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Microcopying — 16 mm and 35 mm microfilms, spools and reels

Microcopie — Microfilms de 16 mm et de 35 mm et leurs bobines d'approvisionnement et de lecture

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up 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.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 46 has reviewed ISO Recommendation R 1116 and found it technically suitable for transformation. International Standard ISO 1116 therefore replaces ISO Recommendation R 1116-1969 to which it is technically identical.

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ISO Recommendation R 1116 was approved by the Member Bodies of the following countries :

Australia	India	Romania
Belgium	Iran	South Africa, Rep. of
Canada	Israel	Sweden
Czechoslovakia	Italy	Switzerland
Denmark	Netherlands	Thailand
Egypt, Arab Rep. of	New Zealand	Turkey
France	Norway	United Kingdom
Germany	Poland	
Hungary	Portugal	

No Member Body expressed disapproval of the Recommendation.

No Member Body disapproved the transformation of ISO/R 1116 into an International Standard.

Microcopying — 16 mm and 35 mm microfilms, spools and reels

1 SCOPE AND FIELD OF APPLICATION

This International Standard gives specifications for microfilms in roll and strip form 16 mm and 35 mm wide, and their supply spools and reader reels.

It does not necessarily apply to microfilms of engineering drawings.

2 REFERENCES

ISO 69, *Cinematography — 16 mm motion-picture raw stock film — Cutting and perforating dimensions.*

ISO/R 269, *Sizes of correspondence envelopes and pockets.*

ISO 491, *Cinematography — 35 mm motion-picture film — Cutting and perforating dimensions.*

ISO 543, *Cinematography — Motion-picture safety film — Definition, testing and marking.*

ISO 1019, *Cinematography — Spools, daylight loading type for 16 mm motion-picture cameras — Dimensions.*

ISO/R 1200, *Motion-picture film perforated along one edge — Direction of winding.*

ISO 2803, *Photography — Silver-gelatin type microfilms — Processing and storage for archival purposes.*

ISO 3047, *Cinematography — Spool, daylight loading type, for 35 mm motion-picture cameras (capacity 30 m — 100 ft) — Dimensions.*

ISO . . . , *Microcopying — Recording of bibliographical and cataloguing data.*¹⁾

3 SPECIFICATIONS RELATING TO UNEXPOSED NEGATIVE FILM

3.1 Film stock

3.1.1 Unexposed negative film in roll form for the production of microfilms is characterized by its width, its

useful length (i.e. exclusive of leader and trailer) and — if the film is perforated — by the number of rows of perforations, and the shape and pitch of these perforations.

Characteristics which are not the subject of particular specifications in this International Standard shall conform to specifications for cinematographic films as indicated in ISO 69 and ISO 491.

The microfilm thickness shall not exceed 0,16 mm.

3.1.2 Only the useful length is standardized. The film shall be wound on a spool or a core (see 3.2.1). The use of a core for 30 m length is not recommended.

The useful length shall be stated on the packing.

3.1.3 Unexposed negative film for microfilms shall be made of safety stock, as specified in ISO 543.

3.1.4 Films intended for the production of microfilms may be

- unperforated (for 16 mm and 35 mm widths);
- perforated on one edge only (for 16 mm width);
- perforated on both edges (for 35 mm width).

Unperforated film offers the possibility of using a larger area, but perforated film offers the advantage of constant registration of the position of the image with respect to the perforations.

3.1.5 For 16 mm microfilm, the perforation shall be in accordance with that specified in ISO 69 and, for 35 mm microfilm, with one of those specified in ISO 491, under the designations "Type SC" (perforation known as "Positive") and "Type N" (perforation known as "Negative").

3.1.6 The pitch of the perforations in negative films is generally the Standard pitch of 7,62 mm for 16 mm films and 4,75 mm for 35 mm films.

1) In preparation.

3.2 Supply spool

3.2.1 Capacity

The standardized supply spools for unexposed film are the so-called 30 m spools for 16 mm and 35 mm film on which a useful length of 30 m (or 100 ft) can be wound, and the 60 m spools for 16 mm film on which a useful length of 60 m (or 200 ft) can be wound. The dimensions of the spools shall conform to the values shown in figures 1 a) and 1 b) (supply).

3.2.2 Spindle holes

On each flange the spindle hole is square. On one flange there is a keyway in a corner of the square; on the other flange the keyway is optional. If there are keyways on both flanges (one on each), their alignment is parallel to the spindle. A second keyway in the corner opposite to the first, offset drive holes and/or a slot may be optionally added.

