STANDARDS AND RECOMMENDED PRACTICES

Approved American National Standards

Three American National Standards were approved by the American National Standards Institute recently: ANSI PH22.7-1983, Motion-Picture Film (16-mm) — Camera Aperture Image; ANSI PH22.19-1983, Motion-Picture Film (8-mm Type R) — Camera Aperture Image; and ANSI PH22.41-1983, Motion-Picture Film (16-mm) — Prints — Photographic Sound Records. Copies of the standards are available for a nominal fee from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Approved SMPTE Recommended Practices

The Society's Executive Committee for Standards Approval approved two revised SMPTE Recommended Practices on March 24, 1983: RP 38.1-1983, Specifications for Deflection Linearity Test Pattern for Television; and RP 27.5-1983, Specifications for Mid-Frequency Response Test Pattern for Television. SMPTE Recommended Practices are available from Society Headquarters for $1.50 each.

Withdrawn SMPTE Recommended Practice

On May 25, 1983, the Executive Committee for Standards Approval accepted the recommendation of the Standards Committee to approve withdrawal of SMPTE Recommended Practice RP 27.6-1972, Specifications for Gray-Scale Operational Alignment Test Pattern for Studio and Field Television Cameras. Withdrawal was initiated because it is presently not practical to manufacture a transparency to meet the specifications.

— *Alex E. Alden, Manager of Engineering.*

ANSI PH22.7-1983
Revision of ANSI PH22.7-1976

American National Standard
for motion-picture film (16-mm)—camera aperture image

Approved March 17, 1983

Secretariat: Society of Motion Picture and Television Engineers

1. Scope

This standard specifies the dimensions of the camera aperture image and its relative position to the reference edge and the perforations of 16-mm motion-picture film. The location of the perforations is based on dimensions given in ANSI PH22.109-1980 and ANSI PH22.110-1980.

2. Reference Standards

The following American National Standards are intended to be used in conjunction with this standard:

ANSI PH22.109-1980, Dimensions for 16-mm Motion-Picture Film Perforated 1R

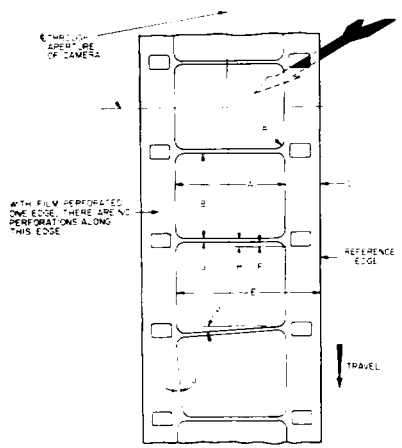
ANSI PH22.110-1980, Dimensions for 16-mm Motion-Picture Film Perforated 2R

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 freshly exposed and processed film.

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	0.404	nom	10.26	nom
B	0.295	+ 0.004 — 0.003	7.49	+ 0.10 — 0.07
D	0.116	max	2.95	max
E	0.512	min	13.00	min
F	0.018	min	0.46	min
G	0.001	min	0.03	min
	0.008	max	0.20	max
H	0.032	max	0.81	max
J		± ½°		± ½°
R	0.015	max	0.38	max

*See Notes.

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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: Dmension 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

(The Appendix is not a part of this American National Standard, but is included for information purposes 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.

ANSI PH22.19-1983
Revision of ANSI PH22.19-1976

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

Approved March 17, 1983 Secretariat: Society of Motion Picture and Television Engineers

1. Scope

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 PH22.17-1982.

2. Reference Standards

The following American National Standards are intended to be used in conjunction with this standard:

ANSI PH22.17-1982, Dimensions for 16-mm Motion-Picture Film Perforated 8-mm Type R, 2R

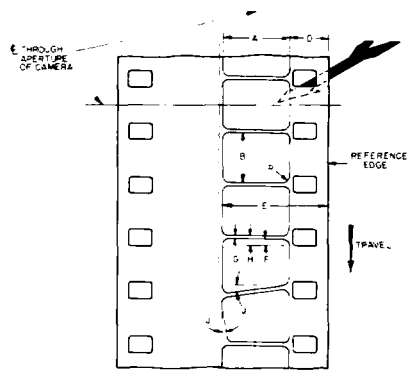
ANSI PH22.21M-1981, Specifications for Camera Usage of Double-Width 8-mm Type R Motion-Picture Film Perforated Two Edges.

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 freshly exposed and processed film.

3.2 The angle between the vertical edges of the aperture image and the edges of normally positioned film shall be $0^\circ \pm \frac{1}{2}^\circ$.

