

ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 1116

35 mm AND 16 mm MICROFILMS,
SPOOLS AND REELS

1st EDITION

September 1969

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Printed in Switzerland

Also issued in French and Russian. Copies to be obtained through the national standards organizations.

BRIEF HISTORY

The ISO Recommendation R 1116, *35 mm and 16 mm microfilms, spools and reels*, was drawn up by Technical Committee ISO/TC 46, *Documentation*, the Secretariat of which is held by the Deutscher Normenausschuss (DNA).

Work on this question led to the adoption of a Draft ISO Recommendation.

In April 1968, this Draft ISO Recommendation (No. 1528) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

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

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in September 1969, to accept it as an ISO RECOMMENDATION.

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35 mm AND 16 mm MICROFILMS, SPOOLS AND REELS

1. SCOPE

This ISO Recommendation covers 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. SPECIFICATIONS RELATING TO UNEXPOSED NEGATIVE FILM

2.1 Film stock

- 2.1.1 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 ISO Recommendation should conform to specifications for cinematographic films as indicated in ISO Recommendation R 69*, *Cutting and perforating dimensions for 16 mm motion-picture raw stock film*, and ISO Recommendation R 491, *Cutting and perforating dimensions for 35 mm motion-picture raw stock film*.

The microfilm thickness should not exceed 0.16 mm.

- 2.1.2 The useful length only is standardized. The film should be wound on a spool or a core (see clause 2.2.1). The use of a core for 30 m length is not recommended.

The useful length should be stated on the packing.

- 2.1.3 Unexposed negative film for microfilms should be made of safety stock, as specified in ISO Recommendation R 543, *Definition and marking of safety film for motion-picture uses*.

- 2.1.4 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.

- 2.1.5 For 16 mm microfilm, the perforation should be in accordance with that described in ISO Recommendation R 69*, *Cutting and perforating dimensions for 16 mm motion-picture raw stock film* and, for 35 mm microfilm, with one of those described in ISO Recommendation R 491, *Cutting and perforating dimensions for 35 mm motion-picture raw stock film*, under the designations "Type 1 and 1 a" (perforation known as "Positive") and "Type 3 and 3 a" (perforation known as "Negative").

- 2.1.6 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.

• 2nd edition (at present, Draft ISO Recommendation No. 852).

2.2 Supply spool

2.2.1 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 should conform to the values of Figure 1 (a) and (b) (supply).

2.2.2 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 should conform to Figure 1 (b).

2.2.3 Affixing of the core. A means should be provided for affixing a standard straight cut film to the core of the spool without any additional preparation.

2.2.4 Winding. The unexposed negative film should be wound emulsion in, unless otherwise explicitly specified in the order, in which case the words "emulsion out" should appear on the packing. In the case of film perforated on one edge, the type of winding should be indicated by A or B in accordance with ISO Recommendation R ...*, *Direction of winding for motion-picture film perforated one edge*.

3. SPECIFICATIONS RELATING TO UNEXPOSED POSITIVE (PRINT) FILM

3.1 Film stock

The requirements of clauses 2.1.1 to 2.1.5 inclusive apply also to unexposed positive film.

The pitch of the perforations in unexposed positive film should be the Standard pitch of 7.62 mm for 16 mm film and 4.75 mm for 35 mm film.

3.2 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 1000 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 should be a full 305 m (1000 ft), without splices.

4. SPECIFICATIONS RELATING TO MICROFILMS

4.1 Specifications relating to images

4.1.1 Distance of the image to the edge of the film. No useful part of the image should 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 should 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.

* At present, Draft ISO Recommendation No. 867.

4.1.2 Arrangement of images. The images should 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 Figure 2 (b) and (c).

4.1.2.1 The following coded notations may be used to describe the various arrangements of images (see Fig. 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.

4.1.2.2 If another arrangement is used on 35 mm microfilms, it should be explicitly ordered.

4.1.3 Sequence of pages. The sequence of pages on the microfilm should 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.

4.2 Recommended practice for positive or negative microfilms in roll form

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

4.2.2 Data which may be usefully reproduced on the microfilm. These data should be chosen in accordance with ISO Recommendation R ...*, *Recording of bibliographical and cataloguing data on microcopies*.

4.2.3 Storage reel. It is recommended that microfilms intended for reader use be stored on reels known as storage reels.**

Their dimensions should conform to Figure 1 (a), (b) and (c), but drive holes and slot are optional.

The resistance of the reels to destructive agents should be at least equal to that of the film itself. The reels should not contain nor release any chemical agent likely to damage the film.