The shapes and dimensions of the spindle holes, keyways, optional holes and slots shall conform to figure 1 b).

3.2.3 Affixing of the core

Means shall be provided for affixing a standard straight cut film to the core of the spool without any additional preparation.

3.2.4 Winding

The unexposed negative film shall be wound emulsion in, unless otherwise explicitly specified in the order, in which case the words "emulsion out" shall appear on the packing. In the case of film perforated on one edge, the type of winding shall be indicated by A or B in accordance with ISO/R 1200.

4 SPECIFICATIONS RELATING TO UNEXPOSED POSITIVE (PRINT) FILM

4.1 Film stock

The requirements of 3.1.1 to 3.1.5 inclusive apply also to unexposed positive film.

The pitch of the perforations in unexposed positive film shall be the Standard pitch of 7,62 mm for 16 mm film and 4,75 mm for 35 mm film.

4.2 Form of supply

When delivered, a roll of unexposed film is generally wound on a core; the usual supply for large laboratories comprises about 300 m or 1 000 ft of film wound on a core of about 50 mm, 75 mm or 100 mm outside diameter, contained in a suitable packing.

For the roll with nominal 300 m length of film, it is desirable that the length supplied shall be a full 305 m (1 000 ft), without splices.

5 SPECIFICATIONS RELATING TO MICROFILMS

5.1 Specifications relating to images

5.1.1 Distance from the image to the edge of the film

No useful part of the image shall be closer than 0,5 mm (0.02 in) to the edge of unperforated 16 mm film, or closer than 1,0 mm (0.039 in) to the edge of unperforated 35 mm film. No useful part of the image shall be closer than 2,8 mm (0.110 in) to the edge of perforated 16 mm film or closer than 5,5 mm (0.216 in) to the edge of perforated 35 mm film.

5.1.2 Arrangement of images

The images shall be arranged on the microfilm as shown in figure 2 a). It will be noticed that only two of the four possible image positions in relation to the direction in which the film unwinds have been adopted, in the case of all 16 mm microfilms and of the simplex 35 mm microfilms. The arrangement of images on duo and duplex microfilms are shown in figures 2 b) and 2 c).

5.1.2.1 The following coded notations may be used to describe the various arrangements of images (see figure 2 a) :

I A : Single page of copy arranged lengthwise on the film with lines of print at a right angle to the edges of the film.

I B : Single page of copy arranged across the film with the lines of print parallel to the edges of the film.

II A : Two pages side by side with the lines of print at a right angle to the edges of the film.

II B : Two pages side by side with the lines of print parallel to the edges of the film.

These notations apply chiefly to 16 mm films and to the simplex 35 mm films.

5.1.2.2 If another arrangement is used on 35 mm microfilms, it shall be explicitly ordered.

5.1.3 Sequence of pages

The sequence of pages on the microfilm shall correspond as closely as possible to the order and position in which they are normally read, taking account of the shape of the original document and of the language in which it is written.

To avoid unnecessary unwinding of the film it is recommended that the table of contents and the indexes be reproduced not only at the end of the film, but also immediately after the title page.

5.2 Specifications for positive or negative microfilms in roll form

5.2.1 *Leader and trailer*

A leader and a trailer of safety stock shall be provided, each at least 30 cm long.

5.2.2 *Data which may be usefully reproduced on the microfilm*

These data shall be chosen in accordance with ISO . . .

5.2.3 *Storage reel*

It is recommended that microfilms intended for reader use be stored on reels known as storage reels. (See ISO 2803.)

Their dimensions shall conform to figures 1 a), b) and c), but drive holes and slot are optional.

The resistance of the reels to destructive agents shall be at least equal to that of the film itself. The reels shall not contain or release any chemical agent likely to damage the film.

5.2.3.1 CAPACITY

Storage reels are usually made for 30 m or 100 ft lengths.

Non-standardized reels of smaller capacity may be necessary. In no case shall the outside diameter be greater nor the core diameter be smaller than those specified for 30 m reels.

5.2.3.2 CORE

Means shall be provided for affixing a standard straight cut film to the core of the reels without any additional preparation.

5.2.3.3 SPINDLE HOLES

5.2.3.3.1 *Reversible reels*

The use of so-called reversible reels is recommended. They have a square spindle hole with one keyway on each flange (see figure 1 b)).

As for supply spools, the square spindle holes on both flanges are in line, as well as the keyways.

A reference mark, such as an embossed mark or a paint mark, shall be placed on one flange to permit the identification of one flange and to assist correct loading.

