Sri Lanka Standard

# MICROGRAPHICS - MICROFILMING OF DOCUMENTS ON 16 mm AND 35 mm SILVER - GELATIN TYPE MICROFILM - OPERATING PROCEDURES

SLS 1092 :1995
ISO 6199 : 1991

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SRI LANKA STANDARDS INSTITUTION
53, Dharmapala Mawatha
Colombo 03.
SRI LANKA.

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## NATIONAL FOREWORD

This standard was approved by the Sectoral Committee on Information Technology on 1994-12-06 and was authorized for adoption and publication as a Sri Lanka standard by the Council of the Sri Lanka Standards Institution on 1995-11-23.

This Sri Lanka Standard is identical with ISO 6199, Micrographics -Microfilming on 16 mm and 35 mm Silver-gelatin type microfilm -Operating procedures, published by the International Organization for Standardization (ISO).

### Terminology and conventions

The text of the International Standard has been accepted as suitable for publication, without deviation, as a Sri Lanka Standard. However, certain terminology and conventions are not identical with those used in Sri Lanka Standards, attention is therefore drawn to the following:

a) Wherever the words 'International Standard' appear, referring to this standard they should be interpreted as Sri Lanka Standard.

b) The comma has been used throughout as a decimal marker. In Sri Lanka Standards it is the current practice to use a full point on the baseline as a decimal marker.

ISO 4331 and ISO 4332 given in Clause 2 References are superseded by ISO 10602, Photography - Processed silver - gelatin type black-and-white film - Specifications for stability.

### Cross references

| International Standards | Corresponding Sri Lanka Standards |
|---|---|
| ISO 5466 : 1986, Photography - Processed safety photographic film - Storage practices. | SLS 1089 : 1995, Photography - Processed safety photographic film - Storage practices |
| ISO 9878 : 1990, Micrographics - Graphical symbols for use in microfilming. | SLS 1096 : 1995, Micrographics - Graphical symbols for use in microfilming |

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Corresponding Sri Lanka standard for the following International Standards referred in the standard, are not available at present.

ISO 446 : 1991, Micrographics - ISO character and ISO test chart No. 1 - Description and use.

ISO 543 : 1990, Photography - Photographic films - Specifications for safety film.

ISO 554 : 1976, Standard atmospheres for conditioning and/or testing -Specifications.

ISO 3272-1 : 1983, Microfilming of technical drawings and other drawing office documents - Part 1 : Operating procedures.

ISO 3334 : 1989, Micrographics - ISO resolution test chart No. 2 -Description and use.

ISO 4330 : 1987, Photography - Determination of the curl of photographic film.

ISO 4331 : 1986, Photography - Processed photographic black-and-white film for archival records - Silver - geleting type on cellulose ester base - Specifications.

ISO 4332 : 1986, Photography - Processed photographic black-and-white film for archival records - Silver - gelatin type on polyethylene terephthalate) base - Specifications.

ISO 6196-1 : 1980, Micrographics - Vocabulary - Section 01 : General terms.

ISO 6196-2 : 1982, Micrographics - Vocabulary - Section 02 : Image positions and methods of recording.

ISO 6196-3 : 1983, Micrographics - Vocabulary - Part 03 : Film processing.

ISO 6196-4 : 1987, Micrographics - Vocabulary - Part 4 : Materials and packaging.

ISO 6196-5 : 1987, Micrographics - Vocabulary - Part 05 : Qualtiy of images, legibility, inspection.

ISO 6196-6 : 1992, Micrographics - Vocabulary - Part 06 : Equipment.

ISO 6200 : 1990, Micrographics - First generation silver-gelatin microforms of source documents - Density specifications.

ISO 10196 : 1990, Micrographics - Recommendations for the creation of original documents.

ISO/TR 10200 : 1990, Legal admissibility of microforms.

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# INTERNATIONAL STANDARD

**ISO 6199**

First edition
1991-07-15

# Micrographics — Microfilming of documents on 16 mm and 35 mm silver-gelatin type microfilm — Operating procedures

*Micrographie — Micrographie des documents sur films argentiques de* 16 mm *et* 35 mm *— Techniques opératoires*

Reference number
ISO 6199:1991(E)

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 6199 was prepared by Technical Committee ISO/TC 171, *Micrographics and optical memories for document and image recording, storage and use.*

Annexes A, B, C, D and E of this International Standard are for information only.



