State of Florida

MICROGRAPHICS HANDBOOK

Guidelines for the Application of Micrographics Technologies in Public Records Management

Florida Department of State

Division of Library and Information Services

Bureau of Archives and Records Management

The Capitol
Tallahassee, Florida 32399-0250
(850)487-2180 Suncom 277-2180

MICROGRAPHICS HANDBOOK

PURPOSE OF THE MANUAL

This handbook is a resource of basic information for all Florida government agencies on the subject of micrographics. It is not intended to serve as a substitute for step-by-step technical manuals or official standards publications. Rather, it is intended to provide the administrator and planner responsible for authorizing a microfilming project with a factual overview of micrographics and the micrographic process. It is intended that this overview will assist the agency in obtaining an economical, high-quality microfilm product which meets filming standards prescribed by Rule 1B-26.0021, *Florida Administrative Code.*

Section 257.36, *Florida Statutes*, charges the Department of State, Division of Library and Information Services with providing a central microfilming service for the benefit of all government agencies. The Division implements this charge through the Bureau of Archives and Records Management. The Bureau offers planning and evaluation of microfilm projects for small or one-time applications as well as large on-going projects. For more information on micrographics or establishing a micrographics program, please contact the Technical Services Section of the Bureau of Archives and Records Management at (904) 487-2180 [SunCom 277-2180].

INTRODUCTION TO MICROGRAPHICS

The term micrographics denotes the area of records management associated with the feasibility, production, handling, care, and use of records which have been photographically copied and reduced in size to preserve information or reduce storage space. In short, it is the process by which miniature photographic images of documents are reproduced on film. Microphotography has become one of the most commonly used solutions to the problems of maintaining and storing records. In the years since the development of the first practical microfilm camera there has been a steady improvement in equipment, processes, and applications. Today microfilm has become easier to utilize, increasingly more stable and durable, and more versatile in its application and use.

Initially, microfilm was used as a means to store inactive records in a form that afforded substantial savings in storage equipment and space. More recently, it has been used to store, index, select, and retrieve both active and inactive records. With the advent of magnetic and electronic formats of recorded information, microfilm has taken on new significance.

Microfilm, properly processed, inspected, and maintained has long been envisioned as a safe long-term means of preserving paper based records. Now that greater numbers of records are being maintained in electronic formats, microfilm is seen as a means of securing long-term access to materials recorded on impermanent media. Whether concern arises from the stability of electronic media or the obsolescence of encoding, storage, or access equipment, microfilm can provide a permanent record within the changing environment of modern records management.

The benefits of a well conceived and well executed micrographics program can be tremendous. Unfortunately, the problems associated with an ill-advised or inappropriate micrographics program can be even greater. An effective micrographics program requires a sizable commitment of personnel, time, and money. The potential for spending large amounts of money on a program that is not needed or that inadequately addresses the needs of an agency is real.

Whether the intent of a microfilm program is to condense storage of inactive records, to provide a medium for heavily accessed materials, to secure vital records, or to preserve historical information, **analysis of an agency's records management program is crucial.** Paramount to this analysis is a thorough understanding of the agency's record creation process as well as how the records are used, stored, and disposed of.

This awareness of a record's life cycle within an agency is crucial to understanding the benefits to be derived from a properly implemented micrographics program. Issues regarding the quantity of records generated, the frequency with which records are created or updated, the length of time they need to be retained, storage space requirements, access needs, security, and preservation concerns vary among agencies.

Just as records management programs vary among agencies so too do the benefits to be derived from a micrographic program. The returns on storage space reduction, improved access through multiple copies, security, and preservation need to be evaluated in light of the costs involved.

Micrographics costs money. The investment will not be a minor one. Preparation for filming takes tremendous quantities of time. The definitive conversion standard, ANSI/AIIM MS23-1991, states in the first chapter that document preparation is the most important step in the conversion process of paper records to microfilm. Document preparation directly impacts indexing and image quality. If it cannot be assured that a

document is where it is supposed to be, or if it cannot be read or printed once it is found, then the conversion process has been both a waste of time and money.

The process of filming, developing, testing, inspecting, refilming, splicing, reinspecting and duplicating microfilm is not only time consuming but requires a significant investment in equipment and staff training if it is to be done within an agency. Much of this expense can be mitigated by contracting with a microfilm vendor or service bureau. However, even in contracting with a vendor there are costs that are often overlooked. Examples of these are the logistics costs of transferring records to and from whomever is doing the filming, inspecting the returned records and film for completeness, refiling the returned materials and documenting the entire process. Finally, regardless of whether an agency films its own materials or contracts with a vendor or service bureau, there are the maintenance costs associated with microfilm such as microfilm readers/printers, proper storage containers, acceptable shelving or housing, and the maintenance and monitoring of appropriate environmental conditions.

Considering the time, staff, space, supplies, and resources required to undertake a micrographics program, it is imperative the manner in which a micrographic program will fit into the organization be understood. This is true regardless of whether it is to be undertaken in-house or through a vendor. Only after a thorough assessment of the organization's records management procedures, the benefits to be derived, and the costs that will be incurred, can an informed decision regarding the applicability of a micrographics program be made.

Finally, it is beneficial if someone within an agency thoroughly understands the parameters of a quality microfilm product. This is important in order to define specifications to assure an agency obtains what it requires regarding how light and how dark the film is as well as how sharp the image looks after it has been processed. Often, agencies mistakenly presume that minimum standards are all that is important when letting a contract for equipment or services. The extent to which an agency achieves a quality microfilm product is contingent upon the quality microfilm product that is demanded.

THE RECORDS MANAGEMENT SURVEY

Successful implementation of a micrographics program is contingent upon conducting a records management survey. This will help gain an understanding of what records are being created, how they are created, who uses them, how they are used, how often they are used, how long they need to be retained, what vital records exist, and what records need to be kept for historical or legal requirements.

Consider the following:

What records are created? Understanding not only what records are being created but who is creating those records is important. This is the key component to determining not only current storage needs, but anticipating future requirements for storage space. A lot of paper piling up doesn't necessarily imply need for a micrographics program. It might well be that attention to retention schedules, copy control, or forms management might be a much more cost effective means of records management.

How are records being created? Examine whether or not the records being created are even necessary. Can forms be eliminated, condensed, or combined to reduce paper load? Are efforts being made to reduce the number of photocopies being made and the number of reports generated? If records are created electronically, is there also a need for paper copies? Control over these areas are a much more cost effective means of controlling paper load than micrographics.

Who uses the records? Do users need to have paper records or is there a strong preference for paper records? Is there more than one user needing a record at the same time? While user preference cannot be the sole determinant of record format it does need to be taken into consideration, as do the number of copies of a record that may be needed.

How are the records used? Do the records need to be updated often or regularly? Are superseded copies replaced with new versions? Records that are constantly undergoing change are not good candidates for microfilming.

How often are the records used? Are the records used frequently? Will their absence for microfilming cause a problem for those who use them? Microfilming frequently-used records can pose problems both for those needing access and those preparing materials for microfilming. As such, they are rarely good candidates for microfilming.

How long do the records need to be kept? Are there paper records that no longer need to be kept? Is the length of time that each type of record needs to be kept known? The Bureau of Archives and Records Management establishes retention schedules specifying the amount of time public records need to be kept in the State of Florida. Quite often the most expedient and cost effective means of saving space is by disposing of records which have met their retention requirement.

What vital records exist? Have all the agency's vital records been identified? Are their locations known? Do surrogate copies exist? While microfilm is an excellent medium for maintaining security copies of vital records, if an agency has only a minimal number of vital records, photocopies made on acid free paper may be a much more cost effective alternative.

What permanent records exist? Are there records that document significant historical, cultural, or evidentiary concerns of the agency? Are these records at risk of being lost due to fragile condition or theft? As with vital records, microfilm provides an excellent storage medium for these items. But again, if only a few such records exist, the prudent choice may be photocopying onto acid free paper.

These concerns represent only a small portion of a thorough records management survey. Nonetheless, it is a vital first step and cannot be stressed too much. **If assistance is needed in conducting a records management survey, please contact the Bureau of Archives and Records Management.**

WHO SHOULD DO THE FILMING?

Once it has been decided which records are to be filmed, a decision needs to be made whether to film them in-house or send them to a vendor or service bureau that specializes in microfilming.

Consider the following when deciding between filming in-house and utilizing a vendor or service bureau:

- The volume of records to be filmed,
- Whether records need to be filmed on a continuing basis or one time only,
- The associated costs of:
    - Buying equipment
    - Providing and outfitting space
    - Training and/or hiring personnel

The advantages and disadvantages of each option are described below.

CONDUCTING AN IN-HOUSE MICROFILMING PROJECT

Though starting an in-house project can initially be costly, it can also result in long-term savings under the right circumstances. Generally, if there are large amounts of records that will continue to accumulate and will need to be filmed, setting up an in-house operation may be a cost effective solution.

Conducting an in-house microfilming project will require:

Space - Adequate space will be needed for processors, duplicators, and a micrographic area that will accommodate all the equipment needed (cameras, splicing equipment, film readers, inspection tables etc.) as well as office or work space for staff to carry out preparation, staging, film production, processing, and inspection.

Special Equipment - Areas in which microfilming will be carried out may need special ventilation as well as improved plumbing, electrical, and lighting conditions. Depending on local ordinances, there may also be special drainage requirements for chemicals used during processing.

Staff - Personnel will need to be trained to perform microfilm duties or experienced staff will need to be hired.