5.2.3.3.2 *Non-reversible reels*

Reels known as "non-reversible" reels are also used, on which one hole is square and the other round (see figure 1 c)). The necessary spindle is square for one part of its length and round on the other part.

This applies in particular to some combined readers designed to receive both 16 mm and 35 mm microfilms, with which some centring difficulties may be encountered. A spool with square spindle holes offset 45° may be used in this case in the same way as a non-reversible spool.

5.2.4 *Position of emulsion*

The position of emulsion inside or outside is determined in accordance with 5.2.5.

5.2.5 *Winding*

Microfilms shall be wound as shown in figure 3 so that the image F appears in the correct position (upright, and not inverted) when read by the eye.

5.3 Specifications for positive or negative microfilms in strip form

The specifications for microfilms in roll form given in 5.2 apply also to microfilms in strip form. Details given in the following sub-clauses apply only to microfilms in strip form.

5.3.1 *Length of strip*

The length of any strip shall not exceed 228 mm so as to fit into ISO C5 size (162 mm X 229 mm) postal envelopes. (See ISO/R 269.)

5.3.2 *Reference marks on strip*

5.3.2.1 Each strip shall bear a reference mark, legible to the unaided eye, identifying its contents and, in particular, an indication of the supplier.

5.3.2.2 If the microcopied text occupies more than one strip, each strip shall be numbered, and the last one shall bear an indication of the end of the text.

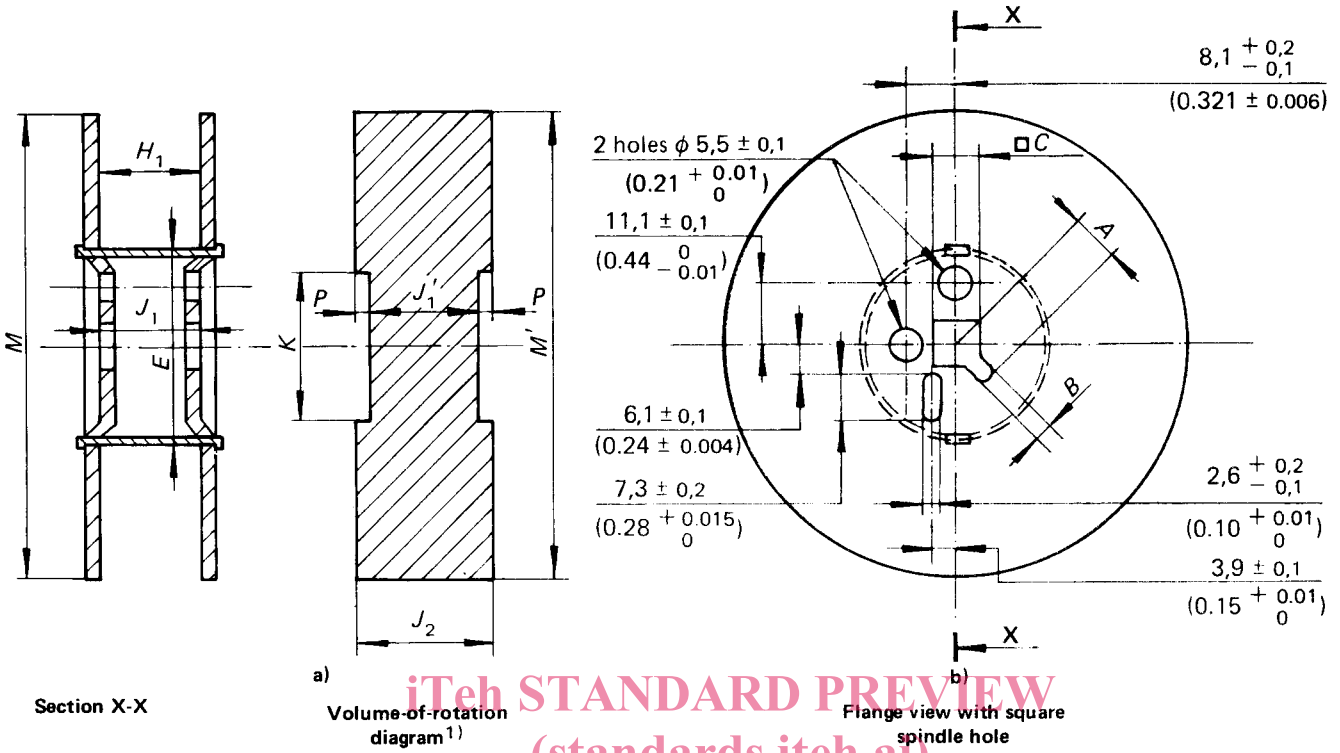
5.3.3 *Storage containers*

Negative or positive microfilms in strips are usually stored in cases, pockets, folders, albums, etc., which shall not contain or release any chemical agent likely to damage the film.

