

Producing High Quality Microfilm

Archives Technical Information Series #9

1998. Includes updates and corrections made in August 2005

[Introduction](#)

[Choosing Records for Microfilming](#)

[Introduction to the Microfilm Production Guidelines](#)

[Appendix A: File Information for Microfilming Paper Records](#) (PDF)

[Appendix A: File Information for Microfilming Paper Records](#) (Word 2000 template)

[Appendix B: Instructions for Completing File Information for Microfilming Paper Records](#)

[Appendix C: Microfilming Production Guideline: Planetary Cameras, 16mm, Office Documents](#)

[Appendix D: Microfilm Production Guideline: Planetary Cameras, 35mm, Bound Documents](#)

[Appendix E: Microfilm Production Guideline: Planetary Cameras, 35mm, Architectural, Engineering, and Topographical Drawings](#)

[Appendix F: Introduction to Rotary Camera Guidelines; Microfilm Production Guideline](#)

[Appendix G: Reference List for Microfilm Production Guidelines](#)

Introduction

This publication defines technical guidelines for producing high-quality microfilm and raises issues that local and state officials will want to consider before undertaking a micrographics project. The publication contains the following:

- Issues to be considered for a proposed microfilm project.
- A [File Information Form \(Appendix A\)](#) and accompanying instructions ([Appendix B](#)). The information recorded on the form can be used to analyze potential record series for microfilming and can aid in securing reasonable bids from microfilm vendors.
- Four Microfilm Production Guidelines (Appendices C, D, E, F) for producing high-quality microfilm.

These guidelines cannot stand alone as specifications. Governments or agencies need to add the essential information outlined in the introductory paragraphs at the beginning of each guideline. Then a File Information Form ([Appendix A](#)) should be completed for each series of records to be microfilmed.

Packaged together, the appropriate microfilm guidelines, the File Information Form(s), and the supplemental requirements added by the government or agency can form a microfilm specification. The specification document provides the essential technical requirements for items, materials, services, and procedures that will determine whether or not the requirements have been met. The specification should be incorporated into standard contractual documents used by governments or agencies for review by legal counsel.

The File Information Form and the four Microfilm Production Guidelines were developed by the Micrographics Committee of the Local Government Records Advisory Council. These representatives from local governments and state agencies donated many hours of their time to address the complex issues involved in drafting microfilm guidelines, and the State Archives would like to thank them for their contributions: Laurie Beecroft (chair), Ulster County Records Manager; Patty Bryce, Deputy Director, Albany County Hall of Records; Glenn Cropsy, Unified Court System; Bebe Moorehead, Records Management Coordinator, Town of Colonie; Amanda Walsh, Shenendehowa Central School District; Seymour Bram, New York City Department of Buildings.

This Technical Information Series publication updates and replaces Producing High-Quality Microfilm, Technical Information Series #9. Additional micrographics publications include Managing Micrographics Projects, Technical Information Series #10 [Replaced by [Publication #77](#)], and [Introduction to Micrographics, Technical Information Series #11](#). These publications support the guidelines outlined in this publication. Contact your [Regional Advisory Officer](#) or other State Archives staff for additional publications and questions concerning your micrographics projects.

Choosing Records for Microfilming

The biggest question that a government records custodian faces is: which records should be considered for microfilming? Microfilming is an expensive process, and the decision to microfilm should not be entered into lightly. When properly utilized, microfilm is a cost-effective tool for records management. When used improperly, however, it can waste money and resources.

Initial Analysis

Before beginning a microfilm project, an official should carefully analyze the records to be filmed and the reasons for filming. Complete the File Information for Microfilming Paper Records Form ([Appendix A](#)) to aid in the analysis. Questions include:

- What are the problems with the current records system?
- What are the objectives of the microfilm project?
- What alternatives are available?
- How will the microfilm be used?
- How many microfilm images must be produced?
- What technical information must be determined in advance to ensure satisfactory microfilm copies?

- What will the job cost?

Based on the answers to these questions, an official can determine if microfilming is appropriate for the records, and which microform will best fit the needs of the office. The analysis is extremely important. A careful appraisal can produce a microfilm program that improves office efficiency and cuts costs. Lack of or poor analysis can waste money and staff time, and lead to the potential loss of valuable information.

Identifying the Problem

The decision to microfilm records is rarely made without a specific need. Usually microfilming is considered a solution to one or more problems. The first step is to identify those problems.

- Storage space is a problem when: the office is running out of space to store records; office space is being rented solely for records storage; records are being moved to inactive storage too soon due to space limitations; space occupied by inactive records could be better used for other purposes.
- Information retrieval is a problem when: staff cannot locate all of their records; documents are lost; there are long delays before a record is retrieved.
- Information distribution is a problem when: copies of records are needed in multiple locations; users experience delays in accessing information, distributing the information is a major expense.

Objectives of Microfilming

Based on an analysis of problems, an official can identify what he/she hopes to accomplish through microfilming. It is important to identify both problems and objectives, since both will play a role in determining the best type of microform to use. Some objectives can be:

- Records protection
- Saving space
- Quicker information retrieval
- Less expensive and easier information distribution
- Retaining file integrity

Disadvantages of Microfilm

Before governments or agencies decide to undertake a microfilm project, the disadvantages of this medium should be evaluated. Some considerations include:

- Equipment costs
- Cost of preparing documents for microfilming
- The difficulty of producing quality microfilm from poor originals
- Cost of producing indices and retrieval aids

Study of Alternatives

Before exploring microfilm options further, an official should consider alternatives to solving the office's records problems. Microfilming is expensive, and less expensive methods may exist for meeting the office's objectives. Before microfilming, an official should:

- Implement a records management program centered on a regularly executed records retention schedule. Space problems may be caused by the retention of obsolete records past their useful life. Initial implementation of a records retention and disposition schedule can reduce office files up to 50%; yearly application of such a schedule can reduce the volume of records by 20%. This alone may resolve space problems. [Records retention and disposition schedules](#) are available from State Archives.
- Conduct an inventory of all records. Before making a final decision to microfilm certain records, State Archives strongly recommends that a government or agency inventory all records. Such an inventory will provide information needed to establish priorities for microfilming. Your [Records Advisory Officer](#), as well as [State Archives workshops](#) and [technical publications](#), are available to guide you through the inventory process.
- Review the filing system for flaws. An official may want to microfilm records because of difficulty in filing or retrieving records. Microfilming poorly organized files will only compound retrieval problems. A reorganization of the filing system may solve the problem of slow information retrieval and lost records.
- Verify that information is not duplicated. Before deciding to microfilm, make sure that the information in the records cannot be found elsewhere. If it is duplicated, reconstruction of the information may be less expensive than microfilming.
- Verify the need to distribute information. Does everyone who receives a copy of a record really need it?

Value of the Records

Once you have determined that microfilm is a viable option, you must decide what records should be filmed. Records should have sufficient continuing administrative, legal, fiscal, or research value to warrant filming. If they do not have value, they should not be microfilmed.

Microfilming can often be justified if:

- The records must be legally retained fifteen years or longer
- Several copies of the records must be maintained
- The records are referenced frequently (i. e., several times daily)
- The records are repeatedly photocopied
- The records are microfilmed as part of operational procedures, such as recording deeds
- The records are so valuable that a microfilm security copy should be created to safeguard against the loss, destruction, or deterioration of the original records

Use of the Microfilmed Records

No records should be microfilmed until the use of the microfilm copy is determined. The following uses should be considered:

- Security only
- Reading only
- Reading and making paper prints
- All the above

Use will determine the number of copies (negative and positive) required, the method and extent of indexing, storage of the processed film, and the type and amount of viewing equipment needed.

Microfilm Storage

When evaluating a microfilm project, storage is a major consideration. The first-generation silver gelatin camera negative of permanent records should be stored off-site in a secure location with rigid temperature and humidity controls. Solid and gaseous pollutants should be filtered from the air. Failure to provide proper storage for microfilm will lead to deterioration of the film and loss of valuable information. Some commercial vendors specialize in the storage of microfilm.

Microfilm Costs

Cost will be an important factor in any decision to microfilm records. The film itself is relatively inexpensive, but certain operations can be extremely expensive. The following factors should be carefully calculated during an analysis of records for microfilming:

- Volume of records
- Percentage of records requiring special filming techniques
- Amount of staff time needed to properly prepare records for filming
- Amount of staff time needed to conduct in-house quality control inspection of microfilm
- Cost of contracting for independent quality control technical inspection of microfilm
- Cost of equipment if filmed in-house; vendor cost if records are to be filmed by a service bureau
- Cost of readers and reader-printers
- Cost of storage

A Note of Caution

One warning must be voiced at the outset. There is a large amount of poor microfilm in existence, on which valuable information is barely legible when read in a viewer and from which only very poor paper copies can be made. The major objective in any microfilm project should be quality microfilm copy. Microfilmed records will be of no value unless they have been properly photographed and adequately identified, indexed, and maintained, so that a specific record can be found when needed and read or copied when located.

For More Information and Assistance

The [File Information Form](#) and the accompanying technical guidelines which follow will aid in establishing sound cost estimates for your microfilm project and will ensure the production of high quality microfilm.

State Archives provides records management services to local governments and state agencies. This includes technical advice and assistance, publications, training and presentations, and consultations concerning records and information issues. State Archives has regional offices throughout the state; each office has an expert records specialist who can visit governments or agencies and provide on-the-spot advice. These services are supported by the Local Government Records Management Improvement Fund. For further information, contact either your [regional office](#) or:

Government Records Services
New York State Archives
State Education Department
Room 9A47 Cultural Education Center
Albany, New York 12230
518-474-6926
via e-mail at: recmgmt@mail.nysed.gov

AN INTRODUCTION TO THE MICROFILM GUIDELINES

The microfilm production guidelines were developed to address four different microfilming situations. The 16mm guideline should be used for microfilming normal office files, usually no larger than 11" by 14". The second guideline addresses issues unique to 35mm bound documents; the third guideline addresses problems relating to architectural and engineering drawings and other large-format images; and the fourth guideline should be used mainly for non-permanent office documents (8 1/2" by 11") to be filmed on rotary cameras.

[Appendix C: Microfilming Production Guideline: Planetary Cameras, 16mm, Office Documents](#)

[Appendix D: Microfilm Production Guideline: Planetary Cameras, 35mm, Bound Documents](#)

[Appendix E: Microfilm Production Guideline: Planetary Cameras, 35mm, Architectural, Engineering, and Topographical Drawings](#)

[Appendix F: Microfilm Production Guideline: Rotary Cameras, 16mm, Office Documents](#)

[Appendix G: Reference List for Microfilm Production Guidelines](#)

For simplicity's sake, each of the guidelines has the same numbering system, 1 through 28.

An explanation of some of the terms used in the guidelines follows:

1. **Reduction Ratio:** This is the size of the original document compared to the size of the microfilm image, expressed as a ratio: for example, 24 to 1, or 24:1, or 24x. The reduction ratio

depends on the size of the original document and the microfilm format. The reduction chosen should produce an image on the reader approximately the size of the original document. The smallest reduction ratio for any microfilm application generally produces the best quality microfilm.

3. **Background Density:** This is the numerical measurement of the contrast between the image and the non-image background of the microfilm. Density is important because it affects the legibility of the microfilm. Faded documents normally have a low density reading (i.e., 0.80) and high-contrast printed documents normally have high density readings (i.e., 1.2).

5. **Resolution:** This measures the ability of the microfilm to record detail. Resolution is expressed in lines per millimeter and is read from a resolution chart filmed with every roll of microfilm. High resolution readings (five and above on the resolution chart) indicate quality microfilm.

7. **Image Orientation:** The "comic" orientation for filming is one in which the documents are filmed with the lines of the image running the length of the film. Exceptions to this format should be noted in your specification.

8. **Film Stability:** Microfilm processors used to develop microfilm for local government records should be tested weekly to ensure that no residual chemicals remain on the microfilm. The test, referred to as the "methylene blue" test, should be conducted by an independent laboratory.

