INTERNATIONAL STANDARD

ISO 18902

Second edition
2007-12-15

Imaging materials — Processed imaging materials — Albums, framing and storage materials

Matériaux pour image — Matériaux pour image après traitement — Albums, cadrage et matériaux d'archivage

Reference number
ISO 18902:2007(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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 2.

The main task of technical committees is to prepare International Standards. 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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18902 was prepared by Technical Committee ISO/TC 42, *Photography*.

This second edition cancels and replaces the first edition (ISO 18902:2001), which has been technically revised.

Introduction

Black-and-white and colour photographic materials, including traditional silver halide, inkjet, dye sublimation, and electrophotography, have become increasingly important as documentary and pictorial reference materials for consumers and in archives, libraries, government, commerce and academia. This importance has focused attention on the preservation of such materials to ensure their longest possible life.

The stability and useful life of processed imaging materials depends on their physical and chemical properties, as well as on the conditions under which they are stored and used. The important elements affecting the useful life of imaging materials are as follows:

— humidity and temperature of the storage environment;

— hazards of fire, water and light exposure;

— fungal growth;

— contact with certain chemicals in solid, liquid or gaseous form;

— physical damage;

— proper processing;

— enclosures and containers in contact with the imaging material.

International Standards have been written specifying the stability requirements for different types of photographic film: ISO 18901[13], ISO 18905[14], ISO 18912[16] and ISO 18919[18].

Recommended storage conditions are given in the following International Standards for different photographic materials: ISO 18911[15], ISO 18918[17] and ISO 18920[19].

This International Standard is an auxiliary document and deals specifically with the enclosure materials used in storage. It pertains to the materials used in filing enclosures, containers, albums and frames, as well as to construction details used in folders, sleeves, jackets, envelopes, pocket pages and slide mounts. In addition, ISO 18916 describes the test method used to evaluate materials for photo-reactivity, referred to in this International Standard.

The term “archival” is no longer used in International Standards for imaging materials for defining optimum storage conditions and enclosures, because the meaning of “archival” has become too ambiguous. In common usage, “archival” has been used to mean that documents can be preserved “forever.” The new terms, when applied to the storage standards mentioned above are “extended-term” and “medium-term.” Likewise, enclosure materials should not be referred to as “archival,” but rather as meeting the specifications of this International Standard and ISO 18916.

When filing processed imaging materials, it is customary and good practice to enclose these materials in envelopes, sleeves, folders or other forms of enclosure in order to exclude dirt, protect them against mechanical damage, and facilitate identification and handling.

Storage conditions for visual records can be designed for extended-term preservation or for preservation for moderate periods of time. The storage protection required in each case will differ in degree according to the inherent stability of the visual records, the cost of providing storage facilities, the desired record life, and the frequency of record use. Storage conditions shall be chosen within specified limits in order to obtain a satisfactory compromise between the degree of protection required and the practical consideration of immediate availability.

Specifying the chemical and physical characteristics of the enclosure materials does not, by itself, ensure satisfactory storage behaviour. It is also essential to provide proper storage temperature and humidity, as well as protection from the hazards of fire, water and fungal growth, from contact with certain chemicals in solid, liquid or gaseous form (e.g., atmospheric pollutants) and from physical damage.

Furthermore, different types of imaging materials may respond uniquely to varying storage conditions. Clean, dust-free storage areas are essential because dust particles can be chemically destructive to images and base materials. In addition, solid particles can abrade photographic prints and negatives when these items are slid in and out of filing enclosures or when stacked items are sorted. Atmospheric conditions, natural and man-made, must be controlled since paper and plastic enclosures are permeable and they do not protect the photograph from environmental effects. Such effects include non-recommended relative humidities or atmospheric pollutants such as hydrogen sulfide, sulfur oxides, nitrogen oxides, peroxides and ozone.

Frames and framing material are included in this International Standard since it is realistic to assume that photographs will be viewed or displayed at some point during their lifetime. In addition, the photograph may be housed in the frame even when not on display. The lifetime of photographs on display is beyond the scope of this International Standard, however in general, long-term display is not recommended for photographs since colour and appearance may change over time.