In-house microfilming offers:

Security - Records do not leave the agency during filming, reducing the risk of loss or damage in transit or improper handling by the vendor or service bureau. Records filmed in-house are also accessible during filming.

Quality Control and Quality Assurance - The acceptable level of microfilm quality can be established in advance, checked on a daily basis, and corrected or modified if needed to achieve the desired level of excellence. Keep in mind, it is the responsibility of the agency; not those performing the microfilming, to determine and document what is an acceptable microfilm quality product.

Savings - Significant cost savings may be generated if there is a large volume of records to be filmed and records continue to be generated in large numbers. Once again, a determination of the projected savings would require a cost benefit analysis based on a microfilm feasibility study.

USING VENDORS OR SERVICE BUREAUS FOR MICROFILMING PROJECTS

Utilizing a vendor or service bureau that specializes in microfilming may be advantageous in certain circumstances:

Small Projects - If there is only a small volume of records to be filmed at one time or if the records are no longer accumulating.

Multiple Formats - If different types of microforms are needed. Roll and fiche require different cameras. It may be cost prohibitive to purchase different types of

cameras for in-house use, but a vendor or service bureau will be able to produce all types of microforms needed.

Security - Some service bureaus offer on-site filming. This may be a benefit if security and transportation of records for filming are problems.

Staffing Requirements - Many agencies use vendors or service bureaus because it is easier to enter into or terminate a contract than to add or release staff.

Consider the following disadvantages when deciding whether to use a vendor or service bureau:

Turn-Around Time - Because vendors and service bureaus have many customers, turn-around time can be slower than in-house filming.

Frequently Referenced Records - If records cannot leave the agency for long periods of time, vendors and service bureaus may pose a problem. One option often considered, though not very viable, is to do the microfilming on-site and send the film out to be processed. While at first this may sound appealing, the problems posed by repeatedly having to send film off for processing to establish quality control, process retakes, and make duplicate copies make it less appealing.

HOW TO CHOOSE A VENDOR OR SERVICE BUREAU

If an organization chooses to have its microfilming undertaken by a vendor or service bureau, it is vitally important that careful consideration be given to the process. Selection may be based on recommendations of other agencies or organizations that have had microfilming done by a particular service bureau. Personal knowledge or experience of a vendor and its reputation for delivering a quality product and service can be the best resource. Location and ease of access may also be a consideration, though this should by no means be the sole determinant for considering a vendor or service bureau.

Once a list of prospective vendors or service bureaus is established, contact each of them and request a brochure listing all the services the vendor or service bureau provides. Compare the list of services provided to those needed by the agency or organization. If a needed service is not available contact the service bureau and inquire as to its availability. Keep in mind that just because a service bureau does not list a particular service does not necessarily mean they do not provide that service. However, most service bureaus do tend to promote the activities at which they are accomplished and regularly provide.

In addition, contact the vendor or service bureau and request a list of their customers as references. Contact those customers and inquire as to the quality of products and service in general and specifically in those services in which there is particular interest.

Ask the following:

Was the quality of the film produced and the time required to deliver the product acceptable? Specifically, ask for the specifications required in their agreement and whether or not there were problems maintaining those specifications.

What indexing system was used and was documentation of index verification provided?

Were the generations, quality of images, and film format delivered by the vendor or service bureau acceptable and in compliance with Rule 1B-26.002 F.A.C.?

Were there problems with refilming materials, was there extensive need for refilming, was refilming and splicing accomplished in a timely manner, and was the quality of the refilming and splicing acceptable?

Were the materials to be filmed returned in good condition and in good order?

Was the vendor or service bureau able to meet stated deadlines?

Reduce the list to two or three service bureaus and make arrangements for a site visit. Look around the facility and ask to see the areas where the services you are requesting are being performed. Request a copy of their procedures and ask to see how the complete process works, from checking in materials to be filmed to the return of materials and products.

Make note of the cleanliness and efficiency of the work areas. Notice whether materials to be filmed are neatly organized, are carefully handled, and safely stored both before and after filming. Keep in mind that standards call for boxes to be off the floor no less than four inches. Is there documentation so that at any point in the process materials can be located and their status in the process determined? Inquire as to whether they have a disaster plan, and ask if it might be seen. In addition note the existence of fire suppression apparatus and security systems. If the vendor or service bureau is also going to store your film, ask to see the microfilm storage area and documentation of environmental control.

Take time to seriously consider the quality of the vendor or service bureau, its product, and its service delivery. Determine the most appropriate vendor or service bureau; establish a contact with a person who understands the product and service required. This person should be able check on the status of a filming project at any point in the process. Then proceed to draw up an agreement between the agency and the vendor or service bureau.

Finally, ask them to provide an example of their microfilm product, process, and documentation on a sample of records like those that will let out to be filmed. Examine it carefully. Does it provide the quality required?

Preparing a Written Agreement or Bid

A written agreement or bid is vital to the success of a microfilming project. At the very minimum it must establish that filming will be performed in accordance with the quality standards for microfilm as found in Rule 1B-26.0021, F.A.C. This rule was promulgated to insure proper processing, duplication, testing, reference and storage of microfilm. It is even better if each of the standards is spelled out in writing. This removes any confusion about what is and is not expected in the completed microfilm project.

Considerations in the agreement or bid should include, but not necessarily be limited to:

Preparation, including:

- order creation
- order verification
- fastener removal
- purging standards
- filming duplicates
- conservation treatment or repair of fragile items
- disbinding, if necessary
- photocopying materials such as newspaper clippings or low contrast materials
- interleaving to eliminate bleed-through in translucent materials such as onionskin or letterpress books

Reel programming, including:

- targets and target placement
- image placement
- reduction ratio

Number of copies of film, including:

- positive or negative image
- film base
- film type (silver, diazo, vesicular)

Testing and Inspection, including:

- light table image inspection
- documentation of methylene blue testing
- documentation of density readings
- verification
- resolution requirements

Retakes and Splicing, including:

- the number of retakes acceptable in a roll
- the number of splices acceptable in a roll
- the manner in which splicing will be undertaken

Transfer of materials, including responsibility for:

- box transmittals
- packing lists
- labeling and packing

Acceptability of subcontracting

- are subcontractors allowed
- specifically what will be subcontracted
- to whom it will be contracted

Costs of products and services, including:

- shipping and handling
- preparation work if done by the vendor or service bureau
- target preparation
- testing and inspection
- retakes
- splicing
- each generation of film per roll
- cost of each type of film processing
- storage fees

- shredding
- restraining tape and enclosures

Options regarding arbitration or termination if product is unacceptable.

A written agreement or bid provides a record of exactly what is included and expected in the microfilm project along with the associated costs involved. If a discrepancy ever arises, the agreement can provide valuable documentation.

Every microfilming project is different. The Bureau of Archives and Records Management encourages any state, county or local agency to contact its Technical Services Section for assistance in insuring a successful microfilming project.

THE MICROFILMING PROCESS

The following information describes the different steps in the microfilm process. It is helpful for those agencies contemplating a microfilm project to be familiar with the type of work that will be undertaken. The basic steps of records preparation, target preparation, filming, indexing, proofing, duplication, and storage are presented. Much of this information has been offered previously, but is presented and expanded upon here to provide a clearer idea of the process from beginning to completion.

STEP ONE - RECORDS PREPARATION:

A fundamental concept in the preparation of materials for microfilming is the imposition of order. It is important to keep the user in mind and realize that records on microfilm are accessed serially. Regardless of whether the person accessing the information is using microfilm or microfiche it is very confusing and disconcerting to have to jump around through a microform to obtain the desired information.

To prevent this, ample time should be allotted to reviewing the contents of individual folders and determining folder sequence so that material is ordered properly. Proper order is a function of the respective record's filing scheme be it chronological, alphabetical, numerical, or geographical. Once folder content and sequence have been established, indexes should be created if they do not already exist to facilitate access to individual files.

Other activities which fall within the category of preparation for microfilming include:

- removing fasteners
- removing duplicate or extraneous materials
- conservation treatment or repair of fragile items
- disbinding volumes, if necessary
- photocopying materials such as newspaper clippings or items of low contrast
- interleaving translucent materials to eliminate bleed through in such items onionskin and letterpress books

Records preparation is a time consuming process. It can be one of the most expensive aspects of microfilming. Do not underestimate this process when estimating costs. Each document filmed must be prepared for the camera operator so that the image will be of the highest quality and the filming can be done quickly and efficiently without continually stopping to adjust documents.

STEP TWO - PREPARATION

There are three different types of targets: informational; legal; and special. In essence, targets explain the records being filmed. Targets are photographed with the paper records to identify features and special problems as well as index each reel of film. Standard or informational targets are those used on every roll of film. Special targets are used when necessary as a means of clarification. Legal targets are those which certify the authenticity of the records being filmed. All targets should be designed to catch the eye. They should be easy to read and contrast with the papers being microfilmed. Targets should be prepared and inserted in the proper sequence with the records before any filming begins.

STANDARD/INFORMATIONAL TARGETS

These targets contain a description of each roll and should be shot at the beginning and end of each roll. Standard targets include the following:

- ***Start Target:*** This target indicates the beginning of the roll and should read "Start" in letters large enough to read with the naked eye. It appears at the very beginning of the roll before any records.