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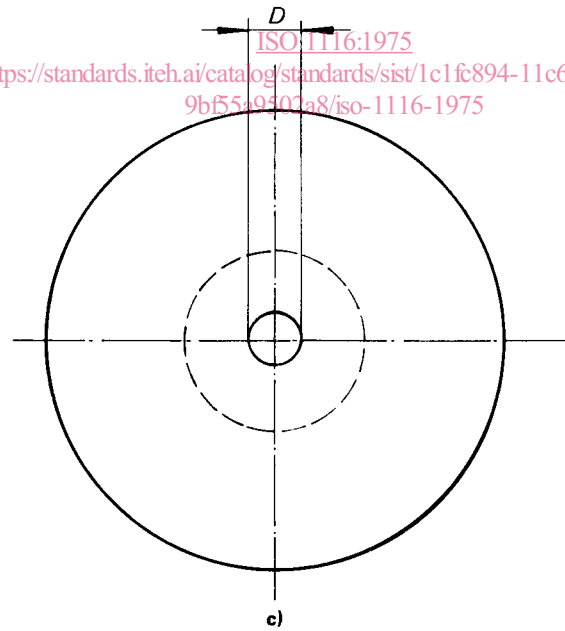
ISO 1116:1975
small summary of specifications for microfilm in strip form
9b55a9502a8/iso-1116-1975

Dimensions in millimetres
(Inch values in parentheses)



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Flange view with round spindle hole for one flange of the non-reversible reel

FIGURE 1 – Spools and reels for 16 mm and 35 mm films and microfilms

1) The volume of rotation is the envelope of the volume(s) generated by all the points of the spool, bosses, fastening devices, and those resulting from variations in flange thickness, flatness and lateral runout, when the spool is rotated on a cylindrical spindle tightly fitted into the square hole, the corresponding flange side resting on a circular flat support 15 mm in diameter perpendicular to the spindle and centred on it. In the case of a reversible spool, this test shall be made with both flange sides.

TABLE – Dimensions and tolerances¹⁾ for 30 m (or 100 ft) spools and reels (see figure 1)

Dimension	Supply spools				Storage reels			
	16 mm		35 mm		16 mm		35 mm	
	mm	in	mm	in	mm	in	mm	in
A	8,1 ± 0,5	0.32 ± 0.02	8,1 ± 0,5	0.32 ± 0.02	8,1 ± 0,5	0.32 ± 0.02	8,1 ± 0,5	0.32 ± 0.02
B	3,3 ± 0,2	0.13 ± 0.01	3,3 ± 0,2	0.13 ± 0.01	3,3 ± 0,2	0.13 ± 0.01	3,3 ± 0,2	0.13 ± 0.01
C and D ²⁾	8,10 + 0,10 - 0,05	0.139 + 0.004 - 0.002	8,10 + 0,10 - 0,05	0.139 + 0.004 - 0.002	8,10 + 0,20 - 0,05	0.139 + 0.008 - 0.002	8,10 + 0,20 - 0,05	0.139 + 0.008 - 0.002
E ³⁾	32,0 ± 0,5	1.26 ± 0.02	32,0 ± 0,5	1.26 ± 0.02	32,0 + 1,0 0	1.26 + 0.04 0	32,0 + 1,0 0	1.26 + 0.04 0
H ₁ ⁴⁾	16,20 + 0,20 - 0,15	0.638 + 0.008 - 0.006	35,30 ± 0,20	1.390 ± 0.008	17,0 + 1,5 - 0,9	0.670 + 0.06 - 0.035	36,0 + 1,5 - 0,9	1.420 + 0.06 - 0.035
J ₁ and J' ₁	18,3 ± 0,2	0.72 ± 0.01	37,5 ± 0,4	1.48 + 0.01 - 0.02	19,0 ± 1,0	0.75 ± 0.04	38,0 ± 1,0	1.50 ± 0.04
J ₂	J' ₁ + 2P	J' ₁ + 2P	J' ₁ + 2P	J' ₁ + 2P	22,0 max.	0.87 max.	41,0 max.	1.61 max.
K ⁵⁾	25,5 min.	1.00 min.	25,5 min.	1.00 min.	25,5 min.	1.00 min.	25,5 min.	1.00 min.
M and M' ⁶⁾	91,5 ± 0,5	3.60 ± 0.02	91,5 ± 0,05	3.60 ± 0.02	92,0 ± 2,0	3.62 ± 0.08	92,0 ± 2,0	3.62 ± 0.08
P ⁷⁾	0,5 max.	0.02 max.	0,5 max.	0.02 max.	$\frac{J_2 - J_1}{2}$	$\frac{J_2 - J_1}{2}$	$\frac{J_2 - J_1}{2}$	$\frac{J_2 - J_1}{2}$