24. **Quality Control:** Each vendor should inspect film as outlined in #23. In addition to the vendor's inspection, it is strongly recommended that local governments have each roll of microfilm inspected by a third party to verify the quality of the work.

Appendix A

Available either in [PDF](#) or [Word template](#) format.

Appendix B

Instructions for Completing File Information for Microfilming Paper Records

The [File Information Form for Microfilming Paper Records](#) (*File Information Form* for short) has two objectives. The first is to develop, in combination with the appropriate Microfilm Production Guidelines, a microfilming specification. This specification will produce, for your government or agency, microfilm of good quality at a reasonable cost. Second, the information gathered will provide local governments with strong documentation when applying for a microfilming grant from the [Local Government Records Management Improvement Fund \(LGRMIF\)](#).

These instructions are intended to make accurate completion of the *File Information Form* as painless as possible. Since no forms or instructions are ever perfect, the writers invite comments and suggestions for improvement. Send comments to: New York State Archives recmgmt@mail.nysed.gov.

Since it is rarely possible to look at every document, you must use a technique called **sampling** to form conclusions about the entire records series. When used for unbound documents found in file cabinet drawers or boxes, it is wise to sample several folders. If the documents are not in folders, several batches of documents (a batch is as many papers as you can conveniently pick up at one time in one hand) should be sampled. As a rule of thumb, examine three or four folders in a file cabinet drawer or transfile box. Sample one or two folders in a one-cubic-foot storage box. Sample records from **every** drawer or storage box. Doing this pays off in the end by reducing costs and saving time when you find a whole new category of records in an unexpected location.

You must complete one *File Information Form* for **each** records series you propose to microfilm. For example, if you want to microfilm your town's board minutes **and** the town's birth records, you must fill out one form for the minutes and one form for the birth records. Note that there is no such thing as a "general file" records series.

Invite vendors to review and comment on your records as you complete the *File Information Form*. The perspectives of potential vendors will give you additional insights into your microfilm project. If possible, meet with at least three vendors. If you are filming in-house, the micrographics coordinator should assist you in completing the *File Information Form*. You may also want your Regional Advisory Officer or other State Archives staff to review the *File Information Form*.

1. Name of Government or Agency

Use the full legal name of your government or agency. If the records belong to a department or a sub-unit of the government, include **that** as well. For example: City of Albany, Health Department, Vital Statistics.

2. Prepared By

If anyone needs more information about the records series, or the File Information Form, this is the person to contact.

3. Name of Records Series

A records series is a group of records that shares a common set of functions **and** characteristics, such as School Board Meeting Minutes, Deeds, Mortgages, Tax Assessment Rolls, Cumulative Student Academic Records, Birth Certificates, etc. It is not uncommon for a records series to have, within the user community, a nickname or shortened version of the full name, such as "student records". The nickname or shortened name can be a useful tool for identifying the records series. The full legal name of the records series should be written on the form. You may be able to take the name from State Archives Inventory Worksheet (Form LGRB-5), which you may have used to perform the Active/Inactive Records Inventory.

4. The [Retention Schedule](#) for These Records is _____ Years

All government records must, under state or local law, be kept for a certain period of time. For records series under the jurisdiction of the Office of Court Administration (OCA), refer to [OCA's records retention and disposition schedule](#). If the record retention is permanent, write PERMANENT on the line.

5. Activity

A records series is **active** or **open** if you are still adding documents to it, or changing the documents in it. Records that are usually referenced less than once a month are said to be **inactive**. If you expect to change the records series after it is microfilmed, you must structure the microfilm system accordingly. For example, an inactive records series may be assigned sequential roll numbers from 0001 upward. An active records series that is updated annually (such as cumulative academic records) should be assigned sequential roll numbers that **re-start** at 001 each year, and should include the year as part of the roll number: 90-001 to 90-999, 91-001 to 91-999, etc. Under some circumstances, it is advisable not to microfilm active records series.

6. Order of Filming

This is one of the most important issues in microfilming. It is absolutely essential that the records are in good order before microfilming, and that this order is clearly and easily understood by the microfilming organization and by researchers using the microfilm. If you film documents that are in disorder, locating any particular document on the microfilm will become far more difficult than it was with the paper versions. Records can be microfilmed in random order if a computer-based index system is created during or following the microfilming, although this is expensive and the least preferable way of microfilming.

When microfilming, it is important to retain the original order of the records established by the office of origin since the office may have a particular filing system that should be retained. In addition, the order of the records may reveal institutional organization, functions, and history.

Many records series are "self-indexing" either by surname or by number. Sometimes "self-indexing" systems are not as straightforward as they seem. Often there is an unwritten hierarchical arrangement that everyone in the office knows but fails to share with the microfilming vendor. For example, in a personnel file with two Jane Smiths, the secondary filing order might include filing by social security number.

A local government's staff may understand the filing systems and how to use them, but conveying this information to people undertaking a microfilm project is sometimes difficult. Staff often assume that the microfilming vendor knows the basis for the filing system - such as the town name or the calendar year - and give the secondary filing order, leaving out the first index. It is essential that the micrographics staff and/or the microfilm vendor understand the filing system, and are aware that it applies to the entire records series. Sometimes file organizations change over the years; this could significantly change microfilming procedures. For example, personnel files previously kept by surname may now be filed by social security number.

It is conceivable that the filing system currently in use will seem excessively complicated, and you may be tempted to use the occasion of this microfilming project to change the index. **DO NOT TRY THIS!** If you really think the filing system needs to be changed, undertake a file reorganization project, test the new filing system to make sure it works better than the old one, and **THEN** microfilm. A file reorganization project should be undertaken only after **careful** analysis of the records. Usually the original order of the records needs to be preserved for administrative and research purposes.

If you do not understand the records series' file order, **GO NO FURTHER!** Ask other staff or State Archives advisory staff for help. If you continue, you are likely to waste time and money, create new problems, and create frustration among the users of the records series.

7. Total Number of Documents:

8. Total Number of Images:

8a. Total Number of Rolls:

You must know the approximate number of images in each records series you microfilm. There are several ways to establish this estimate; which method you choose depends on the type of document (office documents in folders, bound documents, or maps and drawings) and on how much reliable information you already have about the records series.

When you are surveying your records series, take special note of what percentage of the documents has information on both sides of a sheet. When microfilming documents on a "planetary" microfilm camera, an image consists of one side of one sheet of paper. Since some documents have information on both sides, the total number of images (and thus the scale and cost of the microfilming project) may be double the number of sheets.

Here are three methods of measuring the volume of a records series:

1. linear filing inch
2. cubic footage
3. existing inventory by sequential number

The Linear Filing Inch method of measuring the volume of records can be used for a wide range of materials. It is based on the average thickness of a sheet of document paper. If you measured the depth (front to back) of a file cabinet drawer with a ruler or tape measure marked in inches, you would find that, on the average:

- there are 200 sheets of paper per inch
- there are 150 sheets of paper in a full (3/4"-thick) file folder
- there are 4,000 sheets of paper in a full, active 27" file drawer
- there are 5,000 sheets of paper in a full, inactive 27" file drawer

Multiply this average by the total number of inches or file drawers, and you will have a reasonable estimate of the number of documents.

You can refine this method for bound materials by sampling the actual sheet count: take six inches' worth of books off the shelf, count the number of sheets in each book, and use this figure, divided by six, to estimate the number of bound documents. This corrects for the thickness of the book covers.

Estimating drawings and maps is trickier because they are not always kept flat in special file cabinets. You can adapt this method by counting the number of drawings in a typical storage unit (bin or drawer) and then multiplying the number of drawings by the number of storage units.

Cubic Footage estimating is adequate, providing the documents are in ledger, letter, legal, or computer printout sizes, and are in file folders. Drawing on the information in your active/inactive records inventory will speed up the process: multiply the number of cubic feet of records by 2,500 (the approximate number of documents in one cubic foot). This method is useful with bound documents, although you should refine by sampling (as described under "Linear Filing Inches" above). This method is **not valid** with drawings and maps because of the extreme variations in thickness and size which are typical of long-established, and/or large collections of maps.

Inventory by Sequential Number may be acceptable, providing you are satisfied that the inventory is accurate. It is not unusual for a records series to have different numbering systems at different times, so the inventory numbers and the actual number of documents may not correspond. For instance, a group of "recorded maps" or of "plan drawings" may be assigned a single number because they are tied to the same parcel or building. On the other hand, certain records series, such as birth certificates, have an intrinsically accurate numbering system and are therefore good candidates for this inventory method.

To calculate the total number of documents and the total number of images:

1. Multiply the number of "storage units" (boxes, file cabinet drawers, etc.) by the average number of documents per unit. This gives you the total number of documents in the records series.
2. Multiply the total number of documents by the percentage of documents in the records series that have information on both sides, then add the product to the total number of documents calculated in Step 1. This gives you the total number of images.
3. Since these figures are derived by sampling, you must add in an error factor, based on the confidence you have in the accuracy of these numbers. If you are quite confident, add 10%; if you are not, add 15%.
4. For the sake of simplicity, round off the numbers upward (which increases the error factor).

LINEAR FILING INCH example, based on 20 file cabinet drawers:

Step 1. How many documents are there?

17 full drawers x 5,000 documents/drawer = 85,000 documents
3 half-full drawers x 2,500 documents/drawer = 7,500 documents
85,000 documents + 7,500 documents = 92,500 documents

Step 2. You estimate that about 50% of the documents are double-sided:

92,500 documents x 50% double-sided documents = 46,250 more documents
92,500 documents + 46,250 more documents = 138,750 images

Step 3. You are confident of your figures, so you add an error factor of 10%:

38,750 images x 10% error factor = 13,875 more images
138,750 images + 13,875 more images = 152,625 images

Step 4. Round up to an estimated total number of **153,000 images**

CUBIC FOOTAGE example, based on 50 cubic feet of records.

Step 1. How many documents are there?

50 cubic feet x 2,500 documents/cubic foot = 125,000 documents

Step 2. You estimate that about 50% of the documents are double-sided:

125,000 documents x 50% double-sided documents = 62,500 more documents
125,000 documents + 62,500 more documents = 187,500 images

Step 3. You are not confident of your figures, so you add an error factor of 15%:

187,500 images x 15% error factor = 28,125 more images
187,500 images + 28,125 more images = 215,625 images

Step 4. Round up to an estimated total number of **216,000 images**

INVENTORY SEQUENTIAL NUMBER example, based on 1,132 drawing (maps and plans) inventory numbers. You have sampled the drawing collection and find that, on the average, there are four drawings for each inventory number. Furthermore, the first drawing in each number always has recording stamps on the back, and these stamps must be visible on the microfilm.

Step 1. How many documents are there?

1,132 sequential map/plan numbers x 4 drawings/number = 4,528 documents

Step 2. You know that the first drawing in each number has recording stamps on the back and averages one document in four, or 25%, double-sided documents:

4,528 documents x 25% double-sided documents = 1,132 more documents

4,528 documents + 1,132 more documents = 5,660 images

Step 3. You are not confident of your figures, so you add an error factor of 15%:

5,660 images x 15% error factor = 850 more images

5,660 images + 850 more images = 6,510 images

Step 4. Round up to an estimated total number of **6,600** images. If the record series is a small one, you can count all of the maps, etc.

After you calculate the total number of images you can estimate the rolls of microfilm needed. A rough rule of thumb is that a 16mm roll of office documents contains 2,500 images, a 35mm roll of microfilm contains 1,000 images, and a 35mm roll of drawings or large-size documents contains 500 images. You may want to allow about thirty frames from each roll for technical targets.

Bear in mind that when making these calculations and when writing your contract, **you should accept billing only for images actually filmed.** Thus figuring in a reasonable error factor has few penalties.

9. Record Series Increases

If this is an active records series, you will be adding a certain number of new documents periodically. This figure will help you evaluate your future microfilming needs. You do not have to be accurate - make a reasonable estimate. Go back to the increases of the last two years; if you feel conditions have changed, try to adjust your estimate accordingly.

10. Condition of Documents

This is one of the determining factors in deciding what format of microfilm to use and what the microfilming costs will be. "Condition" really refers to several factors.

