INTERNATIONAL STANDARD

ISO 732

Third edition
1991-07-01

Photography — Film dimensions — 120 and 220 sizes

Photographie — Dimension des films — Rouleaux de pellicule 120 et 220

Reference number
ISO 732:1991(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 732 was prepared by Technical Committee ISO/TC 42, *Photography*.

This third edition cancels and replaces the second edition (ISO 732:1982), which has been technically revised.

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

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Case Postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

Introduction

ISO 732:1982 specified the dimensions for 127, 620 and 120 sizes of roll films. Since the issue of that International Standard, the manufacture of cameras accepting 127 and 620 size films has ceased, and these two sizes of roll films are now in very small and rapidly decreasing demand. On the other hand, new automatic film-metering cameras increasingly use a new 220 size as well as the existing 120 size roll film.

In response to this change in the market, ISO 732 now specifies only the 120 and 220 sizes of roll films.

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Photography — Film dimensions — 120 and 220 sizes

1 Scope

This International Standard specifies the dimensions for 120 and 220 sizes of roll films and for the spool common to both. It delineates the dimensions of the film itself; backing paper for 120 size of roll films; leader, trailer for 220 size of roll films, and pasters and their respective placement. The film area to be reserved before the first and after the last exposures is also specified.

In this International Standard, metric units are prime.

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 1:1975, *Standard reference temperature for industrial length measurements.*

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

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 backing paper (for 120 size of roll films): The protective strip of paper to which the film is attached. Backing paper is usually black on one side and coloured on the other side. Numerals are usually printed on the coloured side in a position where they can be viewed through the camera window.

3.2 core of spool: The cylindrical part extending between (and connecting) the flanges, around which the backing paper and film are wound.

3.3 creep: The difference in location of the film end relative to the numbers on the backing paper when wound on the spool, compared to their respective positions when laid out flat. This difference exists because the backing paper, wound outside the film strip, assumes a curve of greater circumference than the film strip for each successive convolution.

3.4 end margin: The distance from the end of the last picture to the end of the film strip. Included in the end margin is an allowance for attaching a developing clip or splicing tape.

3.5 exposure numbers: The consecutive numbers, or sets of numbers, printed on the outside of the size 120 backing paper away from the film (usually on the coloured side). The spacing of exposures is determined by these numbers as they are brought into position successively in the window of the camera.

3.6 flanges of spool: The discs attached to each end of the spool core, between which the film and backing paper (or leader and trailer) are wound. The main function of the flanges is to prevent light from reaching the edges of the film.

3.7 key slot: See 3.16.

3.8 leader (for 220 size of roll films): A short strip of paper attached to the first-exposure end of the film (see 3.15).

3.9 length of film: The linear lengthwise dimensions of the filmstrip.

3.10 projected film length: For 120 size of roll films, a dimension that shows the distance, measured along the backing paper, between the two ends of the film when it is wound on the spool. The projected film length is the flat film length plus the creep.

3.11 register mark for automatic cameras: For 120 size of roll films, a symbol or mark at a specific dis-

tance from the number "1" on the backing paper. For 220 size of roll films, a symbol or mark on the leader at a specific distance from the leading edge of the film. This mark is used for automatic film metering in certain types of cameras and is shown as an arrow pointed at both ends, but the form is optional.

For 220 size of roll films, a second register mark is represented by a set of dashes closer to the beginning of the leader. This secondary mark is "recognized" because it is used for relatively few cameras. The "preferred" register mark is indicated by the arrow.

3.12 roll film: A transparent plastic base (generally cellulose ester 0,08 mm thick), coated on one side with photosensitive layer(s) and on the other side with an antihalation and anti-curl layer (generally dyed gelatin), cut in strips (generally 61,5 mm width) and wound on a spool with backing paper (for 120 size of roll films) or with a leader and a trailer (for 220 size of roll films), allowing daylight loading and unloading.

3.13 spool for roll film: A core attached to two solid opaque flanges between which a strip of film with backing paper (or with a leader or a trailer) can be wound to comprise a roll film. A slot or the equivalent is provided in at least one end of the spool for engaging the winding key of the camera.