Start Target

- ***Title Target:*** A separate title target is used for each series of records being filmed. It is photographed at the beginning of each reel of film. It appears after the start target. Elements of a good title target are:

1. Name of office originating records
2. Title of records series
3. First and last dates of records in the series
4. File arrangement
5. Beginning and ending documents

CONTENTS

MICROFILM REEL NO. _____
REDUCTION RATIO -1
DATE MICROFILMED

DEPARTMENT _____
DIVISION _____

INDEX TITLE OF RECORDS (WRITE LARGE)

ARRANGEMENT: Alphabetical, chronological, numerical, find, page, combination of the foregoing or other.

BEGINNING DOCUMENT:

BEGINNING DATE:

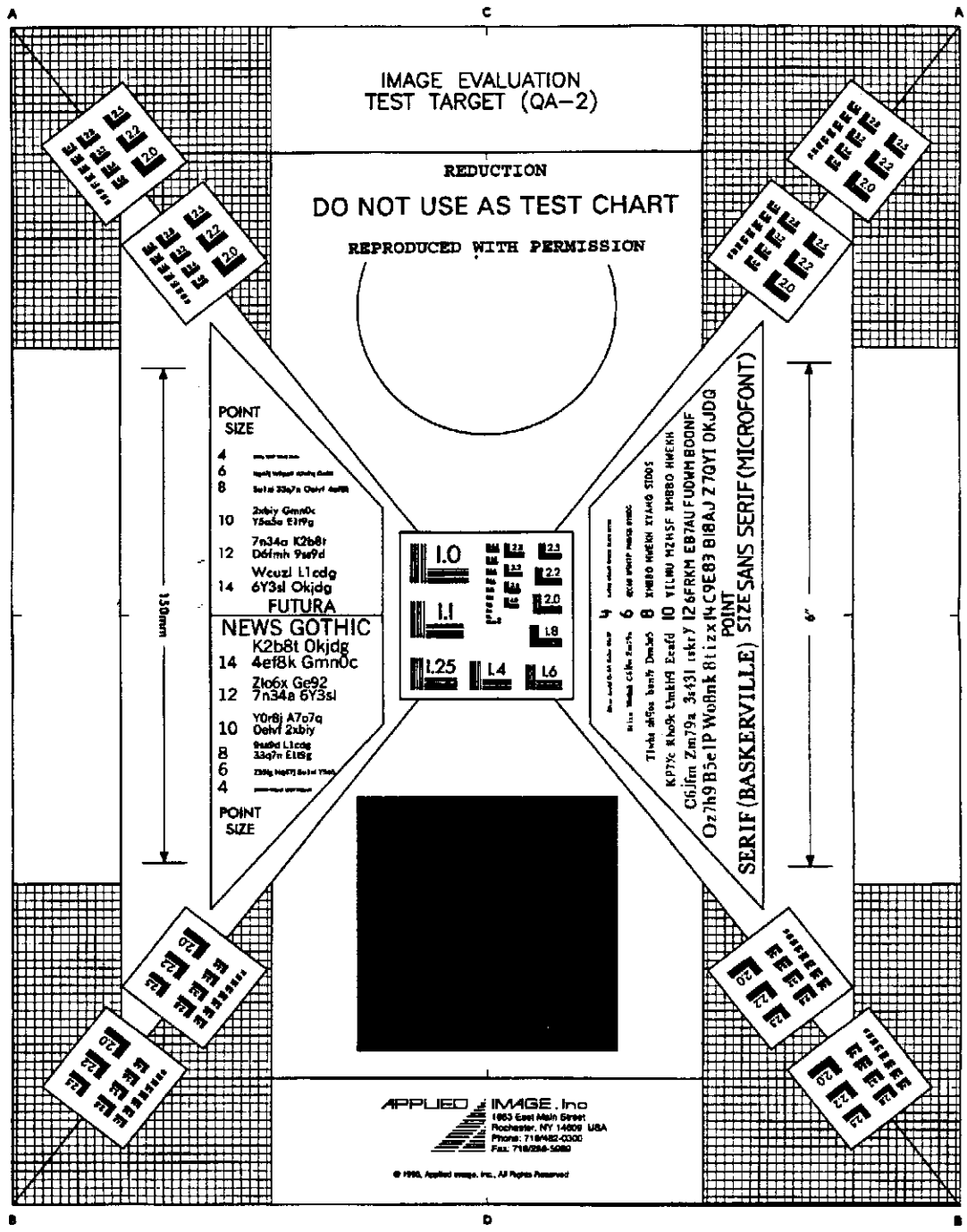
The CAMERA OPERATOR'S CERTIFICATE located near the end of the reel describes the contents of this microfilm

Title Target

- ***Technical Target:*** These are quality control targets. They can be separate targets but usually combine information on density and resolution in the same target. A standard technical target is available from the National Bureau of Standards.

- ***Resolution Target:*** This target must be photographically produced, not printed. It is imperative to test resolution in order to determine the performance of any camera, duplicating equipment, or reader-printer

equipment. This target should be shot five times at the beginning of the roll after the start target and at the end of the roll. If a target for resolution is not used, it will be necessary to compare the image on the screen with the original document in order to interpret the loss factor.

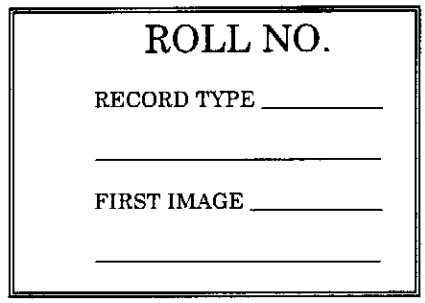


Planetary Resolution Target

- ***Density Target:*** This image clarity target provides areas specifically marked out for reading density. If you do not have a quality control chart,

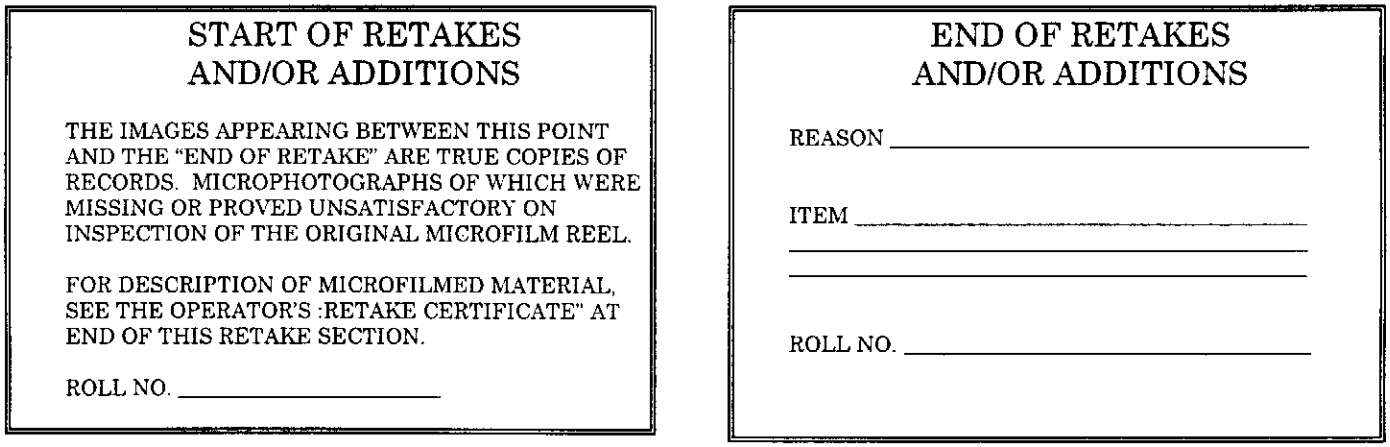
a simple piece of white paper (blank on both sides) will be satisfactory. The color, weight, and quality of paper should match those of the original document. This target should be shot five times at the beginning of the roll after the resolution target if separate technical targets are being used and at the end of the roll.

- ***Roll Number Target:*** When only one camera is in operation, reels are numbered 1,2,3,4, etc. If records are photographed in the same sequence in which the papers are filmed, film containers are filed in reel number sequence. When more than one camera is used, a prefix followed by a decimal may be used. The prefix indicates the camera number; the number following the decimal represents the number of reels produced by that particular camera. For example, the reels from camera number two would be 2.1, 2.2, 2.3, etc. Under this system, a box number is assigned to insure that reels are stored and accessed in proper sequence.



Roll Number Target

- ***Correction Target:*** When the camera operator believes a document has been incorrectly photographed or is of poor quality, a correction or retake target is photographed immediately after the suspect document. If the retake proved satisfactory, no further action is required. The correction target will be sufficient explanation to the user of the microfilm record.



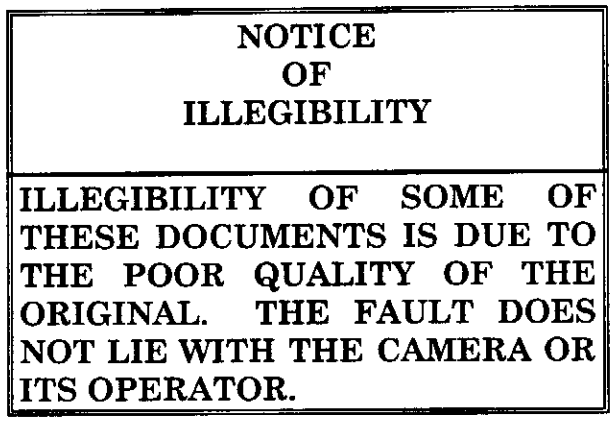
Correction Targets

- ***End Targets:*** These are used to signify either the end of the reel or the end of a set of records on a reel.

