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Imaging materials — Permanence — Vocabulary

Matériaux pour image — Permanence — Vocabulaire

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Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
Annex A (informative) Numbering system for related International Standards	15
Bibliography	17

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 18913 was prepared by Technical Committee ISO/TC 42, *Photography*.

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Introduction

This International Standard is one of a series dealing with the physical properties and stability of imaging materials.

In order to facilitate identification of these International Standards, they are to be assigned new numbers within the block from 18900 to 18999 (see Annex A).

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Imaging materials — Permanence — Vocabulary

1 Scope

This International Standard establishes a vocabulary of terms and definitions used in respect of the permanence of imaging materials and in standards related to permanence. These terms and definitions are generic and are applicable to the entire imaging industry. For terms and definitions specific to particular applications, refer to industry standards.

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 5-3, *Photography — Density measurements — Part 3: Spectral conditions*

ISO 18906, *Imaging materials — Photographic films — Specifications for safety film*

ISO 14644-1, *Cleanrooms and associated controlled environments — Part 1: Classification of air cleanliness*

3 Terms and definitions

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

3.1

accuracy

closeness of the agreement between the result of a measurement and a true value of the measurement

NOTE 1 Accuracy is a qualitative concept.

NOTE 2 The term **precision** (3.85) should not be used for accuracy.

3.2

album

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, gluing, sewing, metal posts or rings

3.3

anti-blocking agent

component of a material that provides microscopic bumps on the surface in order to lower contact area, reduce the coefficient of friction, and minimize ferrotyping and the occurrence of **Newton's rings** (3.74)

EXAMPLE Talc, silicates or matte beads.

3.4

aperture window

opening in the **flange** (3.42) that is used to facilitate threading of magnetic tape on the **hub** (3.50) and inspection of the **wind** (3.114)

3.5

aperture card

card of standard dimensions with one or more openings into which a microfilm frame or frames can be mounted or inserted

3.6

.....

archival medium (deprecated)

recording material that can be expected to retain **information** (3.56) forever, so that such information 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 or system specifications.

3.7

Arrhenius plot

plot of the logarithm of the time for a given change in a characteristic proportional to the reaction rate (dye loss, tensile strength change, $D_{\min}$ yellowing, etc.) versus the reciprocal of the temperature expressed in kelvins

NOTE The Arrhenius plot can be used to predict behaviour at a temperature lower than that at which a test is run.

3.8

base

support in a recording material on which the emulsion layers or magnetic layer (and, if necessary, the back layer) are coated

3.8.1

cellulose-acetate base

base for recording materials composed mainly of cellulose esters of acetic acid

3.8.2

cellulose-ester base

base for recording materials composed mainly of cellulose esters of acetic, propionic, or butyric acid, or mixtures thereof

3.8.3

polyester base

base for recording materials composed mainly of a polymer of ethylene glycol and terephthalic acid (also referred to as polyethylene terephthalate) or a polymer of ethylene glycol and 2,6-naphthalene-dicarboxylic acid (also referred to as polyethylene naphthalate)

3.8.4

poly(ethylene terephthalate) base

polyester base for recording materials composed mainly of a polymer of ethylene glycol and terephthalic acid

3.9

blister

localized delamination that resembles a bubble

3.10

blocking

sticking together of similar or dissimilar materials in physical contact

cf. **anti-blocking agent** (3.3)

3.11**brittleness**

property of a material that causes it to crack or break when bent or flexed

3.12**can**

metal or plastic **container** (3.20) for a roll of recording material, such as **photographic film** (3.79) or magnetic tape

3.13**carrier**

medium upon which **information** (3.56) is recorded

cf. **medium** (3.68)

3.14**carton****box**

outer **container** (3.20) that can hold one or more individual units and which may be a fabrication of paper, card stock or plastic

3.15**cartridge**

housing for a roll of recording material, such as **photographic film** (3.79) or magnetic tape, wound on a single **hub** (3.50) or **reel** (3.89)

cf. **cassette** (3.16)

3.16**cassette**

housing for a roll of recording material, such as **photographic film** (3.79) or magnetic tape, whose ends are attached to two **hub(s)** (3.50) or **reel(s)** (3.89)

cf. **cartridge** (3.15)

3.17**class 100 000 clean room**

controlled environment in which the level of airborne contaminants meets the requirements of ISO 14644-1

3.18**compact disc****CD**

optical disc (3.76) format in which the **information** (3.56) layer is located at one surface of a substrate and the data can be read by an optical beam

NOTE Described in IEC 60908.