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1) This specification has been drawn up to facilitate the use of universal Motion-picture – Reprography spools. For 16 mm microfilm spools, see ISO 1019. For 35 mm microfilm spools, see ISO 3047.

The eccentric, round and oblong holes are optional; they are required only on certain apparatus.

Storage reels for microfilms are purposely different from 16 mm film projection reels specified by Technical Committee ISO/TC 36, *Cinematography*, to allow the use of supply spools as storage reels for infrequently used microfilms.

2) For D, see figure 1 c).

The spindle passing through the round or square holes has a diameter of 7,90 ± 0,10 mm (0.311 ± 0.004 in).

3) The core shall be concentric with the spindle holes within the values given in the table below (for total indicator reading terms, multiply values by two) :

	Film size	Core concentricity
Supply spools	16 mm	0,4 mm (0.016 in)
	35 mm	0,5 mm (0.02 in)
Storage reels	16 mm	1,0 mm (0.04 in)
	35 mm	1,0 mm (0.04 in)

4) The minimum values given for storage reels are intended particularly to allow the use of supply spools as storage reels, when the distance between flanges is at least 16,10 mm (0.634 in) for 16 mm reels and 35,10 mm (1.383 in) for 35 mm reels. But when special storage reels unsuitable for supply of film stock are produced, smaller tolerances with increased minimum values should be preferred :

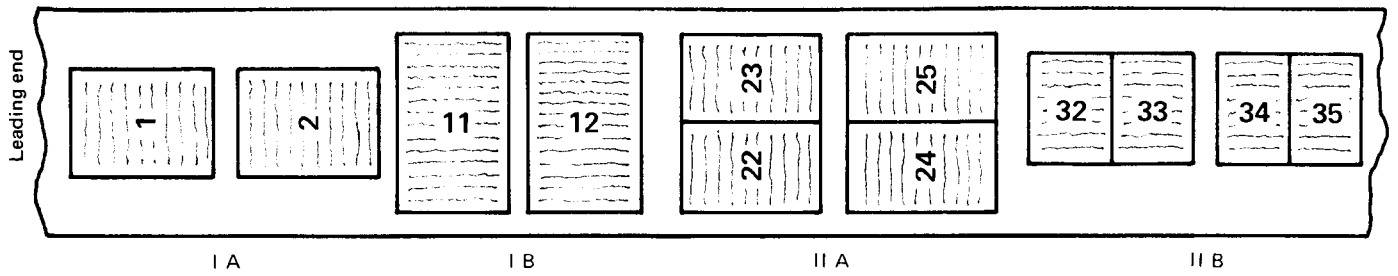
- for 16 mm reels : $17 + \begin{matrix} 1,0 \\ 0 \end{matrix} \text{ mm } \left(0.67 + \begin{matrix} 0.04 \\ 0 \end{matrix} \text{ in } \right)$
- for 35 mm reels : $36 + \begin{matrix} 1,0 \\ 0 \end{matrix} \text{ mm } \left(1.42 + \begin{matrix} 0.04 \\ 0 \end{matrix} \text{ in } \right)$

The total tolerance $+ \begin{matrix} 1,5 \\ - 0,9 \end{matrix} \text{ mm } \left(+ \begin{matrix} 0.06 \\ - 0.035 \end{matrix} \text{ in } \right)$ is preserved, however, to make allowance for possible deformations of the flange circumference during manufacture or use.

