BRITISH STANDARD

BS 1153:1992

Recommendations for

Processing and storage of silver-gelatin-type microfilm

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Information and Documentation Standards Policy Committee (DOT/-) to Technical Committee DOT/16, upon which the following bodies were represented:

British Computer Society
British Library
British Office Technology Manufacturers' Alliance
British Photographic Association
Her Majesty's Stationery Office
Kodak Limited
London Borough of Bromley
National Centre for Information Media and Technology (Cimtech)
United Kingdom Association for Information and Image Management

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Contents

Foreword

This British Standard has been prepared under the direction of the Information and Documentation Standards Policy Committee. It supersedes BS 1153:1975, which is withdrawn.

BS 1153 has been revised chiefly because the methods of test given in the appendices of BS 1153:1975 have been superseded by the methods described in BS 5706:1979. Some amendments have been made to update the recommendations in the main text.

Successful long-term storage of microfilm depends on the kind of film used and the way it is processed, as well as the conditions of storage. The processed microfilm will require storage in controlled temperature and relative humidity, and protection from damage by fire, water, chemicals and biological agents, if it is to remain in good condition while in storage. This British Standard has been prepared to help users to ensure that microfilm in storage will remain in good condition as long as it is needed.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 4, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This British Standard gives recommendations for the processing and commercial or archival storage of microfilm that is in roll, sheet, strip or card form, mounted or unmounted. It applies to microfilm on a base of cellulose ester or polyester coated with a gelatin layer containing a conventional silver image produced by the use of a liquid developer, fixer and wash system.

It does not apply to the following:

Processes	Films
dry-processed silver images	vesicular
diffusion transfer processes	colour
monobath processing systems	diazo
halide reversal processes	

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard, the following definitions apply.

2.1
archival storage

the storage of records that have been selected for permanent preservation

2.2
commercial storage

the storage of records for a period sufficient for general business purposes

2.3
fix time

the length of time any particular point on the film spends in contact with fixing solution

3 Processing

3.1 General

The recommendations for fixing (see **3.2**) and washing (see **3.3**) should be followed for all microfilms within the scope of this British Standard, whether for commercial or archival storage.

NOTE Successful preservation of microfilm depends on the absence of impurities. If fixing is inadequate, silver compounds will be left in the film; they cause darkening of clear areas of film when exposed to light, heat and humidity. If washing is inadequate, excessive amounts of thiosulfate will be left in the film; they attack the silver image, causing discoloration and fading.

3.2 Fixing

Fixing should be complete. Unexposed film should become transparent within 50 % of the fix time. If a proprietary processing system is used, fixing should be in accordance with the manufacturer's recommendations. The iodide content should be between 0.1 g and 0.5 g potassium iodide per litre in order to minimize the formation of ageing blemish microspots.

To avoid excessive depletion of the fixer and build-up of silver content, the manufacturer's recommendations for replacement and replenishment of the fixer should be followed.

3.3 Washing

The water used for washing should be free from insoluble precipitates and other substances in suspension. Its temperature should preferably be within the range 15 °C to 40 °C; lower temperatures may require longer washing times. The wash-water temperature should be high enough and the wash time long enough to achieve compliance with the limits recommended in **4.2**.

If a washing accelerator is used, thiosulfate-destructive washing accelerators such as oxidizing agents should be avoided.

NOTE In general the length of time a film spends in the wash depends on its speed of transport through the machine. This affects all stages of processing and a shortened wash time will result in shorter development and fix times. A shorter wash time may result in high residual thiosulfate levels.

4 Measurement of residual thiosulfate content

4.1 Test samples

Test samples should be taken from a clear area, i.e. area of minimum density, of the processed film and tested within two weeks of processing. Test samples of 16 mm and 35 mm microfilm should include the full width of the film. Test samples of film intended for loading in adhesive-type aperture cards should be taken before the film is loaded. Test samples of film that is mounted in aperture cards should not include film that has been in contact with the card adhesive. Test samples of 105 mm roll microfilm should be taken from both edges and the centre line of the roll. Test samples of processed sheet film should be taken from opposite corners and the centre.

4.2 Thiosulfate content

When measured in accordance with either of the methods for determining residual thiosulfate described in BS 5706, the residual thiosulfate ion content in the microfilm after processing should be not more than 0.7 $\mu g/cm^2$.

4.3 Frequency of testing

A high level of residual thiosulfate found on one test sample will throw doubt on the stability of all film processed since the preceding test. Film should be tested at regular intervals, the frequency of testing being decided according to the following:

a) length of time of use of processing chemicals;

b) turnover rate of chemicals in the processor;

c) film throughput;

d) wash-water temperature and flow rate.

5 Splices

The use of splices should be avoided if possible. If film has to be spliced, ultrasonic and dielectric hot-fusion methods are preferable. Cement splices and pressure-sensitive adhesive tape should not be used.

6 Storage media

6.1 Microfilm in roll form

6.1.1 *General*

Microfilm in roll form should be stored in corrosion-resistant containers (see ISO 10214). The containers may be kept in boxes of paperboard. Microfilm without containers should not be stored in such boxes. Rubber bands and pressure-sensitive adhesive tape should not be used to secure the boxes.

6.1.2 *Airtight containers*

Sealed airtight containers are preferable to non-airtight containers and are essential if the temperature and relative humidity in the storage area are not maintained within the limits recommended in **7.2** for commercial storage or **8.2** and **8.3** for archival storage.

Containers should be of a kind that will prevent water vapour reaching the film. A container and its airtight seal should be capable of withstanding an excess pressure of 70 kPa within the container without rupture of the seal or other injurious effects.