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## Introduction

This International Standard establishes procedures for producing microfilm with standard characteristics of presentation and quality from a diversity of documents.

Compliance with these requirements will enable an operator to provide legible microfilm.

# Micrographics — Microfilming of documents on 16 mm and 35 mm silver-gelatin type microfilm — Operating procedures

## 1 Scope

This International Standard establishes general principles for document filming on 16 mm and 35 mm silver-gelatin type microfilm, including orientation of images on film, area for codes, and the information required to facilitate identification, classification, testing and subsequent use of the microfilm.

It applies to rotary and planetary filming.

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 446:1991, *Micrographics — ISO character and ISO test chart No. 1 — Description and use.*

ISO 543:1990, *Photography — Photographic films — Specifications for safety film.*

ISO 554:1976, *Standard atmospheres for conditioning and/or testing — Specifications.*

ISO 3272-1:1983, *Microfilming of technical drawings and other drawing office documents — Part 1: Operating procedures.*

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ISO 4332:1986, *Photography — Processed photographic black-and-white film for archival records — Silver-gelatin type on poly(ethylene terephthalate) base — Specifications.*

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ISO 6196-1:1980, *Micrographics — Vocabulary — Section 01: General terms.*

ISO 6196-2:1982, *Micrographics — Vocabulary — Section 02: Image positions and methods of recording.*

ISO 6196-3:1983, *Micrographics — Vocabulary — Part 03: Film processing.*

ISO 6196-4:1987, *Micrographics — Vocabulary — Part 04: Materials and packaging.*

ISO 6196-5:1987, *Micrographics — Vocabulary — Part 05: Quality of images, legibility, inspection.*

ISO 6196-6:—[1], *Micrographics — Vocabulary — Part 06: Equipment.*

ISO 6200:1990, *Micrographics — First generation silver-gelatin microforms of source documents — Density specifications.*

ISO 9878:1990, *Micrographics — Graphical symbols for use in microfilming.*

1) To be published.

ISO 10196:1990, *Micrographics — Recommendations for the creation of original documents.*

ISO/TR 10200:1990, *Legal admissibility of microforms.*

## 3 Definitions

For the purposes of this International Standard, the definitions given in ISO 6196 apply.

## 4 Preparation of documents

The document file should be examined carefully for, among others, condition of documents, legibility, order, targets, and foreign objects.

Appropriate action should then be taken prior to microfilming (see annex A).

## 5 Conditions of microfilming

### 5.1 Rawstock microfilm

The microfilm shall comply with the requirements of ISO 543, ISO 4330, ISO 4331, and ISO 4332.

### 5.2 Formats and orientation

#### 5.2.1 Formats

The formats commonly used in roll microfilm are shown in figure 1.

The dimensions for the placement of the documents on the film are listed in table 1.

**Table 1 — Dimensions for indicated areas for unperforated film without document marks** (see figure 1)

Dimensions in millimetres

| Dimension | 16 mm film | 35 mm film |
|---|---|---|
| A min. | 0,50 | 0,97 |
| B min. | 0,50 | 0,97 |
| C max. | 14,92 | 33,00 |
| D min.[1)] | 0,50 | 0,97 |

1) For all formats except simplex.

#### 5.2.2 Orientation

Images should be recorded preferably in the horizontal mode (orientations 1B and 2B of simplex format of figure 1). If this arrangement is not possible, the images shall be placed in any of the other orientations shown in figure 1.

The preferred orientation of images for filming in the duo, duplex, or combination duo duplex formats, is also shown in figure 1.

#### 5.2.3 Roll-film coding

Documents recorded on rolls of microfilm should be indexed in such a way that individual documents or series of documents can be easily located. Examples of index systems are shown in annex B.