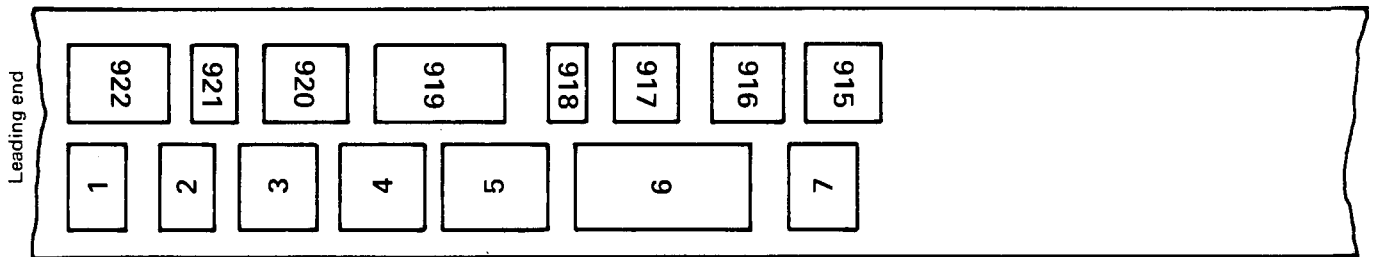
5) When the flanges comprise the oblong slot and offset holes, K may have to be increased to 28,4 mm (1.12 in) minimum, in order to avoid the rivets interfering with the most offset edges of these holes.

6) For the 60 m (200 ft) supply spools, the values of M and M' for 16 mm film are 125,5 ± 0,5 mm (4.94 ± 0.02 in).

7) An indentation is unnecessary, unless imposed by J₁.



a) 16 mm microfilms and simplex 35 mm microfilms, especially for languages written from left to right



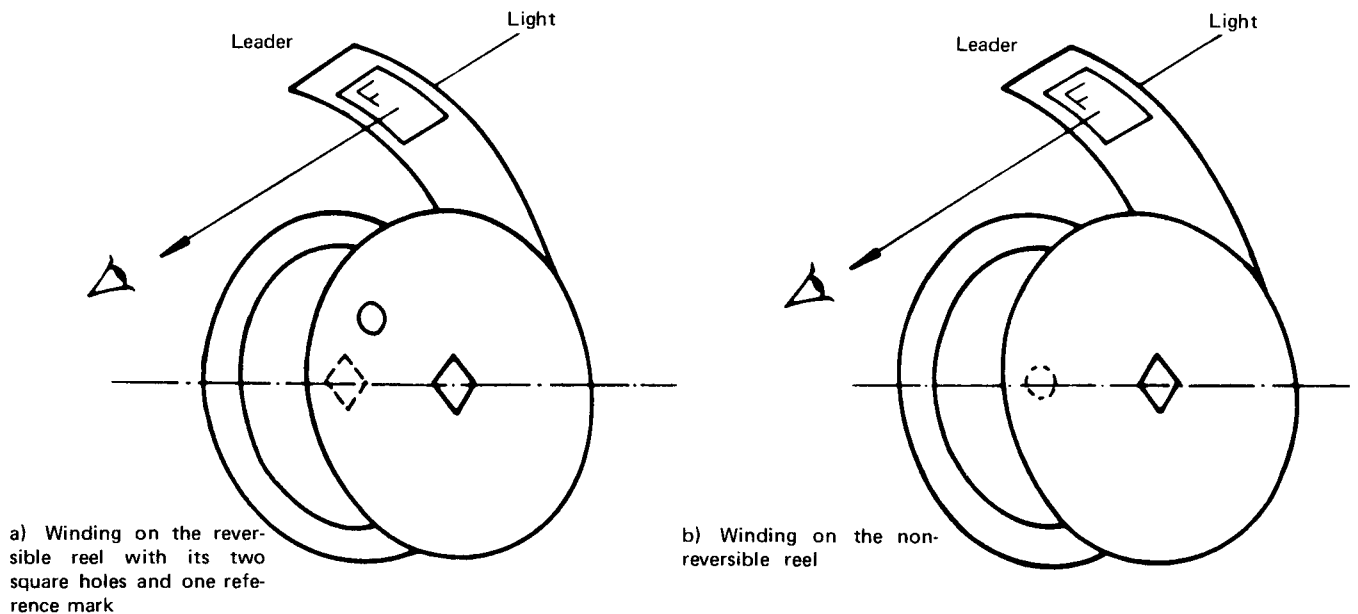
b) Duo microfilms



c) Duplex microfilms

NOTE – In the above figures, an odd number symbolizes the right-hand page, and an even number symbolizes the left-hand page. In this way the "simplex" arrangement shown in II A of figure 2 a) can be distinguished from the duplex arrangement in figure 2 c).

FIGURE 2 – Arrangement of the images



a) Winding on the reversible reel with its two square holes and one reference mark

b) Winding on the non-reversible reel

FIGURE 3 – Diagram showing the winding of the film on the reel