
**Imaging materials — Processed
photographic plates — Storage practices**

*Matériaux pour image — Plaques photographiques développées —
Directives pour l'archivage*

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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 18918 was prepared by Technical Committee ISO/TC 42, *Photography*.

This first edition cancels and replaces the fourth edition of ISO 3897:1997 of which it constitutes a technical revision.

This International Standard is one of a series of 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 I of this International Standard are for information only.

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Introduction

Photographic plates on glass or metal supports have been in existence almost since the beginning of photography. They have become increasingly important as documentary and pictorial reference material in archives, libraries, government, commerce and academia.

The stability and useful life of processed photographic plates depends on their physical and chemical properties, as well as on the conditions under which they are stored and used. This International Standard provides recommendations on proper storage conditions and practices. Although it is difficult to distinguish between the various types of plates covered by the definitions (see 3.7.1 to 3.7.8) with respect to storage life, the recommendations may be applied to all processed photographic plates.

The important storage elements affecting the preservation of processed photographic plates are as follows:

- relative humidity and temperature of the storage environment;
- hazards of fire, water, and light exposure;
- fungal growth and other microorganisms;
- contact with certain chemicals in solid, liquid or gaseous form;
- physical damage.

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The extent to which relative humidity and temperature, or variations of both, can be permitted to reach beyond recommended limits without producing adverse effects will depend upon the duration of exposure, biological conditions conducive to fungal growth, and the accessibility of the atmosphere to the surfaces.

The term “archival” is no longer specified to express longevity or stability in International Standards on image materials, since it has been interpreted to have many meanings, ranging from preserving information “forever”, which is unattainable, to temporary storage of actively used materials.

This International Standard defines two levels of recommended storage conditions: medium-term and extended-term. Medium-term storage conditions can be used to preserve plates for a minimum of 10 years. Extended-term storage conditions will prolong the life of all plates, even those not optimized for permanence.

The space requirements and costs for establishing and operating the two levels of storage conditions (medium-term and extended-term) differ significantly. Furthermore, the specified limits of temperature and relative humidity for both sets of storage conditions may not be realizable due to budgetary constraints, energy considerations, climatic conditions, building construction, etc. However, it must be recognized that temperatures and relative humidities which are higher than the specified conditions will reduce the effectiveness of the storage environment. If such deviation is unavoidable, the environmental conditions closest to the specified limits should be provided. In any event, the best preservation of plates will be attained with extended-term conditions.

The recommendations of this International Standard for processed photographic plates encompass the following:

- storage enclosures, housing and rooms;
- atmospheric and environmental conditions;
- fire protection;
- handling and inspection procedures.

This International Standard does not pertain to means or methods for protecting photographic plates against natural or man-made catastrophes, with the exception of fire and its associated hazards; these are sufficiently common to warrant inclusion of protective measures.

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Imaging materials — Processed photographic plates — Storage practices

1 Scope

1.1 This International Standard specifies dark storage conditions, storage facilities, and handling and inspecting procedures for processed photographic plates having integral photographic layers and intended for record purposes.

1.2 This International Standard is applicable to black-and-white, silver-image, gelatin, processed photographic plates as defined in 3.7.7. It is also applicable to medium-term and extended-term storage conditions as defined in 3.6 and 3.2, respectively.

No specific distinction is made, other than the degree of care, between photographic plates for medium-term or extended-term storage. Recommendations for plate storage relate to materials, methods, conditions, and forms of protection applicable specifically to plates defined in 1.1. However, these storage recommendations may also be applied to lacquered and opaque plates, to black-and-white plates altered by dyes or toners, colour plates and other historic photographic plates defined in 3.7.2 to 3.7.8.

1.3 It is not intended to predict or assign a useful lifetime to processed photographic plates stored in accordance with the specifications of this International Standard.

1.4 Recommendations for storage of photographic films are given in ISO 18911 and for storage of processed photographic reflection print material in ISO 18920.

Although there is some variation in recommended storage conditions among these types of photographic materials, recommended temperature and relative humidity ranges do overlap. If all three types of photographic materials are found in one collection or within one storage area, the temperature and relative humidity should be chosen so that all materials are stored within their recommended ranges.

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

ISO 18902:—¹⁾, *Imaging materials — Processed films, plates and papers — Filing enclosures and storage containers*.

ISO 18911:—¹⁾, *Imaging materials — Processed safety photographic films — Storage practices*.

ISO 18920: —¹⁾, *Imaging materials — Processed reflection prints — Storage practices*.

1) To be published.

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 extended-term storage conditions

storage conditions suitable for the preservation of recorded information having a permanent value

3.3 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

3.4 fire-resistant vault

fire-resistant vaults as defined in appropriate national standards and regulations

NOTE See [1] and [2] in the bibliography.