Imaging materials — Processed imaging materials — Albums, framing and storage materials

1 Scope

This International Standard specifies the principal physical and chemical requirements for filing enclosures, containers, albums and frames, particularly designed for storing wet or dry processed films, plates and papers. This International Standard covers requirements for paper and board, plastic, metal, adhesives (except spray adhesives), writing, labelling and printing materials. It is applicable to photographs made with hardcopy materials. Included are photographs made with traditional chromogenic ("silver halide") and silver dye bleach photographic materials, dye- and pigment-based inkjet, dye diffusion thermal transfer ("dye sublimation"), liquid- and dry-toner electrophotography, and other analogue and digital print processes.

This International Standard applies to storage copies and does not include work copies as defined in Annex A. It applies to visual records for extended-term preservation and to visual records for preservation for moderate periods of time. The requirements are limited to the characteristics that may affect the enclosed item chemically or physically when it is stored under recommended conditions. (For methods of proper storage, see ISO 18911[15], ISO 18918[17] and ISO 18920[19]).

This International Standard does not apply to the material used as a support for prints or documents. (For permanence requirements for paper for documents, see ISO 9706[12]).

2 Normative references

The following referenced documents are indispensable for the application 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 302, *Pulps — Determination of Kappa number*

ISO 699, *Pulps — Determination of alkali resistance*

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

ISO 12757-1:1998, *Ball point pens and refills — Part 1: General use*

ISO 12757-2:1998, *Ball point pens and refills — Part 2: Documentary use (DOC)*

ISO 14145-1:1998, *Roller ball pens and refills — Part 1: General use*

ISO 14145-2:1998, *Roller ball pens and refills — Part 2: Documentary use (DOC)*

ISO 18916, *Imaging materials — Processed imaging materials — Photographic activity test for enclosure materials*

ISO 18932, *Imaging materials — Adhesive mounting systems — Specifications*

TAPPI T 406, *Reducible sulfur in paper and paperboard*[1)]

TAPPI T 408 cm, *Rosin in Paper and Paperboard*[1)]

TAPPI T 509 om-06, *Hydrogen ion concentration (pH) of paper extracts (cold extraction method)*[1)]

3 Terms and definitions

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

3.1
acid-free adhesive
mounting adhesive with a cold extraction pH between 7,0 ± 0,2 and 9,5 ± 0,2

3.2
acid-free paper or paperboard
paper or paperboard with a cold extraction pH between 7,0 ± 0,2 and 9,5 ± 0,2 that is produced in an acid-free process and is sized in a neutral or alkaline manner

3.3
anti-blocking agent
component of a material which provides microscopic bumps on the surface in order to minimize contact area and reduce the coefficient of friction

NOTE Examples are talc and other silicates.

3.4
archival (deprecated)
material that can be expected to preserve images forever, so that such images can be retrieved without significant loss when properly stored

NOTE However, as no such material exists, this is a deprecated term and as such is not to be used in International Standards for imaging materials or in systems specifications.

3.5
buffered
paper or paperboard with an alkali reserve that is equivalent to at least 2,0 % mass fraction calcium carbonate ($CaCO_3$)

3.6
ferrotyping
changes in the surface gloss of swellable photographic coatings (e.g. gelatine) resulting from high humidity and direct contact with another surface

3.7
lignin-free
paper or paperboard with a Kappa number of 7,0 or less, corresponding to a lignin concentration of approximately 1,0 % or less by mass

3.8
Newton's rings
faint coloured rings or fringe patterns formed by the interference between a direct and a reflected beam of light generated by two transparent surfaces in close contact

1) Available from the Technical Association of Pulp and Paper Industry, Box 105113, Technology Park, Atlanta, GA 30348, USA. These documents are examples of suitable documents available commercially. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of these documents.

3.9
photo-safe
material that meets the requirements of this International Standard so that it will not accelerate the natural ageing of photographic prints or films

NOTE Material that only meets pH requirements or passes the photographic activity test described in ISO 18916 is not necessarily photo-safe due to other factors that may be harmful to images and bases. These factors can include poor workmanship, poor design features and harmful chemical interactions not predicted by pH or PAT alone. In addition, some materials are themselves physically and chemically unstable and thus will not last long, even though they may not initially be reactive.