3.14 start margin: The distance from the beginning of the film to the beginning of the first exposure. Included in the start margin is an allowance for attaching a developing clip or splicing tape.

3.15 trailer (for 220 size of roll films): A short strip of paper attached to the last-exposure end of the film (see 3.8.)

3.16 turning slots (key slots): Slots at each end of the spool, which can be engaged by the wind-up key in the camera. These slots may be cross-shaped.

3.17 usable film length: The portion of the film length used for exposing the pictures. It represents the film exclusive of start and end margins and is indicated on figure 1 and figure 2 by the dotted sections at each end of the film strip.

3.18 window (of camera): The coloured transparent window (usually red) normally located in the back of a camera, through which the numbers on the backing paper can be seen as the film is wound through the camera.

4 Dimensions

Dimensions apply at the time of manufacture, measured under standard atmospheric conditions of (23 ± 2) °C and (50 ± 5) % relative humidity, as specified in ISO 554[1].

4.1 Dimensions for 120 size of roll films and backing paper

The dimensions of films and backing paper for 120 size of roll films shall comply with the values shown in figure 1.

4.2 Dimensions for 220 size of roll films, leader and trailer

The dimensions of film, leader and trailer for 220 size of roll films shall comply with the values shown in figure 2.

4.3 Dimensions for spool for 120 and 220 sizes of roll films

Dimensions of the spool used for 120 and 220 sizes of roll films shall comply with the values shown in figure 3. These values apply to spools with flanges having plane, parallel inside surfaces.

5 Package marking

5.1 Data

Sufficient data shall be given on the package to ensure correct usage of the product.

Package are marked for the purpose of identifying

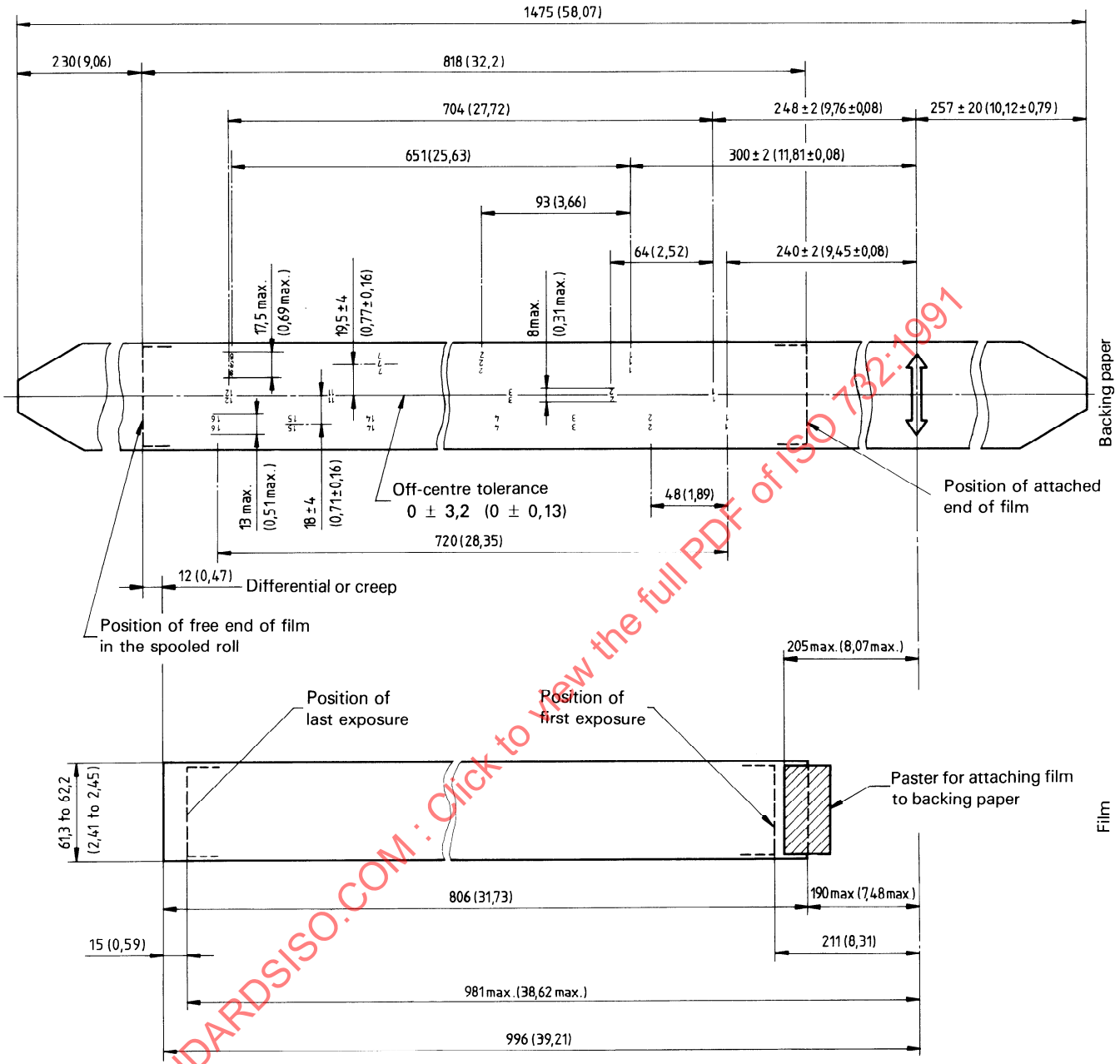
a) the product name and format;