4.2.3.1 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 should the outside diameter be greater nor the core diameter be smaller than those specified for 30 m reels.

* In preparation.

** Storage problems are dealt with in ISO Recommendation R ..., *Processing and storage of silver gelatin type microfilms* (in preparation).

4.2.3.2 **CORE.** A means should be provided for affixing a standard straight cut film to the core of the reels without any additional preparation.

4.2.3.3 SPINDLE HOLES

4.2.3.3.1 *Reversible reels.* The use of so-called reversible reels is recommended. They have a square spindle hole with one keyway on each flange (see Fig. 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, should be placed on one flange to permit the identification of one flange and to assist correct loading.

4.2.3.3.2 *Non-reversible reels.* Reels known as “non-reversible” reels are also used, on which one hole is square and the other round (see Fig. 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 centering 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.

4.2.4 *Position of emulsion.* The position of emulsion inside or outside is determined in accordance with clause 4.2.5.

4.2.5 *Winding.* Microfilms should 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.

4.3 Specifications relating to microfilm in strip form

The details on microfilms in roll form given in clause 4.1 apply also to microfilm in strip form. Details given in the following clauses apply only to microfilms in strip form.

4.3.1 *Length of strip.* The length of any strip should not exceed 228 mm so as to fit into ISO C5 size* (162 mm × 229 mm) postal envelopes.

4.3.2 Reference marks on strip

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

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

4.3.3 *Storage containers.* Negative or positive microfilms in strips are usually stored in cases, pockets, folders, albums, etc., which should not contain nor release any chemical agent likely to damage the film.