3.10
slip agent
component added to plastic material in order to reduce the coefficient of friction

NOTE Slip agents are usually amide-type materials.

4 Materials

4.1 General

The enclosure material shall be free of harmful materials that may be released slowly with time and cause degradation to the image or support material. For example, ageing blemishes in processed silver gelatine microfilm may be caused by chemicals such as peroxides evolved from the paper, see Bibliography [1], [2]. Likewise, the presence of acid in paper can cause paper degradation.

The enclosure itself shall be chemically stable. Otherwise, the decomposition products might be harmful to the photographic material, and dirt or dust might be produced that could scratch, or become embedded in the image surface. Cellulose nitrate, polyvinyl chloride, and glassine sheeting are examples of enclosure materials that are either chemically or physically unstable and shall not be used, see Bibliography [3], [4].

The surface of the enclosure material is also important. The enclosure shall not abrade the photographic print, film or plate. While a slightly textured or matte surface is recommended for the filing enclosure to minimize ferrotyping, a rough surface can produce abrasion problems. There may be other harmful physical characteristics of the enclosure material that may develop under adverse environmental conditions, e.g. elevated relative humidity. These include wrinkling and distortions common to glassine paper, or ferrotyping, of the image surface, i.e. local or overall glazing that can result from contact under pressure with smooth, glossy, plastic enclosure materials. Finally, enclosures shall be of sound and sturdy construction so that the enclosure functions properly during use, without seams or fabrication components failing or otherwise damaging the photographs during storage.

Paper, cardboard, mat board, mounting board, slide mounts, plastic materials, inks, adhesives and frames used without matting shall meet the requirements of the photographic activity test as described in ISO 18916. This incubation test determines whether these materials have a chemical interaction with silver, colour or diazo images or cause stain in the image binder layer, see Bibliography [5]. Paper shall also have a Kappa number of 7,0 or less, corresponding to a lignin concentration of approximately 1,0 % or less by mass, as lignin adversely affects photographs stored in lignin-containing enclosures, even when not in direct contact with the photographs, see Bibliography [6].

If a particular material or product is found to be safe for long-term storage purposes (i.e. passes the requirements of ISO 18916 and does not fail with use or cause physical damage), there is no assurance that subsequent lots will contain ingredients of the same purity, chemical inertness or sound and sturdy construction. All materials or products shall require annual evaluation and testing in accordance with this International Standard and ISO 18916, unless the specific lot of materials or products was previously tested. All materials shall also be retested in accordance with this International Standard and ISO 18916 should the formulation or supplier change.

4.2 Paper and board

Paper and paperboard material should meet the physical tests required for the particular application. These include folding endurance (Bibliography [10]), tear resistance (Bibliography [9]) and tensile strength (Bibliography [8]).

Paper and paperboard material shall have a pH between 7,0 ± 0,2 and 9,5 ± 0,2 as determined by the cold extraction method given in TAPPI T 509 om-06, with the following modifications.

— Verify that the ASTM D1193[21] Type I or Type II water used for this measurement has a conductivity that does not exceed 0,1 mS/m (1,0 µS/cm) and a pH between 6,8 and 7,3. Should either the pH or conductivity not meet these requirements, boil water for 1 h and allow the water to cool under pure nitrogen or CO_2-free air so that it meets these requirements.

— The temperature of the water shall be 25 °C ± 5 °C and the circuit of the pH meter shall include temperature compensation.

— Reagent water may be added as a single 75 ml addition in order to limit the exposure of the extract solution to acids in the atmosphere.

— Gently mix the sample at least once during the one hour soak to promote homogeneity. Purge the sample with pure nitrogen or CO_2-free air during the one hour soak. Purging may be conducted at intermittent times, if necessary, to prevent foaming.

— Rinse the probe with a small quantity of extract before measuring the pH of that particular extract.

