

**Washington State Standards
For the Production
And Use of**

MICROFILM

**Adopted by the State Archivist
In accordance with the provisions of
RCW 40.14**

Revised December 2012
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Note to public officials from the State Archivist of Washington:

This revision of the Washington State Standards for Microfilm describes the minimum standards that must be adhered to in the selection, preparation, storage, and handling of film intended to be security or preservation copies of public records. The standards must apply to “in-house” operations, as well as to all work committed to external service bureaus. Specific authority to establish these standards is assigned to the State Archivist under RCW 40.14.020, section (6) subsection (a).

We strongly recommend:

- 1) These microfilm standards should be cited and incorporated into the language of all contractual arrangements with vendors of microfilm services.**
- 2) All agencies should store the first generation silver halide film, original film, or master copy of their microfilm with the State Archives for safe-keeping. This service is provided by the Archives to all state and local government agencies, at no additional cost.**

Note to microfilm service providers: These standards set the minimum requirements for microfilming the permanent and essential public records of Washington State, and apply to all agencies and political sub-divisions of state and local government. In contracting to film archival, essential, and permanent public records, **vendors must guarantee in writing that the standards will be met.** The technical standards described and cited herein apply to the production, processing, inspection, storage, and handling of all microfilm intended to serve as a copy of archival, essential, or permanent records.

Further information: Contact the Washington State Archives regarding the use of this standard or for storing film with the Archives; Security Microfilm-email: securitymicrofilm@sos.wa.gov, 360-753-0740, or Imaging Services-email: imagingcustomerservice@sos.wa.gov, phone: 360-586-0108.

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SUMMARY OF MAJOR CHANGES AFFECTING ALL SECTIONS – EFFECTIVE DECEMBER 2012 –

REVISION GOALS & OVERVIEW

The 2008 revision of the standard contained an entirely new section dedicated to digitally created film. This section covered virtually every topic elsewhere in the standard, creating duplications and inconsistencies. This standard aims to merge the digital and camera sections together.

This standard features several new and expanded sections covering topics including proper splicing techniques, resolution chart guidelines for digital film, and film storage requirements. Also gone are several sections noted below.

CHANGES AFFECTING ALL SECTIONS

Updated State Archives contact information and references to ANSI or ISO standards.

Merged or removed duplicative camera and digital film sections, eliminating redundant sections and conflicting guidelines.

Removed the term “camera microfilm.” This has been replaced in many cases with “microfilm” to clarify that a given guideline is applicable to camera and digital film.

CHANGES BY SECTION

Introduction:

Added note that the State Archives provides microfilm storage services to state and local government agencies.

Updated RCW citation giving the State Archivist the authority to issue the standards.

Definitions (Section 1):

Removed “Direct Microfilm” definition.

Film Base and Emulsion Material (Section 3):

Removed working copy microfilm life expectancy recommendations.

Document Preparation: (Section 4):

Added note that records and files consisting of multiple pages should not be separated on two different rolls.

Microfilm Identification (Section 5):

Added requirement that any record types not filmed, such as post-it notes, photographs, over-sized documents, etc., be described on a separate “Exclusion (Weeding) Policy” target.

Emphasized that reference targets are required.

Film Container Identification (Section 6):

Added requirement that film base and emulsion type be listed on the film container.

Removed requirement that the height of the lower case “e” be listed on the film container.

Reduction Ratio (Section 7.1):

Merged digital and camera reduction ratio sections. Also, merged oversized document and engineering drawing sections.

Resolution (Section 7.2):

Added requirements for digital resolution targets and guidelines for reading resolution targets on digitally produced film.

Modified the resolution requirements for the camera filming of oversized documents. The 120 lines per millimeter standard only needs to be met in the center pattern, not in all of the corners of the resolution chart.

Removed use of Quality Index Method section.

Density (Section 7.3):

Increased range of acceptable density readings from 1.00-1.20 to 0.90-1.30 to conform with international standards.

Post-filming Inspection (Section 7.10):

Added requirement for defective film to be fixed prior to shipment to the State Archives.

Added “**Important Note:** It is the agency’s responsibility to ensure that film meets post-filming inspection requirements. Film not meeting these standards may not be admissible in court.”

Splicing: (Section 8):

Added requirement that *only retakes* may be spliced onto a roll.

Added requirement that records spliced onto a roll must be clearly identified on the box label and that splices must have the same beginning and end targets specified in Section 5.1

Added requirement that splices must be at the beginning of the roll.

Added note that the number of splices on a roll should be kept to a minimum to ensure court admissibility.

Added: “**Note:** In essence, each splice is its own roll, and targets and guide sheets ensure the splice can be inspected for quality and authenticity. Splices not meeting state standards may not be admissible in court.”

Digital to Microfilm Conversion (Section 7.8)

Updated and moved Resolution Test Target requirements to Resolution section.

Removed Introduction, Blip Coding, Annotation, Print Test, Targets, Splicing, Skew, Imaging Contrast, Microfilm Type, and Density sections.

