950 CMR 39.00: REGULATIONS ON USING MICROFILM

Section

39.01: Scope

950 CMR 39.00 shall apply to all records defined as public records by M.G.L. c. 4, § 7, clause 26, M.G.L. c. 66. The purpose of 950 CMR 39.00 is to ensure that microfilmed copies of public records have a life expectancy equal to or greater than the retention period assigned to the original record.

The minimum standards set out in 950 CMR 39.00 shall be adhered to in all microfilm applications for records the retention of which has been designated as more than 15 years by the Records Conservation Board for the records of the Commonwealth and by the Supervisor of Public Records for the records of counties, cities and towns, and to all records for which retention periods have not been assigned. No records shall be destroyed after microfilming without the written permission of the Records Conservation Board or the Supervisor of Public Records, as appropriate.

950 CMR 39.00 shall apply to all in-house preparations of such records, as well as to work contracted with microfilm service bureaus. It is the responsibility of the contracting agency to inform the microfilm service bureau of the requirements of 950 CMR 39.00.

It is recommended that records with a retention period of less than 15 years be microfilmed on base stock and processed in such a manner as required herein for long-term records. However, for economic reasons and for certain systems applications, other film types may be better suited for microforms containing short-term records; care should be taken that these film types are used and processed so as to provide a life expectancy equal to or greater than the retention period of the record. All filming and processing shall be in accordance with manufacturers' specifications and all applicable ANSI and ISO standards. Microfilm of short-term records shall be stored under the conditions prescribed in the appendix to ANSI IT9.2.

39.02: Incorporation by Reference

The following standards of the American National Standards Institute (ANSI) and the International Organization for Standardization (ISO) contain provisions that, by reference in this text, constitute provisions of 950 CMR 39.00. These standards are subject to revision. Where a standard has been revised, the most current revision shall apply.

ANSI PH 1.25 Photography (Film) - Safety Photographic Film

ANSI/NAPM IT 9.1 Imaging Media (Film) - Silver Gelatin Type - Specifications for Stability

ANSI PH 1.43 Photography (Film) - Processed Safety Film - Storage

ANSI PH 1.51 Photographic Film - Micrographic Sheet and Roll Films - Dimensions

ANSI PH 2.51 American National Standard for Photography (Film) - Source Document Microfilms - Determination of ASA Speed and Average Gradient

ANSI IT 9.2 Photography (Processing) - Processed Films, Plates and Papers - Filing Enclosures and Containers for Storage

ANSI PH 4.8 Photography (Chemicals) - Residual Thiosulfate and Other Chemicals in Films, Plates and Papers - Determination and Measurement

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ANSI/ISO 3334 Micro copying - ISO Test Chart No.2 - Description and Use in Photographic Documentary Reproduction

ANSI/AIIM MS 1 Recommended Practice for Alphanumeric Computer-Output Microforms - Operational Practices and Quality Control

ANSI/AIIM MS 5 Micrographics - Microfiche

ANSI/AIIM MS 14 Specifications for 16 and 35mm Microfilms in Roll Form

ANSI/AIIM MS 17 Test Chart for Rotary Microfilm Cameras

ANSI/AIIM MS 18 Splices for Imaged Film - Dimensions and Operational Constraints

ANSI/AIIM MS 19 Recommended Practice for Identification of Microforms

ANSI/AIIM MS 23 Practice for Operation Procedures/Inspection and Quality Control of First-Generation, Silver-Gelatin Microfilm of Documents

ANSI/AIIM MS 35 Recommended Practice for the Requirements and Characteristics of Original Documents to be Microfilmed

ANSI/AIIM MS 37 Recommended Practice for Microphotography of Cartographic Materials

ANSI/AIIM MS 43 Recommended Practice for Operational Procedures/Inspection and Quality Control of Duplicate Microforms of Documents and from COM

ANSI/AIIM MS 45 Recommended Practice for Inspection of Stored Silver Gelatin Micro- forms for Evidence of Deterioration

ANSI Z 39.32 Information on Microfiche Headings

ANSI/NFPA 232 Protection of Records

39.03: Definitions

Definitions appropriate to 950 CMR 39.00 can be found in the Association of Information and Image Management publication, *Glossary of Micrographics*, TR-2-1992, or the latest revision thereof.

