ANSI/SMPTE 59-1989
Revision and Redesignation of
ANSI PH22.59-1974

American National Standard

for motion-picture film (35-mm)— camera aperture images

Approved March 29, 1989

Sponsor: Society of Motion Picture and Television Engineers

1. Scope

1.1 This standard specifies the dimensions of the camera aperture images and the relative positions of the vertical and horizontal centerlines of the intended image area with respect to the reference edge and the perforations of the camera negative film for 35-mm motion-picture cameras.

1.2 Motion-picture cameras used for different purposes require different aperture sizes. This standard specifies the image dimensions resulting from three styles of apertures used for the following purposes:

Style A: Nonanamorphic sound motion pictures

Style B: Anamorphic sound motion pictures

Style C: Instrumentation photography and special processes

2. Dimensions

The dimensions shall be as specified in the figures and tables. They shall apply to measurements of the images formed on fresh film, properly exposed and processed.

NOTE: The displacement of 0.050 in (1.27 mm), Dimension G, of the vertical centerline of the image area for styles A and B is in accord with current usage of low-shrinkage film base. However, there are in use many cameras in which the vertical centerline is displaced by 0.055 in (1.40 mm), which is the dimension used prior to development of low-shrinkage film base.

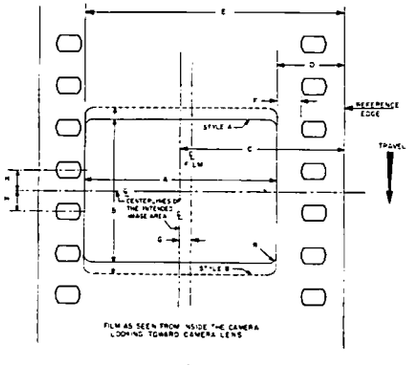


Fig. 1
Styles A and B Camera Aperture Image Area

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

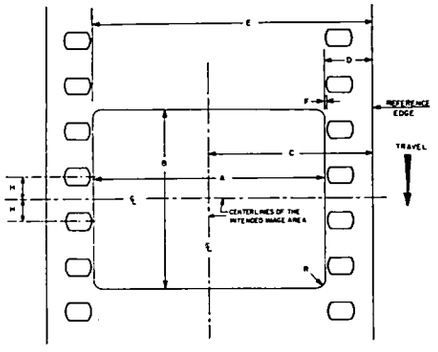


Fig. 2
Style C Camera Aperture Image Area

Table 1
Style A

Dimensions	Inches	Millimeters
A	0.864 nom	21.95 nom
B	0.63 $^{+0.02}_{-0.00}$	16.0 $^{+0.5}_{-0.0}$
C	0.738 ± 0.002	18.75 ± 0.05
D	0.307 max	7.80 max
E	1.171 min	29.74 min
F	0.115 nom	2.92 nom
G	0.050 nom	1.27 nom
H	0.093 ± 0.002	2.36 ± 0.05
R	0.03 max	0.8 max

Table 2
Style B

B	0.732 $^{+0.008}_{-0.000}$	18.59 $^{+0.20}_{-0.00}$

Table 3
Style C

A	0.981 nom	24.92 nom
B	0.735 ± 0.002	18.67 ± 0.05
C	0.688 ± 0.002	17.48 ± 0.05
D	0.198 max	5.03 max
E	1.179 min	29.95 min
F	0.009 nom	0.23 nom
H	0.093 ± 0.002	2.36 ± 0.05
R	0.03 max	0.8 max

ANSI/SMPTE 231-1989
Revision and Consolidation of
ANSI/SMPTE 231M-1987 and ANSI PH22.19-1983

American National Standard
for motion-picture film (8-mm type R)—camera aperture image and usage

Approved March 29, 1989 Sponsor: Society of Motion Picture and Television Engineers

1. Scope

1.1 This standard specifies the dimensions of the camera aperture image and its relative position to the reference edge and the perforations of 8-mm type R motion-picture film. The location of the perforations is based on dimensions given in ANSI/SMPTE 239-1989.