Moved and merged Reduction Ratio and Page Size vs. Film size guidelines with the Reduction Ratio section.

Moved Page Spacing, Page Orientation, Film Polarity, and Indexing sections.

Storage Containers (Section 9.1):

Clarified paper film box requirements.

Added “**Note:** Unprocessed plastic film containers do not meet these standards.”

Film Storage (Section 9.2):

Added note that silver halide film must not be stored in the same area as diazo film.

Working Copy Films Storage:

Removed entire section.

Custody of Microfilms/Security Storage (Section 9.3):

Added requirement for a transmittal to accompany all film sent to the State Archives for storage.

Film Handling and Film Maintenance /Inspection (Section 10):

Clarified use of gloves for handling guidelines.

Removed requirements for the inspection of Working Copies of film.

Disposition of Microfilm (Section 11):

Changed: Text simplified to bring it into line with current State Archives procedures.

Microfilm Program, Materials and Systems Approval:

Removed entire section.

Available Microfilm Services (Section 12):

Updated list of services offered by State Archives, Imaging Services.

Appendix 2: Sample Microfilm Targets:

Updated layout of some guide sheets and added an example of exclusion (weeding) policy and reference point targets.

Appendix 3: List of Agency Forms:

Removed entire section.

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Washington State Standards for the Production and Use of Microfilm

Adopted by the State Archivist in accord with the Provisions of Chapter 40.14 RCW.

In all microfilm applications intended to produce security or preservation microfilm copies of public records, the following minimum standards shall be adhered to in the selection, preparation, storage, and handling of film. Said standards must apply to "in-house" operations, as well as to all work committed to external service bureaus.¹

1 DEFINITIONS

- 1.1 Public Records** - The term 'public records' includes any paper, correspondence, completed form, bound record book, photograph, film, sound recording, map drawing, machine-readable material, compact disc meeting current industry International Organization of Standardization (ISO) specifications, or other document, regardless of physical form or characteristics, and including such copies thereof, that have been made by or received by any agency of the state of Washington in connection with the transaction of public business, and legislative records as described in RCW 40.14.100."
- 1.2 Essential Records** - Essential records are records essential to: 1) the resumption and/or continuation of operations; 2) the re-creation of the legal and financial status of the agency; or 3) the fulfillment of obligations to the public, and local, state and federal governments.²
- 1.3 Permanent Records** - Permanent records are those records required by law or regulation to be retained indefinitely by the office or agency of origin. Records designated as permanent are identified on approved records retention schedules. Primary copies of the records must be retained by the agency.
- 1.4 Archival Records** - Archival records are those records identified by the State Archivist, or designee, as possessing sufficient legal or historic value to be retained indefinitely. Records designated as archival must be approved as such by the State or Local Records Committee and will be so identified in an approved records retention schedule.
- Note:** Some records may meet all of the above definitions for essential, permanent, or archival records. For further clarification contact the State Archives.
- 1.5 Digital Microfilming** - Digital Microfilming refers to creating microfilm from digital images.
- 1.6 Security Microfilm** - Security microfilm refers to microfilm that is produced with the explicit purpose of creating a secure, off-site backup to original public records officially identified as essential or permanent. The film is also produced with the specific intent of storing the first generation or master

¹ The standards and procedures set forth herein are based upon American National Standards Institute/Association for Information and Image Management MS48-1999 (*Recommended Practice for Microfilming Public Records on Silver-Halide Film*). Additional specific standards are cited when relevant.

² On designating records as *essential*, see RCW 40.10.

negative at the State Archives, apart from the original records or working copy microfilm.

1.7 Preservation Microfilm - Preservation microfilm refers to film that is intended for use in the preservation of archival records, particularly where the records are deteriorating or in danger of loss.

Note: Both security and preservation microfilm must be manufactured, processed, and stored in accordance with national standards to achieve an LE-500 rating.³ The life expectancy of all microfilm is largely dependent upon:

1. Film Type
2. Photographic Processing
3. Storage Conditions and Handling

2 MICROFILM QUALIFICATIONS

Microfilm may qualify as *security*, *preservation*, or *working copy*, depending on the retention value of the source documents to be filmed and/or the intended use of the resulting microfilm.

2.1 Security Microfilm or Preservation Microfilm is produced for those records that are officially designated as essential, permanent, or archival, according to the definitions outlined above.

2.2 Working Copy Microfilm, also referred to as the reference, use or service copy, is microfilm designated for everyday use and reference purposes. Working copy microfilm may be produced 1) as a copy of a security or preservation microfilm master or printing negative, or 2) as a first- or second-generation film where the filmed records are not of permanent value and are filmed for the purpose of active reference use for a period not to exceed six years.

Note: *If multiple working copies of security or preservation microfilm will be needed, it is recommended that the production of such microfilm conform to a three-generation system as noted in section 7.1 of ANSI/AIIM MS48-1999 (Recommended Practice for Microfilming Public Records on Silver-Halide Film).*

Such a system consists of an original negative, also called "master negative"; a second-generation copy of the negative, also called "duplicate negative," "printing master," or "printing negative," to be used for producing additional copies; and one or more third-generation working copies produced from the second-generation film.