A. Size. Use a ruler or measuring tape; be sure you have measured the largest document in the record series. The size of the largest document determines the type of camera and the film format. Usually documents larger than 11" x 14" (in any direction) cannot be microfilmed using the typical "tabletop" 16mm camera. Large documents, particularly those with details, are commonly filmed on 35mm film to capture the maximum amount of detail. If there are multiple document sizes found within a records series, this can add to the complexity and cost of the project. Discuss this issue thoroughly with your microfilm vendor and State Archives staff.

B. Age/brittleness/fasteners. The age and brittleness of the paper determine the difficulty of handling the documents, both for preparation and for filming. The type and number of fasteners (i.e., staples, paper clips, etc.) determine the difficulty (and cost) of making the documents camera-ready.

C. Enclosure. Most office documents are either loose (frequently in folders) or bound. The quality and cost differences between microfilming unbound and bound documents are considerable. The disbinding of documents should be done if possible. Disbinding will usually decrease the cost and increase the quality of the microfilm. Such bindings as "ring", "drill post" and "clamp" are designed to make disbinding easy. At the other extreme are glued bindings (for example, the infamous "perfect binding"), which make it almost impossible to remove the documents without cutting them out of the binding (usually with a machine humorously known as a "guillotine"). Comb bindings are commonly used for computer printouts, which are left in their accordion ("unburst") state; the "comb" consists of a thin plastic or metal plate with many fine rods extending from one side of the plate. The rods are inserted through holes in the printout and fastened to a plate on the back of the package.

D. Lay of the paper. Folded or rolled documents must be flattened before microfilming; the cost of this preparation should be factored into vendor estimates.

E. Color of the paper. The color of the paper affects how well it will reproduce on microfilm, particularly when the color of the imprint (a collective term for handwriting, typing, printing, or drawing) is factored in. If all the paper is white, skip to the **IMPRINT** box. Use common terms to describe the colors, such as *yellow*, *blue*, *pink*, etc. Blueprints are drawings, usually with white lines and text on a blue background. Photostats may be any kind of document where the text is white or lightly shaded on a dark gray or black background. The paper is usually extra-thick; this should be taken into account when calculating your number of images.

F-G. Imprint. The type and color of the writing or drawing are major considerations. The best results will come from very dense black ink on pure white paper. The worst results come from faded colored inks or light pencil on paper of the same color (i.e., faded red ink on pink paper, or third-layer-down carbon paper). Large printed letters reproduce better than fine handwriting. In rare cases, documents will be so illegible that producing acceptable copies from reader-printers will be impossible. In these cases, local government officials will want to ensure that these records have enough permanent historical, legal, or administrative value to warrant undertaking such a microfilm project.

11. Document preparation

Careful preparation of records for microfilming is critical to ensure the usefulness of the film. Often overlooked, document preparation can be the **largest** project expense when records are found in poor condition and when files need reorganization.

Document preparation for microfilming consists of the following steps:

1. File organization: placing the records in the order required to locate them (such as alphabetical - by last name; numeric - by case number; date; or any arrangement that combines these systems - see item 6, "Order of Filming," above).
2. Indexing: filming existing indices at the beginning of the appropriate rolls of microfilm. Sometimes descriptions of records are available and should also be microfilmed.
3. Purging: removing any documents that are not to be microfilmed.
4. Prepping: removing staples and paper clips, repairing torn sheets, flattening folded or rolled documents, and producing required information targets. If possible, during prepping identify roll breaks and make sure to note any missing documents on an informational target. Required technical and informational targets found at the beginning and end of each roll of microfilm are listed in item #11 of each microfilm guideline.

In general, it is bad practice to have the microfilming vendor (whether in-house or a service bureau) perform either **file organization** or **purging**. Files are frequently organized in complex ways that the employees may understand but are difficult to explain to the microfilm vendor. The vendor might erroneously purge documents that should have been retained. This could leave the government or agency in a precarious legal position. If the number of documents to be removed is small and if retaining them is not likely to cause legal problems, then film all the records. It is usually less expensive to film these records than to pay staff to purge documents. If there are large volumes of duplicate records and blank forms, it will be economical to purge those items before microfilming. Records that must remain with a file but that are not to be microfilmed should be carefully marked so that the camera operator will not film them.

It is usual practice for the microfilming vendor to remove staples and paper clips, repair torn sheets, flatten folded or rolled documents, and produce required information targets. The cost of this work is usually included in the cost of microfilming, although special problems such as mending a quantity of torn paper, flattening many folded or rolled documents, etc., may make it worthwhile to separate the pricing of this work from the pricing of the microfilming. Please note that the purpose of separating out the pricing is to establish a more accurate estimate, not to provide the microfilming contractor with a means for maximizing revenue. A government or agency that feels it can do this work as well as the microfilming contractor, and at substantially lower cost, may wish to exclude the cost from the microfilming bid, with two reservations:

- a. The quality of the work must be acceptable to the microfilming contractor (failing this the work will have to be done all over again, which eliminates any savings).
- b. Special care must be taken, when transporting loose documents, to avoid any shuffling of the documents (in a records series that is even moderately large, shuffling documents is equivalent to losing them forever).

12. Usage

Records usage will help determine the kind of retrieval and storage systems needed for the microfilmed records. For instance, if a government or agency has many users at several different (and distant) locations, and a heavy daily volume of retrievals, it may make sense to purchase *for each location* a duplicate of the microfilm, microfilm readers or reader-printers, and storage equipment. If, however, the government or agency has the same situation, but with a low daily

retrieval rate, it may make more sense to establish a central station to retrieve documents for all users, and to send the documents to remote locations by mail or fax.

You will also want to consider if the microfilm will be used in conjunction with other paper or electronic records. Will an entire file be used, or only individual documents within the file? To the extent possible, you should base your estimates of usage on available figures: most governments or agencies try to keep statistics of *how many users* request *what kind of information* and *how often*. Describing who the users are may require watching the existing operation and "interviewing" both who retrieves the records and who uses the records (they are sometimes, but by no means always, the same people). If the retrieval system now in place is excessively time-consuming, difficult to use, and/or has a high rate of complaints (such as "I can't find this document"), you will add to your reasons to undertake a systematic review of your filing system.

13. Microfilm Format

You, the government or agency, must decide this; you can seek advice from State Archives advisory staff (or from the Office of Court Administration's Micrographics Coordinator, if this records series falls under OCA's jurisdiction). Asking microfilming vendors for advice on this matter is delicate, for several reasons: first, the choice of format will affect their pricing (this may even constitute a conflict of interest under your government's or agency's procurement regulations); second, no vendor, however well-intentioned, knows your records as well as you do; third, some vendor representatives are strictly salespeople, with minimal understanding of microfilming technology, and their advice may lead you astray.

The microfilm format will affect filming techniques, camera adjustments and image arrangement of the microfilm. For example, for the use copy of large format drawings an aperture card might be appropriate. For case files, a use copy in microfiche format might be appropriate (as described below). Many governments or agencies now use Computer Assisted Retrieval (CAR) systems. These indexing systems, used primarily with 16mm roll film, have reduced the need for producing microfiche and aperture card formats for use copies of microfilm. Careful analysis of microfilm use will help you accurately project the number and types of microfilm formats needed.

On the first part (A) of the **Microfilm Format** section:

- Common office documents in letter, legal, or computer printout sizes are best microfilmed on 16mm microfilm. Should these records be bound, you will almost always get a better microfilm image at a lower cost by having records disbound for microfilming and later having them treated and boxed or re-bound, if they have sufficient intrinsic value to warrant the expense.
- In rare cases **and only as a last resort**, bound documents, the **bindings** of which are intrinsically so valuable that they cannot be disassembled, should be microfilmed in a book cradle, on 35mm film.
- Finally, large maps and drawings (usually larger than 11" x 14") must be microfilmed on 35mm film (using a special "engineering" camera).

On the second part (B) of the **Microfilm Format** section:

- On rare occasions, a government or agency may require the addition of a duplicate silver negative for extremely valuable records.

On the third part (C) of the **Microfilm Format** section:

- Use only duplicates ("diaz duplicates") of the camera film for retrieval; one of the benefits of microfilm is the relatively low cost of producing and distributing multiple copies. You might, for instance, need to retrieve the same records at different locations.

Microfilming projects funded by a grant from the [Local Government Records Management Improvement Fund \(LGRMIF\)](#) require the local government to supply the State Archives with a diazo duplicate of selected records series as outlined in grant application materials.

- Certain microfilm systems use sheet microfilm, known collectively as microfiche, to group together all the documents relating to one file. One of several methods of producing microfiche is to cut a roll of microfilm into segments of related documents, insert the segments into a clear plastic sandwich called a "jacket," then print a microfiche from this jacket.

Appendix C

Microfilm Production Guideline: Planetary Cameras, 16mm Office Documents

Changes

These microfilm guidelines were first produced in 1994. Listed below are the changes since the 1994 edition.

[Par. 4](#) Base plus fog changed to 0.08.

[Par. 5](#) Resolution changed to 5.0.

[Par. 6.1](#) NEW. Adds provision for 130 foot rolls of film.

[Par. 11b and c](#) Removed option of combining eye-legible START and ROLL NUMBER targets. They should be separate. Now says "f. through h. above may be combined into one target", changed from "f. through g."

[Par. 16](#) Now sets minimum resolution for duplicates. Other changes for clarity and correctness.

[Par. 27](#) "Purchaser" changed to "government/agency."

This guideline is not a specification and should not be used as such. Governments/agencies need to complete the *File Information Form* ([Appendix A](#)) for each records series to be microfilmed and add the following essential eleven items:

- Name of government/agency
- Name of records series
- Total number of images
- Condition of records series (document sizes, type, single- or double-sided, color and age of paper, type of fasteners, what percentage of documents are flat, rolled, or folded, current document storage conditions, type and color of imprint)
- Preparation requirements
- Order of filming: general arrangement of records, targeting, etc.
- Format (roll, jackets, etc.)
- Microform numbering (roll number, jacket labeling, etc.)
- Number of duplicates and film types (silver, diazo, etc.) required
- Delivery information (date, destination, etc.)
- Additional deviations from this guideline as necessary to accommodate the needs of each records series

Packaged together, the appropriate microfilm guideline(s), the File Information Form(s), and the supplemental requirements outlined above can form a microfilm specification. The specification document provides the essential technical requirements for items, materials, and services, and procedures that will determine whether or not the requirements have been met. The specification should be incorporated into the standard contractual documents used by governments or agencies and for review by legal counsel.

SCOPE: These guidelines provide the parameters to produce and inspect microfilm of office documents produced on 16mm tabletop planetary cameras. The contents of this document are based on national microfilm standards and industry practices, such as ANSI/AIIM MS-23, AIIM and TR-02. All references to industry standards (ANSI, AIIM, etc.) are the latest revision thereof, on the date of the Invitation for Bids (IFB) (see attached list). Contractors performing microfilm work for local governments under the Local Government Records Management Improvement Fund should be able to meet these guidelines without difficulty. Contracts for microfilming records under the jurisdiction of the Office of Court Administration (OCA) must comply with OCA microfilming guidelines. For further information concerning OCA guidelines, contact the State of New York Unified Court System, Office of Court Administration, Division of Court Operations, 25 Beaver Street, Suite 883, New York, NY 10004-2310, phone 212-428-2875, and fax 212-428-2880.

1. **REDUCTION RATIO:** Maximum 32x.

2. *Intentionally left blank.*

3. **BACKGROUND DENSITY RANGE, CAMERA FILM: 0.80 to 1.20**, measured as visual diffuse transmission density in accordance with ANSI PH2.19. Background density applies to all images.

4. **BASE PLUS FOG** (Dmin): Dmin shall not exceed 0.08.

5. **RESOLUTION:** At 24x, 5.0 chartpattern; at 32x, 4.0 chart pattern. Resolution must be read from corner to center to corner in all directions, on all test charts.

6. **CAMERA FILM:** 16mm x 100 feet x 5mil thick, non-perforated, polyester, high-contrast (gamma 3.0 to 4.0) panchromatic film preferred. Film shall be in accordance with ANSI IT9.1.

