BS ISO 18902:2013

BSI Standards Publication

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

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National foreword

This British Standard is the UK implementation of ISO 18902:2013. It supersedes BS ISO 18902:2007 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CPW/42, Photography.

A list of organizations represented on this committee can be obtained on request to its secretary.

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INTERNATIONAL STANDARD

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

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

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Foreword

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The committee responsible for this document is ISO/TC 42, *Photography*.

This third edition cancels and replaces the second edition (ISO 18902:2007), which has been technically revised.

Introduction

This International Standard contains specifications to ensure that products used for the storage and display of imaging materials, such as envelopes, boxes, albums and frames, will not damage the enclosed imaging materials or accelerate their natural decay rates.

Specifying the chemical and physical characteristics of the storage and display materials does not, by itself, ensure satisfactory storage or display behaviour. It is also essential to provide proper storage temperature, humidity and light levels (if on display), 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.

Recommended storage conditions are given in the following International Standards for the different types of imaging materials: ISO 18911, ISO 18918, ISO 18920, and ISO 18934.

This International Standard does not apply to supplementary materials that may be stored with imaging materials such as documents and ephemera (for permanence requirements for paper for documents, see ISO 9706).

Note that the term “archival” is not used in International Standards for imaging materials or for storage and display materials, because the meaning of “archival” has become too ambiguous. Therefore, storage and display materials should not be referred to as “archival,” but rather as meeting the specifications of this International Standard.

INTERNATIONAL STANDARD **ISO 18902:2013(E)**

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

1 Scope

This International Standard specifies the principal physical and chemical requirements for album, storage and framing materials to prevent damage to processed or printed imaging materials over time. This International Standard covers requirements for paper and paperboard, plastics, metals, writing instruments, adhesives, tapes, self-adhesive labelling materials, stamping inks and pads as well as framing and glazing materials used as or in the construction of storage and display materials for black-and-white or colour reflection prints or negatives made with traditional silver-halide and silver dye bleach photographic materials, as well as dye- and pigment-based inkjet; dye diffusion thermal transfer ("dye sublimation"), and liquid- and dry-toner electrophotographic digital prints.

This International Standard does not provide specifications for the design, construction or durability of the storage and display materials themselves. The requirements are limited to the characteristics of the storage or display materials that may affect the imaging materials either chemically or physically when they are stored or displayed under recommended conditions.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 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 T509, *Hydrogen ion concentration (pH) of paper extracts (cold extraction method)*

ASTM D1193, *Standard Specification for Reagent Grade Water*

3 Terms and definitions

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

3.1
acid-free adhesive
adhesive with a cold extraction pH equal to or greater than the reference water minus 0,5 and less than 10,0

3.2
acid-free paper or paperboard
paper or paperboard with a cold extraction pH equal to or greater than reference water minus 0,5 and less than 10,0

3.3
anti-blocking agent
additive or component which prevents sticking or fusing of adjacent resins or plastic films, either through microscopic bumps on the surface or by otherwise reducing the likelihood that two materials will stick together

Note 1 to entry: Examples are talc, other silicates, and amides.

3.4
buffered
paper or paperboard with an alkali reserve that is equivalent to at least 2,0 % by weight calcium carbonate ($CaCO_3$)

3.5
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

3.6
photo-safe
material that meets all requirements within this International Standard so that it will not accelerate the natural aging of photographic prints or films or digitally printed images

Note 1 to entry: 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. Only materials that meet all requirements of this International Standard can be considered photo-safe.

3.7
slip agent
component added to plastic material to reduce the coefficient of friction

4 Materials

4.1 Paper and board

Paper or paperboard shall be acid-free as determined by a cold extraction pH measurement equal to or greater than the reference water minus 0,5 and less than 10,0 using the method given in TAPPI T509, with the following modifications.

— ASTM D1193 Type I or Type II water shall be used for this measurement and shall have a pH between 6,0 and 8,0. If the pH does not meet these requirements, the water shall be boiled for 1 h so that it meets these requirements.

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

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

— The sample and the reference water shall be gently agitated at least once during the 1 h soak.

— The probe shall be rinsed with a small quantity of extract or reference water before measuring the pH.