3 FILM BASE AND EMULSION MATERIAL

3.1 Original Film

Film base material for all microfilm records shall be durable and sufficient for the definition of that record as an original. All such film stock shall

³ The term LE (life expectancy), refers to the minimum number of years for which information may be retrieved without significant loss. In the case of LE-500, it is 500 years. See ISO 18901:2010 (*Imaging materials - Processed Silver-Gelatin-Type Black-and-White Films - Specifications for Stability*) for a more detailed explanation.

conform to the standard stated in ANSI/ISO 543-1995 (*Photographic Films - Specifications for Safety Film*).

All security or preservation microfilm must be produced on polyester-base film manufactured to achieve an LE-500 rating. Acetate-base films are not acceptable for security or preservation microfilm.⁴

Film emulsion material for security or preservation microfilm must be of the silver-halide type. Such film will comply with the minimum standards of quality as set forth in ISO 18901:2010 (*Imaging materials - Processed Silver-Gelatin-Type Black-and-White Films - Specifications for Stability*).

Note: Agencies using microfilm systems that do not produce an original silver gelatin film that meets the standard for security microfilm must make a silver gelatin duplicate negative or positive that does meet the standard before depositing such film for security storage at the State Archives.

3.2 Working Copy Film

Working copies for reference or daily use may be of the silver halide, diazo, or vesicular composition, although diazo is recommended.

3.3 Film Generations

1. First Generation - Master or Original (silver halide)
2. Second Generation - Reproduction microfilm made from first-generation microfilm (silver halide, diazo, or vesicular)⁵
3. Third Generation - Reproduction microfilm made from second-generation microfilm (silver halide, diazo, or vesicular)
4. Fourth Generation - Reproduction microfilm made from third-generation microfilm (silver halide, diazo, or vesicular)

4 DOCUMENT PREPARATION

4.1 Preparation

Proper care should be taken in the preparation and arrangement of original records for filming to ensure that a true, accurate, and complete reproduction is made.⁶

Remove all staples, paper clips, attachments, etc., before document filming.

⁴ Polyester base is also referred to as "poly (ethylene terephthalate)." Acetate base is also referred to as "cellulose ester," and includes cellulose acetate, cellulose acetate propionate, and cellulose acetate butyrate. See ANSI/ISO 543-1990 for a further discussion of base types.

⁵ When using the three generation system as described in the note below section 2.2, the second generation, or printing master in this case, must be made of silver halide type film.

⁶ Restoration or repair of documents determined to be of historical value will be in accord with procedures established by the State Archives.

Mend tattered or torn documents prior to filming to eliminate camera or scanner malfunctions and filming errors to protect the original records against further damage.⁷

Eliminate creases or folds in the documents by pressing or flattening, either mechanically or manually, to prevent shadows, risk of damage to the document, or camera or scanner malfunction.

Pages of post-bound volumes may be removed for filming provided that they are replaced without damaging the book. Sewn volumes of historical value must be filmed in such a manner so as not to break or destroy the bindings.⁸

4.2 Arrangement

Source documents shall be arranged and filmed in a manner consistent with their customary reference and use, or as specified by the agency of record.

Note: Although maximizing the number of images on a microfilm roll improves efficiency, records and files consisting of multiple pages should not be separated on two different rolls.

5 MICROFILM IDENTIFICATION

5.1 Film Roll Identification

Eye-readable targets must be filmed at the beginning and end of each roll of film as follows⁹:

- 5.1.1 “Beginning of Roll No.” and “End of Roll No.” targets, before the first and after the last image on the roll.
- 5.1.2 Density Target, 3 sheets of 8 ½ X 11 white paper just after the “Beginning of Roll” target and just before the “End of Roll” target.
- 5.1.3 “Certificate of Authenticity,”¹⁰ to ensure court admissibility. The certificate must indicate whether post-it notes, photographs, oversized documents, etc. were not filmed.
- 5.1.4 “Information” or “Guide Sheet”, describing the records series or inclusive portions found on the roll of film, the beginning and ending index numbers or letters, inclusive dates of records filmed, the type of camera or film scanner, the reduction ratio, date filmed, Disposition Authority Number (DAN), the name of the equipment operator, and the name of the organization performing the work.

⁷ Do not use pressure sensitive adhesive tape. Please consult the State Archives.

⁸ Contact the State Archives if you have any questions or concerns about bound volumes.

⁹ Refer to the Sample Targets at the end of this guide, or call the State Archives to obtain Targets.

¹⁰ The “Certificate of Authenticity” target is not required to meet the standards which are contained in this manual. The target (see Appendix 2 for an example) may be altered or omitted, depending upon the legal requirements as set forth by the office for which the records are being filmed.

