/WG 5

Secretariat: ANSI

Date: 2024-xx

Imaging materials — Photo books — Test methods for permanence and durability

Matériaux pour l'image — Albums photos — Méthodes d'essai de permanence et de durabilité

FDIS stage

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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 documentsdocument should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directiveswww.iso.org/directives).

Attention is drawnISO draws attention to the possibility that some of the elementsimplementation of this document may beinvolve the subjectuse 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. 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.htmlwww.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 42, *Photography*.

This second edition cancels and replaces the first edition (ISO 18948:2018), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

The changes are as follows:

— two editorial clarifications in Terms and Definitionsdefinitions;

— minor punctuation and grammar changes in Clauses 4Clauses 4 and 66;

— consistency of calculation terms in Clause 7Clause 7;

— minor editorial clarifications in the Annexesannexes.

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.htmlwww.iso.org/members.html.

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Introduction

Photo books are bound books with printed pages comprised of integrated photos, along with artwork and text, designed by and usually dedicated to a limited group of people.

Like photographic prints, photo books are produced on the widest available spectrum of production, from large run commercial facilities to one-off home kits. Their expected permanence and durability can cover a similarly broad range. Careful consideration should be given to the materials used in the construction of photo books to insure high permanence of the printed images[32][33] and of the books themselves[33],[34].

Photo books are typically stored in a closed condition, either in a stack or on a book shelf; consequently environmental factors that may adversely affect displayed prints, such as light and ozone, may not be applicable to the preservation of the inside pages of a photo book. The user is cautioned that these factors may become relevant if the photo book is displayed or otherwise exposed to light or other environmental factors for an extended period of time. ISO 18937 (all parts) and ISO 18941 provide guidelines on testing for the effect of light and ozone on photo books.

The test methods included in this document assume that the photo book will be stored and used in environments that may or may not be climate controlled. For this reason, it includes test conditions designed to assess the adverse effects of humidity and temperature that may be outside of recommended long-term and medium-term storage conditions as described in ISO 18920. It also includes test conditions intended to simulate short duration exposure of photo books to the interior of a hot vehicle.

This document contains many specific tests for various binding systems and printing processes. It is not the intention of this document to require that all possible combinations be tested. Testing all combinations of sizes, cover materials, binding options and printing processes is not possible due to the large number of combinations. However, testing representative combinations of materials is encouraged.

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ISO 18937-1, Imaging materials — Methods for measuring indoor light stability of photographic prints — Part 1: General guidance and requirements

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Imaging materials — Photo books — Test methods for permanence and durability

1 Scope

This document specifies test methods to assess the permanence and durability of photo books, including cover and pages.

This document is applicable to photo books which contain reflection colour prints made with colour hardcopy materials of all types, including those from either traditional analogue printing or modern digital printing processes. The same performance test methods apply, regardless of the printing process. Because of the large number of combinations of sizes, cover materials, binding options and printing processes, testing of all possible combinations is not within the scope of this document. Instead, a representative selection of printed pages, cover materials and binding options that are used in the makeup of the photo book are tested.

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.

<std>ISO 527-3, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets*</std>

<std>ISO 527-3, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets*

ISO 11800:1998, *Information and documentation — Requirements for binding materials and methods used in the manufacture of books*</std>

<std>ISO 18913, *Imaging materials — Permanence — Vocabulary*</std>

<std>ISO 18924, *Imaging materials — Test method for Arrhenius-type predictions*</std>

<std>ISO 18931, *Imaging materials — Recommendations for humidity measurement and control*</std>

<std>ISO 18936, *Imaging materials — Processed colour photographs — Methods for measuring thermal stability*</std>

<std>ISO 18937, *Imaging materials — Photographic reflection prints — Methods for measuring indoor light stability*</std>

<std>ISO 18941:2017, *Imaging materials — Colour reflection prints — Test method for ozone gas fading stability*</std>

<std>ISO 18946, *Imaging materials — Reflection colour photographic prints — Method for testing humidity fastness*</std>

<std>ISO 18924, *Imaging materials — Test method for Arrhenius-type predictions*

ISO/TR 18931, *Imaging materials — Recommendations for humidity measurement and control*</std>

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ISO 18937-1, Imaging materials — Methods for measuring indoor light stability of photographic prints — Part 1: General guidance and requirements

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ISO 18941:2020, Imaging materials — Colour reflection prints — Test method for ozone gas fading stability

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ISO 18936, *Imaging materials — Processed colour photographs — Methods for measuring thermal stability*

ISO 18937 (all parts), *Imaging materials — Methods for measuring indoor light stability of photographic prints*

ISO 18941:2020, *Imaging materials — Colour reflection prints — Test method for ozone gas fading stability*

ISO 18946, *Imaging materials — Reflection colour photographic prints — Method for testing humidity fastness*

ISO 18949, *Imaging materials — Reflection colour photographic prints — Method for testing stability under low humidity conditions*~~</std>~~

~~<std>~~ISO 19594, *Graphic technology — Test method for the determination of the binding strength for perfect-bound products — Page-pull test working upwards*~~</std>~~

