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# MANAGEMENT DIRECTIVE

210.8  
Amended  
Number

## COMMONWEALTH OF PENNSYLVANIA GOVERNOR'S OFFICE

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Subject:

Micrographics Procedures to be Used in Conjunction With Central Microfilm Management

By Direction Of:



Fritz Bittenbender, Secretary of Administration

Date:

November 18, 2002

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This directive contains procedures to be used in conjunction with *Management Directive 210.4, Central Microfilm Management*. This amendment reflects organizational changes at the Historical and Museum Commission.

1. **PURPOSE.** To establish procedures to ensure the accuracy, usability, longevity, and legal acceptance of microforms generated by agencies subject to *The Administrative Code of 1929*.

2. **SCOPE.** This directive applies to all agencies covered by *The Administrative Code of 1929*. Legislative and judicial agencies and other executive branch agencies are invited to comply with policy and procedures outlined in this directive.

3. **POLICY.** The standards relate to the filming, processing, inspection, handling, and storage of microform copies of records of executive branch departments, boards, and commissions. They must be included as part of the requirements in all microfilm service contracts. With minor exceptions, these standards are in strict conformance with the American National Standards Institute (ANSI) and the Association for Information and Image Management (AIIM) standards and practices. Computer output microforms produced by bit map image capable devices are covered by the standards. Color films are not covered by the standards. This directive should be used in conjunction with *Management Directives 210.4, Central Microfilm Management*, and *210.5, Records Management*, and other related *Management Directives* and *Information Technology Bulletins*.

4. **DEFINITIONS.** (See Enclosure 1 for a complete listing of the Definitions.)

5. **RESPONSIBILITIES.**

a. **Division of Records Administration and Image Services (DRAIS), Historical and Museum Commission (PHMC)**, will provide technical advice and assistance to agencies engaged in, or contracting for, the microfilming of government records.

b. **Heads of agencies** will ensure compliance with all micrographics standards.

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## 6. PROCEDURES.

**a. When a microform copy is to serve as, or in place of, the original record or to serve as a security copy of the original record, the following general standards shall apply:**

(1) Microimages, including the generation intended for use by office staff or the general public, should contain all of the recorded information shown on the originals and shall be able to serve the purpose for which the original records were created or maintained. Microimages should be free of obstructions, shadows, or glare which impair the legibility of a document.

(2) Microimages of the records must be arranged, identified, and indexed so that any individual document or component of the records can be located with reasonable ease.

**b. Creation of archival security microfilm copies of permanent records.**

(1) All state agencies, boards, or commissions covered by *The Administrative Code of 1929*, engaged in, or contracting for, the microfilming of permanent records must provide for the creation of an archival security microfilm copy of such records.

(2) Permanent records are those scheduled for permanent retention by the creating/administering agency or appraised as being permanently valuable by the Historical and Museum Commission's Division of Archival and Records Management Services (DARMS).

(3) An archival security microfilm copy is a copy which is created, used, inspected, and stored in conformance with standards for archival security microfilm.

(4) The original camera film (Master Negative) of records scheduled for permanent retention should never be used for reference purposes and should normally be designated as the archival security microfilm copy. Silver-gelatin duplicate negatives or silver-gelatin duplicate positives that meet appropriate standards may serve as the security copy, if necessary. If the original camera film is to be jacketed or cut for aperture cards, an uncut duplicate roll of silver halide film that meets the appropriate standards for security film should be made and designated as the official security copy. State agencies employing systems that do not produce an original silver-gelatin microfilm which meets permanency standards should make a silver-gelatin duplicate negative or silver-gelatin duplicate positive which meets these standards.

**c. Film stock, processing, and quality standards for archival security microfilm copies.**

(1) **Film Stock.** Safety photographic film as specified in *ANSI/NAPM IT9.1* and *ANSI/NAPM IT9.6* having a maximum life expectancy (LE) rating of 500.

(2) **Density.** Background densities of negative-appearing archival security microfilm copies shall, where possible, be between 0.9 and 1.2. In certain instances, some poor-contrast documents may require lower densities in order to make the entire image legible and reproducible as mentioned in *ANSI/AIIM MS23-1998, Practice for Operational Procedures/Inspection and Quality Control of First-Generation Silver-Gelatin Microfilm of Documents*. Densities of computer output microfilm produced by bit map image capable devices should be adequate and uniform. All information must be reproduced accurately and completely so that its use will not be impaired. Computer output microforms produced by bit map image capable devices must meet all appropriate density standards. Background density on positive-appearing negative camera film shall not exceed 0.35. The density of silver duplicate positives designated as the security copy shall be between 0.04 and 0.20 where possible. Background density of Computer-Output Silver-Gelatin (1N) Microfilm (full reversal) shall, where possible, be between 1.5 and 1.8 (1.8 preferred).