3.18.1**CD-ROM****read-only-medium compact disc**

optical disc (3.76) to which **information** (3.76) is transferred during manufacture to certain areas in the compact disc format and can be read many times

NOTE Described in ISO/IEC 10149.

3.18.2**CD-R****recordable compact disc**

recordable **optical disc** (3.76) in which **information** (3.56) can be recorded (once) to certain areas in the compact disc format and read many times

3.18.3

CD-RW

rewritable compact disc

recordable **optical disc** (3.76) in which **information** (3.56) can be recorded to certain areas in the compact disc format, erased and rerecorded many times, and read many times

3.19

conditioning

exposure of a specimen to air at a given **relative humidity** (3.52.2) and temperature until equilibrium is reached

3.20

container

box, can or carton used for storage and shipping of recording materials

EXAMPLE The box into which a **reel** (3.89), **cassette** (3.16), **cartridge** (3.15) or **shell** (3.93) is placed.

NOTE Reels, cassettes, cartridges or shells are not containers.

3.20.1

insulated record container

storage box designed to withstand elevated temperatures and conforming to national standards and regulations

3.21

copy

reproduction of the **information** (3.56) from a master

3.22

core

metal or plastic cylinder on which recording material is wound

cf. **hub** (3.50)

3.23

cupping

departure of film or paper from physical flatness characterized by the condition where the four corners of a rectangular sheet turn up, but the edges do not

3.24

curl

departure of film, paper or magnetic tape from physical flatness with the tendency to curve into a cylindrical shape

3.25

delamination

separation of a laminate into its constituent layers

3.26

optical density

density

degree of light absorption, reflection or scattering characteristics of a photographic image, expressed as the logarithm to the base 10 of the ratio of incident radiant flux to the transmitted, reflected or scattered flux

3.26.1

printing density

optical density of a processed photographic image in which the incident radiant flux has the same spectral energy distribution as the printer light source and the transmitted density is evaluated by a receiver having the same spectral response as the print material

3.26.2**projection density**

optical density of a processed photographic image in which the angular distributions of the incident and transmitted radiant flux are equal and specified

3.26.3**visual density**

optical density of a processed photographic image in which the incident radiant flux has a spectral energy distribution as defined in ISO 5-3 and the transmitted or reflected radiant flux is evaluated by the human eye or by a receiver having the same spectral response as the human eye

3.27**dew point**

temperature at which moisture begins to condense on a surface, corresponding to saturation for a given **absolute humidity** (3.52.1)

EXAMPLE The more humid the air, the higher the dew-point temperature.

See, also, **relative humidity** (3.52.2).

3.28**differential dimensional change**

difference between the dimensional changes of the material in the two principal directions (length and width)

NOTE Polyester-based films frequently have maximum and minimum dimensional changes in directions other than the length or width. These can be determined by rotating and viewing the uncoated base between a pair of crossed polarizers. When the direction corresponding to either the maximum or minimum dimensional change is coincident with the optical axis of one polarizer, there is minimum light transmission through the base.

3.29**digital versatile disc****DVD**

optical disc (3.76) format in which one or more **information** (3.56) layers are located between two substrates and the data can be read by an optical beam

NOTE Formerly called digital video disc.

3.30**dimensional change**

⟨processing alone⟩ permanent dimensional change caused by photographic processing

NOTE This can be the conventional wet chemical processing, vapour processing or heat processing. The dimensional change is measured after conditioning at the same **relative humidity** (3.52.2) and temperature as used for the original measurement and is expressed as a percentage.