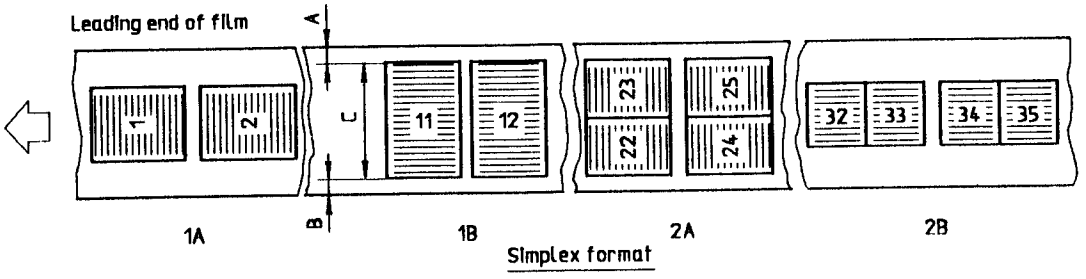
### 5.3 Reduction ratio

The reduction ratio shall be determined by the size of the characters, the quality of the originals (see ISO 10196), the quality of the camera/film system, and the size of the documents to be microfilmed. The orientation of the document on the film and the film size should then be determined, in relation to the reduction ratio that will accommodate the document and the desired quality. The film format and reduction ratio selected should allow the smallest alphanumeric characters to be legible in a distribution copy projected on a reader screen and in a hard-copy made from a distribution copy.

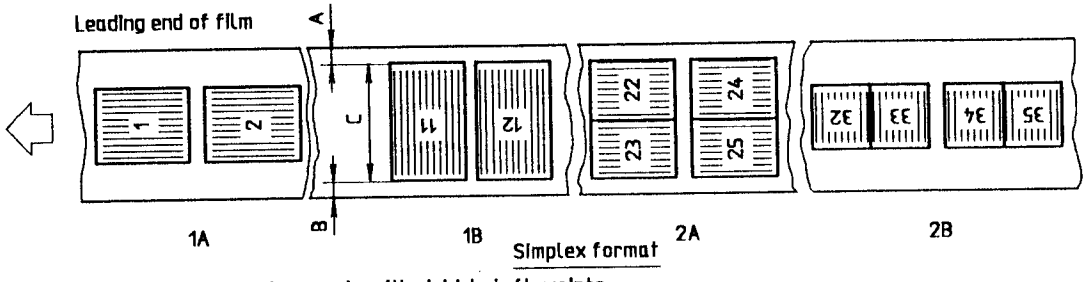
Annex C provides procedural information to determine the level of image quality for a given micrographic system.

### 5.4 Maximum dimensions of the document

The maximum height or width of a document that can be recorded on the usable width of the film as indicated in table 1 and figure 1 for uncoded film, and figure 2 for coded film, depends on the film format, the reduction ratio and the type of camera to be used, either rotary or planetary.