**(3) Base-plus-fog density.** The base-plus-fog density of unexposed, processed, clear-based film should not exceed 0.10. When a tinted-base film is used, the density will increase by 0.10 or 0.20 which must be added to the 0.10 value. The use of tinted, high fog base films is not recommended.

**(4) Resolution.** A minimum resolution of 90 lines per millimeter must be obtained regardless of reduction ratio used or the type of camera used, and the 4.0 pattern should be resolved. In cases where computer output microforms are produced by bit map image capable devices, measurement of resolution and quality of the film is in dots per inch (dpi). Computer output microforms must meet all appropriate resolution standards to assure that a paper print made from the third-generation microfilm copy will be able to serve the same purpose as that for which the original records were created.

**(5) Residual thiosulfate.** Residual thiosulfate ion concentration must be greater than zero but should not exceed 0.014 grams per square meter in a clear area in accordance with *ANSI/NAPM IT9.1-1996*.

**d. Identification and technical targets for source document microfilming.**

**(1)** All roll microfilm must include targets which adequately identify the records and targets needed to check for compliance with resolution requirements. A blank, white sheet of paper should be photographed at the beginning of each roll to test the uniformity of the illumination and the cleanliness of the camera's optical system. Resolution test targets should be filmed near the beginning and end of each roll. Targets used must be either the NIST SRM 1010A Microcopy Resolution Test Chart or an equivalent for planetary cameras such as the AIIM X303 test chart and the AIIM X112 (plastic target) or AIIM X113 (paper target) or their equivalents for rotary cameras. Do not use photostatic or electrostatic copies of resolution charts.

**(2)** Identification targets must state the name of the executive branch department, board, commission, or agency; title of the records custodian responsible for the records at the time of filming; reduction ratio; and record series title, dates, and such volumes or serial numbers needed to clearly identify the records. Each roll should end with a declaration by the camera operator. The declaration must include the operator's signature, date the declaration was filmed, and restatement of records filmed. Retakes and retake targets should normally be spliced onto the beginning of the roll in which the errors occurred, preceding the start target. The use of intelligent/blip encoded microfilm may necessitate the use of different retake procedures.

**(3)** Filming sequence should be:

**(a)** blank white sheet of paper;

**(b)** start target;

**(c)** roll number target;

**(d)** resolution test target;

**(e)** reduction ratio target;

**(f)** state agency and record series identification target(s);

**(g)** if applicable, "continued from preceding roll" target-instances where volume is filmed on more than one roll;

**(h)** the text;

(i) if end of book, film "end of volume" target – if not end of volume, but end of roll coming, film "continued on next roll" target;

(j) if end of roll, film the declaration by the camera operator, the resolution target, and the "end of roll" target.

**e. Splices.** Splicing of archival security microfilm rolls should be avoided, but if splicing is necessary, care should be taken to keep the number of splices to a maximum of four per roll. Ultrasonic splicing meets standards for polyester base film.

**f. Quality control practices and procedures.**

- (1) Procedures to be followed in establishing and operating a microfilm quality control program
- should conform to appropriate recommendations contained in *ANSI/AIIM MS23-1998, Practice for Operational Procedures/Inspection and Quality Control of First-Generation Silver-Gelatin Microfilm of Documents*. Each camera negative should be checked for proper identification targets, density, resolution, and visual defects.

(2) The ability of archival security microfilm copies of permanent records to serve as a substitute for the original records shall be adequately confirmed and documented. Quality control logs for such film must be maintained to document adherence to standards. At a minimum, quality control logs should verify the following:

(a) Images are legible and can serve the purposes for which the original records were created or maintained.

(b) Roll film contains all required informational and declaratory targets.

(c) Density readings were taken on a blank white sheet of paper at the beginning of the roll, and, at a minimum, on the background of document images at the beginning, middle, and end of each roll.

(d) A base-plus-fog density reading (Dmin) for each roll.

(e) The number of the pattern resolved from a reading of the resolution test chart.