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

Dimensions in millimetres
with inch values in brackets

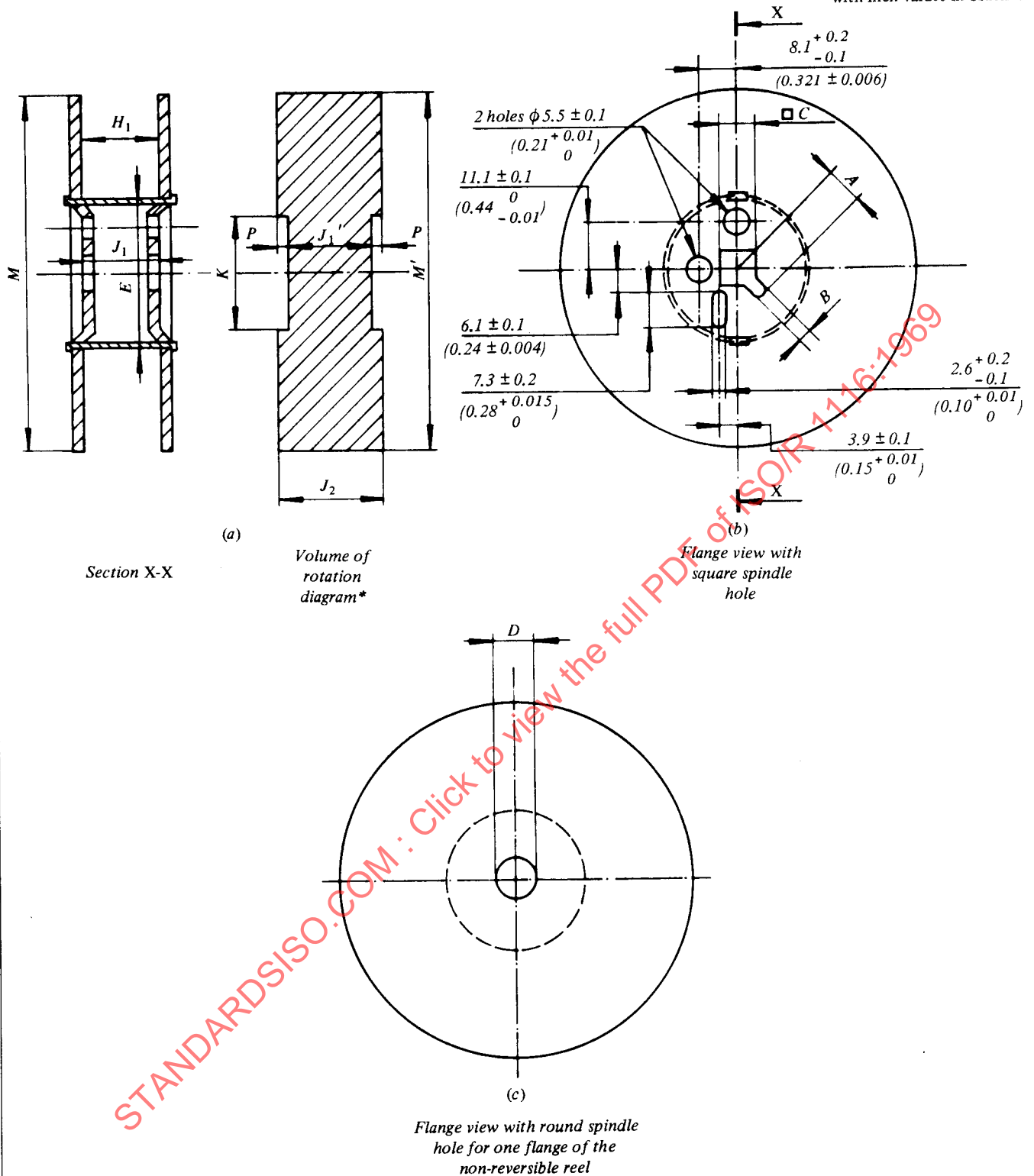


FIG. 1 – Spools and reels for 16 mm and 35 mm films and microfilms

- * 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 centered on it. In the case of a reversible spool, this test should be made with both flange sides.

TABLE - Dimensions and tolerances in millimetres and in inches for 30 m
(or 100 ft) spools and reels (see Fig. 1)

		Supply spools		Storage reels	
		16 mm	35 mm	16 mm	35 mm
<i>A</i>	mm	8.1 ± 0.5	8.1 ± 0.5	8.1 ± 0.5	8.1 ± 0.5
	in	0.32 ± 0.02	0.32 ± 0.02	0.32 ± 0.02	0.32 ± 0.02
<i>B</i>	mm	3.3 ± 0.2	3.3 ± 0.2	3.3 ± 0.2	3.3 ± 0.2
	in	0.13 ± 0.01	0.13 ± 0.01	0.13 ± 0.01	0.13 ± 0.01
<i>C and D</i> ⁽¹⁾	mm	$8.10^{+0.10}_{-0.05}$	$8.10^{+0.10}_{-0.05}$	$8.10^{+0.20}_{-0.05}$	$8.10^{+0.20}_{-0.05}$
	in	$0.319^{+0.004}_{-0.002}$	$0.319^{+0.004}_{-0.002}$	$0.319^{+0.008}_{-0.002}$	$0.319^{+0.008}_{-0.002}$
<i>E</i> ⁽²⁾	mm	32.0 ± 0.5	32.0 ± 0.5	$32.0^{+1.0}_0$	$32.0^{+1.0}_0$
	in	1.26 ± 0.02	1.26 ± 0.02	$1.26^{+0.04}_0$	$1.26^{+0.04}_0$
<i>H</i> ₁ ⁽³⁾	mm	$16.20^{+0.20}_{-0.15}$	35.30 ± 0.20	$17.0^{+1.5}_{-0.9}$	$36.0^{+1.5}_{-0.9}$
	in	$0.638^{+0.008}_{-0.006}$	1.390 ± 0.008	$0.670^{+0.06}_{-0.035}$	$1.420^{+0.06}_{-0.035}$
<i>J</i> ₁ and <i>J</i> ₁ '	mm	18.3 ± 0.2	37.5 ± 0.4	19.0 ± 1.0	38.0 ± 1.0
	in	0.72 ± 0.01	$1.48^{+0.01}_{-0.02}$	0.75 ± 0.04	1.50 ± 0.04
<i>J</i> ₂	mm	$J_1' + 2P$	$J_1' + 2P$	22.0 max.	41.0 max.
	in	$J_1' + 2P$	$J_1' + 2P$	0.87 max.	1.61 max.
<i>K</i> ⁽⁴⁾	mm	25.5 min.	25.5 min.	25.5 min.	25.5 min.
	in	1.00 min.	1.00 min.	1.00 min.	1.00 min.
<i>M and M'</i> ⁽⁵⁾	mm	91.5 ± 0.5	91.5 ± 0.5	92.0 ± 2.0	92.0 ± 2.0
	in	3.60 ± 0.02	3.60 ± 0.02	3.62 ± 0.08	3.62 ± 0.08
<i>P</i> ⁽⁶⁾	mm	0.5 max.	0.5 max.	$\frac{J_2 - J_1'}{2}$	$\frac{J_2 - J_1'}{2}$
	in	0.02 max.	0.02 max.	$\frac{J_2 - J_1'}{2}$	$\frac{J_2 - J_1'}{2}$

Notes (1) to (6) - see following page.