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Information and documentation — Permanence and durability of writing, printing and copying on paper — Requirements and test methods

Information et documentation — Permanence et durabilité de l'écriture, de l'impression et de la reprographie sur des documents papier — Prescriptions et méthodes d'essai

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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).

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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.

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 11798:1999), which has been technically revised.

The main changes are as follows.

— The reference material used for the testing of mechanical properties is defined and shall, prior to testing, be handled according to 4.5.

— CIELAB measurements replaces optical density measurements, i.e. evaluation of monocoloured printing shall be performed by CIELAB measurements. Accordingly, microdensitometers or densitometers are no longer needed.

— Testing of colour fastness (5.2 and 6.2) shall be followed to evaluate recording (monocoloured and multicoloured) for lightfastness (6.4), water resistance (6.5) and resistance to heat (6.8).

— Table 1 (see 5.1) presents, for printing devices, elaborated CIELAB lightness and colour shift requirements ΔL^*, Δa^*, Δb^* and, in addition, a new requirement of ΔE^*_{ab} (Euclidean distance between two CIELAB coordinates).

— Table 2 (see 5.1) presents, for pens and stamps, requirement of maximum CIELAB lightness change ΔL^*.

— Abrasion resistance (formerly referred to as *resistance to wear*) shall be evaluated by the degree of abrasion (6.7) and is determined by CIELAB measurements prior to, and after, abrasion.

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— Detailed descriptions of specimen preparation for pens and stamps, three printout templates for specimen preparation from printers and copying machines and reporting forms are given in Annexes.

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.

This corrected version of ISO 11798:2023 incorporates the following corrections:

— The UV-light dose value given in 6.4 has been corrected from "0,108 J/m^2" to "10,8 MJ/m^2".

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Introduction

It is of great importance that recording of images on paper which, during long-term storage in libraries, archives, and other protected environments, undergo little or no change in properties that affects its use. The documents must preserve their information content and, thus, enable information storage and information supply for the future. Accordingly, it is important to study the permanence and durability of recording on paper.

Writing materials and printing equipment meeting the requirements given in this document can be used in the preparation of paper documents intended for long-term storage and recurrent use. Such documents contain permanent and durable images, i.e. images likely to be stable and thus undergo little or no change in properties that influence legibility and the possibility of copying or converting the paper documents to other data carriers.

This document specifies requirements and testing methods for evaluation of the permanence and durability of images. It is primarily intended for recording on writing, printing, and photo-copying papers in accordance with ISO 9706 (permanent paper) or ISO 11108 (archival paper). This document does not specifically evaluate permanence and durability of books, but if permanent/archival paper is used in combination with recording that meets the requirements in this document, the book content will most likely become permanent. However, book bindings and covers are not included.

Permanent paper and archival paper, used in the preparation of documents, may differ widely in properties of importance for the quality and permanence of the image. Some properties of an image, such as abrasion resistance, depend on the combination of the image and the paper. The testing conditions of this document are chosen so that results, representative of most papers on the market to be used for a particular imaging process, shall be obtained.

In this document, the requirements are given in the following attributes:

— visual image colour strength and appearance;

— lightfastness;

— water resistance;

— transfer of recorded image;

— abrasion resistance;

— resistance to heat;

— effect of recording on the mechanical strength of the paper.

Experience has shown that images written with carbon black ink as well as printed images using commercial printing inks have proved to be consistently reliable. There are, however, many documents where acidic inks have affected the paper to such an extent that the paper has degraded. Images produced from dry or liquid toner are also susceptible to ageing problems.

Images printed with modern material and machinery are often completely different from old images with respect to composition and properties. The rapid development of new printing techniques makes this testing very important. One printing technology may be replaced by a newer technology within a few years on the market. Therefore, conclusions based on studies of old documents in libraries and archives are of limited use when discussing the permanence of modern documents.

Strictly speaking, the only way to test the permanence and durability of documents is to handle them and to store them under the relevant conditions for long periods of time. In practice, one can only rely on the observations made on documents kept for a few decades and evaluate the effect of factors known to influence the permanence and durability of the image. Therefore, the testing according to this document does not correlate to lifetime of documents, but rather the documents that satisfy the requirements can be stored for a long time in the future in archives and protected environments, probably for several hundred years.

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Information and documentation — Permanence and durability of writing, printing and copying on paper — Requirements and test methods

1 Scope

This document specifies requirements and test methods for evaluation of the permanence and durability of writing, printing and copying on paper stored in libraries, archives, and other protected environments for long periods of time, in which the information recorded on paper must be retained but not necessarily the full artistic quality.

It is applicable to:

— images on white permanent paper according to ISO 9706 or ISO 11108;

— recording obtained from pens, stamps, copying machines and printers (that can produce monocoloured and/or multicoloured images).

It does not apply to:

— documents stored under harmful conditions, such as high humidity that promotes microbiological attack, excessive heat, radiation (e.g. light), high levels of pollutants, or the risk of water damage (or water contact). Since documents might be kept in non-protected environments before being transferred to protected environments, resistance to water and light is, however, of importance;

— legal documents, e.g. banking documents, where the authenticity is of primary interest;

— documents where the information contents are influenced by small colour changes;

— documents within the scope of ISO/TC 42, *Photography*.

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 536, *Paper and board — Determination of grammage*

ISO 1924-2, *Paper and board — Determination of tensile properties — Part 2: Constant rate of elongation method (20 mm/min)*

ISO 2470-1, *Paper, board and pulps — Measurement of diffuse blue reflectance factor — Part 1: Indoor daylight conditions (ISO brightness)*

ISO 4892-2, *Plastics — Methods of exposure to laboratory light sources — Part 2: Xenon-arc lamps*

ISO 5626, *Paper — Determination of folding endurance*

ISO 9352, *Plastics — Determination of resistance to wear by abrasive wheels*

ISO 9706, *Information and documentation — Paper for documents — Requirements for permanence*

ISO 11108, *Information and documentation — Archival paper — Requirements for permanence and durability*

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