5.1.5 “Exclusion (Weeding) Policy,”¹¹ indicates whether post-it notes, photographs, oversized documents, duplicate copies, etc. were not filmed. The purpose of the exclusion policy target is to indicate which, if any, records were excluded in the filming to those viewing the reel.

If the entire record is not filmed, court admissibility may be affected.

5.1.6 Resolution Test Chart filmed at the beginning and end of each roll.¹²

5.2 Reference Point Targets

Flash Targets must be filmed at appropriate reference points, i.e., for each record series, case file, file folder, change of alphabetical category, etc. These targets are critical in locating individual records on a roll and will assist in any digitization projects.

Note: Correct targeting of microfilm is critical to quality control, and lack of proper targets may impact court admissibility.

6 FILM CONTAINER IDENTIFICATION

Roll film containers should clearly identify:

1. The office of record
2. Records series
3. Inclusive file numbers or alphabetical range
4. Inclusive dates
5. Date filmed
6. Roll number
7. Disposition Authority Number (DAN)
8. Inspection results for density, density-minimum, and resolution
9. The reduction used for filming the roll
10. Film Generation (i.e. first or second)
11. Film Base
12. Emulsion Type

7 PRODUCTION AND INSPECTION - QUALITY CONTROL STANDARDS

7.1 Reduction Ratios

The reduction chosen for the microfilm output should be consistent with recommended practices for the filming of permanent records.

¹¹ This target is not required to meet the standards which are contained in this manual. The target (see Appendix 2 for an example) may be altered or omitted, depending upon the legal requirements as set forth by the office for which the records are being filmed.

¹² See section 7.2 of this guide for more information.

- 7.1.1** Reduction ratios for simplex cine or comic mode will vary with the size of the documents and the size of the film. Letter size (8.5"X11") and Legal size (8.5"X14") pages are suitable for 16mm microfilm and should be within the 20:1 to 32:1 reduction range, ideally 24:1. Ledger or Tabloid size (11"X17") pages are best suited for 35mm with a reduction ratio range between 8:1 to 14:1, ideally 12:1.
- 7.1.2** Engineering drawings and oversized documents, such as C size (17"X22"), D size (34"X22") or, E size (35"X44") will be filmed at 15:1, 16:1, 24:1, or 30:1 reductions, depending on size, on 35mm film

Note: The primary goal when choosing a reduction ratio is to provide good clarity and sufficient detail. Space savings on the film should be of secondary consideration. As a general rule, lower reductions serve to provide a better quality image.

7.2 Resolution

- 7.2.1** Each roll must have a photographic image of a standard resolution test card or chart filmed at the beginning and ending of each roll.
- 7.2.1.1** Resolution charts for digital film will conform with ANSI/AIIM MS62-1999 (*Recommended Practice for COM Recording Systems Having an Internal Electronic Forms Generating System - Operational Practices for Inspection and Quality Control*). A chart designed specifically for the film scanner being used is also acceptable (i.e. Kodak's resolution chart for the Archive Writer film scanner may be used for film produced on an Archive Writer).
- 7.2.1.2** Resolution charts for camera film will conform to ISO 3334:2006 (*Micrographics - ISO Resolution Test Chart No. 2 - Description and Use*).
- 7.2.2** These chart images should be used to monitor resolution as filming progresses. The five-line patterns must be read in each corner and in the center of each chart and the lowest resolution reading for the beginning and end chart must be posted to the film container and it is recommended they be posted to a laboratory record.
- 7.2.2.1** For digital films the minimum resolution readings should fall within vendor guidelines for the film scanner (i.e. for the Kodak Archive Writer a reading of 200 or better should be obtained to ensure all fine detail is captured).
- 7.2.2.2** For camera film a minimum resolution reading of 120 lines per millimeter shall be obtained regardless of the reduction ratio type or filming equipment used.

Note: When using a camera to film oversized documents (i.e. of D size (34"X22") or greater), it is not always possible to achieve a minimum resolution reading of 120 lines per millimeter in the corner patterns. Only a reading of 120 lines per millimeter is required from the center pattern.

- 7.2.3** Substandard results for camera and digital film must be reported immediately to the office of record and the camera or scanner station. The cause of the substandard resolution must be identified and corrected prior to further production of filming. All substandard film shall be corrected before shipping to the State Archives for storage.

7.3 Density

- 7.3.1** All film must be optically inspected for density at beginning and end of the roll using a transmission type densitometer designed to measure diffuse density. Test results must be posted to the film container and to the laboratory record. The film production or processing laboratory will immediately advise the office of record of substandard test results. Corrections of unacceptable material should be filmed at the earliest possible time. All substandard film must be corrected before shipping to the State Archives for storage.

7.3.2 Density Standards

D-Minimum:¹³ no greater than 0.10

Background Density:¹⁴ between .90 and 1.30

Note: Paper Photostats, reverse-image documents or records printed on color paper may not produce an acceptable image if filmed at standard densities. Step tests should be taken and hard copy reproductions made from the step test images before filming such documents. The densities of the best of these reproductions should be established as the filming criteria. Experience indicates that a density as low as 0.75 and as high as 1.50 may be required.