7. **IMAGE ORIENTATION:** comic or cine mode, whichever yields lower reduction ratio.

8. **FILM STABILITY:** All silver gelatin film shall be monitored for stability in accordance with ANSI IT9.1. A sample of clear film shall be subjected to the methylene blue test, procedure 2 (high range thiosulfate) for residual thiosulfate ion, in accordance with ANSI PH4.8 (re ANSI IT9.1, table 4, 0.14 g/m² max.). The test shall be performed by an independent test laboratory, subject to the approval of the government/agency. Each processor employed for this project shall be tested once weekly, preferably when the microfilm covered by these guidelines is processed. The original test certificate shall be mailed directly to the local government. The stability of the film is tested by sampling; therefore, failure of the test will require refilming all microfilm in the untested batches that precede and follow the failed sample.

9. *Intentionally left blank.*

10. *Intentionally left blank.*

11. TARGETING AND SEQUENCE:

a. Clear leader, 24" minimum

b. START target (eye-legible)

c. ROLL NUMBER (eye-legible)

(b. and c. above may be combined into one target)

d. State Archives Inventory Worksheet (Form LGRB-5), if applicable

e. State Archives File Information for Microfilming Paper Records (if applicable)

f. Government's/agency's name and address

g. Contractor's name and address, date filmed, reduction ratio, film manufacturer, type, expiration date and batch number

h. Certification target signed by the camera operator

(f. through h. above may be combined into one target)

i. Declaration by records custodian

j. Density target: the optimum density target is a full-frame image, using blank paper that matches the record in color and reflectance density. Every effort should be made to use a blank sheet from the actual record. In the event this is not available, a clean, blank, color-matched 20-pound bond sheet may be substituted

k. Resolution target: ANSI/AIIM MS51, or equivalent

l. Residual thiosulfate test certificate: A copy of the certificate (see paragraph 8) that precedes the filming date by a maximum of two (2) weeks (one week preferred)

START RECORDS

m. Indices and finding aids precede the documents, if supplied by local government, or added by vendors. *START FILE* target shall be used to separate individual existing folders when specified by government or agency

n. Defect targets indicate defects to records as appropriate. Typical targets: *DAMAGED DOCUMENT, MISSING DOCUMENT, POOR QUALITY DOCUMENT*, etc.

END OF RECORDS

o. Density target (same as **j** above)

p. Resolution target (same as **k** above)

q. Residual thiosulfate test certificate (same as **l** above)

r. ROLL NUMBER, eye-legible

s. END target, eye-legible

t. Clear trailer, 24" minimum

11.1 The complete microfilm specifications for this project, including these guidelines, shall be filmed at the beginning of the first roll of this records series. In the case of an ongoing filming program, the specifications will be microfilmed at the beginning of the first roll of the year, whether calendar or fiscal. When filmed, the specifications shall be placed after State Archives File Information Required for Microfilming Paper Records (item **11.e** above).

12. **IMAGE SPACING:** 10mm (also known as "pulldown," this is the distance between corresponding points on two successive frames).

13. **RETRIEVAL AIDS:** Image marks ("blips"), in accordance with ANSI/AIIM MS8, shall be provided for all 16mm roll film applications.

13.1 (The following requirement shall not apply when roll film is reformatted into jackets, or when the documents are pre-numbered and when this numbering system shall be used for retrieval). Sequential frame numbers shall be provided, starting with 1 (or 0001) at the beginning of each roll (including the identification target), and shall continue sequentially through the roll without variation. The last frame number shall be equal to the number of frames on the roll.

14. **JACKETS:** (this paragraph applies only to jacket systems).

Warning

First-generation silver gelatin microfilm (camera film) shall not be jacketed.

- a. **Indexing:** Jacket indexing shall be machine-printed, 10 pitch, dense black opaque characters (fifty-three characters and spaces maximum). There shall be 1/4" minimum clearance to both edges. All letters shall be capital letters. Characters shall be vertically centered in the index space within .03".
- b. **Format:** Overall size: 105mm x 148mm, as per ANSI/AIIM MS11, with five 16mm chambers.
- c. **Loading:** Insert film with sensitized side in contact with the thin wall (contact sheet) of the jacket. Film strips shall have a minimum clearance of 5mm (1/8") from both edges of the jacket.
- d. **Target jackets:** Identification and inspection targets (paragraph 11) shall be inserted into jackets in roll number sequential order, one roll per jacket chamber. Target jackets shall be delivered in separate envelopes with the associated jacket delivery.

15. **SPLICING:** Splices shall comply with ANSI/AIIM MS 18.

- a. Only ultrasonic-weld splices shall be used.
- b. There shall be no more than two splices per 100 foot roll.
- c. Splicing shall be placed only in the clear leader at the beginning of the roll.
- d. Targeting described in [paragraph 11](#) shall be reproduced in the retake, with the exception that 11.b shall read *START RETAKE*, and 11.s. shall read *END RETAKE*.
- e. Splicing technical targets is prohibited.

16. **FILM DUPLICATES**

16.1 The maximum allowance of resolution loss on the duplicate shall not exceed one pattern from the camera original.

16.2 Diazo (best for reader service use).

- a. Base: polyester, 4.0mil thick
- b. Size: 16mm x 100 feet or 16mm x 130 feet (for microfiche or jackets: 105mm X 148mm x 5mil thick)
- c. Bar-gamma range: 1.10 to 1.49

d. Dmax range: 1.50 to 1.80

e. Dmin range: burn-out density plus 0.05 to 0.09. Example: typical burn-out density of 0.05 should result in a Dmin of 0.10 to 0.14

f. Title backing for duplicate microfiche: white.

16.3 Silver (should not be used in a reader, only for storage and printing)

a. Base: polyester, (4.0mil thick)

b. Size: 16mm x 100 feet or 16mm x 130 feet

c. Film should be sign maintaining, negative to negative, such as Kodak 2468 and 2470. Sign reversing films, such as Kodak 2462, should not be used unless a positive appearing image is mandatory.

d. Dmin range: 2468 - 0.10 to 0.15; 2470 - 0.15 to 0.25; 2462 - less than 0.16, Dmax = 1.20 - 1.60

17. **EMULSION ORIENTATION:** Emulsion shall be oriented as specified in ANSI/AIIM MS 14.

18. *Intentionally left blank.*

19. **PACKAGING:** Silver gelatin camera film shall be on spools as per ANSI PH1.33. Film shall be in closed plastic boxes suitable for permanent storage as per ANSI IT9.2. Spools shall fit into boxes loosely, without binding or pressure.

19.1 Duplicate film copies shall be packaged as follows: all reels in plastic boxes, in accordance with ANSI/AIIM MS 34, the film trailer secured to the hub with plastic trailer holders. All cartridges, in accordance with ANSI/AIIM MS 15.

19.2 Microfiche/jackets and duplicates, packaged separately, shall be delivered to the local government in boxes.

20. **PACKAGE MARKING:** The following data, machine-printed on plain white permanent adhesive labels, shall appear on each roll package edge:

Government /Agency

Records Series Title / Date and/or Subject

Film Type: SILVER ORIG. or SILVER DUPL. or DIAZO

Roll Number

20.1 Side label data: same as above. The contractor's name shall appear on the package side label, lower edge only, no more than thirty characters; maximum character height 1/16".

21. **DOCUMENT FLATNESS:** Folded and rolled documents shall be microfilmed absolutely flat and shadow-free. The bottom surface of each document shall be totally in contact with the camera copy board working surface.

22. **QUALITY OF WORK:** Each frame of microfilm shall be exposed and processed so that every line and character on the document appears on the microfilm. Film shall be free of scratches, holes in the emulsion or base, tears, finger marks, or any other defect that might adversely affect quality.

23. **CONTRACTOR INSPECTION:** Each roll of first-generation silver gelatin microfilm shall be inspected by the contractor for compliance with the requirements herein. As a minimum, each roll of film shall be inspected for resolution, density, processing quality, and general workmanship. A contractor's inspection report for each roll of microfilm shall be included in each shipment.

24. **QUALITY CONTROL:** Images that, upon inspection, do not meet the requirements of these guidelines will be defined as defective, and must be refiled at the contractor's expense. If the number of defective images does not exceed one image in 500 (five images per roll of 2,500 images), the defective images may be filmed as retakes in accordance with [paragraph 15](#) (SPLICING) of these guidelines. If the number of defective images exceeds one image in 500, the entire roll must be refiled.

24.1 First-generation silver gelatin microfilm (camera film) shall be delivered for inspection, **before duplication**, to the government's or agency's inspection agent.

24.2 Note that certain requirements, such as [paragraph 1](#), REDUCTION RATIO; [paragraph 5](#), RESOLUTION; [paragraph 15](#), SPLICING; etc., apply to the entire roll of microfilm. Should a roll of microfilm fail to meet the requirements described in these and similar paragraphs, the entire roll of microfilm must be refiled, despite the number of defective images.

25. **REJECTION OF FIRST-GENERATION SILVER GELATIN MICROFILM:** When an entire roll of film is rejected by the government or agency or a government's or agency's inspection agent, the rejects may be defaced by punching a clearly defined hole approximately 1/4" in diameter through the microfilm image or *START* target, without deleting the image or unit identification; or the entire leader up to the first frame can be cut from the roll. Rejected film may be retained by the government/agency.

26. **SHIPMENT OF FILM FOR INSPECTION:** Film shall be shipped in reusable fiber cases. Cases remain the property of the filming contractor. Recommended case construction:

- a. Size (large box): 15" x 12.5" x 4"; nominal inside dimensions' capacity: (42) 16mm rolls.
- b. Size (small box): 15" x 8.5" x 4"; nominal inside dimensions' capacity: (28) 16mm rolls.
- c. Mail card holder with reversible mailing card for convenient return shipment.

d. Metal reinforced corners.

e. Adjustable cross-straps, two minimum.

26.1 The film must be packed so that all edge labels are visible and facing the same direction.

26.2 Each film shipment shall include the following:

a. Detailed packing slip, in duplicate.

b. Photocopy of the most recent methylene blue test results.

c. Copy of the contractor's film inspection report (see [paragraph 23](#)).

26.3 Shipment by express service only. The shipment must be insured for replacement costs, payable to the contractor, in both directions.

27. VENDOR FACILITIES: Vendor facilities shall be subject to inspection and approval by the representatives of the government/ agency, before and at any time during the performance of a contract, to ensure production and quality control capabilities.

28. FILE INTEGRITY: Unless otherwise specified elsewhere in the contract, the documents shall be maintained in existing file order before, during, and after filming. File material shall be returned to the original storage containers in the same order that existed before filming. Corrections to file order resulting from preparation for filming shall be maintained in the subsequent refile. Fasteners (staples, clips, tape, etc.) removed in preparation should not be restored.

Appendix D

Microfilm Production Guideline: Planetary Cameras, 35mm Bound Documents

Changes

These microfilm guidelines were first produced in 1994. Listed below are the major changes since the 1994 edition.

[Par. 4](#) Base plus fog changed to 0.08.

[Par. 5](#) Adjusted resolution requirements for correctness and consistency.

[Par. 11b and c](#) Removed option of combining eye-legible START and ROLL NUMBER targets. They should be separate.

[Par. 16](#) Now sets minimum resolution for duplicates. Other changes for clarity and correctness.

[Par. 27](#) "Purchaser" changed to "government/agency."

Foreword

Disbinding bound materials is the preferred method of microfilming bound materials. Less desirable is microfilming bound materials in a book cradle. The purpose of using a book cradle is to ensure that the surface of the document and the film plane are kept parallel, and to prevent shadows from obscuring information. Whenever permitted by their size, bound materials shall be microfilmed in a book cradle. The least desirable method of microfilming bound materials is to lie them flat on the copyboard. This may be required when the bound materials are too large to fit in the largest book cradle.

Microfilming facilities should note the inclusion in this specification of density requirements (paragraph 3.2) applicable to the microfilming of negative-appearing documents (i.e., photostats) which are commonly found in local government archives.