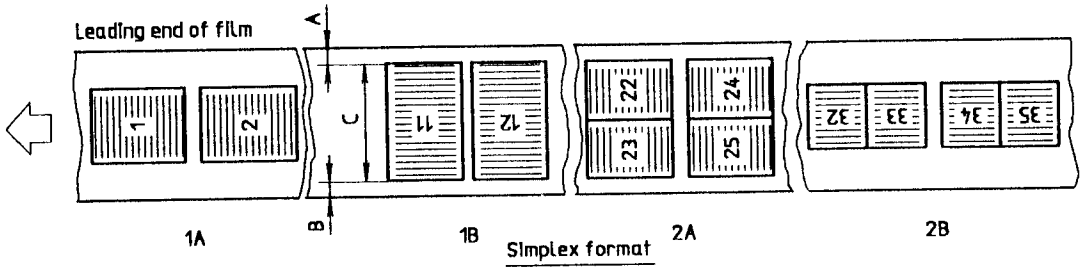



Simplex format



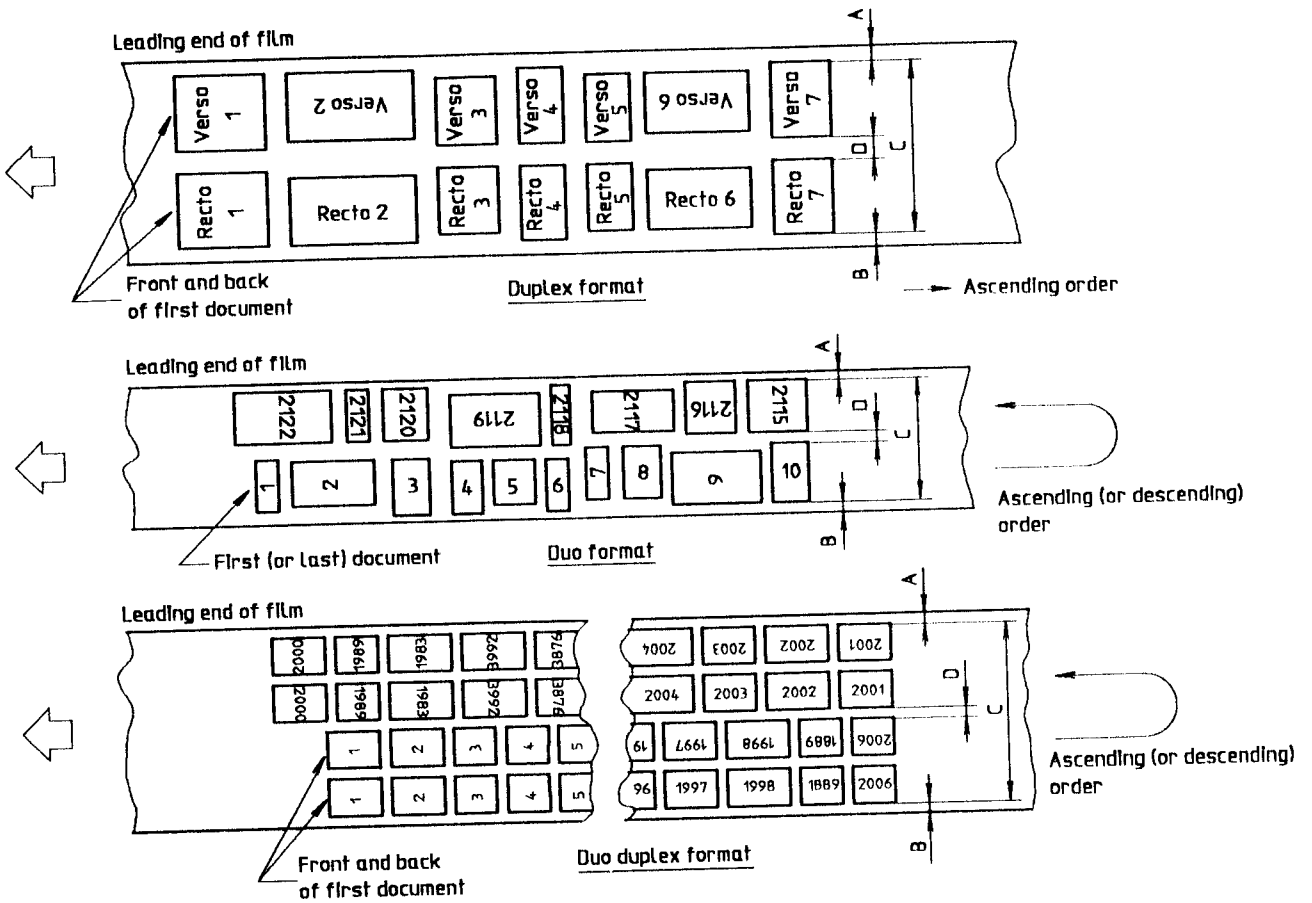

Simplex format

Alternative orientation for documents with right to left scripts




Simplex format

Preferred orientation for documents with horizontal and right to left scripts




NOTES

1 On the duplex format, the image orientation of one row (front) is controlled by the orientation of the text on the original page, and the image orientation of the opposite row (back) is controlled by the image orientation of the above-mentioned row.

2 The duo duplex format is used primarily in banking applications.

**Figure 1 — Roll microfilm formats**

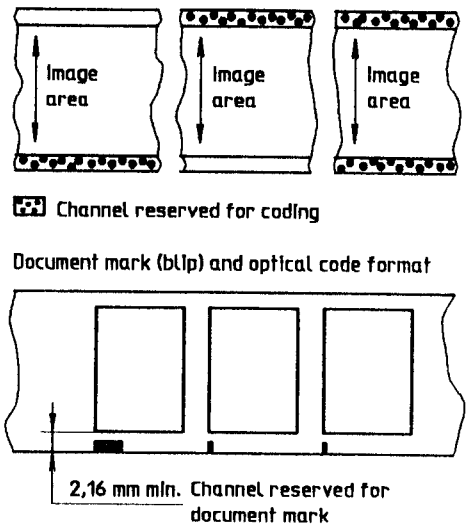



**Figure 2 — Channels provided for document marks (blips) and optical code format**

### 5.4.1 Simplex format in rotary cameras

The side of the document parallel to the length of the film may be any length. Table 2 lists two of the most commonly used reduction ratios for the simplex format of uncoded film in 16 mm rotary cameras. If the document is close to the recordable size, a higher reduction ratio should be used to avoid the possibility of image loss caused by the skewing of the document while being photographed.