7.4 Film Polarity

Negative film is preferred as it is more effective in hiding dust and other foreign material that can become attached to the film and it does a better job of hiding base side film scratches. Because of this, pages scanned from negative film produce cleaner looking images.

¹³ D-Min, or minimum density, is the lowest density obtainable in a processed film as measured in the clear part of the negative on which there is no image.

¹⁴ Background density, or D-max (maximum density), is the highest obtainable density for a particular photosensitive material as measured in the dark part of the negative image.

7.5 Indexing

It may be desirable to include a printed index at the beginning or end of the film. The content of all index fields associated with the images on individual rolls should be provided, in a microfilm format, and should be a part of the microfilmed series submitted for deposit.

7.6 Page Orientation

Pages can be recorded on microfilm in two ways. In “cine mode” where the text on a page runs perpendicular to the length of the film and in “comic mode” where the text on a page runs parallel to the length of the film. Unless a lower reduction ratio is needed for acceptable image quality, recording letter and legal sized pages in comic mode is preferable. This is accomplished by rotating the images 90° prior to recording or feeding the page “sideways” through the scanner. The advantage of comic mode recording is that more pages can be captured on each roll of film saving storage space and promoting more efficient scanning in the event that the film needs to be used to recover lost image data.

7.7 Page Spacing

Pages need to have sufficient separation to allow a film scanner to differentiate adjacent pages on the film. There should be a minimum separation of 0.06” (1.5mm) between adjacent pages. Pages that touch each other at any point may preclude them from being captured separately by a microfilm scanner. If splicing must occur within a film roll, additional space between frames will be required to accommodate the splicing process.

7.8 Digital to Microfilm Conversion

7.8.1 Quality Monitoring of Scanner

All operations using the digital-to-film process should follow procedures outlined in ANSI/AIIM MS44 Recommended Practice for Quality Control of Image Scanners to conform to WAC 434-663-305.

7.8.2 Quality Monitoring of Images

Each digital image will be visually compared against its corresponding original document in order to identify and correct the following defects:

1. Missing pages
2. Page skew
3. Text cut off at edges
4. Double-page feeds
5. Contrast problems

- 6. Images in a different order than originals
- 7. Legibility

7.8.3 Image Resolution

The ideal resolution is 300 dots per inch (dpi) as it produces sharper lines. Smaller fonts or fonts that contain detailed serifs are best scanned in the 400 to 600 dpi range depending on the characteristics of the font. See WAC 434-663-300 and WAC 434-663-305 for minimum dpi resolution requirements.

7.9 Film Processing and Treatments

7.9.1 Film must be processed as timely as possible to ensure that images meet density standards. Processing laboratories cannot guarantee proper densities after 14 days.

7.9.2 For Security or Preservation Microfilm, the film will be washed to reduce the amount of residual Thiosulfate ion (hypo) to something greater than 0 and less than 0.014 g/m².

7.9.3 The Methylene Blue Test is needed to ensure that the polysulfide solution has been washed out of the film. The test should be conducted daily, if not at the end of each run or batch to verify that the above requirements are met.

7.9.4 Additionally, all silver-halide film must undergo chemical treatment for the conversion of silver images against oxidation, referred to as the polysulfide treatment, or "brown-toning."

7.10 Post-filming Inspection

7.10.1 Content Quality As soon after processing as possible, all film must be inspected on a light box for content quality, including inspection for correct targets and target sequence, missing pages or files, incorrect document or file order, etc.

7.10.2 Physical Quality Additionally, all film must be inspected on a light box for physical quality, including inspection for image orientation/skew, fog, stretched or overlapping documents, scratches, chemical or water stains, finger prints, and other faults as described in ANSI/AIIM MS23-2004.

7.10.3 All substandard film must be corrected before shipping to the State Archives for storage.

7.10.4 Film sent to the State Archives for safekeeping will be re-inspected for quality and any failing will be reported to the client agency.

Important Note: It is the agency's responsibility to ensure that film meets post-filming inspection standards. Film not meeting these standards may not be admissible in court.

8 SPLICING

- 8.1 Splicing should be done in accordance with the guidelines established in ANSI/AIIM MS23-2004 and ANSI/AIIM MS18-1992 (R1998). Ultrasonic splices are required. Microfilm must not be spliced with tapes, rubber cement, glues, or any other adhesive. **Only retakes may be spliced onto a roll.**
- 8.2 Identification - Records spliced onto a roll need to be clearly identified on the film box label. Splices must have the same beginning and end targets specified in Section 5.1.
- 8.3 Location - Splices must be at the beginning of the roll to ensure easy identification.
- 8.4 Densities – Care should be taken to match the densities of the splice and roll. This will help ensure a quality copy of the roll can be made.
- 8.5 The entire record must be refiled to guarantee court admissibility (i.e. if documents in a court case were missed during filming, then the entire case file should be re-filmed).
- 8.6 Number of splices – The number of splices on a roll should be kept to a minimum to ensure court admissibility.