Notice

This guideline is **not** a specification and should not be used as such. Governments/agencies need to complete the *File Information Form* ([Appendix A](#)) for each records series to be microfilmed and add the following essential eleven items:

- Name of government/agency
- Name of records series
- Total number of images
- Condition of Record Series (document sizes, type, single- or double-sided, type and condition of binding, color and age of paper, what percentage of documents are flat, rolled or folded, current document storage conditions, type and color of imprint)
- Preparation requirements
- Order of filming: general arrangement of records, targeting, etc.
- Format (roll, etc.)
- Microform numbering (roll number, etc.)
- Number of duplicates and film types (silver, diazo, etc.) required
- Delivery information (date, destination, etc.)
- Additional deviations from these guidelines as necessary to accommodate the needs of each records series

Packaged together, the appropriate microfilm guideline(s), the File Information Form(s), and the supplemental requirements outlined above can form a microfilm specification. The specification document provides the essential technical requirements for items, materials, services, and procedures that will determine whether the requirements have been met. The specification should be incorporated into standard contractual documents used by governments or agencies for review by legal counsel.

SCOPE: These guidelines provide the parameters to inspect microfilm of bound documents produced on 35mm planetary cameras. The contents of this document are based on national microfilm standards and industry practices, such as ANSI/AIIM MS-23 and AIIM TR-02. All references to industry standards (ANSI, AIIM, etc.) are the latest revision thereof, on the date of the Invitation for Bids (IFB). (See reference list at the end of this document.). Contractors performing microfilm work for local governments under the Local Government Records

Management Improvement Fund should be able to meet these guidelines without difficulty. Contracts should note the inclusion in this specification of density requirements (paragraph 3) applicable to the microfilming of negative-appearing documents (i.e., photostats) which are commonly found in local government archives. Contracts for microfilming records under the jurisdiction of the Office of Court Administration (OCA) must comply with OCA microfilming guidelines. For further information concerning OCA guidelines, contact the State of New York Unified Court System, Office of Court Administration, Division of Court Operations, 25 Beaver Street, Suite 883, New York, NY 10004-2310, phone 212-428-2875, and fax 212-428-2880.

1. **REDUCTION RATIO:**

DOCUMENT SIZE; REDUCTION

Up to 18" wide x 24" long; 16x

Up to 24" wide x 36" long; 24x

1.1 A ruler will be positioned in the identification target in accordance with ANSI/AIIM MS24. The ruler may be metal, plastic, paper, or other suitable material with sufficient contrast in the frame to permit test measurements. The ruler is to be calibrated in inches (a metal or plastic tape with black characters on a non-reflective light-color background cut to size may be used).

2. *Intentionally left blank.*

3. **BACKGROUND DENSITY RANGE, CAMERA FILM:** Measured as visual diffuse transmission density in accordance with ANSI PH2.19. Background density applies to all images.

3.1 Background density range for negative-appearing images (positive-appearing originals): 0.80 **to 1.20.**

3.2 Background density range for positive-appearing images (negative-appearing originals, i.e. photostats): 0.15 **to 0.50.**

3.3 **Camera illumination uniformity:** Illumination uniformity shall comply with AIIM MS26. Before the start of the project, contractors shall provide the customer with a one-time test target for each camera to be used in the project at the maximum reduction ratio for this project.

4. **BASE PLUS FOG (Dmin):** Dmin shall not exceed 0.08.

5. **RESOLUTION:** At 16x, 7.1 chart pattern, at 24x, 5.0 chart pattern, at 20x, 6.3 chart pattern.

The five resolution targets (central and four corners) shall conform to ANSI/AIIM MS51. If a reduction ratio between 16x and 24x is used, the resolution requirement for 16x shall apply.

5.1 The patterns shall be resolved on all five target positions. The direction of lines in both groups in each of the test charts shall be distinguishable in accordance with ANSI/AIIM MS23.

5.2 Resolution chart positioning: A minimum of five NBS resolution charts shall be positioned in accordance with ANSI/AIIM MS24. One of the two groups of lines of the chart representing the 5.0 block shall be nominally parallel to the diagonal axis of the lens.

5.3 Resolution chart, photostat microfilming (positive-appearing images): Four (4) negative-appearing resolution charts shall be located at the extreme corners of the image area on diagonal lines in accordance with ANSI/AIIM MS24.

6. CAMERA FILM: 35mm x 100 feet x 5mil thick, non-perforated, polyester, high-contrast (gamma 3.0 to 4.0) panchromatic film. Film shall be in accordance with ANSI IT9.1.

7. IMAGE ORIENTATION: Comic, simplex mode (two pages per frame where applicable).

8. FILM STABILITY: All silver gelatin film shall be monitored for stability in accordance with ANSI IT9.1. A sample of clear film shall be subjected to the methylene blue test, procedure 2 (high-range thiosulfate) for residual thiosulfate ion, in accordance with ANSI PH4.8 (ref. ANSI IT9.1, table 4, 0.14 g/m⁵ max.). The test shall be performed by an independent test laboratory, subject to the approval of the government/agency. Each processor employed for this project shall be tested once weekly, preferably when the microfilm covered by these guidelines is processed. The original test certificate shall be mailed directly to the local government. The stability of the film is tested by sampling; therefore, failure of the test will require refilming all microfilm in the untested batches that precede and follow the failed sample.

9. FORMAT FOR MULTIPLE SHEET DRAWINGS: The section on "Document Placement" of ANSI/AIIM MS32 applies.

10. MULTIPLE FRAME IDENTIFICATION: The section on "Document Placement" of ANSI/AIIM MS32 applies, except as indicated in paragraph 10.1.

10.1 Oversized documents: Documents that require multiple frames will be identified by consecutive frame numbers as shown in ANSI/AIIM MS32, Figures 5, 6, & 7. Preferred numbering sequence is from left (upper left corner of document) to right. The first frame of a series will be numbered F1, followed by F2, F3, etc.

11. TARGETING AND SEQUENCE:

- a. Clear leader, 24" minimum
- b. START target (eye-legible)
- c. ROLL NUMBER (eye-legible)
(b. and c. above may be combined into one target)
- d. *State Archives Inventory Worksheet* (Form LGRB-5)

- e. State Archives [File Information Required for Microfilming Paper Records](#)
- f. Government's/agency's name and address
- g. Contractor's name and address, date filmed, reduction ratio, film manufacturer, type, expiration date, and batch number
- h. Certification target signed by the camera operator
(*f. through h. above may be combined into one target*)
- i. Declaration by records custodian
- j. Intentionally left blank.
- k. Resolution target: ANSI/AIIM MS51, or equivalent
- l. Residual thiosulfate test certificate: A copy of the certificate (see [paragraph 8](#)) that precedes the filming date by a maximum of two (2) weeks (one week preferred)

START RECORDS

- m. Indices and finding aids precede the documents, if supplied by the local government, or added by vendors. A START FILE target shall be used to separate individual existing files when specified by local government
- n. Defect targets indicate defects to records as appropriate. Typical targets:
DAMAGED DOCUMENT, TIGHT GUTTER, MISSING DOCUMENT, PAGE MISSING AT TIME OF FILMING, POOR QUALITY DOCUMENT, etc.

END OF RECORDS

- o. Intentionally left blank*
- p. Resolution target (same as k above)
- q. Residual thiosulfate test certificate (same as l above)
- r. ROLL NUMBER (eye-legible)
- s. END target (eye-legible)
- t. Clear trailer, 24" minimum

11.1 The complete microfilm specifications for this project, including these guidelines, shall be filmed at the beginning of the first roll of this records series. In the case of an ongoing filming project, the specifications will be microfilmed at the beginning of the first roll of the year,

whether calendar or fiscal. When filmed, the specifications shall be placed after State Archives *File Information Required for Microfilming Paper Records* ([item 11.e above](#)).

12. **IMAGE SPACING:** The distance between the trailing edge of one frame and the leading edge of the succeeding frame shall be not less than 2mm and shall not exceed 5mm.

13. **RETRIEVAL AIDS:** (This requirement shall not apply when the documents are pre-numbered and when this numbering system shall be used for retrieval). Sequential frame numbers shall be provided for all 35mm roll film applications. This number shall be positioned consistently throughout the record series. The numbers microfilmed shall be of adequate height so as to be legible when viewed on a 20:1 viewer. Numbers shall be sequentially assigned, starting with 1 (or 0001) at the beginning of each roll (including the identification target), and shall continue sequentially through the roll without variation. The last frame number shall be equal to the number of frames on the roll. Most automatic frame-numbering devices normally available as camera accessories are considered adequate for index numbering as required herein.

14. *Intentionally left blank.*

15. **SPLICING:** Splices shall comply with ANSI/AIIM MS 18.

a. Only ultrasonic-weld splices shall be used.

b. There shall be no more than two splices per 100 foot roll.

c. Splicing shall be placed only in the clear leader at the beginning of the roll.

d. Targeting described in [paragraph 11](#) shall be reproduced in the retake, with the exception that 11.b. shall read START RETAKE, and 11.s. shall read END RETAKE.

e. Splicing technical targets is prohibited.

16. **FILM DUPLICATES**

16.1 The maximum allowance of resolution loss on the duplicate shall not exceed one pattern from the camera original.

16.2 **Diazo** (best for reader service use)

a. Base: polyester, (4.0mil thick)

b. Size: 35mm x 100 feet

c. Bar-gamma range: 1.10 to 1.49

d Dmax range: 1.50 to 1.80

e. Dmin range: burn-out density plus 0.05 to 0.09. Example: a typical burn-out density of 0.05 should result in a Dmin of 0.10 to 0.14

f. Title backing for duplicate microfiche: white.

16.3 **Silver** (should not be used in a reader, only for storage and printing).

a. Base: polyester, (4.0mil thick)

b. Size: 35mm x 100 feet

c. Film should be sign-maintaining, negative to negative, such as Kodak 2468 and 2470. Sign-reversing films, such as Kodak 2462, should not be used unless a positive appearing image is mandatory.

d. Dmin range: 2468 - 0.10 to 0.15; 2470 - 0.15 to 0.25; 2462 - less than 0.16, Dmax = 1.201.60

17. **EMULSION ORIENTATION:** Emulsion shall be oriented as specified in ANSI/AIIM MS 14.

18. **BOOK CRADLE:**

18.1 The microfilm camera shall be focused to the underside of the book cradle's glass platen, and meet the requirements of [paragraph 5](#), RESOLUTION.

18.2 The book cradle shall maintain the bound materials pressed flat against the glass platen, such that no shadows shall obscure information.

18.3 If it is not possible to use a book cradle, the microfilm camera must be able to focus on the full range of book thickness, and meet the requirements of [paragraph 5](#), RESOLUTION.

19. **PACKAGING:** Silver-gelatin camera film shall be on spools as per ANSI PH1.33. Film shall be in closed plastic boxes suitable for permanent storage as per ANSI IT9.2. Spools shall fit into boxes loosely, without binding or pressure.

19.1 Duplicate film copies shall be packaged as follows: all reels in plastic boxes, in accordance with ANSI/AIIM MS 34, the film trailer secured to the hub with plastic trailer holders.

20. **PACKAGE MARKING:** The following data, machine-printed on plain white permanent adhesive labels, shall appear on each roll package edge:

Government /Agency

Records Series Title / Date and/or Subject

Film Type: SILVER ORIG. or SILVER DUPL. or DIAZO

Roll Number

20.1 Side label data: same as above. The contractor's name shall appear on the package side label, lower edge only, no more than thirty characters; maximum character height 1/16".

21. *Intentionally left blank.*

22. **QUALITY OF WORK:** Each frame of microfilm shall be exposed and processed so that every line and character on the document appears on the microfilm. Film shall be free of scratches, holes in the emulsion or base, tears, finger marks, or any other defect that might adversely affect quality.

23. **CONTRACTOR INSPECTION:** Each roll of first-generation silver gelatin microfilm shall be inspected by the contractor for compliance with the requirements herein. As a minimum, each roll of film shall be inspected for resolution, density, processing quality, and general workmanship. A contractor inspection report for each roll of microfilm shall be included in each shipment.