b) the conditions of use (such as safelight);

c) the conditions of shipping and storage.

1) All measuring instrument calibrations should be referred to a temperature of 20 °C (as specified in ISO 1) and a relative humidity of 50 %.

Dimensions in millimetres (inches)



NOTES

1 The orientation of the exposure numbers is optional with the manufacturer.

2 All dimensions are minimum unless otherwise indicated.

3 The maximum film length shall not be more than 44 mm (1,75 in) over the minimum.

4 The thickness of the backing paper shall be 0,104 mm ± 0,015 mm (0,004 1 in ± 0,000 6 in).

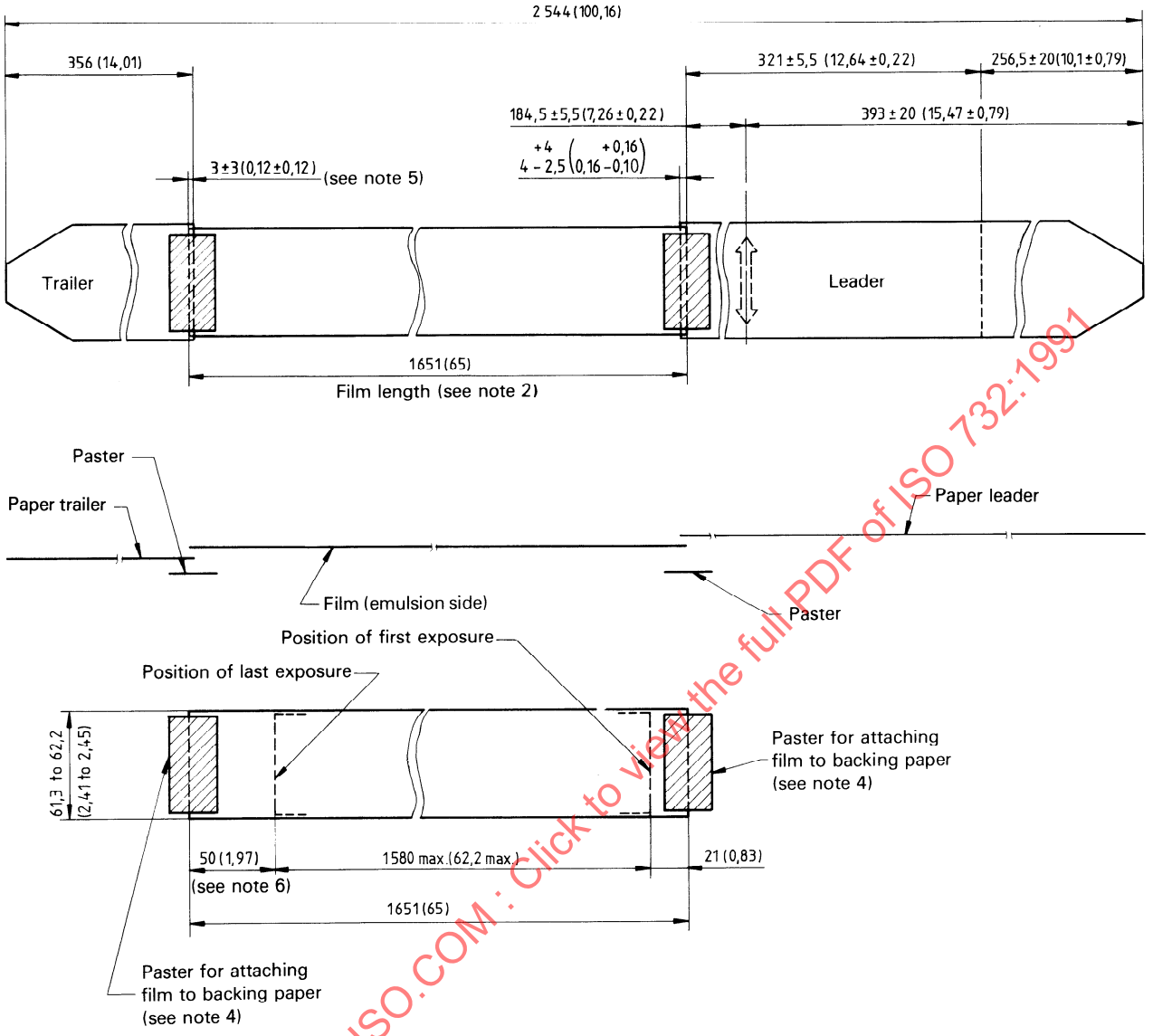
5 The thickness of the backing paper plus the film shall be 0,24 mm ± 0,04 mm (0,009 9 in ± 0,001 6 in).

6 The thickness of the backing paper plus the film plus the paster for attaching the film to the backing paper shall be 0,4 mm ± 0,1 mm (0,016 in ± 0,004 in).

