ANSI/SMPTE 137-1988
Revision and Redesignation of
ANSI PH22.137-1981

American National Standard for motion-picture film (35-mm)—four magnetic audio records—release prints

Approved March 31, 1988 Sponsor: Society of Motion Picture and Television Engineers

1. Scope

1.1 This standard specifies the position, dimensions, reproducing speed, identity, and use of the four magnetic audio records on 35-mm motion-picture release prints.

1.2 The standard also specifies the longitudinal picture-audio displacement on the film.

2. Referenced American National Standards

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

ANSI/SMPTE 102-1986, Motion-Picture Film (35-mm)—Perforated CS-1870

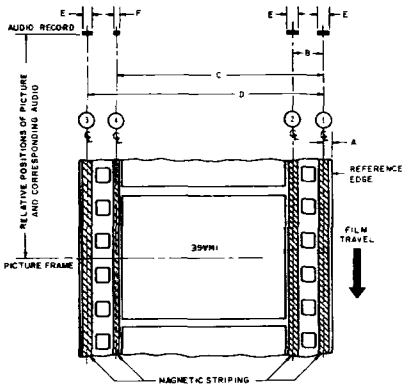
ANSI PH22.177-1982, Motion-Picture Film (35-mm)—Four-Track Magnetic Sound Release Prints—Magnetic Striping

ANSI PH22.194-1984, Motion-Picture Film (35-mm)—Projector Usage—Release Prints Having Four Perforations Per Frame

3. Audio Records

3.1 The lateral location and width of the magnetic audio records shall be as specified in the figure and table.

3.1.1 The records shall be referred to by number, as shown in the figure, with record No. 1 nearest the reference edge. The left and right channel apply to a listener facing the screen. Record No. 1 shall be used for the left loudspeaker channel. Record No. 2 shall be used for the center loudspeaker channel. Record No. 3 shall be used for the right loudspeaker channel. Record No. 4 shall be used for the surround or auditorium loudspeakers or control signals or both.



Dimensions	Inches	Millimeters
A	0.040 ± 0.002	1.02 ± 0.05
B	0.171 ± 0.002	4.34 ± 0.05
C	1.148 ± 0.002	29.16 ± 0.05
D	1.298 ± 0.002	32.97 ± 0.05
E	0.059 min	1.50 min
F	0.036 ± 0.002	0.91 ± 0.05

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3.2 The recording shall be made so that the azimuth of the record is at an angle of 90° ± 5′ to the reference edge of the film.

3.3 With the direction of film travel as shown in the figure, the magnetic striping shall be on the surface of the film facing the projector lens.

3.4 The audio records shall be recorded in such a manner that they can be reproduced properly by reproducing heads whose gaps are positioned along a common plane and in line.

4. Reproducing Speed

The recordings shall be made so that the audio records will reproduce properly at 96 perforations per second (approximately 90 ft [27 m] per minute or 18 in [457 mm] per second) which is 24 frames per second.

5. Longitudinal Picture-Audio Displacement

The magnetic audio records on the film shall lag behind the center of the corresponding picture by a distance of 28 frames ± ½ frame (see Appendix A5).

NOTE: The dimensions which locate the reproducing heads are based on the assumption that the film has shrunk 0.2 percent in width. Since the shrinkage of the film will normally increase between the time of recording and the time of reproducing, it would be logical that different shrinkage values should be taken to determine the dimensions which locate the recording and reproducing heads, but the same value of 0.2 percent (which corresponds to low-shrinkage safety-type film) is adopted for practical reasons. This value has been chosen to represent rather more than the shrinkage likely to have occurred at the time of recording and rather less than the shrinkage likely to have occurred at the time of reproducing.

Appendix

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

A1. Record Width

The width of the recorded area must be measured with great care as it enters directly into the calculation of flux per unit track width.

When the recording head gap is narrower than the width of the coating or stripe, as is normal for all motion-picture test films, there is a measurement complication involving both the uncertainties in seeing the track and in determining the recording fringing.