3.5 insulated record containers (Class 150)

insulated record containers (Class 150) as defined in appropriate national standards and regulations

NOTE See [3] and [4] in the bibliography.

3.6 medium-term storage conditions

storage conditions suitable for the preservation of recorded information for a minimum of 10 years

3.7 photographic layer

sensitive coating that yields an image after exposure to radiant flux

NOTE Exposure is usually followed by processing to generate the image.

3.7.1 photographic plate

material consisting of one or more radiation-sensitive layers coated on a rigid support, such as glass or metal, that yields a visible image

3.7.2 albumen plate

glass sheet bearing a silver halide/albumen layer which yields a visible image after exposure and processing

3.7.3 ambrotype plate

glass plate collodion positive, i.e., a glass sheet bearing a thin silver halide/cellulose nitrate layer which yields a visible image after exposure and processing

NOTE The processed negative silver image appears as a positive when backed by a dark field.

3.7.4**collodion plate**

collodion wet or dry plate

glass sheet bearing a thin silver halide/cellulose nitrate layer which yields a visible image after exposure and processing

3.7.5**colour screen plate**

glass sheet bearing a colour screen consisting of dyed elements in contact with a silver halide/gelatin layer which yields a visible image after exposure and processing

3.7.6**ferrotype plate**

tintype

enamelled iron sheet bearing a thin silver halide/cellulose nitrate layer which yields a visible image after exposure and processing

NOTE This is not to be confused with a thin metal sheet with a glossy surface upon which high-glass photographic prints are dried.

3.7.7**gelatin plate**

gelatin dry plate

glass sheet bearing a silver halide/gelatin layer which yields a visible image after exposure and processing

3.7.8**lantern slide**

glass sheet bearing a silver halide/gelatin layer which yields a visible image after exposure and processing

NOTE The image layer of lantern-slide plates is usually protected with a cover glass, bound on all edges with adhesive tape, as this type of plate is viewed by projection. Albumen and colour-screen plates are also found as lantern slides.

3.8**storage container**

box or can used to store plates

3.9**storage enclosure**

any item in close or direct contact with recording material such as folders, envelopes, sleeves, albums and mats

3.10**storage housing**

physical structure that supports materials and their enclosures

NOTE It may consist of drawers, racks, shelves or cabinets.

4 Photographic-plate housings: Storage enclosures and containers

Processed photographic plates require protection against all types of physical damage such as scratches, abrasion, fingerprints, breakage, etc. Filing enclosures and containers provide physical protection that minimizes or prevents such damage. Processed photographic film and prints shall not be stored within the same enclosure or container as photographic plates. Different types of photographic plates shall not be stored together within the same enclosure or container, but instead shall be segregated by type (see definitions 3.7.2 to 3.7.8).

Enclosures and containers shall be designed to permit vertical storage of plates, resting on one long edge. Plates shall not be stored in a flat or horizontal position since those on the bottom may be put under excessive pressure. Plates made from 19th century glass are especially vulnerable to stress-related fractures when stored horizontally, since such glass usually is not flat.

If unprotected plates are stored in contact, they shall be oriented with the emulsion side against the back side, not emulsion against emulsion. However, unprotected plates with very fine-grain images should never be stored in contact, but in grooved, multiple-plate containers of the type described in 4.2.

For maximum storage life, processed photographic plates shall be in a clean condition before they are placed in storage.

4.1 Individual enclosures

All enclosures used for medium-term and extended-term storage shall meet the requirements of ISO 18902 and ISO 14523. This includes enclosures that are in direct contact or in close proximity to the photographic plates.

Processed photographic plates may be stored in envelopes or sleeves, file folders, folding cartons, boxes, or albums made from paper or plastic which meet the requirements of ISO 18902 and ISO 14523. Individual plates should be placed in suitable individual envelopes (seamed or seamless types), sleeves or folders (see annex B) to exclude dirt, to protect the plates against mechanical damage, and to facilitate identification and handling.

Suitable plastic enclosure materials are uncoated polyester (polyethylene terephthalate), polystyrene, polyethylene and polypropylene. Other plastics may be satisfactory, but there has been no extended experience with such materials. Glassine envelopes and chlorinated, nitrated, or highly plasticized sheeting shall be avoided. Specifically, cellulose nitrate and polyvinyl chloride are not acceptable.

The adhesive used for seams and joints shall also meet the requirements of ISO 18902 and ISO 14523. The filing enclosure shall be constructed so that the seam or joint will be at the edge of the enclosure and not in contact with the image layer. Adhesives that are suitable for use with paper include photographic-quality gelatin, some acrylic and polyvinyl acetate adhesives, pure starch paste, and methyl cellulose.