7 It is preferred that pasters not be more than 25 mm (0,98 in) in length in the direction of winding and that their width be such that the edges are not more than 3 mm (0,12 in) from the edges of the backing paper. The overlap of the paster from the end of the film should not exceed 15 mm (0,59 in).

Figure 1 — 120 size of roll films and backing paper

Dimensions in millimetres (inches)



NOTES

1 All dimensions are minimum unless otherwise shown.

2 Maximum film length shall not be more than 50 mm (2 in) over the minimum.

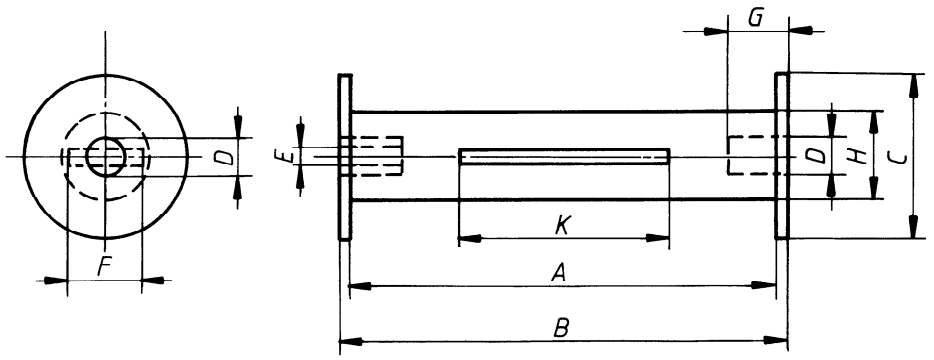
3 Thickness of leader and trailer paper shall be as follows: minimum 0,06 mm (0,003 2 in); maximum 0,12 mm (0,004 7 in). Thickness of leader, trailer, pasters, and film shall not exceed 0,51 mm (0,020 in).