Paper and paperboard material shall include an alkali reserve of at least 2,0 % by weight calcium carbonate ($CaCO_3$), as determined by the alkali reserve test described in ISO 10716. The alkali reserve

should be evenly distributed throughout the paper or paperboard. There is no maximum limit for alkali reserve content.

A minimum of sizing chemicals should 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.

Unprinted, pre-consumer recycled material may be used; however, post-consumer recycled material shall not.

Paper and paperboard material shall meet the requirements of the photographic activity test described in ISO 18916.

Paper and paperboard material shall have a Kappa number of 7,0 or less as determined by the method described by ISO 302.

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.

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

Album, storage and framing materials made with paper or paperboard that are coated or laminated on both sides with a plastic film shall be subject to 4.2, Plastic, and not 4.1, Paper. Album, storage and framing materials that are coated or laminated on only one side with a plastic film shall be subject to both 4.1, Paper, and 4.2, Plastic

For album bindings, requirements for the photographic activity test, lignin and sizing do not apply when the bindings will not come in direct contact with the imaging materials inside (either front or back), when the bindings are separated by a barrier material such as a plastic cover sheet over the pages, or when the interior lining of the binding is either a barrier or meets all of the requirements in 4.1.

4.2 Plastic

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

Chlorinated, nitrated or acetate plastic sheeting, such as polyvinyl chloride, cellulose nitrate, and cellulose acetate, shall not be used as they have poor chemical stability.

Plasticized sheeting or coatings shall not be employed, as this might result in image transfer, sticking, or changes to the image surface. Plastics containing residual solvents or plasticizers are suspect, because these chemicals may escape and have a harmful effect on the imaging materials.

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

Album, storage and framing materials made with paper or paperboard that are coated or laminated on both sides with a plastic film shall be subject to 4.2, Plastic, and not 4.1, Paper. Album, storage and framing materials that are coated or laminated on only one side with a plastic film shall be subject to both 4.1, Paper, and 4.2, Plastic.

Historically, pigment inkjet prints on all paper types and dye inkjet prints on matte-surface papers have been sensitive to scuffing and smudging, but resistance to abrasion has been improved for more recent products. These prints should be sleeved in smooth plastic enclosures; however, some plastics, such as polyester, may develop a static charge that can attract dust which may also damage the surface of prints. All valuable prints should be housed in such a way that no material comes in direct contact with the surface of the print.

NOTE Examples of suitable plastic enclosure materials are polyester [poly(ethylene terephthalate)], polystyrene, polyethylene, polypropylene, and spun-bonded polyolefins 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.

4.3 Metal

Metals used for cores, reels, cans, frames, etc. shall be non-corrodible and non-reactive, 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 gives off reactive fumes, peroxides, or exudations during storage, as indicated by ISO 18916, shall not be used.

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

4.4 Adhesives

4.4.1 Basic requirements for all adhesives

Adhesives are used both for mounting imaging materials to album pages, mat boards, etc. and in the construction of storage and display products.

Adhesive shall be acid-free as determined by a cold extraction pH measurement equal to or greater than the reference water minus 0,5 and less than 10,0 using the procedure in 4.1 with the following additional modifications.

— For liquid adhesives, measure the pH of a dried film. Cut the film into 5mm to 10 mm 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 into 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 thin polyester film or polyweb. Measure pH of the resulting sample.

— If adhesive interferes with pH measurement, remove adhesive from extract after soak.

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

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 damaging sulfur, usually a vulcanizer, accelerator or stabilizer. Even some “low-desensitizing” or “sulfur-free” rubber cements contain sulfur.

Water-based adhesives should not be used directly on non-resin-coated dye inkjet prints as they may induce bleeding of the image.

While most pressure sensitive adhesives that meet the above requirements are safe for use, some pressure sensitive adhesives used directly on non-resin-coated inkjet prints can cause severe yellowing of the paper, adhesive or both. For prints of high value, no adhesives, or only adhesives known to be compatible with the specific print type shall be used.

4.4.2 Pressure-sensitive and thermally-activated mounting adhesives

Pressure-sensitive and thermally activated adhesives intended for permanently mounting images on mat board, album pages, etc. shall meet all requirements in 4.4.1 of this International Standard and all requirements of ISO 18932. All other adhesives as well as those not intended for permanent bonding are exempt from this clause.

