

American National Standard for motion-picture film (16-mm) — perforated 8-mm type R, 2R

Approved March 3, 1989

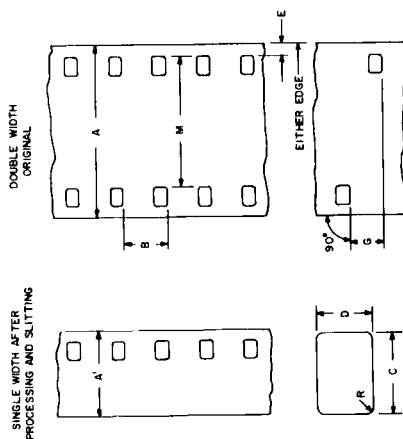
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Page 1 of 2 pages

1. Scope

This standard specifies the cutting and perforating dimensions for 16-mm motion-picture film with two rows of 8-mm type R perforations and

a perforation pitch of either 0.1500 or 0.1497 in (3.810 or 3.802 mm). The width of the 8-mm strip after processing and slitting is also specified.



Dimensions	Inches	Millimeters
A Film width	0.628 ± 0.001	15.95 ± 0.03
A' Film width after slitting	0.314 ± 0.002	7.98 ± 0.05
B Perforation pitch (long)	0.1500 ± 0.0005	3.810 ± 0.013
B' Perforation pitch (short)	0.1497 ± 0.0005	3.802 ± 0.013
C Perforation width	0.0720 ± 0.0004	1.829 ± 0.010
D Perforation height	0.0500 ± 0.0004	1.270 ± 0.010
E Edge to perforation	0.0355 ± 0.0020	0.902 ± 0.051
G Perforation misalignment	0.001 max	0.03 max
L 100 consecutive perforation pitches	15.000 ± 0.015	381.00 ± 0.38
L' 100 consecutive perforation pitches	14.970 ± 0.015	380.24 ± 0.38
M Lateral perforation displacement	0.485 ± 0.001	12.32 ± 0.03
R Radius of perforation fillet	0.010 ± 0.001	0.25 ± 0.03

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American National Standards Institute, 1430 Broadway, New York, N.Y. 10018

2. Referenced American National Standard

This standard is intended for use in conjunction with the following American National Standard: ANSI/SMPTE 223M-1985, Motion-Picture Film—Safety Film

3. Dimensions

3.1 The dimensions shall be as given in the figure and table.

3.2 The dimensions pertain to a safety film as defined in ANSI/SMPTE 223M-1985.

3.3 Except for Dimension A', the dimensions

Appendix

(This Appendix is not part of the American National Standard, but is included for information only.)

A1. The user is reminded that, as a plastic, film can change dimensions temporarily due to moisture or temperature, or permanently due to solvent loss or strain effect.

A2. The uniformity of pitch, hole size, and margin (Dimensions B, C, D, and E) is an important variable affecting steadiness. Variations in these dimensions, from roll to roll, are of little significance compared to variations from one perforation to the next within any small group of consecutive perforations. As an example, the uniformity of the margin is uniquely critical for optical

printing. During the printing process, the placement of the image on the film is usually with respect to successive lateral pairs of perforations at one-frame intervals. During subsequent projection, however, the portion of the image projected is usually located, not by these perforations, but by the edge of the film. The lateral steadiness of the projected image is, therefore, directly related to the frame-to-frame uniformity of the margin.

A3. For historical background on the development of this standard, refer to A. J. Miller and A. C. Robertson, "Motion-Picture Film—Its Size and Dimensional Characteristics," Jour. SMPTE, 74: 3-11, Jan. 1965.

American National Standard for motion-picture equipment – 35- and 70-mm projection lenses and mounts

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Page 1 of 2 pages

1. Scope

1.1 This standard specifies for lenses used in 35- and 70-mm motion-picture projectors the lens markings, focal length tolerances, mounting diameters, mechanical factors in mounting additional lens adapters to lenses, and the preferred value steps in focal lengths. (Focal length referred to in this standard is the equivalent focal length, commonly known as EFL.)