24. **QUALITY CONTROL:** Images that, upon inspection, do not meet the requirements of these guidelines, will be defined as defective, and must be refilmed at the contractor's expense. If the number of defective images does not exceed one image in 500, the **defective** images may be filmed as a retake in accordance with paragraph 15, SPLICING. If the number of defective images exceeds one image in 500, the entire roll must be refilmed.

24.1 First-generation silver gelatin microfilm (camera film) shall be delivered for inspection, **before duplication**, to the government's or agency's inspection agent.

24.2 Note that certain requirements, such as [paragraph 1](#), REDUCTION RATIO, [paragraph 5](#), RESOLUTION, [paragraph 15](#), SPLICING, etc., apply to the entire roll of microfilm. Should a roll of microfilm fail to meet the requirements described in these and similar paragraphs, the entire roll of microfilm must be refilmed, despite the number of defective images.

24.3 Re-microfilming documents in rejected frames: Documents in rejected frames shall be re-microfilmed. When any frame of a roll-size drawing (such as a foldout map) or any sheet of a multi-sheet drawing being microfilmed is rejected, the entire drawing or sheet shall be re-microfilmed.

25. **REJECTION OF FIRST-GENERATION SILVER GELATIN MICROFILM:** When an entire roll of film is rejected by the government or agency or the government's or agency's inspection agent, the rejects may be defaced by punching a clearly defined hole approximately 1/4" in diameter through the microfilm image or START target, without deleting the image or unit identification; or the entire leader up to the first frame can be cut from the roll. Rejected film may be retained by the government/agency.

26. **SHIPMENT OF FILM FOR INSPECTION:** Film shall be shipped in reusable fiber cases. Cases remain the property of the filming contractor. Recommended case construction:

a. Size (large box): 15" x 12.5" x 4"; nominal inside dimensions' capacity: (20) 35mm rolls.

b. Size (small box): 15" x 8.5" x 4"; nominal inside dimensions' capacity: (14) 35mm rolls.

c. Mail card holder with reversible mailing card for convenient return shipment.

d. Metal reinforced corners.

e. Adjustable cross-straps, two minimum.

26.1 The film must be packed so that all edge labels are visible and facing the same direction.

26.2 Each film shipment shall include the following:

a. Detailed packing slip, in duplicate.

b. Photocopy of the most recent methylene blue test results.

c. Copy of the contractor's film inspection report (see [paragraph 23](#)).

26.3 Shipment by express service only. The shipment must be insured for replacement costs, payable to the contractor, in both directions.

27. **VENDOR FACILITIES:** Vendor facilities shall be subject to inspection and approval by the representatives of the government/agency, before and at any time during, the performance of a contract, to ensure production and quality control capabilities.

28. **FILE INTEGRITY:** Unless otherwise specified elsewhere in the contract, the documents shall be maintained in existing file order before, during, and after filming. File material shall be returned to the original storage containers in the same order that existed before filming. Corrections to file order resulting from preparation for filming shall be maintained in the subsequent refiling. Fasteners (staples, clips, tape, etc.) removed in preparation should not be restored.

Appendix E

Microfilm Production Guideline: Planetary Cameras, 35mm Architectural, Engineering, and Topographical Drawings

Changes

These microfilm guidelines were first produced in 1994. Listed below are the major changes since the 1994 edition.

[Par. 4](#) Base plus fog changed to 0.08.

[Par. 5](#) Adjusted resolution requirements for correctness and consistency.

[Par. 11b and c](#) Removed option of combining eye-legible START and ROLL NUMBER targets. They should be separate.

[Par. 16](#) Now sets minimum resolution for duplicates. Other changes for clarity and correctness.

[Par. 27](#) "Purchaser" changed to "government/agency".

Foreword

We acknowledge the contributions of ANSI/AIIM MS32, and of military specification MIL-M-9868, to the following document. Care has been taken to relax those requirements of the military specification that are not fully applicable to projects of a local nature. Nevertheless, we recognize that the vast experience of the military with respect to sequence of frames, positioning of documents, format for large sheets, and general workmanship are too valuable to disregard. Microfilm facilities familiar with the filming requirements of MIL-M-9868 may continue to follow their normal procedures, taking advantage of reduced requirements with respect to density, resolution, indexing, etc.

Microfilming facilities should note the inclusion in this specification of density requirements (paragraph 3.2) applicable to the microfilming of negative-appearing documents (i.e., blueprints and photostats) which are commonly found in local government archives.

Notice

This guideline is not a specification and should not be used as such. Governments or agencies need to complete the *File Information Form* ([Appendix A](#)) for each records series to be microfilmed and add the following essential eleven items:

- Name of government/agency
- Name of records series
- Total number of images
- Condition of records series (document sizes, type, single- or double-sided, color and age of paper, type of fasteners, what percentage of documents are flat, rolled, or folded, current document storage conditions, type and color of imprint)
- Preparation requirements
- Order of filming: general arrangement of records, targeting, etc.
- Format (roll, jackets, etc.)
- Microform numbering (roll number, jacket labeling, etc.)
- Number of duplicates and film types (silver, diazo, etc.) required
- Delivery information (date, destination, etc.)
- Additional deviations from this guideline as necessary to accommodate the needs of each records series

Packaged together, the appropriate microfilm guideline(s), the File Information Form(s), and the supplemental requirements outlined above can form a microfilm specification. The specification document provides the essential technical requirements for items, materials, services, and

procedures that will determine whether or not the requirements have been met. The specification should be incorporated into standard contractual documents used by governments or agencies for review by legal counsel.

SCOPE: These guidelines provide the parameters to produce and inspect microfilm produced on 35mm engineering planetary cameras. The contents of this document are based upon national microfilm standards and industry practices, such as ANSI/AIIM MS-23 and AIIM TR-02. All references to industry standards (ANSI, AIIM, etc., see Appendix G) shall be to the latest revision thereof, on the date of the Invitation for Bids (IFB). Contractors performing microfilm work for local governments under the Local Government Records Management Improvement Fund should be able to meet these guidelines without difficulty. Contracts should note the inclusion in this specification of density requirements (paragraph 3) applicable to the microfilming of negative-appearing documents (i.e., blueprints and photostats) which are commonly found in local government archives. Contracts for microfilming records under the jurisdiction of the [Office of Court Administration \(OCA\)](#) must comply with OCA microfilming guidelines. You can also contact the State of New York Unified Court System, Office of Court Administration, Division of Court Operations, 25 Beaver Street, Suite 883, New York, NY 10004-2310, phone 212-428-2875, and fax 212-428-2880.

1. **REDUCTION RATIO:** The reduction ratio used to microfilm engineering documents shall be in accordance with:

DOCUMENT SIZE; REDUCTION

Up to 18" wide x 24" long (A, B & C); 16x

18" to 24" " to 36" long (D); 24x

24" to 36" wide x 36" to 48.4" long (E & F); 30x

24" to 36" wide but greater than 48" long (G, H & J); 30x multi-frame greater than 36" wide but less than 48" wide (rotate 90E)(K)

1.1 A ruler will be positioned in the identification target in accordance with ANSI/AIIM MS24. The ruler may be metal, plastic, paper, or other suitable material with sufficient contrast in the frame to permit test measurements. The ruler is to be calibrated in inches (a metal or plastic tape with black characters on a non-reflective light-color background cut to size may be used).

2. **FRAME** (Document image area, centering, frame pitch [spacing]): ANSI/AIIM MS32 applies.

3. **BACKGROUND DENSITY RANGE, CAMERA FILM:** Measured as visual diffuse transmission density in accordance with ANSI PH2.19. Background density applies to all images.

3.1 Background density range for negative-appearing images (positive-appearing originals): **0.80 to 1.20.**

3.2 Background density range for positive-appearing images (negative-appearing originals, i.e. blueprints): **0.15 to 0.50.**

3.3 Camera illumination uniformity: Illumination uniformity shall comply with AIIM MS26. Contractors shall provide the customer with a one-time test target for each camera to be used in the project at the maximum reduction ratio, before the start of the project.

4. BASE PLUS FOG (Dmin): Dmin shall not exceed 0.08.

5. RESOLUTION: At 16x, 7.1 chart pattern; at 24x, 5.0 chart pattern; at 30x, 4.0 chart pattern.

The five resolution targets (central and four corners) shall conform to ANSI/AIIM MS51.

5.1 The patterns shall be resolved on all five target positions. The direction of lines in both groups in each of the test charts shall be distinguishable in accordance with ANSI/AIIM MS23.

5.2 Resolution chart positioning: A minimum of five NBS resolution charts shall be positioned in accordance with ANSI/AIIM MS24. One of the two groups of lines of the chart representing the 4.0 block shall be nominally parallel to the diagonal axis of the lens.

5.3 Resolution chart, photostat microfilming (positive-appearing images): Four (4) negative-appearing resolution charts shall be located at the extreme corners of the image area on diagonal lines in accordance with ANSI/AIIM MS24.

6. CAMERA FILM: 35mm x 100 feet x 5mil thick, non-perforated, polyester, high-contrast (gamma 3.0 to 4.0) panchromatic film, and in accordance with ANSI IT9.1.

7. IMAGE ORIENTATION: Comic, simplex mode.

8. FILM STABILITY: All silver gelatin film shall be monitored for stability in accordance with ANSI IT9.1. A sample of clear film shall be subjected to the methylene blue test, procedure 2 (high range thiosulfate) for residual thiosulfate ion, in accordance with ANSI PH4.8 (ref ANSI IT9.1, table 4, 0.14 g/m⁵ max.). The test shall be performed by an independent test laboratory, subject to the approval of the government/agency. Each processor employed for this project shall be tested once weekly, preferably when the microfilm covered by these guidelines is processed. The original test certificate shall be mailed directly to the government/agency. The stability of the film is tested by sampling; therefore, failure of the test will require re-filming all microfilm in the untested batches that precede and follow the failed sample.

9. FORMAT FOR MULTIPLE SHEET DRAWINGS: The section on "Document Placement" of ANSI/AIIM MS32 applies.

10. MULTIPLE FRAME IDENTIFICATION: The section on "Document Placement" of ANSI/AIIM MS32 applies, except as indicated in paragraph 10.1.

10.1 Oversized Documents: Documents that require multiple frames will be identified by consecutive frame numbers as shown in ANSI/AIIM MS32, Figures 5, 6, & 7. Preferred

numbering sequence is from left (upper left corner of document) to right. The first frame of a series will be numbered F1, followed by F2, F3, etc.

11. TARGETING AND SEQUENCE:

- a. Clear leader, 24" minimum
- b. START target (eye-legible)
- c. ROLL NUMBER (eye-legible)
(b. and c. above may be combined into one target)
- d. State Archives *Inventory Worksheet* (form LGRB-5)
- e. State Archives [*File Information Required for Microfilming Paper Records*](#)
- f. Government/agency name and address
- g. Contractor's name and address, date filmed, reduction ratio, film manufacturer, type, expiration date, and batch number
- h. Certification target signed by the camera operator
(*f. through h. above may be combined into one target*)
- i. Declaration by records custodian
- j. *Intentionally left blank.*
- k. Resolution target: ANSI/AIIM MS51, or equivalent
- l. Residual thiosulfate test certificate: A copy of the certificate (see [paragraph 8](#)) that precedes the filming date by a maximum of two (2) weeks (one week preferred)

START RECORDS

- m. Indexes and finding aids precede the documents, if supplied by local government, or added by vendors. START FILE target shall be used to separate individual existing files when specified by government/agency
- n. Defect targets indicate defects to local government's records as appropriate. Typical targets: DAMAGED DOCUMENT, MISSING DOCUMENT, SHEET MISSING AT TIME OF FILMING, POOR QUALITY DOCUMENT, etc.

END OF RECORDS

- o. *Intentionally left blank.*

- p. Resolution target (same as k above)
- q. Residual thiosulfate test certificate (same as l above)
- r. ROLL NUMBER (eye-legible)
- s. END target (eye-legible)
- t. Clear trailer, 24" minimum

11.1 The complete microfilm specifications for this project, including these guidelines, shall be filmed at the beginning of the first roll of this record series. In the case of an ongoing filming program, the specifications will be microfilmed at the beginning of the first roll of the year, whether calendar or fiscal. When filmed, the specifications shall be placed after State Archives *File Information Required for Microfilming Paper Records* ([item 11.e above](#)).