End Target

SPECIAL TARGETS

Special targets are prepared to meet the needs of a specific microfilming project. They explain if there are missing or blank pages, if the original was too illegible to film, indexing points, etc. They must be inserted in sequence so that they appear immediately before the document to which they refer. Special targets include those that explain restrictions on use of the records or any comments needed to facilitate the use of the film.



Special Target

LEGAL TARGETS

These targets certify that the microfilm has been produced in the normal course of business and can be accepted in court in lieu of the paper original.

There are two types of legal targets:

- ***Declaration of Records Custodian:*** This target identifies the records being filmed, gives the title and arrangement of the records, the date they are filmed, location of original records, and identifies the custodian of the records, who must sign and date the declaration form. The Declaration of Records Custodian is filmed at the beginning of a roll.

DECLARATION OF INTENT AND PURPOSE

I, _____
Name Position

for _____which is located in
Agency

_____
Location

do hereby declare that the records microfilmed herein are actual records of above named agency created during its normal course of business and that the filming of these records is part of a planned records retention program carried out in the normal course of business, and that the destruction of the records on the microphotograph will be accomplished only after inspection of said microphotographs to assure completeness and accuracy of all said documents.

Date this _____ day of _____, 19 _____
Signature: _____

Declaration of Records Custodian

- ***Declaration of Camera Operator:*** The person filming the records must identify themselves, the company of agency doing the filming, the company or agency for whom the records are being filmed, and the date filming was completed. Technical information such as reduction ratio and type of microfilm produced is also provided. The camera operator signs and dates the form which is filmed at the end of the roll.

CERTIFICATE
OF
AUTHENTICITY

I hereby certify that the microfilmed images contained between the beginning and ending certificates are true microfilmed copies of the instruments as recorded in the offices of

_____
Agency

_____
Location

and that retakes contained therein have been properly certified for insertion in their proper sequence.

_____
Camera Operator's Signature

Declaration of Camera Operator

Targets should be prepared before the records are filmed so that they may be placed in the proper filming sequence. Filming should not be started until preparation of documents and targets is complete.

STEP THREE - FILMING RECORDS

In order to film records, you must determine the type of camera and film that will best suit your microfilm needs and which will produce the desired product. The total cost of film for a project depends upon which size and type of film is used, the number of images to be made, and the number of records that can fit on a roll of film.

FILMING STANDARDS

Standards for microfilm production are outlined in Rule 1B-26.002, *Florida Administrative Code.* Rule 1B-26.0021, ***Florida Administrative***

Code is divided into two major parts: (1) microfilming of permanent or long-term records and (2) microfilming of short term records. Permanent or long term records have been determined to have sufficient historical or other value to warrant continued preservation.

Records with retentions of more than 10 years should be microfilmed as permanent records to insure the preservation and availability of information for the required retention period. Records which are designated as of permanent or long-term retention have strict microfilming requirements. Original silver film which is processed in developer and fixer and washed in accordance with the photographic standards established in ANSI/IT9.17 and set forth in Rule 1B-26.0021 must be used.

Non-permanent records have a specific retention period of 10 years or less. These records may be filmed in accordance with agency standards and requirements for the retention of records including the option of using any type of film and processing systems the agency selects.

STEP FOUR - PROCESSING FILM

Once records have been filmed, the film needs to be processed which includes developing, fixing, washing, and drying. Microfilm needs to be processed as carefully as it was filmed so that image quality will not be compromised during processing. Several types of processors exist. The two most commonly used are the table top processor and the deep tank processor.

Film processed in table top processors loses anywhere from one to two line pairs of resolution. In the last twenty years film quality and cameras have improved. The only thing that has not improved is film processing and what we expect out of film processing. Quality processing can do much more than improve resolution contrast can also be improved. Image quality can be improved so much that many of those thinking that the only way to get good images is to go to electronic imaging are shocked to see high quality microfilm.

QUALITY CONTROLS

No matter what type of processor is used, the processing chemicals should be checked for quality and replenished when necessary. Likewise, the water used to wash the film should be checked. Hard water may need to be treated before being used. ANSI/IT9.17 establishes water quality and testing standards required in film processing. Film should be dried completely.

Control strips for monitoring density should be used when processing. Strips are available from the American National Standards Institute (ANSI). They should be used at the beginning of processing and each time chemicals are changed.

FILM TESTING

Processed film should be tested daily in order to prevent an accumulation of defective film. Film Testing is the term used for the examination of the physical qualities of the film after it has been developed to insure that no residue has been left to cause discoloration, fading, or film degradation. The most common type of residue is residual thiosulfate ion. There are two tests which check for this residue. The methylene blue test is very reliable in detecting even small amounts of this sulfate. It is a complicated method that is necessary when checking long life expectancy film. The other test is the silver densitometric test. It is a simpler process; however, it takes longer than the methylene blue test and is not as accurate.

INSPECTION

An experienced technician should review the exposed and processed film as it passes over a light box (an illuminated panel). The person inspecting the film uses a jeweler's loupe or magnifying glass to check for spacing, framing, density, blurring, bleed through, or overexposure. Depending on the requirements of the project, the light box inspection can be followed up by a more detailed inspection.

PROOFING

Proofing is a more in-depth inspection of the film. It is carried out in order to ascertain that the documents have been filmed without omission, distortions or misplacement. The degree of proofing will depend upon the nature and importance of the project. In some cases a frame-by-frame check will be warranted. In others, inspection and proofing can be performed at the same time. If problems are found, requests for retakes must be made.

FILM VERIFICATION

Film verification ensures that all documents have been filmed and processed. During film verification, problems with the film are noted and requests are made to correct those problems. If the records are to be disposed of after filming, they must be retained until after verification is complete. If the film is found to be satisfactory following inspection, proofing, and verification, it can be sent to storage or used.

ORDERING RETAKES

Any errors or omissions detected during inspection, proofing, and verification need to be corrected by ordering a retake. Retakes can be ordered using a simple memo or a more detailed form. Regardless of the type of form used, the request for a retake should be documented. Requests should identify the problem, the roll of film, the location of the problem on the roll, who identified the problem, and the date it was originally filmed. This information allows the camera operator to find and fix the error, and provide the agency with documentation to verify the corrections.

PLACEMENT OF RETAKES AND SPLICES

Retakes should be re-filmed and spliced on at the end of the reel, not spliced into the reel in their proper sequence. Splices in the middle of the reel weaken the film and can raise questions regarding the integrity of the film. The retakes need to be inspected again to make sure the problem was fixed. When the retake has been spliced and checked, a note should be made on the request indicating that the retake was completed.

STEP FIVE - INDEXING RECORDS

Records that have been microfilmed will not serve any purpose if the information on them cannot be found quickly. Indexing records enables them to be quickly retrieved. While it is crucial to the success of a microfilm project, it is an especially time consuming process; if records already have an index, it should be filmed with the records which will save time.

There are different levels of indexing. The most basic level of indexing is at the box or container level. The identification of the contents of a roll of film by box labels makes microfilm records more accessible.

Microfilm rolls can be indexed on a series or document level. Some indexing systems can be performed prior to filming. Preparation work for such systems needs to be taken into account.

Types of indexing systems and when they can be utilized are listed below:

- Code-line and flash card indexing. Performed before records are filmed.
- Photo-optical indexing. Performed either during or after filming.
- Sequential number indexing. Performed during or after filming.
- Document mark encoding indexing (blipping). Performed during filming to provide direct access to individual documents.

These findings aids are indispensable in order to locate specific records on microfilm. The success of a microfilming project is measured in its usability, which depends heavily the quality of the indexing system. Choose an indexing system that is compatible with your records and needs.

DUPLICATION OF FILM

The decision as to whether a duplicate set of microfilm is needed is determined by the requirements in Rule 1B-26.0021, *Florida Administrative Code.* One method of duplication is to utilize a machine equipped with two cameras so that two original rolls may be produced at one time. Another method is to film one roll and obtain a duplicate of the original negative.

Duplicates should be made from the silver negative on silver, diazo, or vesicular film. Silver negatives should not be used more than ten times for duplication. Extensive duplication of silver negatives leads to image deterioration. If more than ten copies are needed, a silver duplicate or printing master can be made for duplicating purposes only.

GENERATION

The relation of a copy to the original is referred to as a "generation." The original exposed and developed microfilm is the first generation microfilm. Copies made from the first generation microfilm, whether produced on film or paper, are the second generation. Copies made from the second generation are third generation, etc. Any generation may be either positive or negative, depending upon the type of process used.

LABELING REEL CONTAINERS

After the film has been inspected and retakes have been spliced, a label is prepared for the storage box. The following items are recorded on the label:

1. Reel number
2. Custodian of records
3. Title of records series
4. List of contents and dates
5. Storage location
6. Additional finding aids if applicable

STEP SIX - MAKING MICROFILM AVAILABLE

Microfilm readers should be provided so that everyone who needs to use the product has access to it. Equipment for viewing or reading microforms differs widely. Reader-printers can print a copy of the document being read, while readers cannot. Some machines will accept only one type of microform (roll, fiche, cards etc.) while others will accept combinations.

Original microfilm copies of permanent records must not be used for reference purposes. Negative or positive duplicates of the original negatives should be provided for reference use.

Printed copies of microfilm usually approximate the size and quality of the document that was originally microfilmed. If images need to be reproduced in paper form for reference purposes, additional costs will be involved.