4.2 Multiple-plate containers (standards.iteh.ai)

Container materials should be metal, plastic or paperboard, and meet the specifications defined in ISO 18902 and ISO 14523. The storage container materials shall be non-corrodible. Materials made of wood, pressed-board, hardboard, particle-board, and other natural materials shall be avoided because they can contain oxidizing materials which can attack the silver image (see annex C). Finishes on metal containers shall meet the criteria listed in clause 5 for metal storage housings.

There are two types of multiple-plate containers, both of which are available in commonly used plate dimensions:

- standard document-storage containers for vertical storage of plates filed in contact with each other or a spacer material;
- containers having grooved, parallel tracks for holding the plates apart in fixed, vertical positions.

The first type of container shall be designed to permit and maintain vertical plate storage on one long edge, as well as allowing insertion and removal of plates without damage. This requires that the inner dimensions of the container are only slightly larger than the plate size and that the strength and rigidity of the container are commensurate with the weight of a full complement of plates. Rigid paperboard inserts or filler pieces meeting the requirements of ISO 18902 and ISO 14523 can be used to ensure that plates are kept upright and to prevent them from rubbing against each other.

The second type of container shall be used when it is necessary to avoid plate-to-plate contact, as in the case of plates having a very fine-grain image or when plates are not protected by either individual enclosures or a cover glass. Such containers normally are lined on the bottom and sides of the interior with inserts that have parallel grooves. The grooves have a U- or V-type cross-section to restrict contact at the extreme edges of the plates while holding the plates vertical.

5 Storage housings

Processed photographic plates should be stored in closable storage housings such as vertical filing drawers or cabinets, in storage cabinets with tightly fitting doors, or inside closed containers on open shelves. Storage housings for photographic plates should be designed to bear a heavy weight load. Plates or plate containers should be placed so that their weight is centred on the shelving or inside the drawer, thus minimizing the tendency of the shelving or cabinets to topple over due to uneven weight distribution. Storage housings may be bolted to floors and wall studs as an added precaution to secure against the danger of tipping over.

The materials used in the fabrication of storage housings should be non-combustible, non-corrosive, and chemically inert, for example, anodized aluminium, stainless steel, or steel finished with a non-plasticized synthetic resin-powder coating. Wood, pressed-board, particle-board, plywood, and other such materials shall be avoided because of their combustible nature and the possibility of their producing active deteriorating agents as they age.

The finish on the storage housing materials should be durable and should not contain substances that can have a deleterious effect on the stored plates. Adverse effects may be produced by finishes containing chlorinated or highly plasticized resins, or by solvents off-gassing from freshly applied finishes. Paints used on cabinets may give off peroxides, solvents, and other contaminants for up to three months after being applied. Metal housing materials that have been powder-coated (a solvent-free finish process in which electrostatically applied resin particles are fused by heat), or cabinets made from stainless steel or anodized aluminium, are recommended.

When air that is temperature- and humidity-conditioned is supplied to storage housings, adequate interior air circulation shall be provided to all shelves and drawers holding plates or their containers, to ensure proper and uniform temperature and relative humidity conditions. Storage housings located in rooms that are properly air-conditioned in accordance with 7.2 shall be vented to permit adequate air circulation within the interior of the housing. Such openings shall not interfere with the requirements for fire-protective storage or water protection.

Photographic reflection prints and film may be stored within the same storage area as processed photographic plates, but not in the same enclosure or storage container. Magnetic tapes and optical disks shall not be stored within the same storage area or housing as photographic plates due to possible deleterious effects of off-gassing during storage.

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5.1 Drawer cabinets

Structurally reinforced, modified office-type filing cabinets with drawers are suitable for storing individual photographic plates when the following handling precautions are observed:

- care is taken to avoid uneven weight distribution and potential toppling of the cabinet when the upper drawers are opened all the way;
- drawers are opened and closed slowly and smoothly to avoid jostling the plates inside.

The drawers should be flat-bottomed and the vertical height of the drawer should be slightly larger than the vertical dimension of the plates. Drawers should be fitted with rigid vertical dividers that are the same height as the plates. Dividers should be fixed at appropriate intervals, for example, 2,5 cm to 5 cm and not more than 10 cm. In addition to supporting the plates, the dividers minimize movement of plates during retrieval and filing and relieve pressure on plates located at the end of rows.

Plates should be grouped by size and shall be filed vertically in the drawers, in one or more parallel rows depending on the plate size. Rows should be divided by suitable partitions. If drawers are not fitted with rigid dividers, containers can be used as a means of grouping plates within compartments in order to minimize jostling, and as an aid to organization and filing.

Structurally reinforced drawer-type cabinets are also recommended for storing plate containers as described in 4.2. Containers should be filed in a single layer, i.e., not stacked on each other. Care should be taken to ensure that containers do not tip over when other containers are removed during use.