Paper and paperboard material shall include an alkali reserve of at least 0,4 ± 0,1 mol/kg, which is the molar equivalent of at least 2,0 % by weight calcium carbonate ($CaCO_3$), as determined by the alkali reserve test described in ISO 10716. This alkali reserve shall be accomplished by the incorporation of an alkaline earth carbonate or equivalent. The alkali reserve shall be evenly distributed throughout the paper or paperboard.

Paper and paperboard material shall meet the requirements of the photographic activity test described in ISO 18916. It shall be made from high alpha-cellulose, bleached sulfite, or bleached kraft pulp with an alpha-cellulose content greater than 87 %, as determined by the method given in ISO 699. It shall be lignin-free, with a Kappa number of 7 or less when measured by the method given in ISO 302, corresponding to a lignin concentration of approximately 1,0 % or less (see, e.g., TAPPI T 236 om[22]), shall contain less than 0,000 8 % reducible sulfur when measured according to TAPPI T 406 and shall not contain alum rosin sizing when tested according to TAPPI T 408 cm. For album binding, requirements for the photographic activity test, alpha-cellulose, lignin, reducible sulfur and sizing do not apply to lined board materials, where the exterior covers are not in direct contact with photographs inside, are separated by a barrier material such as a plastic cover sheet over the pages, or where the interior lining is either a barrier or meets all the requirements in this subclause, thus mitigating possible chemical interactions caused by the board composition and cover material.

NOTE Copper, iron, and manganese adversely affect paper permanence and photo-safety (TAPPI T 266 om[23]).

A minimum of sizing chemicals shall be used, the amount being dictated by the requirements of the end use (enclosures, overwraps, interleaving, etc.). If sizing is used, neutral or alkaline sizing chemicals (internal and/or surface) shall be employed. Dyes or pigments used to colour the paper shall show no bleeding or transfer when soaked in distilled water for 24 h while held in direct contact with white bond paper.

The surface of the paper shall be free of knots, shives and other abrasive particles. Surface fibres that might offset on to image layers should not be present. The paper shall not contain waxes, plasticizers or other ingredients that may transfer to the photographic print or film during storage.

Each colour of paper or paperboard shall be tested separately to meet all requirements in this International Standard.

4.3 Plastic

Plastics shall meet the requirements of the photographic activity test described in ISO 18916.

A suitable plastic enclosure material is polyester [poly(ethylene terephthalate)]. In addition, polystyrene, polyethylene, polypropylene and spun-bonded polyolefins generally have been found suitable as they are usually inert, unplasticized and have good chemical stability. Other plastics may be satisfactory, but there has been no extended experience with such materials. Chlorinated, nitrated or acetate plastic sheeting, such as polyvinyl chloride, cellulose nitrate and cellulose acetate, shall not be used.

Highly plasticized sheetings or coatings shall not be employed, as this might result in image transfer, sticking, or changes to the image surface. Plastics of unknown quality containing residual solvents or plasticizers are suspect, because these chemicals may escape and have a harmful effect on the image.

Fire-retardant plastics used for containers, shall contain anti-oxidants and non-halogenated fire retardants, such as antimony oxide.

Most plastic sheeting used for enclosures contains slip agents and anti-blocking agents, in order to lower the coefficient of friction on the surface and thus prevent blocking of the sheets. In low density polyethylene and cast polypropylene, these components may migrate from the body of the plastic sheeting to the surface, where they are deposited as a waxy residue that may transfer to the film or photographic print stored inside the enclosure. In addition, this waxy film may attract dust and other foreign matter that could cause abrasion or otherwise deteriorate the photograph. Currently there is no standard test procedure to evaluate the suitability of slip agents and anti-block agents in plastic enclosures for long-term storage of photographic prints or films.

The plastic shall meet the physical tests required for the particular application. These include folding endurance (Bibliography [10]), tear resistance (Bibliography [11]) and tensile strength (Bibliography [7]).

4.4 Metal

Metals used for cores, reels, containers and frames shall be noncorrodible, such as anodized aluminium or stainless steel. The use of steel is permissible, provided the surface is well protected by powder coating, tinning, plating or some other corrosion-resistant finish. Lacquer or enamel that might give off reactive fumes, peroxides or exudations during storage shall not be used. Powder coated finishes are generally inert and do not release solvents or reactive fumes. Metal finishes shall meet the requirements of the photographic activity test described in ISO 18916.