STEP SEVEN - STORING MICROFILM

The commitment to microfilm records does not end once they have been filmed. It is imperative that microfilmed records be stored properly. The photographic qualities of the media require special storage equipment and a controlled environment.

STORAGE EQUIPMENT

Store microfilm on inert plastic reels, preferably in acid-free boxes. Use alkaline paper strips with strings rather than rubber bands to secure film on reels. Boxes of microfilm should be stored in metal drawers, shelves, or cabinets. Storage equipment should be non-combustible and should not release gasses harmful to microfilm. Rule 1B-26.0021, *Florida Administrative Code* outlines the requirements for proper storage of microfilm.

STORAGE ENVIRONMENT

Microfilm should be protected from water and fire damage as well as from the environment. Temperature and humidity should be controlled where microfilm is stored. Relative humidity in areas where non-permanent microfilm records are stored should not be below 20% or exceed 50%. The temperature should stay between 50 and 77 degrees Fahrenheit. Microfilm records with a life expectancy of more than ten years (LE-10+) should be stored in areas where the relative humidity stays between 20% and 30% and a stable temperature between 55 and 70 degrees Fahrenheit, allowing fluctuation no greater than plus or minus 2 degrees.

Humidity and temperature rates that fall below or exceed those given can cause the emulsion on film to break down. In addition, extreme temperatures can cause mold to form on film or the film can become brittle and cracked. Records are microfilmed so that they can be used. Make sure that their environment ensures long-term accessibility.

PRESERVATION MICROFILMING

There is a popular misconception that preservation microfilming is somehow different from other forms of microfilming. Quite simply, it is not. Records need to be prepared, they need to be filmed (almost always on 35mm film), the film processed, inspected and verified, the completed film indexed, boxed, and labeled, and finally the boxed film returned to its proper location. The distinguishing factor in preservation microfilming is the attention paid to detail in each of these steps, documentation of all activities including testing and inspection, adherence to accepted standards and procedures, and an unwavering dedication to quality control.

In addition to strict adherence to established standards and procedures, preservation microfilming requires the production of three generations of film. Each generation has its own set of inspection and testing procedures for density, resolution, scratches, and other defects, and number, type, and placement of splices. A master negative (1N) is kept as a security copy and never accessed except to inspect or create a new printing negative (2N). The printing negative is used to generate service copies (3P) for use by patrons.

Any agency interested in pursuing preservation microfilming would be well-advised to prepare a checklist of standards and procedures to be followed by a chosen service bureau. For help in preparing such a list, the appropriate standards are listed in the back of this manual. For additional help in the overall process of preservation microfilming, consult the RLG Archives Microfilming Manual, Research Libraries Group, Mountain View, California, April, 1994.

WHERE TO GO FOR ASSISTANCE

The Bureau of Archives and Records Management offers regular workshops on micrographics and records management in addition to the Bureau's on-site technical consultation services. The Bureau of Archives and Records Management offers governmental organizations a complete range of services including micrographics

preparation work, filming, processing, and testing. The state-of-the-art Florida Records Storage Facility also offers climate controlled storage for micrographic materials, computer tapes, and optical and magnetic discs. Low cost storage space is also available for non-permanent records.

SUGGESTED READING

Archives and Manuscripts: Reprography
Society of American Archivists

Care and Handling of Active Microform Files
Association of Information and Image Management

Micrographics: Care and Handling
Association of Information and Image Management

Preservation Microfilming: A Guide for Librarians and Archivists
American Library Association

Recommended Practice For Inspection of Stored Silver Gelatin Microforms For Evidence of Deterioration
Association of Information and Image Management

RLG Archives Microfilming Manual
Research Libraries Group

Storage and Handling of Microforms
Kodak Business Imaging Systems

ADDRESSES

American Library Association (ALA)
Publications
50 East Huron Street
Chicago, IL 60611
(800) 545-2437

Association of Information and Image Management (AIIM)
1100 Wayne Avenue, Suite 1100
Silver Springs, MD 20910
(301) 587-8202

Eastman Kodak Business Imaging Systems
343 State Street
Rochester, NY 14650

Research Libraries Group (RLG)
1200 Villa
Mountain View, CA 94041
(415) 962-9951

Society of American Archivists (SAA)
600 S. Federal, Suite 504
Chicago, IL 60605
(312) 922-0140

PROFESSIONAL ASSOCIATIONS

In addition to the preceding publications and organizations, the following associations have an interest in micrographics and recordkeeping:

American National Standards Institute (ANSI)
11 West 42nd Street
New York, NY 10036
(212) 642-4900

Association of Records Managers and Administrators (ARMA)
4200 Somerset Drive, Suite 215
Prairie Village, KS 66208
(913) 341-3808
Publishes ARMA Quarterly, previously Records Management Quarterly

Association of School Business Officials International
11401 Northshore Drive
Reston, VA 22090-4232
(703) 478-0405

Florida Records Management Association
c/o Bureau of Archives and Records Management
Mail Station 9A
Tallahassee, FL 32399-0250

International Association of Clerks, Recorders, Election Officials, and Treasurers
P.O. 1012
Camden, NJ 08101-9998
(609) 963-0109

International City Management Association
5450 777 North Capitol Street, NE
Suite 500
Washington, DC 20002-4201
(202) 284-4262

International Information Management Congress
1650 38th Street
No. 205 West
Boulder, CO 80301
(303) 440-7085
Publishes IMC Journal

International Institute of Municipal Clerks
160 N. Altadena Drive
Pasadena, CA 91107
(818) 795-6153

International Journal of Micrographics and Optical Technology
Pergamon Press, Inc.
Journals Division, Maxwell House
Fairview Park
Elmsford, NY 10523

Image Permanence Institute
Gannett Memorial Building
P. O. Box 9887
Rochester, NY 14623-0887
(716) 475-2303

National Association of Counties and its National Association of County Recorders and Clerks
440 First Street, NW
Washington, DC 20001
(202) 393-6226

National Association of Government Archives and Records Administrators
Executive Secretariat
New York State Archives
10A46 Cultural Education Center
Albany, NY 12230
(518) 463-8644

National Association of Towns and Townships
1522 K Street, NW
Suite 600
Washington, DC 20005
(202) 737-5200

National Center for State Courts
300 Newport Avenue
Williamsburg, VA 23187
(804) 253-2000

National League of Cities
1301 Pennsylvania Avenue, NW
Washington, DC 20004
(202) 626-3000

University Microfilms International (UMI)
300 North Zeeb Road
Ann Arbor, MI 48106-1346
(800) 521- 0600

STANDARDS

The following standards are applicable to microfilming programs and activities. Standards and recommendations are regularly revised and updated. Please contact the issuing organization for the most current update of any standard.

AIIM D003. Specifications for the Microfilming of Manuscripts. Reprint of 1980 original available.

AIIM TR2-1992. Glossary of Imaging Technology.

AIIM TR20-1994. Environmental and Work Place Safety Regulations Affecting Microfilm Processors.

AIIM TR26-1993. Resolution as it Relates to Photographic and Electronic Imaging.

ANSI/AIIM MS14-1988. Specifications for 16mm and 35mm Roll Microfilm.

ANSI/AIIM MS18-1992. Splices for Imaged Microfilm-Dimensions and Operational Constraints.

ANSI/AIIM MS19-1993. Recommended Practice for Identification of Microforms.

ANSI/AIIM MS23-1991. Practice for Operational Procedures/Inspection and Quality Control of First-Generation, Silver-Gelatin Microfilm of Documents.

ANSI/AIIM MS26-1990. 35mm Planetary Camera (top light)-Procedures for Determining Illumination Uniformity of Microfilming Engineering Drawings.

ANSI/AIIM MS34-1990. Dimensions for Reels Used for 16mm and 35mm Microfilm.

ANSI/AIIM MS35-1990. Recommended Practice for the Requirements and Characteristics of Original Documents That May Be Microfilmed.

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

ANSI/AIIM MS48-1990. Recommended Practice for Microfilming Public Records on Silver-Halide Film.

ANSI IT9.1-1992. Standard for Imaging Media (Film)-Silver Gelatin Type-Specifications for Stability.

ANSI IT9.2-1991. Photographic Processed Films, Plates, and Papers-Filing Enclosures and Storage Containers.

ANSI IT9.3-1989. American National Standard for Photography (Imaging Media)-Photographic films and Papers-Methods of Determining Dimensional Change Characteristics.

ANSI IT9.4-1988. American National Standard for Photography (Film)-Lubrication on Films- Methods for Determining.

ANSI IT9.5-1992. America National Standard for Imaging Media (Film)-Ammonia Processed Diazo Films-Specifications for Stability.

ANSI IT9.6-1990. American National Standard for Photography-Photographic Films-Specifications for Safety Film.

ANSI IT9.11-1991. American National Standard for Photography (Film)-Processed Safety Photographic Film

ANSI IT9.12-1991. American National Standard for Photography (Film)-Processed Vesicular Film-specifications for Stability.

ANSI IT.13-1992. American National Standard for Photography (Imaging Media)-Photographic Films, Papers, and Plates-Glossary of Terms Pertaining to Stability.

ANSI IT9.17 1993. Residual Thiosulfate and Other Chemicals in Films, Plates and Papers.

ANSI/NAPM IT9.1. Archival Records, Silver-Gelatin Type, on Cellulose Ester Base.

ANSI/NAPM IT9.15 1993. American National Standard for Imaging Media (Photography)-The Effectiveness of Chemical of Silver Images Against Oxidation-Methods for Measuring.