1.2 This standard also specifies the limiting or maximum available space for projector lens mounts where lenses of varying focal lengths and designs and attachments thereto are used.

2. Marking of Prime Lenses

The focal length of the lens shall be marked on the exterior of the lens barrel in a permanent manner in both English and metric values.

3. Focal Length of Prime Lenses

3.1 The actual focal length shall not differ from the value marked on the lens by more than ± 1 percent.

3.2 Preferred values of focal lengths shall be integral multiples of $\frac{1}{4}$ in (6 mm) nominal, over the range from 2 to 7 in (50 to 178 mm) inclusive for lenses designed to English units.

3.3 Preferred values of focal lengths shall be integral multiples of 5 mm (0.2 in) nominal, over the range of 50 to 150 mm (2 to 6 in) for lenses designed to metric units.

4. Lens Barrel Diameter

The barrel diameter (Dimension A) shall be as specified in the figure and Table 1. It is expected that in most projectors the lens mount will either clamp onto the lens barrel or provide a mechanical lens holder which will clamp onto the lens barrel at the specified diameter.

5. Limiting Space Dimensions

The limiting volume within which the lens, set at infinity, shall mount and perform its function, as intended, shall be as specified in Table 1. These are not necessarily the dimensions of any lens but specify the limits beyond which there may be physical interference with the projector mechanism.

6. Optical Conversion Lenses

Anamorphic attachments and other optical converters to be mounted to the objective lens specified or to be mounted in turret, swing-away, or other separate mounting, must fit within the limiting space dimensions (see Dimension D).

7. Lens Thread

The internal threads for holding attachments, such as anamorphic units, shall be located at Dimension P within Dimension A and shall have dimensions as specified in Table 2.

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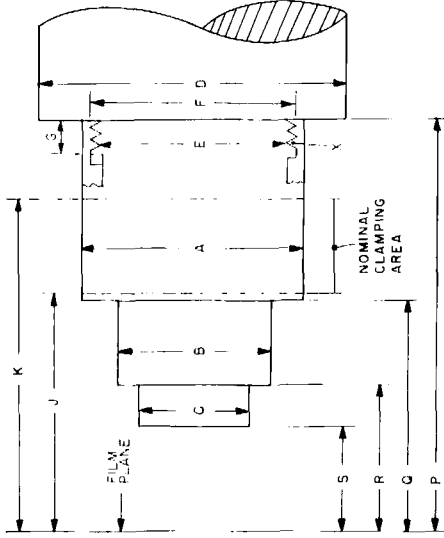


Table 1

Dimensions	Small Lenses		Large Lenses ¹	
	Inches	Millimeters	Inches	Millimeters
Barrel Diameter				
A	2.782 \pm 0.005	70.66 \pm 0.13	3.990 \pm 0.005	101.35 \pm 0.13
Limiting Space				
B ²	max	max	max	max
C	max	max	max	max
D ³				
D ³	min	min	min	min
Q	min	min	min	min
R	max	max	max	max
S	min	min	min	min
Nominal Clamping Area				
J	min	min	min	min
K	max	max	max	max

¹All large-lens dimensions apply to 70-mm projection units.

²Dimension B may be as large as 3.25 in (82.6 mm) for projectors manufactured since 1960. For 70-mm projection units, Dimension B is 3.25 in. Some European projectors have a lens mount diameter of 2.46 in (62.5 mm) in which case Dimension B is equal to 2.46 in.

³There is no restriction on the limiting space beyond distance P from the film plane; however, because of the practice of clamping lenses and/or their attachments by the section identified by Dimension D, it is recommended that this dimension be held to 3.125 \pm 0.002 in (79.38 \pm 0.05 mm).

⁴Projectors with small (2.782 in (70.66 mm)) lens mounts, including clamps outside the projector case, are 10.00 in (254.0 mm) minimum.

Table 2
Small Diameter Lenses

Dimensions	Inches		Millimeters	
	max	min	max	min
E Minor diameter	2.630	2.668	66.80	67.77
F Major diameter	0.219 \pm 0.010		5.56	
G Thread length	36		0.706	
X Thread size				pitch