(f) The reduction ratio on each roll.

- (g) Methylene blue tests are being done on a regular basis. Testing should be done by an outside laboratory at least once a month. Appropriate sample strips must be inspected within 14 days after processing. Certificates from the laboratory, documenting that the microfilm passed the methylene blue test, should be maintained along with the quality control logs. The certificates should include the name of the agency whose film was processed, processing date, date of methylene blue test, test results, processor used, and the signature of the person who did the test. Standard quality control log forms are available through the Historical and Museum Commission's Division of Records Administration and Image Services. Logs in any other format must be preapproved by that division.

**g. Formats and headings for unitized microfilm systems (aperture cards, microfiche, and jacketed film).** Unitized microfilm system records should be designed and administered so that the resulting microfilm file is an accurate representation of the original records. Any indexes, registers, or other finding aids should be microfilmed and located in a readily identifiable place within the collection of microfilmed records. Formats for microfiche should conform to *ANSI/AIIM MS5*. The data on heading or title areas on all microforms should be legible without magnification. The data should conform to *ANSI/AIIM MS19*.

**h. Computer Output Silver-Gelatin (1N) Microfilm procedures.** COM programs should conform to standards set down in *ANSI/AIIM MS1-1996*. Density of Computer Output Microfilm should be between 1.5 and 1.8 (full reversal).

**i. Storage-conditions for archival security microfilm copies of permanent records.** The security copy should be stored and inspected in conformance with *ANSI/NAPM IT9.11-1993*, *ANSI/NAPM IT9.2*, and *ANSI/AIIM MS45*.

(1) **Maximum** temperature should not exceed 21 degrees Celsius (69.8 degrees Fahrenheit) with a variation of no more than three degrees Celsius (five degrees Fahrenheit) within a 24-hour period.

(2) Relative humidity of 20 percent to 30 percent. Cycling of relative humidity should be no greater than plus or minus five percent over a 24-hour period.

(3) Air-conditioning with a filtration system should be utilized to remove gaseous impurities.

(4) Facility should provide protection from fire, theft, and natural disaster.

(5) The security microfilm copy should be maintained in a separate building from the user copy.

(6) Film should be stored in closed containers made of an inert material such as plastic, acid-free paper, or nonferrous metals. Cores or reels should be noncorroding such as plastic compounds or nonferrous metals. Rubber bands should not be used to fasten film onto reels or cores.

(7) Security copy should not be stored with non-silver film.

(8) As appropriate, a sampling of randomly selected microforms should be inspected in conformance with *ANSI/AIIM MS45*. For each inspection period, a different lot should be chosen allowing some overlap to note changes in previously inspected microforms.

**j. Security copies of vital and long-term records.** The security microfilm copy of long-term records should be created and stored in conformance with standards for archival security microfilm copies of permanent records.

(1) The following sections under **6., Procedures**, are applicable to long-term records: Sections a., b., c., d., e., f.(1), g., h., and i.

(2) Long-term records are any records that need to be maintained for more than 10 years either in the original or microfilm copy. Security microfilm copies of vital records should be stored, when appropriate, in conformance with standards for long-term and permanent records.

(3) All security microfilm copies of vital records, regardless of retention periods, should be stored in a separate building from the user copy.

**k. Security copies of short-term records.** Short-term records are defined as records that require retention for 10 years or less as determined by an approved agency records retention and disposition schedule. Silver halide or other films are acceptable as the camera film. Film must be processed in accordance with applicable *ANSI/AIIM* standards for their particular film types.

The following sections under **6., Procedures**, are applicable to short-term records: Sections a., c.(2), (3), and (4), d., and f.(1).

**I. Reference copies of microforms.** The standards relating to the film stock, processing, use, and storage of archival security microfilm copies of permanent records do not apply to reference, user, or additional duplicate copies. These copies may be on film types other than silver-halide, safety base film but must be processed in accordance with applicable *ANSI/AIIM* standards for their particular film types.

Sample targets, the standard quality control log form, a suggested sequence for roll microfilm, and information on obtaining appropriate copies of government and industry standards can be obtained by contacting the:

- Historical and Museum Commission  
Division of Records Administration and Image Services  
State Document Image Services Center
- Telephone: 717-787-2181

OR; for U.S. Mail:

1825 Stanley Drive  
Harrisburg, PA 17103

**Enclosure:**

1 – Definitions

**This directive replaces, in its entirety, Management Directive 210.8, dated June 16, 2000, which should be recycled.**

## DEFINITIONS

**AIIM.** Association for Information and Image Management. Trade association and professional society for the micrographics, optical disk, and electronic image management markets.