3.31**dimensional change**

⟨processing and ageing together⟩ permanent dimensional change that occurs as a result of processing plus ageing of the processed material

NOTE It is measured after conditioning of the processed, aged film or paper at the same **relative humidity** (3.52.2) and temperature as used for the original measurement and is expressed as a percentage.

3.32**dimensional hysteresis**

difference in the absolute dimensions of a specimen in equilibrium with air at a given **relative humidity** (3.52.2), when conditioned from a higher relative humidity and when conditioned from a lower relative humidity

3.33

duplicate

reproduction of a master, retaining the same polarity and size

3.34

emulsion layer

image or image-forming layer of **photographic film** (3.79), paper and plate

3.35

encapsulation

sealing of all edges of a specimen that has been laminated on both front and back surfaces

NOTE This process is usually done by laminating with sheets whose dimensions are larger than the specimen's and then sealing at the overlaps.

3.36

enclosure

folder, envelope, sleeve or clam shell that is intended for physical protection against mechanical damage

3.36.1

open enclosure

enclosure that is intended for physical protection against mechanical damage, but is neither light-tight nor airtight

EXAMPLE Spool, **reel** (3.89), **core** (3.22), **cassette** (3.16), magazine, folder, envelope, carton, box, sleeve, transparency mount or aperture card.

3.36.2

photographic enclosure

container (3.20) in close or direct contact with photographic plates, films or papers such as reels, cans, bags, folders, sleeves (sheaths), jackets, envelopes, window mounts or mats, slide mounts, cartons, boxes and aperture cards

3.36.3

protective enclosure

impermeable sealed **container** (3.20), which could also by necessity be opaque, used for protection from outside factors such as reactive gases and moisture, including changes in **relative humidity** (3.52.2), and from light in the case of certain kinds of products

NOTE Such enclosures can be taped cans and sealed envelopes.

3.36.4

storage enclosure

item in close or direct contact with recording material

EXAMPLE Folder, envelope, sleeve, **album** (3.2), mat, **cartridge** (3.15) or **cassette** (3.16).

3.37

envelope

bag

enclosure (3.36) that is sealed with adhesive, mechanically joined or heat-sealed on two-edges with a bottom fold and one side open

3.38

extended-term storage conditions

storage conditions suitable for the preservation of recorded **information** (3.56) having permanent value

3.39**ferrotyping****glazing**

changing of surface characteristics resulting from contact of two surfaces

3.40**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

3.41**fire-resistant vault**

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

3.42**flange**

fixed or removable circular disc that is connected to the **hub** (3.50) to make a **reel** (3.89) for the purpose of protecting the roll of recording materials

cf. **reel** (3.89)

3.43**folder**

single sheet that is folded, does not have adhesive seams, and can be made from either paper or plastic

3.44**folding endurance**

measure of fatigue resistance after multiple flexing

3.45**frost point**

temperature to which moisture-laden air must be cooled for frost or ice formation

3.46**full reversal processing**

processing of a **photographic film** (3.79) or paper to produce a positive image using bleach and redevelopment

3.47**glass transition**

reversible change in an amorphous polymer from, or to, a viscous or rubbery condition to, or from, a hard and relatively brittle one

3.48**glass transition temperature**

T_g
approximate mid-point of the temperature range over which glass transition takes place

NOTE 1 T_g can be determined readily only by observing the temperature at which a significant change takes place in a specific electrical, mechanical or other physical property.

NOTE 2 T_g can also be sensitive to the moisture content of the polymer.

3.49**heads out**

configuration of roll film or magnetic tape stored on its **core** (3.22), **reel** (3.89) or in its **cassette** (3.16), such that the film or tape is positioned to play from the beginning of the recorded **information** (3.56)

3.50

hub

metal or plastic cylinder on which recording material is wound

cf. **core** (3.22)

3.51

humidistat

device that senses the moisture content of the air for the purpose of controlling it

3.52

humidity

general term for the amount of water vapour in air

3.52.1

absolute humidity

mass of water vapour per unit volume of wet gas

3.52.2

relative humidity

RH

ratio, defined as a percentage, of the existing partial vapour pressure of water to the vapour pressure at saturation

NOTE It is usually, but not always, equal to the percentage of the amount of moisture in the air to that at saturation.