ANSI PH1.51. 1983. American National Standard for Photography (Film)-Micrographic Sheet and Roll Film Dimensions.

Federal Standard Number 170B. Film, Photographic, Black and White, Classification and Testing Methods.

GLOSSARY

The following are terms which have been used in this handbook or are terms which are frequently encountered in the microphotography process. All terms and definitions are taken from Association for Information and Image Management publication *AIIM TR2-1992 Glossary of Imaging Technology*. Definitions which have (ISO) at the end are approved by the International Standards Organization. **For copies, please contact:**

AIIM
100 Wayne Avenue, Suite 1100
Silver Spring, MD 20910-5699
(301) 587-8202

ACETATE FILM (ACETATE BASE): Safety film with a base composed of composed principally of cellulose acetate or triacetate.

AMMONIA PROCESS: Development of diazo materials by immersion in a concentrated atmosphere of ammonia. Development is achieved by alkalizing (neutralizing) the acid stabilizers in the diazo coating.

ANTIHALATION: Reduction of halation (light scattering and/or reflection) within a surface, e.g., film. NOTE: Four common methods are used to reduce halation. (1) Tint the film base with a light-absorbing dye. (2) Coat the back of the film with a light-absorbing material. (3) Introduce a layer of light-absorbing dye between the base and the emulsion. (4) Tint in the emulsion layer.

ANTIHALATION UNDERCOAT: Separate layer of light-absorbing dye located between the film emulsion and the base to suppress light reflection. During processing of this film, the dye layer becomes transparent.

APERTURE: (1) Rectangular opening in an aperture card that is specifically designed to hold a chip of microfilm of a specified size (ISO). (2) In an optical system, an opening through which light can pass (ISO).

APERTURE CARD: Card with one or more apertures specifically designed for the mounting or insertion of microfilm before or after imaging (ISO).

ARCHIVAL MEDIA: A recording material that can retain information indefinitely so that it can be retrieved without significant loss when properly stored. NOTE: It is not a term to be used in material or system specifications. See also LE designation and life expectancy.

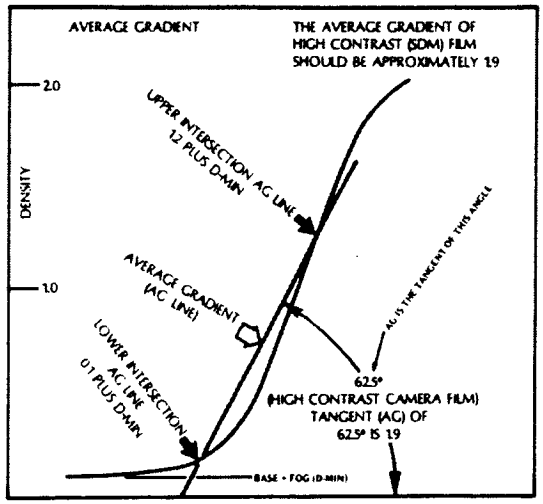
ARCHIVAL QUALITY: (deprecated) See archival media, LE designation, and life expectancy.

ARCHIVAL STANDARDS: (deprecated) See archival media, LE designation, and life expectancy.

AVERAGE CONTRAST: See average gradient

AVERAGE GRADIENT: The contrast expressed by the slope of a straight line joining two density points on the sensitometric curve. In micrographics, the density points

generally are 0.1 and 1.2 density units above base-plus-fog density. Synonymous with average contrast.



Average Gradient

BASE: Material onto which photosensitive layer(s) are coated (ISO).

BASE-PLUS-FOG DENSITY: Transmission density of a film which has not been exposed, but which has been developed and fixed. Base plus fog is the inherent density of the film base plus the inherent chemical fog of the developed emulsion.

CAMERA MICROFILM: First-generation microfilm; also called the master film.

CARTRIDGE: (1) In micrographics, a single-core container, used to enclose processed roll microfilm, which much be completely rewound to allow removal from the apparatus (ISO). (2) In electronic imaging, a case containing an optical disk.

CHEMICAL FOG: Chemically-initiated background density occurring either previous to or during development. See also base-plus-fog and fog.

CINE MODE: See vertical mode.

CLEARING: (1) Removal of silver halides from developed films in fixing process step. NOTE: The film is said to be cleared when no visible unchanged silver halides remain in the emulsion. However, about 5 percent of the silver halide usually remains at this point. (2) With vesicular films, clearing is the process of exposing film to ultraviolet radiation after development to decompose any remaining diazonium salts.

COM: See computer output microfilm.

COMIC MODE: See horizontal mode.

COMPUTER-OUTPUT MICROFILM: Microforms containing data produced by a recorder from computer-generated electrical signals. Synonymous with COM.

COMPUTER-OUTPUT MICROFILMING: Technique for generation of microforms directly from computer output either on-line or off-line (ISO).

CONDENSING LENS: Optical component used to concentrate the light onto the aperture area of a reader or a printer in order to obtain sufficient illumination of the microimage (ISO).

CONTRAST: Expression of the relationship between the high and low brightness of a subject or between the high and low density of a photograph.

DEFINITION: Distinctness or clarity of detail in a photo image, microfilm image or enlargement.

DENSITOMETER: Instrument for measuring optical densities by transmission or by reflection, under geometrical and spectral conditions (ISO).

DENSITOMETRIC METHOD (SILVER): Testing procedure that produces a yellow stain for density measurement. NOTE: Used for indicating the presence of thiosulfate or other potentially harmful residual chemicals in processed film.

DENSITY: (1) In micrographics, the light-absorbing quality of a processed photographic image expressed as a logarithm to the base ten of the ratio of incident radiant flux to transmitted or reflected radiant flux. (2) In electronic imaging, the number of bits in a single linear track measured per unit of length of the recording medium.

DENSITY, BACKGROUND: The opacity of the noninformation area of microform. See also density.

DENSITY, MINIMUM: The lowest density obtainable in processed film. Synonymous with Dmin. See also base-plus-fog density.

DEVELOP: To subject to the action of chemical agents or physical agents (as in electrophotography) for the purpose of bringing to view the invisible or latent image produced by the action of radiant energy on a sensitized surface.

DIAZO COUPLER: In a diazo film, compounds that combine with the unexposed diazonium salts to form dyes (ISO).

DIAZO FILM: A photographic film containing one or more photosensitive layers composed of diazonium salts in a polymeric material which react with coupler(s) to form an azo dye image after film processing. NOTE: Couplers are contained in either a photosensitive layer(s) or in the processing solution. The color of the image is determined

by the composition of the diazonium compound and coupler(s) used in the process. Diazo film gives polarity identical to that of the original (ISO).

DIAZONIUM SALTS: Light-sensitive compounds of a specific chemical class sensitive to the blue through ultraviolet spectrum. NOTE: In the presence of a coupler and ammonia vapor or alkaline solution these salts can yield a visible image.

DIRECT-IMAGE FILM: Film that will retain the same polarity as the previous generation or the original material; that is tone for tone, black for black, white for white, negative for negative or positive for positive with conventional processing. See also direct positive silver film and polarity.

DIRECT POSITIVE SILVER FILM: Silver film which after conventional processing gives an image which has polarity identical to that of the original (ISO).

Dmax: See density, maximum.

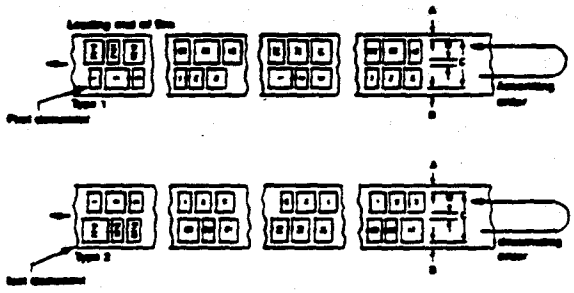
Dmin: See density, minimum.

DOCUMENT PREPARATION: Steps to ready documents for filming or scanning, e.g., removing paper clips, staples, bindings, and sorting by categories.

DOUBLE FRAME: Combination of two horizontal, adjacent, single frames.

DRY-SILVER MATERIALS: Sensitized film and paper products that are developed by the application of heat rather than by a liquid or viscous process.

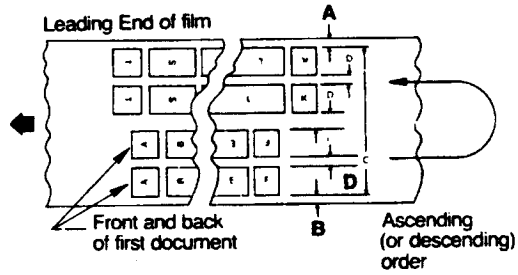
DUO: Method of recording images on each half of the usable width of the roll of microfilm in which the microimages are made first along one half of the film and then continued along the other half in the reverse direction (ISO).



Duo format

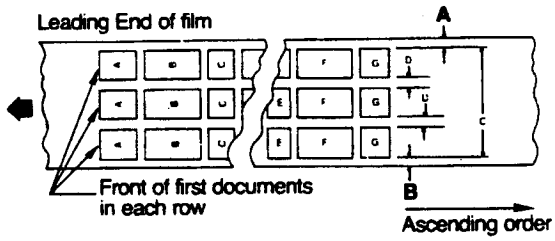
DUO-DUPLEX: (1) Combination of duo and duplex methods in which, through the use of mirrors or prisms, images on both the front and rear sides of the documents are recorded simultaneously on half the width of the film (the other film half being masked). When the

full length of the film has passed through the camera, it is reloaded so that the second set of images can be photographed on the half previously left unexposed. (2) Format on microfilm using the technique described in (1). See also image arrangement.