Note: In essence, each splice is its own roll, and targets and guide sheets ensure the splice can be inspected for quality and authenticity. Splices not meeting state standards may not be admissible in court.

9 STORAGE

Security or preservation films must not be used as a daily work record. Security and preservation microfilm must not be stored within the same room or in rooms connected by ventilating ducts with working copy microfilm, due to the off-gassing of non-silver films. Security or preservation films shall be stored in a vault meeting the standards cited below.

9.1 Security or Preservation Film Cores and Containers

- 9.1.1 Cores and Rolls - Roll microfilm will be wound on cores and rolls as specified in ANSI/AIIM MS34-1990 (*Dimensions for Reels Used for 16mm and 35mm Microfilm*). The material for cores and rolls shall be made of an inert plastic, which does not off-gas reactive fumes, such as those containing peroxides. Rubber bands shall not be used on microfilm rolls; strips of an acid and lignin free buffered paper with strong ties can be used to secure the film on the roll.
- 9.1.2 Storage Containers - Microfilm shall be stored in closed containers made of an inert material such as paper or plastic which conforms to ISO 18902:2007 (*Imaging Materials - Processed Imaging Materials* -

Albums, Framing and Storage Materials). Because of the lack of suitable tests to guarantee the inert quality of plastics currently used for film containers, acid-free paper storage containers are recommended.

9.1.2.1 Paper - The material must be non-dyed and acid free with a calcium carbonate buffer.

9.1.2.2 Plastic - The container shall be constructed of a chemically inert material that does not give off reactive fumes.

Note: Unprocessed plastic film containers do not meet these standards.

9.2 Security or Preservation Film Storage

Storage should be in accord with ISO 18911:2010 (*Imaging Materials - Processed Safety Photographic Films - Storage Practices*), with minimum standards as follows:

9.2.1 Temperature - The temperature should not exceed 68° F.

9.2.2 Humidity - The optimum relative humidity varies with the temperature at which the microfilm is stored. At 68° ± 2° F., 35% ± 5% relative humidity is suggested. In no case should relative humidity exceed 50% or fall below 15%. Short-term, non-routine fluctuations in humidity should be avoided. Routine fluctuations should not exceed 5% over a 24-hour period.

9.2.3 Monitoring - Temperature and humidity levels for security film storage facilities should be checked and recorded daily.

9.2.4 Atmospheric Controls - Properly controlled air conditioning may be necessary for maintaining temperature and humidity. The controls should meet the specifications as outlined in ISO 18911:2010 and as follows.

9.2.5 Air Purity - It is important to protect security microfilm against airborne particles that might abrade/degrade the film image or film base. Solid particles should be removed by mechanical filters having an arrestment rate of 85 percent. Filters must be of non-combustible material. Gaseous impurities can be adequately eliminated by location of the security vault in an area as far as possible from urban or industrial areas where contaminants may be present in harmful concentrations. Where protection is not afforded by the above, air washers or absorbers are required.

9.2.6 Light - Film should be kept in dark conditions, with lights remaining off except when someone is in the storage area.

9.2.7 Fire and Associated Hazards - Protection can be achieved by placing security film in either fire-resistive vaults or insulated records containers (class 150). If fire-resistive vaults are used, they should be constructed in accordance with ANSI/NFPA 232-2012, Protection of Records.

9.2.8 Separation of Film Types – Silver Halide film must not be stored in the same area as diazo film.

Note: Damage to photographic film records by high temperatures can happen even if the film is not destroyed by fire. Silver gelatin images can withstand temperatures as high as 302° Fahrenheit for several hours without significant loss in image quality. However, in addition to potential image loss, photographic films may become so severely distorted at high temperatures that they become difficult to view, project or print. One danger to film as a result of high temperature exposure is the sticking or blotching of adjacent sheets or laps, particularly with film having gelatin or special backings.

Ultimately the best protection against fire is keeping duplicate copies of the film in separate storage areas. If you use the three-copy system, the printing master should not be kept with the master negative.

9.3 Custody of Microfilm/Security Storage

Security or preservation microfilm of public records must remain in public custody and must be retained in the office of record, or stored in a publicly owned facility subject to inspection and approval for security storage in accord with state microfilm storage standards. Security microfilm can be transferred to the State Archives for storage.¹⁵ Forms and instructions for use of security vaults may be obtained from the Essential Records Protection section of the State Archives. Film to be stored in security microfilm vaults must be accompanied with completed transmittal forms.

9.4 Use and Removal of Security Microfilm

Security microfilm is for use only as a master for authorized film duplication. Security microfilm will not be removed from the State Archives storage facility except for permanent return to the agency of origin. Any relocation of security microfilm must be to facilities meeting security film storage standards. (WAC 434-677-060)

¹⁵ RCW 40.14.020 "All Public records shall be and remain the property of the state of Washington." See also RCW 40.10.020 "The state archivist is authorized to reproduce those documents designated as essential by the several elected and appointed officials of the state and local government by microfilm...and to assist and cooperate in the storage and safeguarding of such reproductions in such a place as is recommended by the state archivist..."