3.53

humidity coefficient of expansion

change in dimension per unit length per a 1 % change in the **relative humidity** (3.52.2) at constant temperature

3.54

humidity expansion/contraction

dimensional change caused by the gain/loss of moisture as a result of changes in the **relative humidity** (3.52.2) of the ambient air at constant temperature

3.55

hygrometer

instrument that measures the moisture content of a sample of air

3.56

information

data recorded using the system

3.57

isoperm lines

lines of constant life plotted as a function of temperature and **relative humidity** (3.52.2)

3.58

jacket

two transparent sheets separated by divider strips with single or multiple film channels (sleeves) made to hold single or multiple microfilm images

3.59

laminare

layer of material that goes over the top or bottom of a specimen

NOTE The material is usually water resistant in order to provide physical or ultraviolet (UV) light protection of the specimen, or both, during a weathering test.

3.60**leader**

flexible plastic or paper strip which can be spliced to either end of a roll of recording material

3.61**leafing**

multiple **popped strand(s)** (3.84) in a magnetic-tape **wind** (3.114)

See also **stepped pack** (3.102).

3.62**length direction**

direction of the film or paper parallel to its forward movement in the film or paper-making machine

NOTE This is also termed "grain" or "machine direction" in the case of papers.

3.63**life expectancy****LE**

length of time that **information** (3.56) is predicted to be acceptable in a system after dark storage at 23 °C and 50 % RH

3.64**LE designation**

rating for the **life expectancy** (3.63) 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 23 °C and 50 % RH.

EXAMPLE LE-100 indicates that information can be retrieved after at least 100 years storage.

3.65**loose pack**

undesirable pack condition in a roll of recording material, such that the outer portion of the roll can be moved and tightened by pulling on the end

3.66**macroenvironment**

atmospheric conditions (temperature, **relative humidity** (3.52.2) and pollutants) in a large area in which records are kept

3.67**magnetic field intensity**

magnitude of the magnetic field, in amperes per metre, at a point in space

3.68**medium****media, pl**

material on which **information** (3.56) is recorded

cf. **carrier** (3.13)

3.69**medium-term storage conditions**

storage conditions suitable for the preservation of recorded **information** (3.56) for a minimum of 10 years

3.70**microenvironment**

atmospheric conditions (temperature, **relative humidity** (3.52.2) and pollutants) inside a storage enclosure in which records are kept

3.71

MO disc

optical disc (3.76) in which the **information** (3.56) is recorded using magneto-optical technology in some specified format and which can be read many times and overwritten many times

3.72

morphological changes

changes in the physical structure of the association of the molecules

3.73

mottle

localized non-uniform visual density variation in an image

3.74

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

3.75

non-curl backing layer

layer, usually made of gelatine, applied to the side of the **photographic film** (3.79) base opposite that of the emulsion layer for the purpose of preventing curl

NOTE 1 It is comparable to the emulsion layer in thickness and is not removed in processing.

NOTE 2 Antihalation or other layers removed are excluded from this definition.

3.76

optical disc

disc that will accept and retain **information** (3.56) in the form of marks or density modulations in a recording layer that can be read with an optical beam

3.77

ODC

optical disc cartridge

case containing an **optical disc** (3.76)

3.78

outdoor weathering

placement of specimens outdoors in specific locations, often those of climatic extremes

NOTE This is differentiated from simulated weathering where instruments (weatherometers) are used to obtain very controlled conditions that simulate, to some degree, outdoor weathering results.