Duo-duplex format

DUPLEX: (1) In micrographics, a method of recording on roll microfilm in one exposure the images of the front and back of a document. The microfilm images appear side by side across the width of the microfilm (ISO). (2) Term applied to any camera capable of performing duplex work as described in (1). (3) Photographic paper having emulsion coating on both sides. (4) Format on microfilm using the technique described in (1). See also image arrangement. (5) In communications, the ability to send and receive information simultaneously.



Multiplex format

DUPLICATE (noun): Copy of a microform made by contact printing or by optical means.

DUPLICATE (verb): To make multiple copies of a document or microfilm, often with the aid of a master or intermediate.

EMULSION: Silver-gelatin image layer of the processed film.

EXPOSURE: (1) Act of exposing a sensitive material to radiant energy to obtain an image (ISO). (2) Time during which a sensitized material is subjected to the action of radiation. (3) Product of radiation intensity and the time during which it acts on the photosensitive material.

(PHOTOGRAPHIC) FILM: Combination of a flexible transparent base and one or more photosensitive layers in a roll or sheet form (ISO). See also diazo film, dry-silver material, silver film, and vesicular film.

FILM SIZE: Film width, generally expressed in millimeters, e.g., 16 mm.

FILM SPEED: Expression of the sensitivity of a film to light.

FIRST-GENERATION IMAGE: Image, generally used as a master, produced directly from a subject. See also camera microfilm and master.

FIXER: Chemicals used in the fixing process (ISO). See also silver halide.

FIXING: Processing step which converts the residual light sensitive silver halides into removable soluble salts eliminated by washing to make the developed image stable (ISO).

FLAT-BED CAMERA: See planetary camera.

FOCUS: (1) Plane in which rays of light reflected from a subject converge to form a sharp image after passing through different parts of a lens. (2) To adjust the relative position of the lens and film to obtain the sharpest possible image.

FOG: Nonimage photographic density. NOTE: A defect in film that can be caused by (1) the action of stray light in the exposure, (2) improperly compounded processing solutions or (3) wrongly stored or outdated photographic materials. See also base-plus-fog, chemical fog, and light fog.

FRAME: That area of the film on which radiant energy can fall during a single exposure (ISO). See also double frame, microfiche frame, and single frame.

GENERATION: One of the successive stages of photographic reproduction of an original or master. NOTE: The first generation is the camera film. Copies made from this first generation are second generation, etc. See also generation, Nth.

GENERATION, Nth: (of a microform) The number of generations from the original. Example: The 2nd generation is a copy from the camera film (ISO). See also generation.

GHOST IMAGES: Spurious multiple images of objects caused by reflections from lens surfaces in cameras, etc.

GRID AREA: Total area of the microfiche contained within the perimeter of the grid pattern. See also grid line and grid pattern.

GRID LINE: Imaginary vertical or horizontal line which defines an edge of the frame boundary. The line is of zero width on the microfiche proper and does not infringe on the usable area of a single or double frame. See also grid area and grid pattern.

GRID PATTERN: Array of horizontal and vertical lines (usually not represented) which divides an area of a microform (usually a microfiche) into spaces called frames (ISO). See also grid area and grid line.

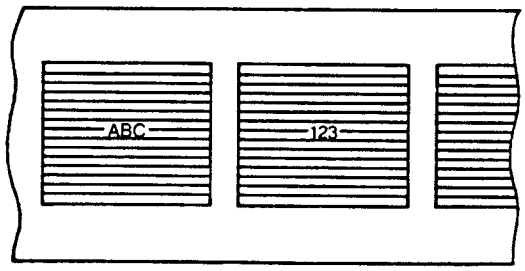
HALATION: Halo or ghost around the desired image on a photographic emulsion. NOTE: Caused by the reflection of rays of light from the base to the emulsion or by internal scattering of light within the film. See also antihalation and antihalation undercoat.

HALIDE: Any compound of chlorine, iodine, bromine or fluorine and another element. NOTE: The compounds are called halogens. The silver salts of these halogens are light sensitive materials used in silver-halide emulsions.

HARDENER: Chemicals which increase the hardness of the gelatin layers of sensitized materials (ISO).

HIGH CONTRAST: (1) Relationship of image tones in which the light and dark areas are represented by extreme differences in density. (2) Photographic materials whose sensitometric curve has a high value of average gradient, i.e., average gradient greater than 1.8 when measured as described under average gradient. See also low contrast and medium contrast.

HORIZONTAL MODE: (1) Arrangement of images on a roll of microfilm in which the lines of print or writing are parallel to the length of the film for horizontal script and perpendicular for vertical script. (2) Arrangement of images on a microfiche in which the first microimage is in the top left-hand corner of the grid pattern and succeeding microimages appear in sequence from left to right and in rows from top to bottom (ISO). Synonymous with comic mode, orientation B, and landscape.



Horizontal mode

HUMIDIFY: To add moisture to the air, thereby reducing the accumulation of static electricity and extending the life of photographic materials that become brittle in excessively dry air.

HUMIDITY: Moisture or water vapor in the atmosphere. NOTE: Relative humidity is the relation between the concentration of water vapor present in air to the maximum that

could be present at a given temperature. Humidity is important for micrographic materials because it affects physical properties such as brittleness, curl, and dimensions.

HYPO CLEARING AGENT: See hypo eliminator.

HYPO ELIMINATOR: Chemical compound used to neutralize or speed up the diffusion of the hypo from photographic material, thus shortening the washing time. NOTE: Compounds containing oxidizing agents such as peroxide are not permitted for washing microfilm with a life expectancy of 100 years or more.

HYPO, RESIDUAL: See residual thiosulfate ion.

ILLUMINATION: Act of providing with light. The process by which a surface receives light. Erroneously used for illuminance.

IMAGE: (1) In micrographics, the representation of information produced by radiation (ISO). (2) In electronic imaging, digital representation of a document.

IMAGE ARRANGEMENT: Placement of frames on a microform (ISO). See also duo, duo-duplex, duplex, multiplex, and simplex

INTERMEDIATE: Duplicate specifically prepared for producing further copies.

(MICROFILM) JACKET: Flat, transparent, flexible carrier formed by affixing a support sheet to a thin emulsion sheet, forming one or more film channels, made to hold one or more pieces of imaged microfilm and with a heading area (ISO). Synonymous with microfilm jacket.

LANDSCAPE: See horizontal mode.

LEADER: (1) A length of non-microimage-bearing photographic film or other material at the beginning of a roll of microfilm used for protection and for threading into micrographics equipment (ISO). (2) An unused or blank length of magnetic tape at the beginning of a reel of tape. The leader precedes the text or recorded data. See also trailer.

LE DESIGNATION: A rating for the "life expectancy" of recording materials and systems. NOTE: The number following the LE symbol is a prediction of the minimum life expectancy in years for which information can be retrieved without significant loss when properly stored, e.g. LE-100 indicates that the information can be retrieved after at least 100 years of storage. See also life expectancy.

LENS: Converging optical system consisting of refracting components designed to form real optical images which may be recorded on a sensitive surface or viewed on a screen (ISO). See also condensing lens.

LIFE EXPECTANCY: Length of time that information is retrievable in a system. see also LE designation.

LIGHT FOG: Image defect or degradation produced by accidental exposure of a photographic material to nonimage-forming light. See also chemical fog and fog.

LONG-TERM FILM: (deprecated) See LE designation and life expectancy.

LOW CONTRAST: (1) Relationship of image tones in which the light and dark areas are represented by small differences in density. (2) Photographic materials whose sensitometric curves have low values of average gradient, i.e., average gradient of 0.5-1.1. when measured as described under average gradient. See also high contrast and medium contrast.

MASTER (noun): (1) In micrographics, microform from which duplicates are or intermediates can be obtained (ISO). (2) In electronic imaging, the first recording, one from which duplicates can be obtained.

MASTER (verb): Creating of a first recording.

MASTER FILM: Any film, but usually the camera microfilm, used to produce further reproductions, such as intermediates or distribution copies.

MASTER NEGATIVE: See master film.

MASTER POSITIVE: See master film.

MAXIMUM DENSITY: See density, maximum.

MEASLES EFFECT: See redox blemish.

METHYLENE BLUE: Chemical dye formed during the testing of permanence of processed microimages using the methylene-blue method.

MICROFICHE: Microform in the shape of a rectangular sheet having one or more micro images usually arranged in a grid pattern with a heading area across the top (ISO).

MICROFICHE FRAME: Rectangular area on the microfiche bounded by imaginary intersecting gridlines within which a microimage may be recorded. The gridlines shall be part of gauges used for checking microfiche, but they do not actually appear on the microfiche. See also grid pattern.

MICROFILM (noun): (1) Fine-grain, high-resolution film used to record images reduced in size from the original. (2) Microform in the shape of a strip or roll (ISO).

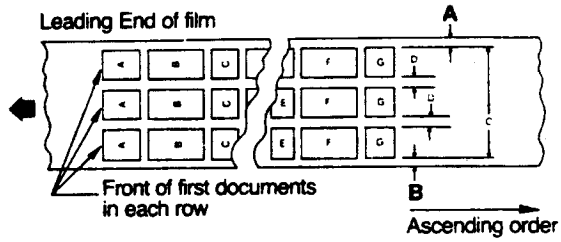
MICROFILM (verb): To record microphotographs on film.