1.2 This standard also specifies the position of the emulsion, the frame rate, and the orientation of the area being exposed for 8-mm type R film as used in a motion-picture camera.

2. Referenced American National Standard

This standard is intended for use in conjunction with the following American National Standard:

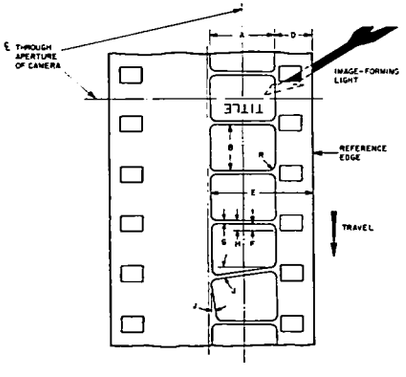
ANSI/SMPTE 239-1989, Motion-Picture Film (16-mm)—Perforated 8-mm Type R, 2R

3. Dimensions

3.1 The dimensions shall be as given in the figure and table and shall apply to measurements of the aperture image as formed on fresh film, properly exposed and processed.

3.2 The angle between the vertical edges of the aperture image and the edges of normally positioned film shall be 0° ± ½°.

3.3 The angle between the horizontal edges of the aperture image and the edges of normally positioned film shall be 90° ± ½°.



Film as Seen from Inside Camera Looking toward Camera Lens; Emulsion Away from Observer

Dimensions*	Inches	Millimeters
A	0.192 nom	4.88 nom
B	0.145 + 0.003 — 0.002	3.68 + 0.08 — 0.05
D	0.113 max	2.87 max
E	0.297 min	7.54 min
F	0.018 min	0.46 min
G	0.002 min 0.007 max	0.05 min 0.18 max
H	0.032 max	0.81 max
J	± ½°	± ½°
R	0.010 max	0.25 max

*See Notes.

4. Camera Usage

4.1 Emulsion Position. Except for special processes, the emulsion shall be toward the camera lens as shown in the figure.

4.2 Frame Rate. The normal frame rate shall be 18 frames per second for silent film and 24 frames per second for sound film.

NOTE 1: Dimension B, vertical height of aperture, must be maintained in order to ensure a real (unexposed) frameline in the projector. Close control of the tolerances given for Dimension B is necessary to enable Dimensions F and H to be held within satisfactory limits. These are the distances from the lower edge of the perforation and the horizontal edges of the framelines. Dimensions F and H represent the maximum conditions which can be tolerated due to misalignment of the horizontal centerline of the aperture opening and the optical centerline of the photographic lens. Dimensions B, F, G, and H shall be measured to lines that are at right angles to the reference edge of the film and through a point where the radius (Dimension R) is tangent to the horizontal framelines (see figure).

NOTE 2: The centerlines of the aperture image are normally on the optical center of the camera. The optical axis of the camera is defined as the mechanical axis or centerline of the sleeve or other device for holding the camera lens. Except for manufacturing tolerances, it coincides with the optical axis of the lens.

NOTE 3: Dimension J shows the limits by which the frameline may be out of square with the reference edge of the film but, at all times, this should be confined within the area designated by Dimension G.

Appendix

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

A1. If the aperture plate is not in the plane of the emulsion, the physical dimensions of the aperture in the camera will be slightly different from the dimensions given in the figure. The exact amount of this difference will depend upon the *f*-number and focal length of the camera lenses used and upon the distance between the emulsion and the physical aperture. This separation should be no greater than is necessary to prevent scratching of the film.

A2. It is the intent of this standard to provide a camera image such that the exposed area will always be larger than the area of the projector aperture. This standard meets this objective without causing double exposure of the area between frames.

A3. Dimension G, the distance between adjacent framelines, has been limited carefully so as to make it possible to keep both framelines masked simultaneously by the projector aperture. In addition, Dimensions F and H have been established to limit the distance that any part of the frameline can depart from the bottom edge of the perforations. This is to minimize the necessity for frequent adjustment of the framing device on the projector.