10 FILM HANDLING/MAINTENANCE/INSPECTION

- 10.1** Microfilm should always be handled on its edges and handlers are required to wear thin cotton gloves.
- 10.2** Security microfilm should be inspected annually for any signs of deterioration as per the requirements in ANSI/AIIM MS45-1990 (*Recommended Practice for Inspection of Stored Silver-Gelatin Microforms for Evidence of Deterioration*) and ANSI/AIIM MS48-1999. If any problems are encountered, notify the State Archives immediately for assistance.
- 10.3** Sampling - As a rule, if less than 100 rolls of film are stored, all film should be inspected. If the number is over 100 rolls, a representative sample may be inspected. An adequate number of properly selected lot samples should be inspected each year; this number should total 0.1% of the collection or 100 rolls, whichever is greater. The sampling pattern shall be created to ensure that all parts of the collection will be inspected. Samples should be selected so as to overlap with film previously inspected for the purpose of determining if any changes have occurred in the interim.
- 10.4** Inspection - Inspection should take place in a clean room, near the storage area to prevent damage during transit, with a relatively dust free atmosphere and with atmospheric conditions as close as possible to the storage area (see section 7). Additionally, the above standards concerning the handling of microfilm apply during inspection (see section 8).
- 10.4.1** Inspectors should look for mold, fungus, oxidation blemishes (redox), film curl, discoloration, excessive brittleness, and emulsion separation.
- 10.4.2** The inspection process should also include re-reading the resolution test and re-measuring the density to ensure image stability.
- 10.4.3** The inspectors should also check for signs of rust, corrosion, or other deterioration on the cores, rolls, and storage containers.

11 DISPOSITION OF MICROFILM

11.1 Disposition Authorization

Film may be dispositioned once it has reached the end of its retention period, as specified by the State or Local Records Committee, and in accord with RCW 40.14.

11.2 Physical Disposal of Microfilm

It is the responsibility of the agency to destroy records promptly and effectively. Such disposal should reduce the microfilm to an illegible condition. Film approved for destruction and stored with Security Microfilm will be confidentially destroyed by the State Archives.

12 AVAILABLE MICROFILM SERVICES

- 12.1** Use of State Archives Imaging Services - The State Archives provides microfilm and scanning services to state and local government agencies through interagency agreement or competitive bid. Cost estimates are provided. The State Archives supports agency "in-house" microfilm operations with film processing and duplicating services. The State Archives also provides security microfilm storage and information for post-disaster microfilm recovery.
- 12.2** Use of Commercial Services - Local government agencies may contract with commercial service bureaus through competitive bid for production services. *It is strongly recommended that these standards be cited and incorporated into the language of contractual arrangements with vendors of microfilm services.*

Appendix 1

FOR ADDITIONAL INFORMATION AND ASSISTANCE ON:

Microfilm Standards, Security Microfilm Storage

Essential Records Protection-Security Microfilm

Phone Number: (360) 753-0740

E-Mail: securitymicrofilm@sos.wa.gov

Microfilming and Digitizing Services

Imaging Services

E-Mail: imagingcustomerservice@sos.wa.gov

Retention Scheduling & Records Management Advice

Records Management

Phone: (360) 586 4901

E-Mail: recordsmanagement@sos.wa.gov

Local Records Scheduling, Appraisal, and Archival Records Transfer

CENTRAL REGION

Serving: Benton, Chelan, Douglas, Franklin, Grant, Kittitas, Klickitat, Okanogan, and Yakima Counties.

Phone: (509) 963-2136

E-mail: CEBranchArchives@sos.wa.gov

EASTERN REGION

Serving: Adams, Asotin, Columbia, Ferry, Garfield, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, and Whitman Counties.

(509) 235-7508

E-mail: EABranchArchives@sos.wa.gov

NORTHWEST REGION

Serving: Clallam, Island, Jefferson, San Juan, Skagit, Snohomish, and Whatcom Counties.

Phone: (360) 650-3125

E-mail: NWBranchArchives@sos.wa.gov

PUGET SOUND REGION

Serving: King, Kitsap and Pierce Counties.

Phone: (425) 564-3940

E-mail: PSBranchArchives@sos.wa.gov

SOUTHWEST REGION

Serving: Clark, Cowlitz, Grays Harbor, Lewis, Mason, Pacific, Skamania, Thurston and Wahkiakum Counties.

Phone: (360) 586-1492

Email: SWBranchArchives@sos.wa.gov

Appendix 2
SAMPLE MICROFILM TARGETS

- 23** Beginning Of Roll No.
- 24** Certificate Of Authenticity
- 25** Guide Sheet
- 26** Weeding Policy Example 1
- 27** Weeding Policy Example 2
- 28** Reference Point Target For Civil Case File
- 29** Reference Point Target For Project File
- 30** Reference Point Target For Oversized Document Not Filmed
- 31** End Of Roll No.