3.3 The angle between the horizontal edges of the aperture image and the edges of normally positioned film shall be $90^\circ \pm \frac{1}{2}^\circ$.



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	0.05	min
	0.007	max	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

The position of the emulsion, the rate of exposure, and the orientation of the area being exposed shall be as specified in ANSI PH22.21M-1981.

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 Dimensons 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

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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 simultanetously 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.

ANSI PH22.41-1983
Revision of ANSI PH22.41-1975

American National Standard for motion-picture film (16-mm)—prints—photographic sound records

Approved February 4, 1983 Secretariat: Society of Motion Picture and Television Engineers

1. Scope

1.1 This standard specifies the lateral location and dimensions of variable-area and variable-density photographic sound records on 16-mm motion-picture prints.

1.2 This standard also specifies the longitudinal picture-sound displacement.

1.3 The standard further specifies the area scanned in the sound reproducer.

2. Reference Standards

The following American National Standards are intended to be used in conjunction with this standard:

ANSI PH22.10-1980, Specifications for Projector Usage of 16-mm Motion-Picture Film

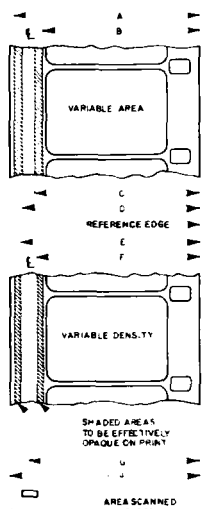
ANSI PH22.48-1976, Location of Printed Areas for 16-mm Picture and Sound Contact Printing

ANSI PH22.109-1980, Dimensions for 16-mm Motion-Picture Film Perforated 1R

3. Sound Record

3.1 The dimensions and location of the sound records shall be as specified in the figure and table.

3.2 The recording and reproducing slit images shall be positioned at an angle of 90° ± 5′ to the reference edge of the film.



Dimensions	Inches	Millimeters
A	0.611 max	15.52 max
B	0.513 ref	13.03 ref
C	0.540 ± 0.002	13.72 ± 0.05
D	0.600 ± 0.002	15.24 ± 0.05
E	0.610 ± 0.002	15.49 ± 0.05
F	0.530 ± 0.002	13.46 ± 0.05
G	0.570 ref	14.48 ref
H	0.071 ref	1.80 ref
J	0.628 ref	15.95 ref

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4. Reproducing Speed

The recording shall be made so that the sound record will reproduce properly at 24 perforations per second (approximately 36 ft (11 m) per minute or 7.2 in (183 mm) per second). This is equivalent to the projection speed of the picture film of 24 frames per second.

5. Longitudinal Picture-Sound Displacement

The sound record on the film shall precede the center of the corresponding picture (Frame 0) by a distance of 26 frames ± ½ frame in the direction of film travel during normal projection.

NOTE 1: Motion-picture prints conforming to this standard are usually projected in accordance with ANSI PH22.10-1980.

NOTE 2: Motion-picture prints conforming to this standard are usually made on film made in accordance with long-pitch dimensions specified in ANSI PH22.109-1980.

NOTE 3: Motion-picture prints described in this standard are printed in accordance with ANSI PH22.48-1976.

NOTE 4: Where the original sound record has been reduction printed in some stage of the process, it may be impossible to obtain the black septum on either side of the recorded area. The presence of a clear septum between the sound and picture areas which does not encroach on the minimum tolerances of the printed area shall not be a basis for rejection of prints. Shaded septum areas are intended to include all unused areas on both sides of the sound record, up to the picture on one side and the film edge on the other. In no case shall the reduction printed area begin farther than 0.530 in (13.46 mm) nor extend less than 0.610 in (15.49 mm) from the reference edge of the film.

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A1. As a working procedure, the accuracy of picture-sound displcement in a projection print is judged by screening in a review room. When the sound record is reproduced, the distance from the center of the projector aperture to the sound-scanning point should be adjusted to bring picture and sound into synchronism for the average observer. This distance should be shortened by one frame for each approximate 50 ft (15 m) of distance from loudspeaker to audience.

A2. The dimensions in this standard are measured from the perforated edge which is the edge used in the factory control of 16-mm width films. Guiding from the perforated edge is the prevalent practice in the manufacture of 16-mm projectors. Films printed in 32-mm width and subsequently slit to 16-mm width will be guided and positioned from factory-slit edges. Films printed on 35-mm width stock will either have one or no factory-made edge. The most common method would leave no factory-slit edge.