

INTERNATIONAL STANDARD



2803

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Photography — Silver-gelatin type microfilms — Processing and storage for archival purposes

Photographie — Microcopies gélatino-argentiques sur film — Traitement et conservation pour archivage

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2803 was drawn up by Technical Committee ISO/TC 42, *Photography*, and circulated to the Member Bodies in August 1972.

It has been approved by the Member Bodies of the following countries :

Australia	Hungary	Spain
Canada	Italy	Switzerland
Czechoslovakia	Japan	Thailand
Egypt, Arab Rep. of	Mexico	United Kingdom
Finland	New Zealand	U.S.A.
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Germany	South Africa, Rep. of	

The Member Body of the following country expressed disapproval of the document on technical grounds :

Belgium

Photography — Silver-gelatin type microfilms — Processing and storage for archival purposes

1 SCOPE AND FIELD OF APPLICATION

1.1 This International Standard specifies the conditions of processing and storage which will give microcopies stored in archives the longest possible preservation.

1.2 It applies to the preservation of microcopies on film (in roll, sheet, strip or card form, mounted or unmounted, without dimensional limitations), whose support is of cellulose ester or polyester coated with a gelatin layer containing a silver image prepared by the use of a liquid developer, fixer and wash solutions; but excluding processes such as :

- a) vesicular images;
- b) diazo images;
- c) dry-processed silver images;
- d) diffusion transfer processes.

This International Standard applies only to the storage of microcopies made on safety supports in accordance with ISO 543.¹

1.3 Storage for short periods is excluded from this International Standard as the conditions of processing and storage are then less critical.

2 REFERENCES

ISO/R 417, *Methods for determining thiosulphate and tetrathionate in processed black-and-white photographic film, plates and papers.*¹⁾

ISO/R 421, *Method for indicating the stability of the images of processed black-and-white films, plates and papers.*¹⁾

ISO 543, *Cinematography — Motion-picture safety film — Definition, testing and marking*

3 GENERAL CONSIDERATIONS

3.1 The important factors which affect the storage and preservation of microcopies are :

- a) the choice of the photo-sensitive product;
- b) the technique of chemical processing;
- c) the relative humidity and the temperature of the air which is in close contact with the film;
- d) contact with chemical materials in liquid, solid or gaseous form;
- e) fungal and bacterial growth.

3.2 This International Standard emphasizes the limitations of the existing knowledge in the field of application defined in 1.2. It will need to be modified or amplified as justified by new discoveries.²⁾

4 PROCESSING

4.1 General

For a large part, the preservation of silver microcopies on film depends on the products which remain in the emulsion after washing. The maximum contents of these various residual products shall not exceed the values given in 5.1 and 5.2. The recommendations given below concerning processing are simply indications of how the requirements can be achieved; they are not the only ways of obtaining them.

4.2 Fixing

4.2.1 The fixing bath shall have been used as little as possible. As an indication of its suitability, it is recommended that the amount of silver in the bath be less than 0,5 % in the case of crystallized sodium thiosulphate, $\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$; or less than 0,8 % in the case of anhydrous ammonium thiosulphate, $(\text{NH}_4)_2\text{S}_2\text{O}_3$.

1) Currently under revision.

2) Attention is drawn to research reported in the articles by R.W. HENN and D.G. WIEST in *Photographic Science and Engineering* 7, No. 5 (1963) pp 253-261; by C.S. McCAMY, U.S. Dept. of Commerce — National Bureau of Standards 96, January 24, 1964, and by C.S. McCAMY and V.L. POPE, *Journal of Research of the N.B.S. in Physics and Chemistry* 69A, No. 5 (1965), pp 385-395.

4.2.2 In order to minimize defects known as "ageing blemish microspots", the iodide content in the fixing bath shall be between 0,1 and 0,5 g/l (expressed as KI).

4.3 Washing

4.3.1 Water used for washing¹⁾ shall be colourless and free from substances in suspension.

A washing water temperature maintained at a level between 15 and 25 °C is generally suitable and minimizes the danger of:

- a) swelling, which occurs at higher temperatures, and
- b) a decrease in the rate of solution of the salts being removed, which occurs at lower temperatures.

15 min washing in well-agitated running water at 20 °C is generally satisfactory provided the microfilms are not in contact with one another and means for renewing the water at their surfaces are provided.²⁾

4.3.2 Ion exchange washing accelerators may be used. For instance, films may be soaked in a 2 % anhydrous sodium sulphite bath before washing, but thiosulphate-destructive washing accelerators such as oxidizing agents shall not be permitted.

NOTE — Indications concerning washing (4.3.1 and 4.3.2) are simply good advice to users in order to get the results which are necessary for good preservation. Users who, for economy's sake, believe it possible to shorten the duration of washing should, more than others, check that the recommended limits for silver content in the fixing bath and residual thiosulphate content in the processed microcopies are not exceeded.

5 PROPERTIES OF THE PROCESSED FILM

5.1 Residual thiosulphate

The residual $S_2O_3^{2-}$ ion content in the microfilm after processing shall be below 7 mg/m².³⁾

The method to be used for determining the residual thiosulphate is that specified in ISO/R 417.

5.2 Residual silver compounds

It is essential that the test for residual silver by the sulphide test specified in ISO/R 421 gives a negative result.

5.3 Resistance test to a non-destructive fire

A film, after having been conditioned at 21 to 24 °C and 38 to 42 % relative humidity and placed in a closed or sealed container, shall tolerate a dry heat at 120 °C for 24 h without appreciable loss of legibility or printability.

5.4 Splices

Splices shall be avoided whenever possible. If splicing is found to be necessary, an excellent quality cement, chemically neutral and free from unstable solvent or nitrocellulose, shall be used. The use of pressure adhesive tape shall be avoided. Attention is drawn to the advantages presented by dielectric hot fusion.

5.5 Reels and cores

Reels and cores for microfilm in rolls shall be made of corrosion resisting material such as non-ferrous metals or plastics; steel reels are suitable if they have been protected from corrosion risk by appropriate treatment: lacquering, tinning, etc. Adverse effects may be caused by the fumes from freshly lacquered surfaces.

Materials used in the production or protection of reels or cores shall neither be more flammable nor more decomposable than the film which is stored on them and shall not release more reactive fumes or vapours than the film or be liable to cause the film to deteriorate when heated for 4 h at 150 °C.

6 ARCHIVAL PREMISES AND CONTAINERS

6.1 Air purification

It is recommended that air be filtered, purified from noxious gases and circulated by means of forced draught.

6.2 Relative humidity

If the containers are not airtight, the air in the archival storage area shall be conditioned so as to maintain the relative humidity at a level between 30 and 40 %.

6.3 Temperature of the archival premises

It is recommended that the temperature in the archival storage area be maintained at a level between 15 and 25 °C and preferably not in excess of 20 °C.

6.4 Chemical contamination

Various noxious emanations can cause slow deterioration and a gradual fading of the image. They are especially to be feared if microfilms are not stored in sealed containers. However, even if the containers are sealed, such emanations shall be eliminated to avoid damage to the containers themselves. Attention is drawn to the danger presented by peroxides which may originate from bleaching agents, glues, varnishes and various products used in the manufacture of the storage cabinets.

1) Drinking water is generally pure enough for washing purposes.

2) The washing time is considerably shortened and the temperature is higher (35 °C) in most automatic machines (droplet jets, etc.).

3) The influence of the thickness of the emulsion layer is practically negligible, hence the use of an area.