Both thermally activated removable and non-removable low temperature tissue and film adhesives may have the longevity and stability for this application, but temperature limitations may restrict use with some prints. Always test mounting temperature on surrogate samples before mounting valuable prints.

NOTE ISO 18932 does not apply to spray adhesives.

4.5 Writing, labelling and printing materials

4.5.1 Basic requirements for all writing, labelling and printing materials

The colorants 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.

All writing, labelling and printing colorants shall meet the requirements of the photographic activity test described in ISO 18916.

All colours shall be tested separately to meet all requirements in this International Standard.

4.5.2 Writing instruments

The ink in all writing instruments shall comply with the performance requirement for strike through given in 4.3.2 of either ISO 12757-1:1998 or ISO 14145-1:1998 and with the performance requirements for water resistance and light resistance given in 4.7 and 4.8 of either ISO 12757-2:1998 or ISO 14145-2:1998.

4.5.3 Pressure sensitive labels

Pressure sensitive labels may be used if the writing or printing colorants (such as electrophotographic toner or inkjet inks) meet 4.5.1 and 4.5.2. Pressure sensitive adhesive can expand and extend over the edge of labels over time or when exposed to elevated temperatures; caution should be taken to avoid direct contact between prints when pressure sensitive labels are used on print backs (such as by using interleaving tissue).

To ensure that the label is inactive, both the printed and adhesive sides shall meet the requirements of the photographic activity test described in ISO 18916.

4.5.4 Stamping

Stamping inks shall meet requirements for colorants used for writing instruments in 4.5.1 and 4.5.2.

Stamp ink pads shall not contain natural latex.

Stamp inks shall not be applied directly to prints.

4.6 Glazing

All framed prints shall be displayed behind glass or plastic glazing of optical density at least 1,5 in the 300 nanometre to 380 nanometre range. Prints should not be framed in direct contact with glazing.

To ensure that the glazing and any coatings are inactive, they shall meet the requirements of the photographic activity test described in ISO 18916.

4.7 Frames

Frames can be made from a variety of materials including woods, metals, plastics, etc. Plastic frames that meet 4.2 and metal frames that meet 4.3 should be used. Other materials (such as wood) may be used however; their effects over time on framed prints will be unknown, so the framing package (glazing, mat, and backing board) shall be sealed along the edges with aluminized polyester tape (or other impermeable barrier) that meets ISO 18902 to minimize or prevent potential harm.

5 Reporting

If a particular material or product meets the requirements of this International Standard there is no assurance that subsequent lots will have the same physical qualities or contain ingredients of the same chemical inertness. All materials or products shall therefore require annual evaluation and testing according to this International Standard, unless the specific lot of materials or products was previously tested. All materials shall also be retested according to this International Standard if the formulation or any component supplier changes.

The following shall be reported:

a) reference to this International Standard, i.e. ISO 18902;

b) material type;

c) intended usage;

d) PAT result;

e) pH result (if required);

f) alkaline reserve (if required);

g) Kappa number (if required);

h) colorant bleed (if required);

i) plastic type (if required).

Annex A
(informative)

Envelope seams

Envelope seam construction of either centre/bottom (T design) or side/bottom (L design) should be avoided because the envelopes and photographs inside become distorted/warped when filed due to build up of extra thickness at the seam locations. A balanced seam construction (two opposite side seams with bottom fold) should be used because this design distributes the seam thickness more evenly when filed in a container and any resulting pressure marks will be located at the margins of the image.

Seams should be smooth and free of wrinkles. The seam should be as narrow as possible to reduce or prevent distortion of the enclosure material.

Imaging materials having an emulsion on only one surface should be inserted with the emulsion side away from the envelope seams, in order to minimize potential damage.

Annex B
(informative)

Slip agents

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 to prevent sticking 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 deposit as a waxy residue that may transfer to the film or print stored inside the enclosure. Slip agents are not known to be chemically harmful to imaging materials; however, this waxy film may attract dust and other foreign matter that could cause abrasion. 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 imaging materials.

Bibliography

[1] ISO 18911, *Imaging materials — Processed safety photographic films — Storage practices*

[2] ISO 18918, *Imaging materials — Processed photographic plates — Storage practices*

[3] ISO 18920, *Imaging materials — Reflection prints — Storage practices*

[4] ISO 18934, *Imaging materials — Multiple media archives — Storage environment*

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

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