MICROGRAPHICS: Techniques associated with the production, handling and use of microforms (ISO).

MICROPHOTOGRAPHY: Application of photographic techniques to produce images smaller than the original material.

MINIMUM DENSITY: See density, minimum.

MULTIPLEX: Method of recording images on film such that there are two or more rows of images across the width of the film. This sequence results in the first image in one row being opposite the first image in the other row or rows. (2) Format on microfilm using the technique described in (1). See also image arrangement.



Multiplex format

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY MICROCOPY RESOLUTION TEST CHART: Chart containing a graded series of blocks of lines and spaces used for determining the optical performance of microfilm equipment and the resolution of materials used in microrecording.

NBS CHART: See National Institute of Standards and Technology microcopy resolution test chart.

NEGATIVE-APPEARING IMAGE: Image in which the lines and characters appear light against a dark background.

ORIENTATION A (IA and IIA): See vertical mode.

ORIENTATION B (IB and IIB): See horizontal mode.

PHOTOGRAPH: Any image recorded on a photosensitive material.

PLANETARY CAMERA: Camera used for planetary filming (ISO). Synonymous with flatbed camera.

PLANETARY FILMING: Method of microfilming in which the document and the film are stationary during exposure (ISO). See also computer output microfilming, rotary filming, and step-and-repeat filming.

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

POLYESTER: Transparent plastic made from polyesters and used as a film base because of its dimensional stability, strength, resistance to tearing, and relative nonflammability.

POSITIVE-APPEARING IMAGE: Image in which the lines and characters appear dark against a light background (ISO).

PRINT (noun): Reproduction or copy on photographic film or paper.

PRINT (verb): To produce a reproduction or copy on photographic film or paper.

PRINT FILM: Fine-grain, high-resolution film used primarily for making contact film copies.

PRINTING MASTER: See intermediate and master.

(FILM) PROCESSING: Treatment of exposed photographic material by chemical or physical means to make a latent image visible and ultimately usable.

QUALITY ASSURANCE: Similar to quality control but with the program independent of the production organization. See also quality control.

QUALITY CONTROL: (1) Planned systematic activities necessary to ensure that media, a component, module or system conforms to established technical requirements.
(2) All actions that are taken to ensure that a department or organization delivers products that meet performance requirements and adhere to standards and procedures.
(3) Policy, procedures and systematic actions established in an enterprise for the purpose of providing and maintaining some degree of confidence in data integrity and accuracy throughout the life cycle of the data, which includes input, update, manipulation and output. See also quality assurance.

READER: Apparatus used to optically enlarge a microimage to make it eye-legible (ISO).

READER-PRINTER: (1) Device that serves both as a reader and a printer and implies the provision of a viewing screen large enough to display a full-size or nearly full-size image of the original document. NOTE: Reader-printers are usually designed for image and print sizes up to 11 inches by 17 inches (approximately ISO A3 size) or 8-1/2 inches by

11 inches (approximately ISO A4 size). (2) Device that combines the functions of a reader and a printer (ISO).

RECORDS PREPARATION: See document preparation

REDOX BLEMISH: Microspot formation on silver-gelatin type films. Synonymous with aging blemish, measles effect, microspot defects and red spots.

REDUCTION: (1) Quotient of a linear dimension of an object and the corresponding linear dimensions of the same object expressed as 1:24, 1:48, etc. (2) Copy smaller than the original; or, its size being expressed as the number of times a given linear dimension is reduced. Example: 1/2 reduction (A2 hardcopy of a A0 drawing) (ISO).

REDUCTION RATIO: Relationship between the dimensions of a microimage and the corresponding dimensions of the original. Example: a reduction ratio is expressed as 1:24.

REFLECTANCE TARGET: Test target that has a known fixed reflectance.

RESIDUAL THIOSULFATE ION: Ammonium or sodium thiosulfate (hypo) remaining in film or paper after washing. Synonymous with residual hypo. See also densitometric method.

RESOLUTION: (1) Relative degree of an image's visual acuity. See also image. (2) In electronic imaging, specific pattern and number of pixels sampled. (3) Measure of capability to delineate picture detail. (4) In micrographics, the ability of a photographic system to record fine detail. See also resolution test chart.

RESOLUTION TEST CHART: Chart containing a number of increasingly smaller resolution test patterns. The pattern is a set of horizontal and vertical lines of specific size and spacing. NOTE: The NIST Microcopy Resolution Test Chart 1010a is generally used in micrographics.

RESOLVING POWER: Numeric expression of the ability of an optical or photographic system to distinguish or separate two entities spaced closely together. NOTE: In micrographics, it is the product of the number of the pattern resolved in the NIST test chart multiplied by the reduction and is expressed in line pairs per millimeter.

ROTARY CAMERA: Camera used for rotary filming (ISO). See also rotary filming.

ROTARY FILMING: Method of microfilming in which the movement of the document and the film are synchronized during exposure (ISO).

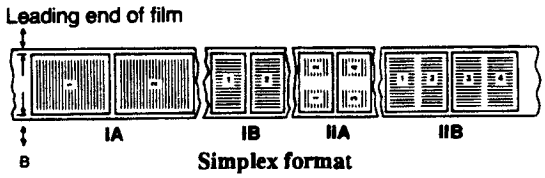
SENSITIVITY: Degree to which an emulsion reacts by the formation of a latent image under exposure to radiation or other agents, especially as this relates to exposure by different wavelengths of light.

SHARPNESS: (1) Visual sensation (subjective) of the slope of the boundary between a light and a dark area. (2) Degree of (line/edge) clarity.

SHORT-TERM FILM: (Deprecated) See LE designation and life expectancy.

SILVER FILM: Photographic film of which the photosensitive layer is composed of silver halides suspended in a suitable binder. When developed, the image is formed either metallic silver (black and white film) or by dyes (color film) (ISO).

SIMPLEX: Method of recording images one by one in which a single frame appears within the usable width of the microfilm (ISO). See also image arrangement.



Simplex format

SINGLE FRAME: Frame that is bounded by adjacent pairs of grid lines; the smallest subdivision of a grid.

SILVER HALIDE: Compound of silver and one of the following elements known a halogens: chlorine, bromine, iodine, and fluorine.

SOURCE-DOCUMENT CAPTURE: Conversion of documents, usually paper, to microimages or digital images.

SOURCE-DOCUMENT MICROFILMING: See source-document capture.

SPLICE: Joint made by cementing, taping or welding (heat splice) two pieces of film or paper together so they will function as a single piece. NOTE: Cemented splices are called lap splices, since one piece overlaps the other. Most welds are called butt splices, since the two pieces are butted together without any overlap.

STABILITY: Degree to which negatives or prints resist change by the action of light, heat or atmospheric gasses.

STANDARD: (1) Document that establishes engineering and technical limitations and applications for items, materials, processes, methods, designs and engineering practices. (2) Fundamental unit or physical constant, e.g., ampere, meter, absolute zero (Kelvin).
STEP-AND-REPEAT CAMERA (MICROFICHE CAMERA): Camera used for automatic step-and-repeat filming (ISO). See also step-and-repeat filming.

STEP-AND-REPEAT FILMING: Method of recording images on microfiche sequentially to form a grid pattern (ISO).

STEP TEST: Graded series of exposures made to determine the optimum exposures for films, papers, and other media.

STREAK: Light or dark area through a number of images, parallel to the edges of film.

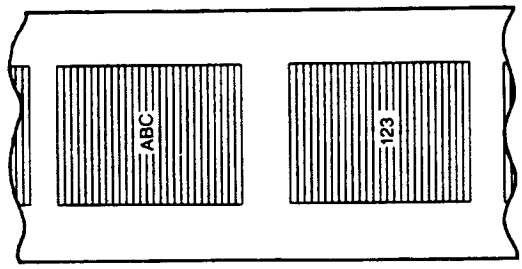
STRETCH: Elongated image. NOTE: Caused by the document stopping, hesitating or slowing down while the microfilm continues to advance in the rotary camera.

TARGET: (1) Any document or chart containing identification information, coding or test charts. (2) Aid to technical or bibliographic control that is photographed on the film preceding or following the document.

TECHNICAL TARGET: Aid to technical control that indicates the reduction and resolution of the film. See also target.

TRAILER: Length of non-microimage-bearing photographic film or other material following the last frame on a roll of microfilm (ISO). See also leader.

VERTICAL MODE: (Cine mode, orientation A) (1) Arrangement of images on a roll of microfilm in which the lines of print or writing are perpendicular to the length of the film for horizontal script and parallel for vertical script. (2) Arrangement of images on a microfiche in which the first microimage is in the top left-hand corner of the grid pattern and succeeding microimages appear in sequence from top to bottom and in columns from left to right (ISO).



Vertical mode (A or cine orientation)

VESICULAR FILM: Photographic film containing one or more photosensitive layers composed of diazonium salt in a thermoplastic material. NOTE: On exposure, the salts are decomposed to yield nitrogen microbubbles which form the latent image. The latent image becomes visible in the form of bubbles (vesicles) with the application of heat. Vesicular film generally reverses the polarity of the original (ISO).

WASHING: Processing step which uses water to remove unwanted soluble chemicals from photographic materials (ISO).

WATER SPOT: Defect in film. NOTE: May be caused by (1) deformation in the gelatin layer in an irregular spot pattern which is caused by water drops on the surface during drying, due to improper squeezing or (2) residue from materials in the wash water.