12. **IMAGE SPACING:** The distance between the trailing edge of one frame and the leading edge of the succeeding frame shall be 2" + .06" - .00" (also known as "pulldown," this is the distance between corresponding points on two successive frames).

13. **RETRIEVAL AIDS:** (This requirement is not applicable when roll film is reformatted into jackets, or when the documents are pre-numbered and this numbering system shall be used for retrieval). Sequential frame numbers shall be provided for all 35mm roll film applications. This number shall be positioned in the frame just below the center edge of the document, except that documents covering the full frame shall have the number placed in an area on the document as close to the lower edge as possible, without obscuring any significant detail. The numbers microfilmed shall be of adequate height so as to be legible when viewed on a 20:1 viewer. Numbers shall be sequentially assigned, starting with 1 (or 001) at the beginning of each roll (including the identification target), and shall continue sequentially through the roll without variation. The last frame number shall be equal to the number of frames on the roll. Most automatic frame-numbering devices normally available as camera accessories are considered adequate for index numbering as required herein.

14. **JACKETS:** (this paragraph applies only to jacket systems)

a. **Indexing:** Jacket indexing shall be machine printed, 10 pitch, dense black opaque characters (fifty-three characters and spaces maximum). There shall be 1/4" minimum clearance to both edges. All letters shall be capital letters. Characters shall be vertical-ly centered in the index space within .03".

b. **Format:** Overall size: 105mm x 148mm, as per ANSI/AIIM MS11; two 35mm chambers.

c. **Loading:** Insert film with sensitized side in contact with the thin wall (contact sheet) of the jacket. Film strips shall have a minimum clearance of 5mm (1/8") from both edges of the jacket.

d. **Target Jackets:** Identification and inspection targets ([paragraph 11](#)) shall be inserted into jackets in roll number sequential order, one roll per jacket chamber. Target jackets shall be delivered in separate envelopes with the associated jacket delivery.

15. **SPLICING:** Splices shall comply with ANSI/AIIM MS 18.

a. Only ultrasonic-weld splices shall be used.

b. There shall be no more than two splices per 100 foot roll.

c. Splicing shall be placed only in the clear leader at the beginning of the roll.

d. Targeting described in [paragraph 11](#) shall be reproduced in the retake, with the exception that **11.b.** shall read START RETAKE and **11.s.** shall read END RETAKE.

e. Splicing technical targets is prohibited.

16. **FILM DUPLICATES:**

16.1 The maximum allowance of resolution loss on the duplicate shall not exceed one pattern from the camera original

16.2 **Diazo**

a. Base: polyester (diazo 4.0 mil thick)

b. Size: 35mm x 100 feet

c. Bar-gamma range: 1.10 to 1.49

d. Dmax range: 1.50 to 1.80

e. Dmin range: burn-out density plus 0.05 to 0.09. Example: a typical burn-out density of 0.05 should result in a Dmin of 0.10 to 0.14

f. Title backing for duplicate microfiche: white

16.3 **Silver**

a. Base: polyester (4.0mil thick)

b. Size: 35 mm x 100 feet

c. Film should be sign-maintained, negative to negative, such as Kodak 2468 and 2470. Sign-reversing films, such as Kodak 2462 should not be used unless a positive appearing image is mandatory.

d. Dmin range: 2468 - 0.10 to 0.15; 2470 - 0.15 to 0.25; 2462 - less than 0.16, Dmax = 1.20 - 1.60

17. **EMULSION ORIENTATION:** Emulsion shall be oriented as specified in ANSI/AIIM MS 14.

18. *Intentionally left blank.*

19. **PACKAGING:** Silver gelatin camera film shall be on spools as per ANSI PH1.33. Film shall be in closed plastic boxes suitable for permanent storage as per ANSI IT9.2. Spools shall fit into boxes loosely, without binding or pressure.

19.1 Duplicate film copies shall be packaged as follows: all reels in plastic boxes, in accordance with ANSI/AIIM MS 34, the film trailer secured to the hub with plastic trailer holders.

19.2 Microfiche jackets and duplicates, packaged separately, shall be delivered to the government/agency in boxes.

20. **PACKAGE MARKING:** The following data, machine-printed on plain white permanent adhesive labels, shall appear on each roll package edge:

Government /Agency
Record Series Title / Date and/or Subject
Film Type: SILVER ORIG. or SILVER DUPL. or DIAZO
Roll Number

20.1 Side label data: same as above. The contractor's name shall appear on the package side label, lower edge only, no more than thirty characters; maximum character height 1/16".

21. **DOCUMENT FLATNESS:** Folded and rolled documents shall be microfilmed absolutely flat and shadow-free. The bottom surface of each document shall be totally in contact with the camera copy board working surface.

22. **QUALITY OF WORK:** Each frame of microfilm shall be exposed and processed so that every line and character on the document appears on the microfilm. Film shall be free of scratches, holes in the emulsion or base, tears, finger marks, or any other defect that might adversely affect quality.

23. **CONTRACTOR INSPECTION:** Each roll of first-generation silver gelatin microfilm shall be inspected by the contractor for compliance with the requirements herein. As a minimum, each roll of film shall be inspected for resolution, density, processing quality, and general workmanship. A contractor inspection report for each roll of microfilm shall be included in each shipment.

24. **QUALITY CONTROL:** Images that, upon inspection, do not meet the requirements of these guidelines will be defined as defective, and must be refilmed at the contractor's expense. If

the number of defective images does not exceed one image in 500, the **defective** images may be filmed as a retake in accordance with paragraph 15, SPLICING. If the number of defective images exceeds one image in 500, the entire roll must be refilmed.

24.1 First-generation silver gelatin microfilm (camera film) shall be delivered for inspection, ***before duplication***, to the government's/agency's inspection agent.

24.2 Note that certain requirements, such as [paragraph 1](#), REDUCTION RATIO, [paragraph 5](#), RESOLUTION, [paragraph 15](#), SPLICING, etc., apply to the entire roll of microfilm. Should a roll of microfilm fail to meet the requirements described in these and similar paragraphs, the entire roll of microfilm must be refilmed, despite the number of defective images.

24.3 **Re-microfilming documents in rejected frames:** Documents in rejected frames shall be re-microfilmed. When any frame of a roll-size drawing (such as a railroad right-of-way map) or any sheet of a multi-sheet drawing being microfilmed is rejected, the entire drawing or sheet shall be re-microfilmed.

25. REJECTION OF FIRST-GENERATION SILVER GELATIN MICROFILM: When an entire roll of film is rejected by the government/agency or government's/agency's inspection agent, the rejects may be defaced by punching a clearly defined hole approximately 1/4" in diameter through the microfilm image or START target, without deleting the image or unit identification; or the entire leader up to the first frame can be cut from the roll. Rejected film may be retained by the government/agency.

26. SHIPMENT OF FILM FOR INSPECTION: Film shall be shipped in reusable fiber cases. Cases remain the property of the FILMING CONTRACTOR. Recommended case construction:

- a. Size (large box): 15" x 12.5" x 4"; nominal inside dimensions' capacity: (20) 35mm rolls.
- b. Size (small box): 15" x 8.5" x 4"; nominal inside dimensions' capacity: (14) 35mm rolls.
- c. Mail card holder with reversible mailing card for convenient return shipment.
- d. Metal reinforced corners.
- e. Adjustable cross-straps, two minimum.

26.1 The film must be packed so that all edge labels are visible, and facing the same direction.

26.2 Each film shipment shall include the following:

- a. Detailed packing slip, in duplicate.
- b. Photocopy of the most recent methylene blue test results.

c. Copy of the contractor's film inspection report (see [paragraph 23](#)).

26.3 Shipment by express service only. The shipment must be insured for replacement costs, payable to the contractor, in both directions.

27. **VENDOR FACILITIES:** Vendor facilities shall be subject to inspection and approval by the representatives of the government/agency, before and at any time during the performance of a contract, to ensure production and quality control capabilities.

28. **FILE INTEGRITY:** Unless otherwise specified elsewhere in the contract, the documents shall be maintained in existing file order before, during, and after filming. File material shall be returned to the original storage containers in the same order that existed before filming. Corrections to file order resulting from preparation for filming shall be maintained in the subsequent refile. Fasteners (staples, clips, tape, etc.) removed in preparation should not be restored.

Appendix F

Introduction to Rotary Camera Guidelines

Local governments and state agencies will want to carefully evaluate their microfilm application before considering the use of a rotary camera. A rotary camera films records while they are moving through rollers similar to a photocopy machine. Because both the document and microfilm are moving during the reproduction process, image quality is minimal. For these reasons, a rotary camera should not be used for the following applications:

- Microfilming fragile, brittle, and/or archival records
- Microfilming permanent records that require high-quality images to be reproduced from the microfilm
- Documents wider than 12 inches

Rotary cameras have several advantages:

- Microfilming is quick for standard-size documents, thereby reducing costs. Normally, microfilming is two or three times faster using a rotary camera.
- A rotary camera can film both sides of a document at the same time.

Sometimes local governments and state agencies, using rotary cameras, microfilm large volumes of records that need to be retained for short periods of time. On rare occasions, large quantities of records in excellent condition are microfilmed using rotary cameras. These projects require special quality control standards and are rarely undertaken for permanent records.

Before undertaking a microfilming project using the rotary camera guidelines listed below, it is strongly recommended that staff discuss the project with a SARA advisory officer.

Microfilm Production Guideline

Rotary Cameras, 16mm Office Documents

Notice

This guideline is **not** a specification and should not be used as such. It can be used as the basis of a specification when combined with the following additional minimum details (see [File Information Required for Microfilming Paper Records](#)) to accommodate the needs of each individual file:

- Name of government/agency
- Name of records series
- Total number of images
- Condition of records series (document sizes, type, single- or double-sided, color and age of paper, type of fasteners, what percentage of documents are flat, rolled or folded, current document storage conditions, type and color of imprint)
- Preparation requirements
- Order of filming: general arrangement of records, targeting, etc.
- Format (roll, jackets, etc.)
- Microform numbering (roll number, jacket labeling, etc.)
- Number of duplicates and film types (silver, diazo, etc.) required
- Delivery information (date, destination, etc.)

Additional deviations from this guideline as necessary to accommodate the needs of each records series Packaged together, the appropriate microfilm guideline(s), the File Information Form(s), and the supplemental requirements outlined above can form a microfilm specification. The specification document provides the essential technical requirements for items, materials, services, and procedures that will determine whether or not the requirements have been met. The specification should be incorporated into standard contractual documents used by the government or agency for review by legal counsel.

SCOPE: These guidelines provide the parameters to inspect microfilm of office documents produced on 16mm (tabletop) planetary cameras. The contents of this document are based on national microfilm standards and industry practices, such as ANSI/AIIM MS-23 and AIIM TR-02. All references to industry standards (ANSI, AIIM, etc.) shall be to the latest revision thereof, on the date of the Invitation for Bids (IFB). (See Appendix G) Contractors performing microfilm work for local governments under the Local Government Records Management Improvement Fund should be able to meet these guidelines without difficulty. Contracts for microfilming records under the jurisdiction of the [Office of Court Administration \(OCA\)](#) must comply with OCA microfilming guidelines. You can also contact the State of New York Unified Court System, Office of Court Administration, Division of Court Operations, 25 Beaver Street, Suite 883, New York, NY 10004-2310, phone 212-428-2875, and fax 212-428-2880.

1. **REDUCTION RATIO:** 24x for single-sided documents, 8 1/2" x 11" or smaller. 40x for all others.

2. *Intentionally left blank.*

3. **BACKGROUND DENSITY RANGE, CAMERA FILM: 0.80 to 1.20**, measured as visual diffuse transmission density in accordance with ANSI PH2.19. Background density applies to all images.

4. **BASE PLUS FOG (Dmin):** Dmin shall not exceed 0.08.

5. **RESOLUTION:** At 24x, 5.0 chart pattern; at 40x, 3.2 chart pattern.