SAMPLE MICROFILM TARGET:

**BEGINNING OF
ROLL**

NO.

SAMPLE MICROFILM TARGET:

MICROFILM CERTIFICATE OF AUTHENTICITY

(Name of Agency)

)

) Seal

)

(STATE OF WASHINGTON)

I, _____, being duly sworn on oath, depose and say:

(Printed Name of Filmer)

That the papers and documents appearing on this roll of film were photographed by your affiant and that said papers and documents are true and correct copies of the originals thereof as the same appeared on record in the custody of the State Archives.

That the microfilming of the papers and documents as aforesaid was done in the pursuance of, and in conformance with provisions of the statutes in these cases made and provided for as they appear in Title 40, of the Revised Code of Washington.

That the entirety of the record appearing on this roll of film was photographed, excepting oversized documents for which reference targets were filmed in their place, per filming policy.

That the oversized documents were photographed on a separate roll of film.

Signed _____

(Name of Filmer)

Subscribed and sworn to before me this _____ day of _____, 20 _____.

Notary Public in and for the State
of Washington, residing at (City),
Washington.

Name of Filmer:

Records Series Title:

Date Span of Records:

Date Filmed:

Disposition Authority Number (DAN):

SAMPLE MICROFILM TARGET:

NAME OF VENDOR
GUIDE SHEET

Name of Agency: _____ Reel #: _____

Title of Record: _____

Start Document: _____ Date: _____

End Document _____ Date: _____

Filming Time: _____ Camera #: _____

Document Count: _____ Reduction Ratio: _____

Date Microfilmed: _____

Supervisor Name: _____

Supervisor Signature: _____

Operator Name: _____

Operator Signature: _____

EXCLUSION (WEEDING) POLICY

That the entirety of the record appearing on this roll of film was photographed, excepting oversized documents for which reference targets were filmed in their place.

That the oversized documents were photographed on a separate roll of film.

That all post-it notes, travel vouchers, greeting cards, photographs, and envelopes were not filmed.

SAMPLE MICROFILM TARGET:

EXCLUSION (WEEDING) POLICY

That the entirety of the record appearing on this roll of film was photographed, excepting duplicate copies of records, of which only one copy was filmed.

SAMPLE MICROFILM TARGET:

Reference Point Target

**Ferguson County
Superior Court**

**Civil Case File
99-2-00001-1**

SAMPLE MICROFILM TARGET:

Reference Point Target

**Ferguson County
Public Works**

**Project File
CRP 2011-0001**

SAMPLE MICROFILM TARGET:

Reference Point Target

**Ferguson County
Auditor**

**Daily Recordings
201112010001**

Not filmed due to image size

SAMPLE MICROFILM TARGET:

Reference Point Target

END OF ROLL

NO.

SOURCES

In all cases, the references cited in this manual are to be superseded by the most current versions thereof.

Abbreviation Key

ANSI - American National Standards Institute

AIIM - Association for Information and Image Management

ISO - International Organization for Standardization

NFPA - National Fire Protection Association

STANDARDS

ANSI/AIIM MS18-1992 (R1998). Micrographics - Splices for Imaged Film - Dimensions and Operational Constraints.

ANSI/AIIM MS23-2004. Recommended Practice - Production, Inspection, and Quality Assurance of First-Generation, Silver Microforms of Documents

ANSI/AIIM MS45-1990. Recommended Practice for Inspection of Stored Silver-Gelatin Microforms for Evidence of Deterioration.

ANSI/AIIM MS48-1999. Recommended Practice for Microfilming Public Records on Silver-Halide Film.

ANSI/AIIM MS62-1999. Recommended Practice for COM Recording Systems Having an Internal Electronic Forms Generating System - Operational Practices for Inspection and Quality Control.

ISO 3334:2006. Micrographics - ISO Resolution Test Chart No. 2 - Description and Use.

ISO 18901:2010. Imaging Materials - Processed Silver-Gelatin-Type Black-and-White Films - Specifications for Stability

ISO 18902:2007. Imaging Materials - Processed Imaging Materials - Albums, Framing and Storage Materials

ISO 18906:2000. Imaging Materials - Photographic Films - Specifications for Safety Film

ISO 18911:2010. Imaging Materials - Processed Safety Photographic Films - Storage Practices.

ISO 18915:2000. Imaging Materials - Methods for the Evaluation of the Effectiveness of Chemical Conversion of Silver Images Against Oxidation.

ISO 18917:1999. Photography - Determination of Residual Thiosulfate and Other Related Chemicals in Processed Photographic Materials - Methods using Iodine-Amylose, Methylene Blue and Silver Sulfide

NFPA 232-2012. Standard for the Protection of Records

Published Sources

Fox, Lisa L., ed. Preservation Microfilming: A Guide for Librarians and Archivists. 2nd Ed. Chicago: American Library Association, 1996.