NOTE 1 The size of the document is limited by the width of the throat of any document feeder.

**Table 2 — 16 mm rotary microfilm camera — Simplex format for uncoded film**

Dimensions in millimetres

| Nominal reduction ratio | Maximum dimension of document side perpendicular to the long axis of the film |
|---|---|
| 1:20 | 298 |
| 1:24 | 357 |

### 5.4.2 Simplex format in planetary cameras

The simplex format is also used with general use planetary cameras which can have variable reductions and a variable film advance. Consequently, the aperture in the camera has a maximum length and width. Table 3 lists the maximum dimensions of documents for different reduction ratios. For fixed advance cameras, see table 4. For technical drawing applications, see ISO 3272-1. The actual dimensions of the documents should be less than that indicated to allow for positioning errors.

NOTE 2 When placing a 35 mm film strip consisting of three frames in an A6 jacket, the maximum film advance should be 47,5 mm.

**Table 3 — Planetary roll film camera with adjustable film advance**

Dimensions in millimetres

| Nominal reduction ratio | Approximate maximum field size (subject to 3 % variation) | | | |
|---|---|---|---|---|
| | 16 mm unperforated film camera aperture size | | 35 mm unperforated film camera aperture size | |
| | 38,00 length | 15,00 width | $45\ ^{0}_{-0,5}$ length | $32\ ^{0}_{-0,5}$ width |
| 1:6 | 229 | 90 | 267 | 190 |
| 1:8 | 305 | 120 | 356 | 254 |
| 1:10 | 381 | 150 | 444 | 318 |
| 1:12 | 457 | 180 | 533 | 381 |
| 1:14 | 533 | 210 | 622 | 444 |
| 1:15 | 572 | 225 | 667 | 476 |
| 1:16 | 610 | 240 | 711 | 508 |
| 1:18 | 686 | 270 | 800 | 572 |
| 1:20 | 762 | 300 | 889 | 635 |
| 1:21 | 800 | 315 | 933 | 667 |
| 1:22 | 838 | 330 | 978 | 698 |
| 1:24 | 914 | 360 | 1 067 | 762 |
| 1:26 | 991 | 390 | 1 156 | 826 |
| 1:27 | 1 029 | 405 | 1 200 | 857 |
| 1:28 | 1 067 | 420 | 1 245 | 889 |
| 1:29 | 1 105 | 435 | 1 289 | 921 |
| 1:30 | 1 143 | 450 | 1 334 | 952 |
| 1:32 | 1 219 | 480 | 1 422 | 1 016 |
| 1:34 | 1 295 | 510 | 1 511 | 1 080 |
| 1:36 | 1 372 | 540 | 1 600 | 1 143 |

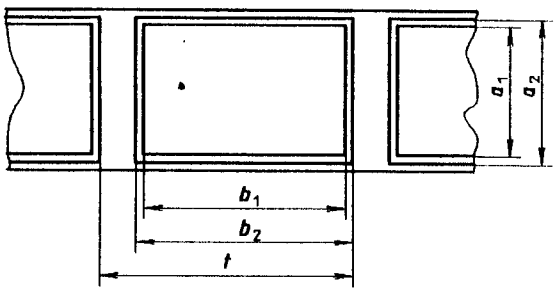



**Figure 3 — Image frame ($a_2 \times b_2$), image area ($a_1 \times b_1$) and frame pitch ($t$)**

**Table 4 — Planetary roll film camera with fixed film advance** (see figure 3)

Dimensions in millimetres

| 35 mm microfilm | Dimensions |
|---|---|
| Image frame ($a_2 \times b_2$) | $32\ ^{0}_{-0,5} \times 45\ ^{0}_{-0,5}$ |
| Image area ($a_1 \times b_1$) | 30,4 × 41,0 (max.) |
| Frame pitch ($t$) | $52\ ^{0}_{-1,2}$ |

### 5.4.3 Simplex format coding

The simplex format is also used with film that is coded along the edge with a document mark or a photo-optical code. Coded film is produced in both planetary and rotary cameras at a fixed reduction ratio. The manufacturer of the camera will provide the maximum dimensions for documents filmed in the camera. The actual dimensions of the documents should be less than that indicated to allow for positioning errors.

### 5.4.4 Duplex and duo formats in rotary cameras

The duplex and duo formats are used only in rotary cameras.