**ANSI.** American National Standards Institute. ANSI is a voluntary nonprofit consensus standards organization which coordinates private sector standards activities and serves all industries and users in the United States. ANSI is the primary interface with the U.S. Government on matters relating to standards and is the recognized representative to the International Organization for Standardization (ISO).

### **Aperture card.**

- (1) A card with a rectangular opening(s) specifically prepared for the mounting or insertion of microfilm.
- (2) A processable card of standard dimensions into which microfilm frames can be inserted.

**Archival quality.** The ability of a processed print or film to retain its original characteristics for up to 500 years (See Life Expectancy [LE] Rating). The ability to resist deterioration.

**Base.** Transparent plastic material, usually of cellulose triacetate or polyester, upon which a photographic emulsion or other material may be coated.

**Book cradle.** A device which holds a large bound book open and flat during filming with a planetary camera.

**Camera microfilm.** First generation microfilm; also called the master film.

**Camera-processor.** A device which performs both filming and processing within one unit.

**Cartridge.** A container enclosing processed microforms, designed to be inserted into readers, reader-printers, and retrieval devices. When applied to roll microfilm, it describes a single-core device.

### **Cassette.**

- (1) A double core container enclosing processed roll microfilm, designed to be inserted into readers, reader-printers, and retrieval devices.
- (2) A lightproof container of rigid metal or plastic containing film for daylight loading in cameras.
- (3) A container for magnetic tape.

**Cellulose ester.** A film base composed mainly of cellulose esters of acetic, propionic, or butyric acids, or mixtures thereof.

**Cine mode.** Vertical mode.

(1) The arrangement of images on roll microfilm in which the lines of print or writing are perpendicular to the length of the film for horizontal script and parallel for vertical script.

(2) The arrangement of images on a microfiche in which the first microimage is in the top left-hand corner of the grid pattern and succeeding microimages appear in sequence from top to bottom and in columns from left to right.

**Comic mode.** Horizontal mode.

(1) The arrangement of images on roll microfilm in which the lines of print or writing are parallel to the length of the film for horizontal script and perpendicular for vertical script.

(2) The arrangement of images on a microfiche in which the first microimage is in the top left-hand corner of the grid pattern and succeeding microimages appear in sequence from left to right and in rows from top to bottom.

**Computer-Output Microfilm (COM).** Microforms containing data produced by a recorder from computer-generated electrical signals.

**Densitometer.** A device used to measure the optical density of an image or base by measuring the amount of light reflected or transmitted.

**Density.** The light-absorbing quality of a processed photographic image.

**Diazo film.** A slow print film, sensitized by a coating of diazonium salts which, subsequent to exposure to light and development, forms an image. Diazo film generally produces nonreversed images; i.e., a positive image will produce a positive image and a negative image will produce a negative image.

**Dots per inch (dpi).** Measure of output device resolution and quality, e.g., number of pixels per inch on display device. Measures the number of dots horizontally and vertically.

**Dry-process silver film.** A nongelatin silver film that is developed by application of heat.

**Duplicate.**

(1) A copy of a microform made by contact printing or by optical means.

(2) To make multiple copies of a document or microfilm, usually with the aid of the master film or intermediate copies.

**Emulsion.** A single- or multi-layered coating consisting of light-sensitive materials in a medium carried as a thin layer on a film base.

**Exposure.**

(1) The act of exposing a sensitive material to light/radiant energy.

(2) The time during which a sensitized material is subjected to the action of radiation.

(3) The product of radiation intensity and the time during which it acts on the photo-sensitive material.

**Eye loupe (measuring magnifier).** A hand-held magnifying glass with a power of 6x to 15x.

**Generation.** One of the successive stages of photographic reproduction. The first generation is the camera film. Copies made from this first generation are second generation, etc.

**Hardcopy.**

- (1) An enlarged reproduction from a microform usually on paper.
- (2) A printed copy of machine output in a readable form, e.g., output from a computer printer.

**Image.** A representation of information produced by light/radiant energy.

**International Organization for Standardization (ISO).** Produces standards or recommendations, including those that impact the information technology field, which are the result of free and open agreement among nations. Its purpose is to coordinate standardization efforts and encourage cooperation in economic, intellectual, technological, and scientific endeavors.