NOTE Zinc and other potentially reactive metals may oxidise silver in the presence of atmospheric oxygen leading to silver image deterioration in black-and-white silver-gelatine films and papers. Iron, zinc and other potentially reactive metals may also reduce some cyan dyes used in the 1940s to the early 1980s in chromogenic negative, slide and motion picture films and in chromogenic paper. Aluminium, stainless steel, and gold are generally photo-safe.

4.5 Adhesives

4.5.1 Basic requirements for all adhesives

Adhesives used as mounting adhesives and in the construction of albums, framing and storage materials and to adhere paperboard plies shall meet the requirements of the photographic activity test described in ISO 18916. Some images can be damaged by adhesives that contain impurities such as sulfur, iron, copper or other ingredients that might attack image silver, gelatine or film and paper supports. Various adhesives are hygroscopic, thus increasing the possibility of local chemical activity. Many adhesives discolour with age, staining any material with which they are in contact, or fail over time causing enclosure seams to open up.

4.5.2 Mounting adhesives

Adhesives for mounting photographs shall meet the requirements of ISO 18932. Mounting adhesives shall also have a cold extraction pH between 7,0 ± 0,2 and 9,5 ± 0,2 as determined by the procedure described in 4.2 with the following additional modifications.

— For liquid adhesives, measure the pH of a dried film. Cut the film into small squares prior to suspending in water. Determine the sample size based on the weight of the dried film.

— To facilitate handling of pressure-sensitive adhesives and dry mount adhesives, do not cut the samples into small squares. Cut sheets into ribbons 5 mm to 10 mm in width and remove any liners that may be present. Place sample in a beaker so as to maximize surface exposure. Once wet, the adhesive may be further compacted to ensure that it is completely submerged below water level. If necessary, a watch glass or stainless steel weight may be used to keep the adhesive submerged.

— For transfer adhesives, apply 1,00 g ± 0,01 g adhesive to 0,025 mm thick polyester film. Measure the pH of the resulting sample as described for pressure-sensitive adhesives.

— If the adhesive interferes with pH measurement, remove the adhesive from the extract after soaking. Continue the pure nitrogen or CO_2-free air purge during removal.

Rubber-based products, such as rubber cement, shall not be used. Not only might they contain harmful solvents or plasticizers, they might also be compounded with photographically damaging sulfur, usually a vulcanizer, accelerator or stabilizer. Even some “low-desensitizing” or “sulfur-free” rubber cements contain sulfur.

Both thermally activated removable and nonremovable low temperature tissue and film adhesives have the longevity and stability for use, but temperature limitations may restrict use with electrophotographic, phase change (solid) inkjet, and inkjet materials that have a swellable dye receptor layer. Heat activated boards coated with low temperature and reversible adhesives may also be used for photographs.

4.6 Writing, labelling and printing materials

4.6.1 Basic requirements for all writing, labelling and printing materials

The ink used for writing, labelling or printing shall not bleed, spread or transfer when soaked in distilled water for 24 h while held in direct contact with white bond paper. In addition, the ink shall not be a source of products that attack the photograph or the enclosure itself. To ensure that the ink is inactive, it shall pass the photographic activity test described in ISO 18916. Ink formulations should be fade-resistant to ensure permanence.

The printed side of a text page should not be in direct contact with the image-receiving layer of ink jet prints.

Each colour of ink shall be tested separately to meet all requirements in this International Standard.

4.6.2 Writing instruments

All pens shall comply with the performance requirement for strikethrough given in 4.3.2 of either ISO 12757-1:1998 or ISO 14145-1:1998 and with the performance requirements for ethanol resistance, water resistance and light resistance given in 4.3, 4.7 and 4.8 of either ISO 12757-2:1998 or ISO 14145-2:1998. Wax pencils for labelling the back side of photographs shall consist of polyvinyl alcohol or polyethylene oxide lead. Minimal pressure shall be used when writing directly on photographs to avoid leaving indentations. Using a hard writing surface underneath also reduces the chance of indentations. Enclosures shall be labelled or imprinted prior to inserting the photograph.