3.79

photographic film

material consisting of one or more radiation-sensitive layers coated on transparent or translucent plastic that yields a visible image

3.79.1

safety photographic film

photographic film which passes the ignition-time test and the burning-time test defined in ISO 18906

3.80

photographic layer

radiation-sensitive coating that yields an image after exposure to radiant flux

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

3.81**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

3.81.1**albumen plate**

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

3.81.2**ambrotype plate**

glass plate collodion positive, i.e. 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.

3.81.3**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

3.81.4**colour screen plate**

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

3.81.5**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 the thin metal sheet with a glossy surface upon which high-gloss **photographic print(s)** (3.82) are dried.

3.81.6**gelatine plate****gelatine dry plate**

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

3.81.7**lantern-slide plate**

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

NOTE 1 The image layer of a lantern-slide plate is usually protected with a cover glass, bound on all edges with adhesive tape, as this type of plate is viewed by projection.

NOTE 2 Albumen and colour-screen plates are also found as lantern slides.

3.82**photographic print**

material consisting of one or more radiation-sensitive layers coated on paper, paper with a pigmented layer, paper with a resin layer, or on an opaque support, that yields a visible image

3.83**pocket-style page**

enclosure made from two pieces of plastic sheeting heat-sealed or ultrasonically welded along three or four edges and at various points across the sheets to create pouches (pockets) that have slit openings to allow the insertion of a photograph

3.84

popped strand

lateral displacement of a single strand or wrap of magnetic tape extending beyond the plane of the tape pack

See **leafing** (3.61) and **stepped pack** (3.102).

3.85

precision

measure of repeatability; degree of closeness of a series of measurements under the same operating conditions

3.86

preconditioning

establishment of a moisture content history by conditioning the specimen at a **relative humidity** (3.52.2) above or below the conditioning relative humidity used for measurement

NOTE The purpose of preconditioning is to control the effects of hysteresis.

3.87

print-through

unwanted transfer of a magnetic field and its signal from one tape lap to another within a roll of magnetic tape

3.88

raw photographic material

photographic material that has not been exposed to actinic radiation and has not been processed

3.89

reel

spool

metal or plastic **hub** (3.50) or **core** (3.22) with **flange(s)** (3.42) (protective sides) onto which recording material is wound

3.90

reflection print support

white, opaque support for the image forming and auxiliary layers of a **photographic print** (3.82) intended for viewing by reflected light

3.91

retrievability

ability to access **information** (3.56) as recorded

3.92

seam

area where an enclosure has an adhesive bond in its structure

3.93

shell

cassette (3.16) or **cartridge** (3.15) housing for magnetic tape

3.94

sleeve

sheath

enclosure with one or more seams and both ends open

3.95

slide mount

structure to retain a film for slide projection

3.96**slip agent**

component of a material added to a surface so as to reduce the coefficient of friction

NOTE Slip agents are usually amide-type materials.

3.97**slot**

space or slit in the **hub** (3.50) or **flange** (3.42) surface

3.98**splice**

union of two pieces of recording material to form a single piece

3.99**splicing tape**

paper or plastic strip coated with a thermal or pressure-sensitive adhesive, used in splicing

3.100**spoking**

deformations in a roll pack that appear radially outward and that disrupt the circular nature of the **wind** (3.114)

3.101**staging****acclimatization**

process of conditioning material from one set of temperature/moisture conditions to another

3.102**stepped pack**

multiple adjacent strands of magnetic tape extending beyond the level of a tape pack

See **leafing** (3.61) and **popped strand** (3.84).

3.103**storage environment**

conditions for storing materials, i.e. temperature, **relative humidity** (3.52.2), cleanliness of facilities, and atmospheric pollutants

3.104**storage housing**

physical structure supporting materials and their enclosures

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

3.105**system**

combination of material, hardware, software and documentation necessary for recording and/or retrieving **information** (3.56)

3.106**tape pack**

length of magnetic tape wound on a **reel** (3.89) or **hub** (3.50)

3.107**tails out**

configuration of roll film or magnetic tape stored on a **core** (3.22), **reel** (3.89) or **cassette** (3.16), such that the film or tape must be fully rewound in order to play correctly from the beginning of the recorded **information** (3.56)