Table 5 lists the maximum dimensions of the document for a few of the most commonly used reduction ratios for the duplex and duo formats. The dimensions should be less than the maximum to allow for errors in positioning and transporting the documents.

**Table 5 — 16 mm rotary microfilm camera duplex and duo formats for uncoded film**

Dimensions in millimetres

| Nominal reduction ratio | Maximum height or width of documents |
|---|---|
| 1:32 | 230 |
| 1:40 | 288 |
| 1:45 | 324 |
| 1:50 | 360 |

#### 5.4.5 Images in the duo duplex format

The images in the duo duplex format should be arranged in one of the preferred orientations shown in figure 1. For dimensions, see table 1.

## 6 Filming procedures

### 6.1 Documents recorded on more than one roll of film

If multiple rolls are required to film a complete sequence of documents, the order and continuity shall be maintained. The last image on each roll shall indicate the identification of the next roll by a target "Continued on roll number ...." and the first image on each of the following rolls shall be a target "Continued from roll number ...". The last roll shall conclude with an "END" target.

### 6.2 Leader and trailer

In addition to any fogged film, which can be removed, each roll of exposed 35 mm microfilm shall have at the beginning and end ($500\ ^{+200}_{0}$) mm of unexposed film.

To accommodate automatic threading readers for 16 mm film, at least 700 mm shall be left at the beginning and end of each roll.

## 7 Filming sequence

If needed, the following items should be included in the microfilm in the order indicated in figure 4.

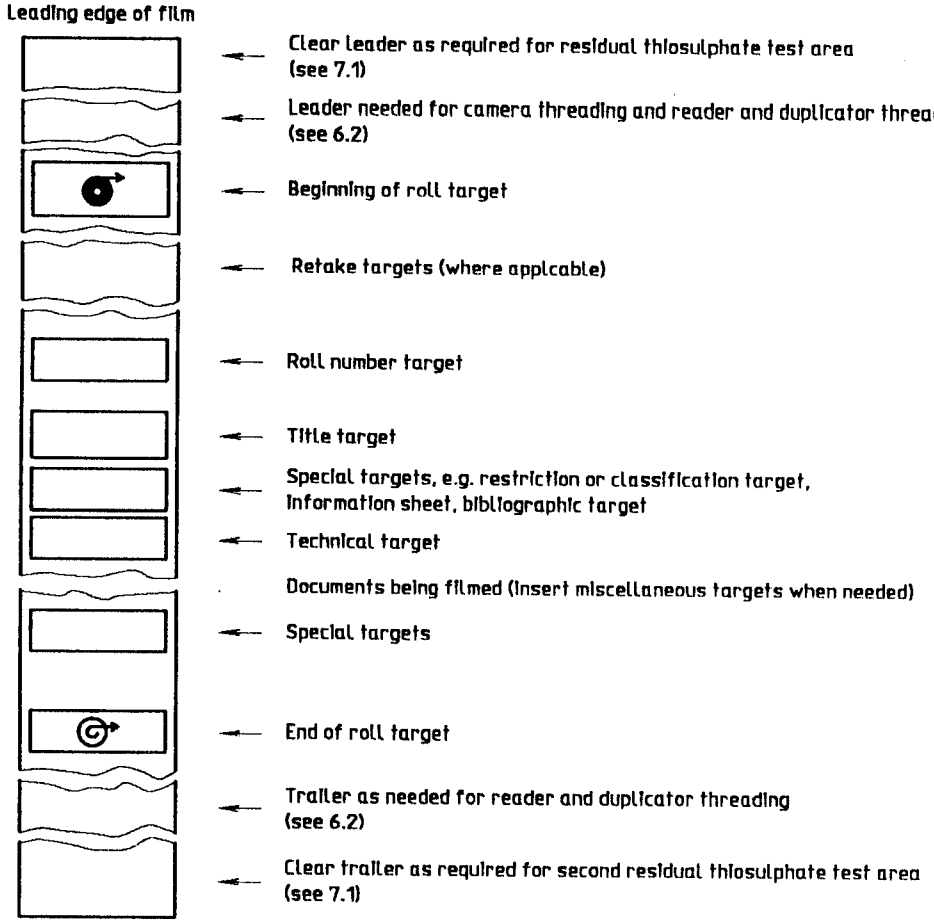



**Figure 4 — Microfilming sequence**

## 7.1 Residual thiosulphate ion test area

If archival tests are required, at least 140 mm of 16 mm film or 70 mm of 35 mm film with minimum density (clear) shall be left at the beginning and end of each roll in addition to the leader and trailer.