4.6.3 Printed materials

Cellulose nitrate or chlorinated surface coatings shall not be used as ink receptive layers or as protective topcoats with printed materials.

4.6.4 Electrophotographic and inkjet materials

Electrophotographic and inkjet colorants that meet requirements for ink used for writing or printing may be used for writing, labelling and decoration. To encourage permanence, materials should also resist fade due to ozone and nitrous oxides.

4.6.5 Rubber stamping

Rubber stamp ink pads shall not contain natural latex.

4.7 Albums

The integrity of all albums shall be verified by opening and closing the binding system 1 000 times. Passing this test requires that there be no visible wear on the binding system after completion.

4.8 Glazing

Glazing shall be glass, acrylic or polycarbonate sheet and shall provide UV protection that blocks at least 97 % of the UV light in the 300 nm to 380 nm range. Glass is a poor insulator and is subject to condensation on the inner surface when rapid or significant change in temperature or humidity is present. Glass may also break or shatter. Acrylic is break-resistant and is a good thermal insulator and protector against condensation but may be subject to static build-up and scratches. Static can pull photographs that are not mounted overall toward the interior surface of the glazing.

All framed photographs shall have a spacer that lifts the glazing from the surface of the framed photograph. Spacers may be in the form of a window mat or narrow strips of photo-safe material along the outer edges of the inside of the frame.

5 Enclosures

5.1 Introduction

This clause describes several types of enclosures for photographic materials and possible materials of construction. The advantages and disadvantages of each are also discussed. The choice depends on the degree of protection required, the frequency of use and the application of the photographic material.

5.2 Enclosure types

5.2.1 General

Enclosures in close or direct contact with film, plate or paper include reels, cans, bags, folders, sleeves (sheaths), pocket pages, jackets, envelopes, window mounts or mats, mounting boards, frames, slide mounts, cartons, albums and aperture cards. All materials used in fabricating enclosures shall comply with the appropriate requirements of Clause 4.

5.2.2 Album

An album is a binder or book structure having front and back covers (usually opaque and rigid) in which pages are bound along one edge either by plastic straps, glueing, sewing, or by metal posts or rings.

Photographs stored in albums may be inserted into pocket pages or envelopes or attached to paper pages that should have plastic cover sheets. In order to protect the three open sides of an album from light and dust, a slipcase may be used (a narrow box with an open end into which the album is inserted) or the album may be placed in a carton or box.

5.2.3 Aperture card

An aperture card is a card of standard dimensions (normally 82,5 mm × 187 mm) with one or more openings into which a microfilm frame or frames can be mounted or inserted.

NOTE Paper, plastic and adhesives used to manufacture aperture cards for extended-term storage shall comply with all requirements given in this International Standard.

5.2.4 Can

A can is a metal or plastic container for a roll of recording material, such as photographic film or magnetic tape.

5.2.5 Carton or box

A carton or box is an outer container that can hold one or more individual units and which may be a fabrication of paper, card stock or plastic.

5.2.6 Cartridge

A cartridge is a housing for a roll of recording material, such as photographic film or magnetic tape, wound on a single hub or reel.

5.2.7 Cassette

A cassette is a housing for a roll of recording material, such as photographic film or magnetic tape, whose ends are attached to two hubs or reels.

5.2.8 Encapsulation

An encapsulation is a protective sandwich of polyester film sealed at the edge on all four sides. The sealed package is protected from contamination and may be placed between a window mat and mount board for insertion into a frame.

NOTE Lamination differs from encapsulation in that the sealing adhesive is applied across the entire surface of the film and not just the edges. Lamination may be applied as a single-sided lamination to the front of the photograph or as a double-sided lamination to the front and back of the photograph. Lamination is therefore not recommended in this International Standard as the adhesive will come into direct contact with the surface of the photograph.

5.2.9 Envelope (bag)

An envelope is a paper or plastic enclosure that is sealed with adhesive, mechanically joined, ultrasonically welded or heat-sealed on two edges with a bottom fold and one side open. A cemented bottom seam shall not be used because the contents tend to slide to the bottom of the envelope. The adhesive used on the edges shall not extend beyond the overlap or into the interior of the envelope. The width of any sealed flaps shall be as narrow as practical to reduce pressure differential effects upon the photographic print or film.