5.1 Resolution must be read from corner to center to corner in all directions, on all test charts.

6. **CAMERA FILM:** 16mm x 100 feet x 5 mil thick, non-perforated, polyester, high-contrast (gamma 3.0 to 4.0) panchromatic film. Film shall be in accordance with ANSI IT9.1.

7. **IMAGE ORIENTATION:** comic or cine, simplex or duplex mode, whichever uses less film at the numerically smallest reduction ratio.

8. **FILM STABILITY:** All silver gelatin film shall be monitored for stability in accordance with ANSI IT9.1 A sample of clear film shall be subjected to the methylene blue test, procedure 2 (high range thiosulfate) for residual thiosulfate ion, in accordance with ANSI PH4.8 (re ANSI IT9.1, table 4, 0.14 g/m² max.). The test shall be performed by an independent test laboratory, subject to the approval of the government/agency. Each processor employed for this project shall be tested once weekly, preferably when the microfilm covered by these guidelines is processed. The original test certificate shall be mailed directly to the government/agency. The stability of the film is tested by sampling; therefore, failure of the test will require re-filming all microfilm in the untested batches that precede and follow the failed sample.

9. *Intentionally left blank.*

10. *Intentionally left blank.*

11. **TARGETING AND SEQUENCE**

a. Clear leader 24" minimum

b. START target (eye-legible)

c. ROLL NUMBER (eye-legible)

d. State Archives *Inventory Worksheet* (Form LGRB-5)

e. State Archives [*File Information Required for Microfilming Paper Records*](#)

f. Government/agency name and address

g. Contractor's name and address, date filmed, reduction ratio, film manufacturer, type, expiration date, and batch number

h. Certification target signed by the camera operator
(f. through h. above may be combined into one target)

i. Declaration by records custodian

j. Density target: the optimum density target is a full-frame image, using blank paper that matches the record in color and reflectance density. Every effort should be made to use a blank sheet from the actual record. In the event this is not available, a clean, blank, color-matched 20-pound bond sheet may be substituted.

k. Resolution target: Association for Information and Image Management (AIIM), Silver Spring, Maryland, 20910, Target AIIM MS113, paper chart (preferred) or AIIM MS112 plastic chart or equal. Multiple exposures (five minimum) are recommended as a capstan check (see ANSI/AIIM MS17, paragraph 3.6 and Table 1).

l. Residual thiosulfate test certificate: a copy of the certificate (see [paragraph 8](#)) that precedes the filming date by a maximum of two (2) weeks (one week preferred)

START RECORDS

m. (Indexes and finding aids precede the documents, if supplied by government/agency, or added by vendors). START FILE target shall be used to separate individual existing folders when specified by the government/agency.

n. Defect targets indicate defects to Government's records as appropriate. Typical targets: DAMAGED DOCUMENT, MISSING DOCUMENT, POOR QUALITY DOCUMENT, etc.

END OF RECORDS

o. Density target (same as j above)

p. Resolution target (same as k above)

q. Residual thiosulfate test certificate (same as l above)

r. ROLL NUMBER (eye-legible)

s. END target (eye-legible)

t. Clear trailer; 24 inch minimum

11.1. The complete microfilm specifications for this project, including these guidelines, shall be filmed at the beginning of the first roll of this record series. In the case of an ongoing filming program, the specifications will be microfilmed at the beginning of the first roll of the year,

whether calendar or fiscal. When filmed, the specifications shall be placed after State Archives *File Information Required for Microfilming Paper Records* ([item 11.e. above](#)).

12. *Intentionally left blank.*

13. **RETRIEVAL AIDS:** Image marks ("blips"), in accordance with ANSI/AIIM MS8, shall be provided for all 16mm roll film applications.

13.1 (The following requirement shall not apply when this numbering system shall be used for retrieval). Sequential frame numbers shall be provided, starting with 1 (or 001) at the beginning of each roll (including the identification target), and shall continue sequentially through the roll without variation. The last frame number shall be equal to the number of frames on the roll.

14. *Intentionally left blank.*

15. **SPLICING:** Splices shall comply with ANSI/AIIM MS 18.

a. Only ultrasonic-weld splices shall be used.

b. There shall be no more than two splices per 100' roll.

c. Splicing shall be placed only in the clear leader at the beginning of the roll.

d. Targeting described in paragraph 11 shall be reproduced in the retake, with the exception that 11.b. shall read START RETAKE, and 11.s. shall read END RETAKE.

e. Splicing technical targets is prohibited.

16. **FILM DUPLICATES**

16.1 The maximum allowance of resolution loss on the duplicate shall not exceed one pattern from the camera original.

16.2 **Diazo** (best for reader service use)

a. Base: polyester (4.0mil thick)

b. Size: 16mm x 100 feet (for microfiche or jackets: 105mm x 148mm x 5mil thick)

c. Bar-gamma range: 1.10 to 1.49

d. Dmax range: 1.50 to 1.80

e. Dmin range: burn-out density plus 0.05 to 0.09. Example: a typical burn-out density of 0.05 should result in a Dmin of 0.10 to 0.14.

f. Title backing for duplicate microfiche: white

16.3 **Silver** (should not be used in a reader, only for storage and printing)

a. Base: polyester, (4.0mil thick)

b. Size: 16mm x 100 feet or 16mm x 130 feet

c Film should be sign-maintaining, negative to negative, such as Kodak 2468 and 2470. Sign-reversing films, such as Kodak 2462, should not be used unless a positive-appearing image is mandatory.

d. Dmin range: 2468 - 0.10 to 0.15; 2470 - 0.15 to 0.25; 2462 - less than 0.16, Dmax = 1.20 - 1.60

17. **EMULSION ORIENTATION:** Emulsion shall be oriented as specified in ANSI/AIIM MS 14.

18. *Intentionally left blank.*

19. **PACKAGING:** Silver gelatin camera film shall be on spools as per ANSI PH1.33. Film shall be in closed plastic boxes suitable for permanent storage as per ANSI IT9.2. Spools shall fit into boxes loosely, without binding or pressure.

19.1. Duplicate film copies shall be packaged as follows: all reels in plastic boxes, in accordance with ANSI/AIIM MS 34, the film trailer secured to the hub with plastic trailer holders. All cartridges, in accordance with ANSI/AIIM MS 15.

20. **PACKAGE MARKING:** The following data, machine printed, on plain white permanent adhesive labels, shall appear on each roll package edge:

Government / Agency

Record Series Title / Date and/or Subject

Film Type: SILVER ORIG. or SILVER DUPL. or DIAZO

Roll Number

20.1. Side label data: same as above. The contractor's name shall appear on the package side label, lower edge only, no more than thirty characters; maximum character height 1/16".

21. **DOCUMENT FLATNESS:** Folded and rolled documents shall be microfilmed absolutely flat and shadow-free. The bottom surface of each document shall be totally in contact with the camera copy board working surface.

22. **QUALITY OF WORK:** Each frame of microfilm shall be exposed and processed so that every line and character on the document appears on the microfilm. Film shall be free of

scratches, holes in the emulsion or base, tears, finger marks, or any other defect that might adversely affect quality.

23. CONTRACTOR INSPECTION: Each roll of first-generation silver gelatin microfilm shall be inspected by the contractor for compliance with the requirements herein. As a minimum, each roll of film shall be inspected for resolution, density, processing quality, and general workmanship. A contractor inspection report for each roll of microfilm shall be included in each shipment.

24. QUALITY CONTROL: Images that, upon inspection, do not meet the requirements of these guidelines, will be defined as **defective**, and must be refiled at the contractor's expense. If the number of defective images does not exceed one image in 500 (five images per roll of 2,500 images), the defective images may be filmed as retakes in accordance with paragraph 15 SPLICING. If the number of defective images exceeds one image in 500, the entire roll must be refiled.

24.1. First-generation silver gelatin microfilm (camera film) shall be delivered for inspection, before duplication, to the government's/agency's inspection agent.

24.2. Note that certain requirements, such as [paragraph 1](#), REDUCTION RATIO, [paragraph 5](#), RESOLUTION, [paragraph 15](#), SPLICING, etc. apply to the entire roll of microfilm. Should a roll of microfilm fail to meet the requirements described in these and similar paragraphs, the entire roll of microfilm must be refiled, without consideration of the number of defective images.

25. REJECTION OF FIRST-GENERATION SILVER GELATIN MICROFILM: When an entire roll of film is rejected by the government/agency or government's/agency's inspection agent, the reject may be defaced by punching a clearly defined hole approximately 1/4" in diameter through the microfilm image or START target, without deleting the image or unit identification; or the entire leader up to the first frame can be cut from the roll. Reject film may be retained by the government/agency.

26. SHIPMENT OF FILM FOR INSPECTION: Film shall be shipped in reusable fiber cases. Cases remain the property of the FILMING CONTRACTOR. Recommended case construction:

a. Size (large box): 15" x 12.5" x 4"; nominal inside dimensions' capacity: (42) 16mm rolls.

b. Size (small box); 15" x 8.5" x 4"; nominal inside dimensions' capacity: (28) 16mm rolls.

c. Mail card holder with reversible mailing card for convenient return shipment.

d. Metal reinforced corners.

e. Adjustable cross-straps, two minimum.

26.1. The film must be packed so that all edge labels are visible and facing the same direction.

26.2. Each film shipment shall include the following:

- a. Detailed packing slip, in duplicate.
- b. Photocopy of the most recent methylene blue test results.
- c. Copy of the contractor's film inspection report (see [paragraph 23](#)).

26.3. Shipment by express service only. The shipment must be insured for replacement costs, payable to the contractor, in both directions.

27. **VENDOR FACILITIES:** Vendor facilities shall be subject to inspection and approval by the representatives of the government/agency, before and at anytime during the performance of the contract, to ensure production and quality control capabilities

28. **FILE INTEGRITY:** Unless otherwise specified elsewhere in the contract, the documents shall be maintained in existing file order before, during, and after filming. File material shall be returned to the original storage containers in the same order that existed before filming. Corrections to file order resulting from preparation for filming shall be maintained in the subsequent refiling. Fasteners (staples, clips, tape, etc.) removed in reparation should not be restored.

Appendix G

Reference List for Microfilm Production Guidelines

"**ANSI PH4.8:** Photography (Chemicals) Residual Thiosulfate and Other Chemicals in films, Plates and Papers-Determination and Measurement" has been superseded by "ANSI/NAPM II 9.17-1993 (American National Standard for Photography-Determination of Residual Thiosulfate and Other Related Chemicals in Processed Photographic Materials-Methods Using Iodine-Amylose, Methylene Blue and Silver Sulfide)."

"**ANSI IT 9.1:** Imaging Media (Film) Silver Gelatin Type Specifications for Stability" has been replaced by "ISO/DIS 18901: 2002 (Imaging materials-Processed silver gelatin type black and white films-Specifications for stability)."

The following can also serve as references:

ANSI/AIIM MS43- 1998 (American National Recommended Practice for Operational Procedures/Inspection and Quality Control of Duplicate Microforms of Documents and From COM.

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

ANSI/AIIM MS48-1999 (American National Standard for Information and Image Management - Recommended Practice-Microfilming Public Records on Silver Halide Film).

ANSI/PIMA IT9.11-1998 (American National Standard for Imaging Media- Processed Safety Film).

ANSI/NAPM IT9.16 - 1993 (American National Standard for Imaging Media-Photographic Activity Test).

ANSI/NAPM IT9.6-1991 (R1996) (American National Standard Specification for Imaging Materials-Photographic Films-Specification for Safety Film).

ANSI/NISO Z39.62-2000 (Eye-Legible Information on Microfilm Leaders and Trailers and on Containers of Processed Microfilm on Open Reels).

ISO 14523: 1999 (Photography - Processed photographic materials - Photographic activity test for enclosure materials).

ISO 18902: 2001(E) (Imaging materials - Processed photographic films, plates and papers - Filing enclosures and storage conditions).

ISO 18906: 2000(E) (Imaging materials - Photographic films - Specifications for safety film).

ISO 18911:2000(E) (Imaging materials - Processed safety photographic films - Storage practices).