39.04: Film Base Materials

(1) Original film. All microfilm records regulated by 950 CMR 39.00 shall be generated on polyester-base silver gelatin-type film. All such film shall conform to the standards set forth in the American National Standards Institute publication, *Specifications for Safety Photographic Film*, ANSI PH 1.25. Such film shall comply with the minimum standards of quality for film rated LE-500 described in *Imaging Media (Film) - Silver-Gelatin Type - Specifications for Stability*, ANSI/NAPM IT 9.1.

(2) Duplicates. The original, or first generation silver film shall be maintained for security purposes and not for reference. At least one duplicate copy of all records filmed shall be prepared for reference purposes. For records having a permanent retention period or for records for which a retention period has not been assigned, a duplication master shall be produced from the master negative. Duplicate copies for reference or additional duplicate copies for security may be of the diazo, silver halide or vesicular composition. Duplicates shall be commensurate in quality with the original and shall comply with the minimum standards set forth in *Recommended Practice for Operational Procedures/Inspection and Quality Control of Duplicate Microforms of Documents and from COM*, ANSI/AIIM MS 43.

39.05: Preparation of Film

(1) Original Records. Original source documents should be of sufficient legibility and high quality to ensure a microfilm of high quality. Should the source documents be of inferior legibility or of low quality, the microfilm output will be of similarly inferior legibility.

Proper care shall be taken in the preparation and arrangement of original records for filming to ensure that a true and accurate reproduction will be made. Insofar as is possible, preparation and arrangement shall be in accordance with *Practice for Operational Procedures/Inspection and Quality Control of First-generation, Silver Microfilm of Documents*, ANSI/AIIM MS 23. All staples, paper clips, folds, attachments, etc. shall be removed before document filming. Source documents shall be arranged and filmed in a manner consistent with their customary reference and usage.

(2) Reduction Ratio. Regardless of format, the guiding consideration in establishing a reduction ratio shall be the reproduction of readable records on film, which shall be system-compatible in usage. The reduction ratio employed shall be such as to ensure a Quality Index resolution level of 8 as described below.

It should be observed that reduction ratios of 24X are regarded as optimal in regular (16 mm) roll film production. Unitized microforms also are becoming standardized on the basis of 24X. Certain applications may require variations from this standard. For example, lower reduction may be beneficial where 35 mm film is used; higher reduction may be necessary where 105 mm film is used or where duplex filming is performed on a rotary camera, and 32X reduction is the norm for filming computer output pages. While such factors may necessitate variations, the 24X optimum shall be followed as closely as possible.

The reduction standard for computer output microfilm (COM) is 48X, as defined in *Recommended Practice for Alphanumeric Computer-Output Microforms - Operational Practices and Quality Control*, ANSI/AIIM MS 1.

(3) Resolution. The method for determining the minimum required resolution shall conform to the Quality Index Method of determining resolution as given in the *Practice for Operational Procedures/Inspection and Quality Control of First-Generation, Silver-Gelatin Microfilm of Documents*, ANSI/AIIM MS 23, and *Recommended Practice for Operational Procedures/Inspection and Quality Control of Duplicate Microforms of Documents and from COM*, ANSI/AIIM MS 43. Resolution shall be sufficient for the production of film producing fine detail and sharpness of image.

Resolution tests shall be performed using a NIST-SRM 1010a Microcopy Resolution Test Chart (a calibrated and certified photographic reproduction) as specified in *ISO Resolution Test Chart No. 2 - Description and Use*, ANSI/ISO 3334 (ANSI/AIIM MS 51) and the patterns will be read following the instructions of ANSI/ISO 3334. Rotary camera targets shall conform to the specifications and be used in accordance with *Test Chart for Rotary Microfilm Cameras*, ANSI/AIIM MS 17. A minimum Quality Index level of 8.0 (high quality) shall be maintained; i.e., a lower case "e" that is 2mm high and will be reproduced to three generations shall be filmed on a system that will resolve the 5.0 pattern, regardless of the reduction ratio or the type of camera used.

