INTERNATIONAL STANDARD

ISO 18911

First edition
2000-11-01

Imaging materials — Processed safety photographic films — Storage practices

Matériaux pour image — Films photographiques de sécurité traités — Techniques d'archivage

Reference number
ISO 18911:2000(E)

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Printed in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 18911 was prepared by Technical Committee ISO/TC 42, *Photography*.

This first edition cancels and replaces the fourth edition of ISO 5466:1996, of which it constitutes a technical revision.

This International Standard is one of a series of International Standards dealing with the physical properties and stability of imaging materials. To facilitate identification of these International Standards, they are assigned a number within the block from 18900 to 18999 (see annex A).

Annexes A to K of this International Standard are for information only.

Introduction

The value of records used in archives, museums, libraries, government, commerce and universities has focused attention on the care of these records to ensure their longest possible life (see [1, 2, 3] in the bibliography). Photographic film is an important documentary and pictorial material, and there is a recognized need for information on safeguarding photographic film having legal, scientific, industrial, artistic or historical value.

Films are susceptible to degradation from many sources. These factors may be divided into three general categories as follows.

a) Nature of the photographic film

The stability of photographic film records depends on the physical and chemical nature of the film. The specification for safety photographic film which is suitable for storage is described in ISO 18906.

For preservation purposes, processed photographic films are classified according to their life expectancy or LE designation. These are specified in the appropriate International Standards. The term “archival” is no longer specified to express longevity or stability in International Standards on imaging materials, since it has been interpreted to have many meanings that range from “preserving information forever,” which is unattainable, to “temporary storage of actively used information.”

For optimum preservation of photographic information, a high LE film should be used, and it should be stored under extended-term storage conditions. A film material suitable for preservation is silver-gelatin type film on polyester base that meets the requirements of ISO 10602. However, this International Standard also applies to processed colour, diazo (ISO 8225), vesicular (ISO 9718) and thermally processed silver (ISO 18919) films. Although these film types may not have as high an LE designation, excellent keeping properties have been obtained with many of them.

b) Photographic processing of the film

For black-and-white silver-gelatin type film, ISO 10602 specifies a maximum residual thiosulfate level for different LE classifications and a residual silver compounds level.

For diazo film, ISO 8225 specifies a proper development test. ISO 9718, for vesicular film, includes both a proper development test and a residual diazonium salt test.

c) Storage conditions

The conditions under which safety photographic film records should be stored are extremely important for the preservation of film and are the subject of this International Standard (see ISO 18906). The same environmental conditions are recommended for nitrate-base films, but they shall be stored in a separate storage area having suitable fire protection safeguards (see [4] in the bibliography).

The important elements affecting preservation of processed film are humidity, temperature and air pollutants, as well as the hazards of fire, water, light, fungal growth, insects, microbiological attack, contact with certain chemicals in solid, liquid or gaseous form, and physical damage. Direct contact with other generic types of film can be detrimental to either film.

The extent to which humidity, temperature, and atmospheric contaminants or variations thereof can be permitted to reach beyond recommended limits without producing adverse effects will depend upon the duration of exposure, the biological conditions conducive to fungal growth, and the accessibility of this atmosphere to the emulsion and support surfaces. Exposure to high temperatures, and in particular to high humidities, can lead to degradation of the film support and the photographic emulsion (see [5, 6, 7] in the bibliography). Cellulose ester base films are more subject to base degradation than polyester base films.

There are two levels of storage conditions: medium-term and extended-term. Medium-term storage can be used for films where the information is to be preserved for a minimum of 10 years, while extended-term storage conditions can extend the useful life of a majority of freshly processed films to 500 years. However, extended-term storage conditions will prolong the life of all films, independent of age, type or processing conditions. The storage protection provided by each level will differ in degree, as will the cost of providing and maintaining the storage facility.