**Jacket.** A flat, transparent, plastic carrier with single or multiple film channels made to hold single or multiple microfilm images.

**Life Expectancy rating (LE rating).** The life expectancy of film when stored under specified storage conditions. For example, film with an LE rating of 100 would have an estimated life expectancy of 100 years when stored under recommended storage conditions.

**Light box.** A device for inspecting film that provides diffused illumination evenly dispersed over the viewing area.

**Master film.** Any film, but generally the camera microfilm, used to produce further reproductions, such as intermediates or distribution copies.

**Methylene blue.** A chemical dye formed during the testing of archival permanence of processed microimages using the methylene blue method.

**Microfiche.** A transparent sheet of film with microimages arranged in a grid pattern.

**Microfilm.**

- (1) A fine-grain, high-resolution film used to record images reduced in size from the original.
- (2) A microform consisting of strips of film on rolls that contain multiple microimages.
- (3) To record microphotographs on film.

**Microform.** A form, usually film, which contains microimages.

**Micrographics.** Refers to the techniques associated with the production and handling of microfilm, microfiche, and related storage technologies based on retaining a photographic representation on film.

**NAPM.** National Association of Photographic Manufacturers, Inc.

**Negative-appearing image.** An image in which the lines and characters appear light against a dark background.

**Planetary camera.** A type of microfilm camera in which the document being photographed and the film remain in a stationary position during the exposure. The document is on a plane surface at the time of filming. Also known as a flatbed camera.

**Polarity.** The change or retention of the dark to light relationship of an image, i.e., a first generation negative to a second-generation positive indicates a polarity change, while a first generation negative to a second-generation negative indicates the polarity is retained.

**Polyester.** A transparent plastic made from polyesters and used as a film base because of its dimensional stability, strength, resistance to tearing, and relative nonflammability.

**Positive-appearing image.** An image in which the lines and characters appear dark against a light background.

**Processing.** A series of steps involved in the treatment of exposed photographic material to make the latent image visible and ultimately usable, e.g., development, fixing, washing, and drying.

**Redox blemish.** A microspot formation on silver-gelatin type films caused by air pollution, improper packaging, or storage conditions. Synonymous with aging blemishes, measles, microspots, and red spots.

**Reduction ratio.** The relationship (ratio) between the dimensions of the original or master and the corresponding dimensions of the microimage; e.g., reduction ratio is expressed as 1:24.

**Residual thiosulfate ion.** Ammonium or sodium thiosulfate (hypo) remaining in film or paper after washing. Synonymous with residual hypo.

**Resolution.** The ability of a photographic system to record fine detail.

**Resolving power.** The numeric expression of the ability of an optical or photographic system to distinguish or separate two entities spaced close together. In micrographics, it is the product of the number of the resolution test pattern resolved in the image multiplied by the reduction and is expressed in line pairs per millimeter.

**Roll microfilm.** Microfilm that is or can be put on a reel, spool, or core.

**Rotary camera.** A type of microfilm camera that photographs documents while they are being moved by some form of transport mechanism. The document transport mechanism is connected to a film-transport mechanism, and the film also moves during exposure so there is no difference in the rate of relative movement between the film and the image of the document.

**Safety film.** A comparatively nonflammable film support (base) that meets ANSI requirements for safety film.

**Silver film.** A photographic film containing photosensitive silver compounds suspended in a suitable material. When developed, the image consists of metallic silver.

**Silver halide.** A compound of silver and one of the following elements known as halogens: chlorine, bromine, iodine, and fluorine.

**Splice.** A joint made by cementing, taping, or welding (heat splice) two pieces of film or paper together so they will function as a single piece when passing through a camera, processing machine, viewer, or other apparatus.

**Step-and-repeat camera.** A type of microfilm camera that can expose a series of separate images on an area of film according to a predetermined format, usually in orderly rows and columns, e.g., microfiche.

**Target.**

(1) Any document or chart containing identification information, coding, or test charts.

(2) An aid to technical or bibliographic control that is photographed on the film preceding or following the document.

**Vesicular film.** A film in which the light-sensitive component is suspended in a plastic layer. On exposure, the component creates optical vesicles (bubbles) in the layer. These imperfections form the latent image which becomes visible and permanent by heating the plastic layer and then allowing it to cool.