## 7.2 Retakes

The following sequence should be followed in filming retakes which should be spliced at the start of the roll after the beginning of roll target.

a) Target stating retakes for roll no. xx;

b) Technical target as described in 7.4.5;

c) Special targets if applicable;

d) Retake documents to be microfilmed;

e) Target stating end of retakes for roll no. xx.

## 7.3 Splices

Heat-weld splices are generally recommended for films with triacetate base and ultrasonic splices for films with polyester base. If cemented splices are used, the cement shall contain no acetic acid or other chemicals that will be injurious to the long-term keeping qualities of the film. Cellophane tape and tape of the pressure-sensitive type shall not be used for making splices unless the adhesive is formulated so that it is not injurious to the long-term keeping qualities of the film, and the adhesive will not migrate from under the splice.

Every effort shall be made to keep the number of splices to a minimum (not more than five) and these shall be made in the master negative before any duplicates are printed.

## 7.4 Targets

### 7.4.1 Beginning of roll target

The beginning of roll target shall contain either the symbol described in ISO 9878, or the word "START".

#### 7.4.2 Roll number target

The numerals shall be large enough to appear at least 2 mm high in the image on film.

#### 7.4.3 Title target

The target shall contain a full or abbreviated description of the document to be found on the film, the name of the microfilmer or the micropublisher, and the year of the microfilming.

A metric scale, in millimetres, for reference purposes of at least 10 cm in length is optional.

#### 7.4.4 Special targets

One or more special targets listed in figure 4 may be needed for specific purposes:

##### 7.4.4.1 Restriction or classification target

This target shall contain any restrictions on access or use, including further reproduction or security classification.

##### 7.4.4.2 Information sheet

For inspection and record purposes, the sheet shall list the filming and quality requirements and necessary microfilm system specifications.

##### 7.4.4.3 Bibliographic target

This target is required for microfilm intended for library or archives. It shall contain the editorial bibliographic data for the document microfilmed. The location of the original document should be given.

#### 7.4.5 Technical target

The required technical target shall contain

a) The reduction ratio in eye-legible numerical characters;

b) An ISO test chart No. 1 (see ISO 446) or ISO test chart No. 2 (see ISO 3334) in the centre and each of the four corners of the field for planetary cameras. For rotary cameras, the test charts shall be placed in the centre and the right and left sides of the document as it passes through the camera. All three charts should have the same orientation;

c) A reflectance target, spectrally neutral, matt-finished area at least 150 mm × 150 mm with a reflectance factor within the range 47 % to 53 %, and a dark, spectrally neutral, matt-finished area of the same size with a reflectance factor within the range 5,6 % to 6,4 %.

For planetary camera, see ISO 10550.

#### 7.4.6 Graphical symbols and targets

The documents shall be microfilmed after the technical target, with symbols as needed. If the ISO symbols are not sufficient, targets with appropriate explanations can be filmed.

#### 7.4.7 End of roll target

The end of roll target shall contain either the symbol described in ISO 9878 or the word "END".

## 8 Image quality

The microimages should have sufficient contrast and resolution to permit easy reading, microfilm duplication and hardcopying. The visual density values of first generation silver microforms should comply with ISO 6200. Minimum resolution quality specifications for planetary filming are indicated in annex E.

## 9 Processing and storage practices

### 9.1 Methods and procedures

Attention shall be given to environmental hazards in microfilm operation facilities.

The methods and procedures adopted for the processing and storage of the film shall comply with the requirements of ISO 2803 and ISO 5466.

### 9.2 Curl

When a processed roll of film is to be inspected for curl, the film shall be placed in an atmosphere of (50 ± 5) % relative humidity with a temperature of 23 °C ± 2 °C (see ISO 554) for at least 6 h. When measured against a curl board template in accordance with Method A of ISO 4330, the maximum curl value should not exceed the following limits:

— Transverse curl: 8

— Longitudinal curl:10

### 9.3 Winding

Processed microfilm shall be wound on the reel as shown in figure 5. The image "F" shall appear in the orientation shown (right reading, not reversed reading) when viewed by the observer. It is recognized that winding orientation of the processed microfilm of simplex format (for documents with vertical and right to left scripts, and for documents with horizontal and right to left scripts) is occasionally reversed to that shown in figure 5.