The envelope may or may not have a protective flap at the open end to provide additional protection against contamination by dust. If a flap is used, it shall not have adhesive or be sealed with tape or rubber bands. If there is no flap, some degree of dust protection is obtained when the enclosure is stored so that the open end is not at the top. Envelopes made from plastic sheeting may also have a sealable mechanism along the open end, such as interlocking grooves, that offer protection against contamination by dust or infiltration of water.

5.2.10 Folder

A folder consists of a single sheet that is folded, does not have adhesive seams and can be made from either paper or plastic.

NOTE Enclosures for microfiche frequently have the front side lower than the full height of the back side to permit easy reading of the eye-legible header normally found on microfiche and jackets. This modification does not offer as much protection from dirt as a full panel, but it makes access to the microfiche very convenient.

5.2.11 Frame

A rigid outer unit, made of wood, plastic or metal, that provides architectural support for the photograph for display or storage. The function of the frame is both decorative and to hold together, as a unit, the glazing, the window mat or spacers, the photograph and the mounting board.

Photographs displayed in frames may be encapsulated, corner mounted, hinged or adhered to a mounting board. Photographs shall be separated from the glazing by either a window mat or spacer. A dust cover shall be applied to the verso side of the enclosed frame to protect the photograph from pollution, dust and insects.

5.2.12 Jacket

A jacket consists of two transparent plastic sheets separated by divider strips with single or multiple film channels (sleeves) made to hold single or multiple microfilm images. Channels may also be formed by heat-sealing, ultrasonic welding, or by a bead of adhesive. The channels shall be designed to permit insertion of the processed photographic material without undue abrasion.

5.2.13 Mounting board

A mounting board is a mat board or paper-covered polystyrene foam that provides a surface or secondary support for attaching an image for storage or framing.

NOTE Other commercially available mounting materials do not have sufficient data to establish their long-term stability for use with photographs. For example, metal panels may be inert, but their thermal coefficient of expansion may exceed the dimensional stability of the photograph resulting in binder cracking or edge lifting over time. For this reason they are not recommended in this International Standard.

5.2.14 Pocket-style page

A pocket-style page is an enclosure made with plastic sheeting, sealed with adhesive, heat-sealed or ultrasonically welded along three or four edges and at various points across the sheet to create multiple pouches (pockets) having uniform dimensions to accommodate certain formats and sizes, such as slides, film sheets or strips and reflection photographs. The page frequently has holes along one edge to allow the page to be used in ring binders or albums.

5.2.15 Reel (spool)

A reel is a metal or plastic hub or core with flanges (protective sides) on to which recording material is wound.

5.2.16 Sleeve (sheath)

A sleeve is an enclosure with one or more seams and both ends open. The seam may be formed with an adhesive by heat-sealing or ultrasonic welding, or the same result may be achieved by tightly creasing a flap of enclosure material, sometimes referred to as a captive-flap enclosure. If an adhesive is used, it shall not extend beyond the area of the overlap. A sleeve is generally made from plastic sheeting.

5.2.17 Slide mount

A slide mount is a structure to retain a film for slide projection. It may be fabricated from paper, plastic or metal and held together by adhesive or interlocking parts. The photographic film may be encased between two glass plates. The glass may have a coating to reduce the tendency to form Newton's rings if the glass comes into contact with the film.

5.2.18 Window mount (mat)

A window mount is formed from two sheets of multi-ply, rag or alpha-cellulose board. The sheets are hinged together with an aperture cut in the front sheet to show the image. Window mounts are principally used for the storage or display of photographs attached to the mounting board.

5.3 Dimensions

The dimensions of enclosures for materials are determined by the dimensions and thickness of the enclosed materials, and the number of photograph, rolls, sheets, plates or strips to be stored within the enclosure. The enclosure shall be sufficiently large to permit the desired number of items to be inserted and withdrawn without producing abrasion, and at the same time be sufficiently close-fitting to prevent excessive movement within the enclosure.