6.1.3 *Non-airtight containers*

If the temperature and relative humidity in the storage area are maintained within the limits recommended in **7.2** for commercial storage or **8.2** and **8.3** for archival storage, closed non-airtight containers may be suitable.

6.1.4 *Reels and cores*

Microfilm in roll form should be mounted on reels or cores. Rolls on cores should be stored flat unless the core is carried on a horizontal spindle that prevents the lower part of the film from supporting the load of the core and its contents (see also ISO 10214).

6.2 Other microforms

If microforms are stored in envelopes, the envelopes should be made of fully bleached chemical wood pulp or cotton fibre and should be neutral-sized. Fastenings should be corrosion resistant.

7 Storage: commercial records

7.1 General

Microfilm on safety-film base is difficult to ignite and its combustion speed is low. When stored at a relative humidity of 40 %, microfilm can withstand a dry heat of 120 °C for a period of 24 h without appreciable loss of legibility and printability. At a dry heat of 150 °C, some distortion may occur after 6 h, although individual frames remain printable. After at least 6 h at a dry heat of 180 °C, microfilm becomes deformed and reproduction is generally impossible.

NOTE Cellulose nitrate film is highly flammable. Any photographic records on cellulose nitrate film should be removed from the storage area and copied on to safety film. Expert advice should be taken about the disposal of cellulose nitrate film.

7.2 Temperature and relative humidity

The temperature in the storage area should not exceed 25 °C and the relative humidity should not exceed 60 %. Large and frequent changes in temperature and relative humidity should be avoided.

7.3 Protection against fire

Microfilm should, if possible, be stored in fire-resistant rooms. Cabinets, safes and containers should be fire-resistant.

7.4 Protection against water

Microfilm records should be protected from the action of water, whatever its origin. To protect them from the risk of damage by leaks, fire sprinklers or flooding, they should be stored above basement level on shelves at least 15 cm above floor level. If films become wet, they should not be allowed to dry, even partially, but should be placed in water-filled containers until they can be washed and dried properly. Expert advice should be sought.

7.5 Protection against contamination

Silver-image microfilm should not be stored with emulsion surfaces in contact. Records on silver-image microfilm should not be kept with other photographic records that do not comply with these recommendations or with records on the kinds of film specifically excluded in clause **1**.

8 Storage: archival records

8.1 General

For archival records the recommendations in **8.2** to **8.6** apply, in addition to the recommendations in **7.1** and **7.3** to **7.5**.

8.2 Air purification

Air should be filtered to remove dust and noxious gases, and circulated by means of forced draught.

8.3 Temperature

The temperature in the archival storage area should be maintained within the range 15 °C to 25 °C, preferably below 20 °C.

8.4 Relative humidity

If sealed airtight containers are not used, the relative humidity in the archival storage area should be maintained within the range 20 % to 40 %. For detailed guidance see Appendix A.

8.5 Movement from storage area

When a microfilm is to be moved from the archival storage area, it should not be removed from its sealed container until its temperature has been brought up to the approximate temperature of the room where it will be handled. For detailed guidance see Appendix A.

8.6 Aperture cards

If aperture cards are to be used for the storage of archival records, they should be checked to ensure that the cards themselves and the adhesives used are of archival quality.

9 Microfilm inspection and reading

9.1 Frequency of inspection

A representative sample of microfilm consisting of 20 % of each film form (16 mm, 35 mm, microfiche, aperture card, etc.) should be inspected every 2 years. One-tenth of each representative sample should be from material included in the previous inspection. The frequency of inspection should be increased if deterioration of the microfilm is observed; the cause of such deterioration should be traced and remedied. Copies on silver-image microfilm, processed in accordance with these recommendations, should be made of any records that are deteriorating. A record of which films have been inspected should be kept.

9.2 Precautions

Anyone inspecting the microfilm should wear lint-free cotton gloves and take precautions to avoid damaging the microfilm with fingermarks, dust and scratching, or malfunction of the reading apparatus.

10 Protection of originals

Original microfilms that are to form an archival secure record should not normally be used for routine viewing or for making paper prints or multiple copies. If necessary, a copy should be made for day-to-day use before the original is stored. For microfilm that may be required in evidence, see BS 6498.

Appendix A Adjustment of microforms to the atmosphere inside the container

Before sealed containers are closed, microforms should be adjusted to the atmosphere in which they will be enclosed. This atmosphere should be kept within the limits of relative humidity and temperature recommended in **7.2** or **8.2** and **8.3**, as appropriate. Readjustment is necessary whenever a microform is removed from its container and is placed in an environment in which tile temperature or relative humidity is not in accordance with the recommended limits. This applies in particular when film is subjected to heat from the lamp of a copying or projecting apparatus.

An indication of the time for reconditioning the film is given in Table 1.

Table 1 — Time required for film reconditioning

Microform	Time for	
	80 % readjustment	Practically 100 % readjustment
Single strip or slide	30 min	90 min
16 mm roll	5 days	3 weeks
35 mm roll	1 week	4 weeks

An adjustment time resulting in 80 % reconditioning is considered sufficient when:

a) the film comes from a room which is too dry (20 % r.h.) and has to be humidified in a room where relative humidity is between 30 % and 40 %;

b) the film comes from a room which is too humid (40 % r.h.) and has to be dried in a room where the relative humidity is between 20 % and 30 %.

Publication(s) referred to

BS 5706, *Methods for the determination of thiosulphate and other residual chemicals in processed photographic films, plates and papers: methylene blue photometric method and silver sulphide densitometric method.*

BS 6498, *Guide to preparation of microfilm and other microforms that may be required as evidence.*

BS 10214, *Photography — Processed photographic materials — Filing enclosures for storage.*

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