4 It is preferred that pasters not be more than 25 mm (0,98 in) in length in the direction of winding and their width be such that the edges are not more than 3 mm (0,12 in) from the edges of the leader and trailer papers. The overlap of the paster on the film should not exceed 15 mm (0,59 in).

5 A butt splice would be permissible between the trailer paper and film; however, this probably would require two pasters — one front and one back — to prevent the adhesive at the seam from tracking on the film.

6 A 50 mm (2 in) length of film is required after the trailing edge of the last exposure in order to prevent an impression mark caused by the trailer paster, or end of film, or both, from appearing in the last exposure.

Figure 2 — 220 size of roll films, leader and trailer



Description	Millimetres	Inches	Description	Millimetres	Inches
A [1] min.	62,5	2,461	G min.	9	0,354
B max.	66,1	2,502	H max.	12,1	0,476
min.	65,4	2,575	min.	11,2	0,441
C max.	25,3	0,996	K min.	31	1,22
min.	25	0,984	M [3] tol.	0,3	0,012
D max.	5,5	0,216	N [4] tol.	0,4	0,016
min.	5,1	0,201			
E [2] max.	2,8	0,11			
min.	2,2	0,087			
F [2] min.	10	0,394			

1) This dimension includes all allowances for any distortion, such as tilted flanges (see annex C).

2) Key slots are required in both flanges of the spool for use as a take-up spool in the camera. As an alternative, cross-shaped key slots may be used at both flanges at the option of the manufacturer.

3) M = concentricity of D and C, or one-half total dial run-out.

4) N = concentricity of D and H, or one half total dial run-out.

Figure 3 — Spool for 120 and 220 sizes of roll films

Any given level of packaging fulfils one or more of these functions and shall be identified accordingly, using appropriate entries from the following list (see note 1):

— product name or trade name;

— name or trade mark of the manufacturer;

— manufacturer's catalogue identification number (see note 2);

— ISO speed of the film;

— quantity of units contained in the package (if more than one);

— number of exposures according to the size of phototypes;

— batch number and/or parent roll number;

— expiration date or "develop before" date or inventory control code;

— manufacturer's recommended storage conditions (see note 2);

— manufacturer's recommended process and safelight conditions (see note 2).

NOTES

1 There may be legal requirements in certain countries for other data to be marked on the package.

2 This may be indicated by wording or by a code.

5.2 Compliance

If it is desired to indicate compliance of the product with this International Standard, the following sentence shall be used:

"COMPLYING WITH ISO 732"

Annex A
(informative)

Roll films

120 size of roll films consist of three essential parts:

1) a spool;

2) a length of photographic film;

3) a backing paper.

In this International Standard, maximum and minimum dimensions are given for the film strip and spool, and minimum dimensions only for the backing paper.

220 size of roll films was developed to fill a need for films of the same nominal width wound on the same size spool as conventional 120 size of roll film but of approximately twice the film length. By eliminating the backing paper and providing a paper leader and paper trailer, the same spool size could be used. The longer film was developed primarily for use in specially designed professional equipment.

Annex B
(informative)

Exposure numbers

120 size of roll film bears a series of numbers, each series associated with a particular picture size and with cameras producing negatives of that size. Proper positioning of the window in the camera permits the use of a series of numbers for the picture size appropriate to that camera. The series are

Eight picture 6 cm × 9 cm (2,25 in × 3,25 in)

Twelve pictures 6 cm × 6 cm (2,25 in × 2,25 in)

Sixteen pictures 4,5 cm × 6 cm (1,625 in × 2,25 in)

In addition, certain 120-size cameras meter the film automatically and do not utilize the exposure numbers on the backing paper. They produce the following size:

6 cm × 7 cm (2,25 in × 2,75 in)

Annex C
(informative)

Dimension A for spools

Dimension A for spools does not have a maximum specified.

Individual manufacturers control spool-flange spacing and paper width to give the best performance (control of edge fog and clock springing) with their individual products. The best performance with competitive spools (used for take-up in the user's camera) is achieved with dimensions as close as practicable to the minimum.