5.4 Seams

Envelopes with centre-seams may cause pressure distortion throughout the main image area of the photograph stored inside. Likewise, envelopes with bottom seams may cause similar effects when the photograph inside slides to the bottom of the envelope. For this reason, envelopes with centre and bottom seams shall be avoided.

The use of envelopes constructed with a bottom fold and two side-edge seams avoids these problems and is preferable to other designs. The seam should be as narrow as possible to reduce or prevent distortion of the enclosure material. This design will also prevent pressure marks and permanent distortion of the material during long-term storage due to pressure being exerted by the extra thickness of the seam. Wrinkles in the enclosure are another possible source of pressure marks. Seams shall be smooth and free of wrinkles.

Envelopes shall be sufficiently large to contain photographs without having the interior seam edge coincide with the enclosed photograph. Seams shall be cemented on the outside of the envelope and the adhesive shall not extend beyond the seam joint.

Photographs having an emulsion on only one surface shall be inserted with the emulsion side away from the envelope seams, in order to minimize damage caused by the seam on the image side of the photograph.

6 Material and construction selection

Each material and enclosure type has advantages and disadvantages. Paper protects the photograph from light, but the contents must be removed for identification or use. However, paper readily accepts writing. Plastic sheeting, with the exception of coloured sheeting or spun-bonded polyolefin sheeting, is generally transparent, permitting easy identification but offering little light protection. Plastic sheeting is more difficult to form and seal and is subject to dust attraction due to static electricity.

Folders are the easiest to use and reduce the possibility of abrading the imaging material upon insertion or withdrawal, but they offer the least protection from dust and gaseous contaminants. They are suitable for materials that are used frequently.

Pocket pages, sleeves or sheaths are usually transparent and therefore offer little light protection. Although the image may be abraded during insertion, it is thereafter well-protected from abrasion; the image is easily identifiable and may be viewed without removal from the enclosure. The open ends provide little protection from airborne contaminants. Sleeves or sheaths made of polyester sheeting may cause abrasion during handling if they develop kinks in the surface. Pocket pages are generally made from polyolefin plastics which do not tend to form surface kinks.

Jackets, like all plastic enclosures, generally offer little light protection but good dust and abrasion protection. The image is easily identifiable and may be viewed without removal from the jacket.

Window mounts or mats offer very good handling protection as they are somewhat rigid. They provide a means of easy identification and also protection during display. A framed display photograph may be subjected to higher intensities of UV light, pollution, ozone, humidity and insects, which could accelerate image deterioration. All framed photographs should be placed behind a sheet of glass or plastic glazing.

Paper or spun-bonded polyolefin envelopes, especially those with protective flaps, offer the best protection from light, with paper providing a good writing surface for identifying the contents. However, the image is more subject to abrasion upon insertion or withdrawal. Envelopes are a good choice for material with low referral rates. When labelling an envelope or any enclosure, the imaging material should not be inside the enclosure where it may be embossed by pressure from writing.

Slide mounts provide a convenient means of storing films intended for projection. Open mounts do not provide protection against light, moisture or gaseous contaminants. Glass mounts protect the film from abrasion and improve projection performance. However, if the glass does not have a matt surface, ferrotyping or Newton's rings may occur. In addition, glass may deteriorate under conditions of elevated temperature and relative humidity resulting in a caustic surface film that is harmful to photographic materials. Glass mounts may trap moisture inside, thereby promoting glass deterioration and mould growth on the interior of the mount.

Cartons or boxes are convenient for storing several individual units and offer good protection from light and dust. More room may be available in the carton or box for identification and indexing. The units might not be held securely however, if the carton is not full. This situation may call for individual protection of each unit within the carton, or the use of rigid supports that fill out unused space to prevent slumping and curling of photographs.

Albums are convenient for storing and viewing many photographs and provide some degree of rigid physical protection. However, albums do not provide protection from light and dust to the same extent as a carton or box.

Aperture cards, like slide mounts, hold relatively small pieces of film with the intention that the film remains attached to the card during use. This feature is a good choice for photographic material with high referral rates, because of the ease of use. However, the open structure offers little physical or elemental protection. Two sets may be used, one for storage and one as a work copy.