Immediate availability of space and cost may need to be considered when selecting storage conditions. It is recognized that many facilities may not be able to obtain the low humidity and low temperature levels specified in this International Standard because of energy considerations, climate conditions or building construction. Such deviation from the specified conditions will reduce the degree of protection offered, and in such cases maintaining a humidity and temperature as low as possible will still provide some benefits.

This International Standard is not designed to provide protection against natural or man-made catastrophes, with the exception of fire and associated hazards which are sufficiently common to warrant inclusion of protection measures.

In addition to the recommendations in this International Standard, good storage practices must consider the filing enclosure. These are covered in ISO 18902.

Imaging materials — Processed safety photographic films — Storage practices

1 Scope

This International Standard provides recommendations concerning the storage conditions, storage facilities, handling and inspection for all processed safety photographic films (hereafter referred to as photographic film) in roll, strip, aperture-card or sheet format, regardless of size.

This International Standard is applicable to extended-term and medium-term storage of photographic film as defined in clause 3.

It is applicable to photographic film records intended as storage copies, which should not be in frequent use. It does not apply to "work" or "use" copies (see annex B).

This International Standard, while intended for materials that are properly processed, should also be of considerable value in prolonging the useful life of photographic film whose processing conditions are unknown, or that have been toned, retouched, or have markings with materials of uncertain or unknown stability.

This International Standard is applicable only to safety photographic film (see ISO 18906). Nitrate-base films are hazardous (see [8] in the bibliography) and are not covered by this International Standard. They require special storage considerations (see [4] in the bibliography), but the environmental conditions specified in this International Standard are applicable.

The storage of photographic prints and photographic plates requires different considerations. They are not covered in this International Standard, but are described respectively in ISO 18920 and ISO 18918.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 18906:—[1)], *Imaging materials — Photographic films — Specifications for safety film*.

ISO 8225:1995, *Photography — Ammonia-processed diazo photographic film — Specifications for stability*.

ISO 9718:1995, *Photography — Processed vesicular photographic film — Specifications for stability*.

ISO 10602:1995, *Photography — Processed silver-gelatin type black-and-white film — Specifications for stability*.

ISO 18915:—[1)], *Imaging materials — Methods for the evaluation of the effectiveness of chemical conversion of silver images against oxidation*.

1) To be published.

ISO 14523:1999, *Photography — Processed photographic materials — Photographic activity test for enclosure materials*.

ISO 18902:2000, *Imaging materials — Processed photographic films, plates and papers — Filing enclosures and storage containers*.

ISO 18919:1999, *Imaging materials — Thermally processed silver microfilm — Specifications for stability.*

3 Terms and definitions

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

3.1
archival medium
recording material that can be expected to retain information forever, so that such information can be retrieved without significant loss when properly stored

NOTE There is, however, no such material and it is not a term to be used in International Standards or system specifications.

3.2
duplicate
reproduction of a master, retaining the same polarity and size

3.3
extended-term storage conditions
storage conditions suitable for the preservation of recorded information on the majority of freshly and properly processed photographic films for 500 years

3.4
fire-protective storage
facility designed to protect records against excessive temperatures, water and other fire-fighting agents, and steam developed by insulation of safes or caused by the extinguishing of fires and collapsing structures

3.5
life expectancy
LE
length of time that information is predicted to be acceptable in a system at 21 °C and 50 % RH

3.6
LE designation
rating for the **life expectancy** (3.5) of recording materials and associated retrieval systems

NOTE The number following the LE symbol is a prediction of the minimum life expectancy in years for which information can be retrieved without significant loss when stored at 21 °C and 50 % RH, e.g., LE-100 indicates that information can be retrieved after at least 100 years storage.

3.7
macroenvironment
atmospheric conditions (temperature, relative humidity and pollutants) in a large area in which records are kept

3.8
medium-term storage conditions
storage conditions suitable for the preservation of recorded information for a minimum of 10 years

3.9
microenvironment
atmospheric conditions (temperature, relative humidity and pollutants) inside a storage enclosure in which records are kept