Computer output microfilm shall meet the requirements of *Recommended Practice for Alphanumeric Computer Output Microforms - Operational Practices for Inspection and Quality Control*, ANSI/AIIM MS 1.

(4) Density. Throughout filming, density shall be monitored constantly. If density values are too low, the film will appear faded or "washed out." On the other hand, if the density is too high, fine or light lines from the original document will tend to fill in and bold black lines will tend to spread. Density values shall be such that exposed film shall have clear and open lines, as well as an absence of spread and/or widened letters (characters).

39.05: continued

The most favorable background density values, in the case of first generation film, and when the base-plus-fog density of the film is less than or equal to 0.10, range from 0.80 to 1.50, depending on the original documents to be filmed. Optimum values for various original documents set forth in *Practice for Operational Procedures/Inspection and Quality Control of First-Generation, Silver-Gelatin Microfilm of Documents*, ANSI/AIIM MS 23, are indicated below.

CLASSIFICATION	DESCRIPTION OF DOCUMENT	BACKGROUND DENSITY
GROUP 1.....	High-quality, high-contrast printed books, periodicals and black typing	1.30 - 1.50
GROUP 2.....	Fine-line originals, black opaque pencil writing, and documents with high contrast printing	1.15 - 1.40
GROUP 3.....	Pencil and ink drawings, faded printing, and very small printing, such as footnotes at the bottom of a printed page	1.0 - 1.20
GROUP 4.....	Low-contrast manuscripts and drawings, graph paper with pale, fine colored lines; letters typed with a worn ribbon; and poorly-printed, faint documents	0.80 - 1.0
GROUP 5.....	Poor-contrast documents (special exception)	0.70 - 0.85

Recommended visual diffuse transmission densities for computer-generated images are as follows:

FILM TYPE	PROCESS	DENSITY MEASUREMENT METHOD	MIN. DMAX.*	MAX. DMIN.*	MINIMUM DENSITY DIFFERENCE
Silver gelatin (1P)	Conventional	Printing or diffuse	0.75	0.15 or 0.10 plus base^	0.60
Silver gelatin (1N)	Full reversal	Printing	1.50	0.20 plus base^**	1.30

***Character or line density, measured with a micro densitometer or by comparing the film under a microscope with an image of a known density.**
^Base equals the density of the uncoated base.
****Character or line density, measured with a micro densitometer or by comparing the film under a microscope with an image of a known density; the cut mark is useful for processing control only.**

Targets and document samples shall be test filmed and density checked for the camera negative, each user generation to be used, and reader-printer blowbacks. The procedure for measurement of density is described in ANSI/AIIM MS 23.

(5) Film Identification. Specifications for film identification should be followed as given in the *Recommended Practice for the Identification of Microforms*, ANSI/AIIM MS 19.

At a minimum, identification targets shall display the following information: name of the agency by which records are held; the declarations by the records custodian and camera operator; the title of the records (with identification of contents if not evident from series title); the microfilm reel number; camera number (where applicable); legal citation for access restriction (if any); the date of filming; and where possible, the inclusive dates, numbers, names or other data identifying the first and last records on the roll.

Unitized microforms (i.e., fiche, aperture cards, and jacketed film) shall contain records identification information in eye-readable headings in the appropriate places at the top (heading area) of the film material, or on the film jacket.

Any indexes, registers, or other finding aids shall be microfilmed and located in a readily identifiable place within the collection of microfilmed records.

39.05: continued

(6) Targets. Standard targets shall be employed pursuant to ANSI/AIIM 19 and ANSI/AIIM MS 23. These shall include appropriate technical targets, restriction or classification targets, targeting for start/end of film record, camera operator's report, and records identification. Other targets, including retake, start file, or space targets, shall be used as necessary.