~~<std>~~ASTM F904, *Standard Test Method for Comparison of Bond Strength or Ply Adhesion of Similar Laminates Made from Flexible Materials*~~</std>~~

3 Terms and definitions

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

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

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

— ~~—~~IEC Electropedia: available at ~~https://www.electropedia.org/~~https://www.electropedia.org/

3.1~~3.1~~
photo book
bound book with printed pages comprised of integrated personal photos along with artwork and text, designed by and usually dedicated to a limited group of people

3.2~~3.2~~
cover
protective covering on the front, back, and spine of a book, including any associated adhesives, binding boards, liners, and laminates

3.3~~3.3~~
blister
localized delamination of a multilayer assembly that looks like a bubble

3.4~~3.4~~
delamination
separation of a *laminated assembly* (3.8) into its constituent layers, either in whole or in part

3.5~~3.5~~
laminate
layer of material that goes over one or both sides of a printed page

Note 1 to entry: Usually the laminate layer provides moisture barrier and abrasion resistance, as well as UV shielding, to add protection to the photo images from physical damage and colour fading.

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3.6~~3.6~~
laminate
<film> clear polymeric layer applied using thermosetting or pressure-sensitive adhesive to one or both surfaces of a print to improve durability

3.7~~3.7~~
laminate
<liquid coating> water-based, solvent-based, or UV-curable liquid protective coating applied to one or both surfaces of a print to improve durability

3.8~~3.8~~
laminated assembly
multilayer structure typically comprising a paper support, one or more barrier layers, an imaging layer, and a protective *laminate* (3.5) top layer

Note 1 to entry: Laminated assemblies include films or coatings adhered to the surface of pages or covers, prints adhered back-to-back to each other forming a completed page.

3.9~~3.9~~
lay-flat
binding that allows for an uninterrupted image across the binding either by using flexible, hinged pages or by using adhesives to adhere the back of two adjacent pages

3.10 ~~3.10~~
sandwich sample holder
metal fixture intended to hold three components in a flattened, pressed-together position so that airflow to the printed areas of the middle component is restricted as a function of the permeability of the two outer components

Note 1 to entry: This type of sample holder is suitable for sandwich thermal test method written in ~~Annex D~~ Annex D.

3.11 ~~3.11~~
sample sandwich thermal test method
thermal stability test method that complies with ISO 18936 except that the *sandwich sample holder* (3.10) is used in place of the free hanging sample holding method

3.12 ~~3.12~~
blocking
undesired adhesion between sheets of printed material that occurs under moderate pressure, high temperature, or high humidity, while in storage or in use that leads to undesirable effects such as *delamination*, (3.4), paper splitting, tearing, ferrotyping, colourant transfer, or edge deformation

3.13 ~~3.13~~
sticking
temporary adhesion of prints in a stack or pages in a *photo book* (3.1) but without physical damage when adjacent prints or pages are separated

3.14 ~~3.14~~
ferrotyping
changes in surface gloss resulting from intimate contact with another surface, often associated with high humidity

Note 1 to entry: The term ferrotyping is derived from a historical term associated with silver halide photography. It is a process used to produce a very high gloss surface on a gelatine silver halide print in which a damp print is placed in contact with a highly polished surface, such as chromium-plated steel, and dried under conditions of elevated temperature and pressure.

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3.15 ~~3.15~~
bleeding
lateral migration of colourant

3.16 ~~3.16~~
colourant transfer
transfer of colourant from one sheet to the other sheet, when both sheets are placed in direct contact

3.17 ~~3.17~~
cumulative exposure
the aggregated total exposure of a test sample to a series of exposures to a specific condition (e.g., light intensity) over a specific duration.

Note 1 to entry: For example, receiving five separate exposures to a light intensity of 10 klx for 24 hours each, would have a cumulative exposure of 1 200 klx-h (5 x 10 x 24)

3.18 ~~3.18~~
curling
physical deformation of a page, a cover, a stack of prints or a bound *photo book* (3.1) resulting in departure from physical flatness with the tendency to curve into a concave or convex shape

3.19 ~~3.19~~
wrinkling
physical deformation of a page or a cover of a *photo book* (3.1) resulting in departure from physical flatness with the tendency to make furrows, crinkles, folds, ridges or creases

3.20 ~~3.20~~
warp
distortion of the front and/or back covers of a bound book, so that the covers do not lie flat against the book block

3.21 ~~3.21~~
book block
text block, including the endpapers and other materials added by the binder, before casing in

3.22 ~~3.22~~
waviness
physical deformation of a page or a cover of a *photo book* (3.1) resulting in departure from physical flatness with the tendency to curve alternately in opposite directions, resembling or suggesting waves

3.23 ~~3.23~~
cockle
planar distortion in flat materials, especially paper or vellum, that is characterized by puckering, waves, or rippling

3.24 ~~3.24~~
edge fluting
wave-shaped deformation along the edges of cut sheets and may be caused by an expansion of the edge of the material, which is exposed to greater variations in temperature and humidity than the centre

4 Image permanence tests for covers and pages

4.1 General

Although the individual pages of most photo books are not typically exposed to light and pollutants in the ambient environment for long periods of time, it is useful to know how stable the printed pages are if the book

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