If the recording head is available, the track width is best measured indirectly by measuring the gap width and adding to this dimension twice the thickness of the test record magnetic coating. This correction will usually be 0.0003 to 0.0006 in (8 to 15 μm).

If the recording head is unavailable, the recorded record may be made visible by the use of a carbonyl iron suspension. Care should be taken to apply the minimum quantity that makes the recording visible, so that the developed image is not wider than the actual recorded area.

A2. Reproducing Head Gap Width

If precision measurements or calibrations are to be made on magnetic audio records made in accordance with this standard, reproducing head gaps of the same width dimension or wider than the recorded track must be used to prevent edge effects or fringing.

A3. Erase Heads

Erasing head gaps used to erase the records specified in this standard should be substantially wider than the record specified.

A4. Basic Standards

Motion-picture prints conforming to this standard are usually made on film made in accordance with ANSI/SMPTE 102-1986, with magnetic striping done in accordance with ANSI PH22.177-1982, and projected in accordance with ANSI PH22.194-1984.

A5. Longitudinal Picture-Audio Displacement

As a working procedure, the accuracy of picture-audio displacement in a projection print is frequently judged by screening in a review room. It is important that the standard thread-path in this review room projector be set accurately to the value specified in this standard plus 1 frame for every 50 ft (15 m) separating the loudspeaker from the observer. Otherwise, nonstandard prints may be produced.

ANSI/SMPTE 201M-1988
Revision and Redesignation of
ANSI PH22.201M-1981

American National Standard
for motion-picture film (16-mm)– type W camera aperture image

Approved March 31, 1988 Sponsor: Society of Motion Picture and Television Engineers

1. Scope

1.1 This standard specifies the dimensions of the image area produced by Type W camera aperture on 16-mm motion-picture film intended for enlargement to 35-mm motion-picture film with an aspect ratio of 1.66:1. It also specifies the position of the image relative to the reference edge of the film and to the perforations.

1.2 The standard further specifies the dimensions and location of the image area on 35-mm duplicate negatives and the enlargement ratio in optical printing from 16-mm originals.

2. Dimensions

2.1 The dimensions shall be as given in the figures and tables and shall apply to measurements of the aperture image as formed on freshly exposed and processed film.

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

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

3. 35-mm Internegatives and Duplicate Negatives

The enlargement ratio for printing 35-mm internegatives and duplicate negatives shall be 1.78:1. The dimensions and location of the image area on 35-mm internegatives shall be as shown in Fig. 2 and Table 2.

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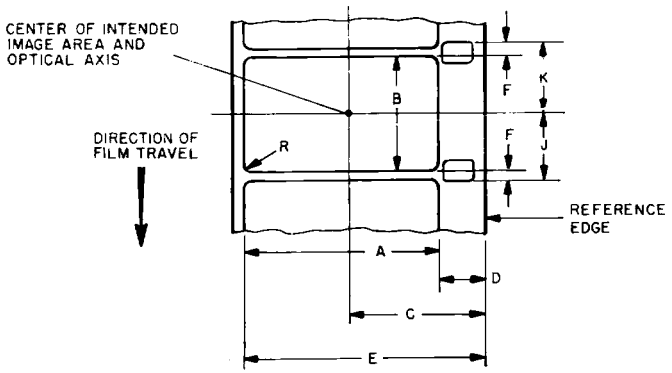

Fig. 1
Image Area on 16-mm Type W Negative or Original

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

Table 1

Dimensions	Millimeters		Inches	
A	12.52	ref	0.493	ref
B	7.42	$+0.15$ -0.00	0.292	$+0.006$ -0.000
C	9.15	ref	0.360	ref
D	2.95	max	0.116	max
E	15.37	min	0.605	min
F	0.82	max	0.032	max
J = K		ref		ref
R	0.15	max	0.006	max