(7) Film Processing. As soon after the date of exposure as possible, (ideally within 24-48 hours), all film shall be processed in order that the film images be properly fixed.

Hypo-residue (sodium thiosulfate) shall meet the standards of *Imaging Media (Film) - Silver-Gelatin Type - Specifications for Stability*, ANSI/NAPM IT 9.1. In all such cases, film shall be washed to reduce the hypo residue to within allowable tolerances as defined in ANSI/NAPM IT 9.1. The amount of thiosulfate ion residue shall be greater than 0 and less than 0.014 gram/meter^2.

To confirm these tolerances, the chemical testing of processed film shall be required. The tests to be used in meeting this requirement are specified in *Photography (Chemicals) Residual Thiosulfate and Other Chemicals in Films, Plates and Papers - Determination and Measurement*, ANSI/ASC PH 4.8. If reversal processing will be used, it must be full photographic reversal and not the halide-type reversal.

The use of polysulfide or other treatment approved by the Image Permanence Institute to retard the deterioration of processed film is encouraged.

(8) Post-filming Inspection. It is the responsibility of the records custodian to ensure that, as soon after processing as possible, all film shall be inspected to determine if the material has been filmed in proper sequence, and to determine if photographic and physical requirements have been met. This shall include resolution, density, and residual thiosulfate ion checks, as well as visual inspections for the quality of the filmed product. Inspections shall be made as recommended by ANSI/AIIM MS 23 and reports shall be prepared detailing defects and errors, if any, and indicating any corrections which may be made. Said reports will be returned to the custodian of the records involved.

In regard to roll film, corrections and/or retakes are to be spliced in at the beginning of each reel in a retake section along with targets for retake certificates. Splices shall be made in accordance with *Splices for Imaged Film - Dimensions and Operational Constraints*, ANSI/AIIM MS 18. Equivalent procedures shall be applied in the correction of unitized microforms.

39.06 Storage

Standards for storing original or duplicate film shall comply with *Processed Safety Photographic Film - Storage*, ANSI IT 9.11. In regard to the original film, the following storage standards shall be met:

(1) Film Enclosures. Film enclosures shall be chemically stable and shall meet the requirements of ANSI IT 9.2.

Materials used for film enclosures shall be free of acids and peroxides that may be released over time and cause degradation of the film. Paper and paperboard materials shall meet the requirements of the photographic activity test as outlined in ANSI IT 9.2.

Only enclosures of inert plastic or non-corroding metal such as anodized aluminum or stainless steel shall be used. Steel will be permitted only if such reels are well-protected by lacquer, enamel, tinning, or other corrosion-resistant finish.

Enclosure materials shall be sufficiently fire-resistive that they will not ignite or emit reactive fumes after heating for four hours at 150°F. Melting and distortion of the enclosure materials after such heating shall not damage or prevent the film from being removed from the enclosure.

Plastics and lacquers that might give off reactive fumes or emissions during storage shall not be used. Suitable plastic enclosure materials are photographic film support material such as uncoated polyester or cellulose acetate. Highly plasticized sheetings or coatings shall not be used. The plastics must be free of peroxides.

The use of rubber bands, tape, paper strips, etc. for fastening film onto reels or cores is prohibited. The materials used shall not ignite, decompose, or develop reactive fumes or vapors. Film on reels may be confined by tucking the film end between the roll and the flange.

39.06: continued

All adhesives shall meet the standards of ANSI IT 9.2.

(2) Storage Containers. The film shall be packaged either in chemically stable containers of metal or inert plastic of proven quality or paper-board boxes of low acidic composition. Plastics and lacquers that might give off reactive fumes or emissions during storage shall not be used. The plastics must be free of peroxides. All containers and adhesives shall meet the standards of ANSI IT 9.2. Containers shall be sealed when necessary to maintain prescribed humidity limits or to protect the film against gaseous impurities. If proper temperature and humidity are maintained as prescribed in 950 CMR 39.06(4), and if there is good ventilation and clean air in the storage area, the containers need not be sealed. Each container shall be properly labeled with the series title, reel numbers, and number of documents (where possible). All inks used for labeling shall pass the photographic activity test outlined in ANSI IT 9.2.

(3) Storage Housings. Microfilm shall be stored in closed housings such as drawers or shelving units equipped with doors, unless the film is in closed containers, in which case open racks and shelves may be used. Storage housings shall be noncorrosive and noncombustible. Air conditioning or ventilation shall be provided in accordance with ANSI IT 9.11.

(4) Storage Facilities. All original film shall be housed in clean, dust-free, environmentally controlled circumstances affording the maximum in security. All storage areas shall be constructed and maintained in accordance with *Processed Safety Photographic Film - Storage*, ANSI IT9.11.

Heat and humidity can deform the film base and weaken the emulsion. Since the emulsion is an organic product, mold growth can also occur. The average relative humidity in areas in which first generation, master film is stored shall be between 20% and 30% with daily fluctuations not to exceed 5%. Temperature shall not exceed 70°F. with lower temperatures providing better keeping characteristics.

Storage areas shall be equipped with air filters since air-entrained impurities, in the form of particulates, can cause abrasion of the film and certain fumes may react with the film to degrade the image.

First generation, master film shall be stored in fire resistant safes or vaults. Safes shall be UL Class 150 rated four hours. Vaults shall provide protection equivalent to ANSI/NFPA 232 except that provision for air-conditioning shall be made in accordance with ANSI IT9.11. Except in fire resistant buildings, all safes shall be on ground-supported flooring.

39.07: Inspection

Regular procedures for the periodic inspection of film shall be followed. These procedures are the responsibility of the custodian of the records, except that the State Records Center will have the responsibility for inspecting the film stored in its vault.

(1) Inspection Procedure. At approximately two-year intervals, a randomly selected sample of one hundred microforms (i.e., rolls, fiche, aperture cards, etc.) or one tenth of one per cent of the collection, whichever is greater, shall be inspected. For any collection of less than 100 microforms of microfilm, the entire collection must be inspected. For each biennial inspection a different lot sample shall be chosen, allowing some overlapping to note any changes in previously inspected samples.

Sampling and inspection shall be as described in *Recommended Practice for Inspection of Stored Silver-Gelatin Microforms for Evidence of Deterioration*, ANSI/AIIM MS 45.

The film shall be inspected for microbial growths, residual processing chemicals, excessive brittleness, film curl or discoloration, evidence of separation of the emulsion from the base ("blocking or fused film"), adhesion of the emulsion, base shrinkage and the presence of redox blemishes. A re-reading of resolution test targets and a remeasurement of the film density shall be made. Cans, boxes or reels used to store the film shall also be inspected for evidence of rust, corrosion and other deterioration.

Additional samples of any lot of film rated as in fair condition shall be inspected and the entire lot of any film rated as poor or bad shall be inspected.

39.07: continued

(2) Inspection Reports. On the basis of inspections, reports shall be prepared and filed regularly with the Supervisor of Public Records. Reports shall include:

(a) quantity and identity of microfilm on hand;

(b) quantity and identity of microfilm inspected;

(c) condition of the microfilm;

(d) corrective action required if necessary.

In the case of film stored at the State Records Center, the State Records Center shall report to the agency having custody, the condition of any of its film that has been inspected.

(3) Deteriorating Film. If deterioration is found among the microfilm of permanent records, a more extensive inspection shall be undertaken to locate all deteriorating film. A silver duplicate shall be prepared to replace all deteriorating film. A silver duplicate shall be prepared to replace all film rated as poor or bad.

(4) Short-term Records. Inspection of the microfilm of records with a retention period of less than 15 years is recommended but not required.

REGULATORY AUTHORITY

950 CMR 39.00: M.G.L. c .66, §§ 1, 3, 8, 8A, 11.