

# Standards and Recommended Practices

## Approved American National Standards

The American National Standards Institute approved five American National Standards on December 28, 1990: ANSI/SMPTE 1-1990, Video Recording — 2-in. Magnetic Recording Tape; ANSI/SMPTE 83-1990, Motion-Picture Film (16-mm) — Edge Numbers — Location and Spacing; ANSI/SMPTE 182-1990, Motion-Picture Film (8-mm Type S) — Photographic Audio Record — Release Prints; ANSI/SMPTE 210M-1990, Motion-Picture Film (16-mm) — Magnetic Audio Records — Two Records on 16-mm Magnetic Film; and ANSI/SMPTE 215-1990, Motion-Picture Film (65-mm) — Camera Aperture Image. Copies of the standards are available for a nominal fee from the Engineering Department of the Society of Motion Picture and Television Engineers, 595 West Hartsdale Avenue, White Plains NY 10607, or the American National Standards Institute, 1430 Broadway, New York NY 10018.

## Reaffirmed American National Standard

Reaffirmation of an American National Standard was approved by the American National Standards Institute on Decem-

ber 3, 1990: ANSI/SMPTE 212M-1984 (R1990), Motion-Picture Equipment — Projection Reels (75-mm Diameter) — 8-mm Type S Motion-Picture Film. Copies of the standard are available from the Society's Engineering Department or the American National Standards Institute.

## Reaffirmed SMPTE Recommended Practices

Four SMPTE Recommended Practices have been reaffirmed by the Society's Standards Committee: RP 9-1986 (R1990), Dimensions of Double-Frame 35-mm 2 × 2 Slides for Precise Applications in Television; RP 49-1986 (R1990), Leaders for 8-mm Type R and S Motion-Picture Release Prints Used in Continuous-Loop Cartridges; RP 59-1986 (R1990), Color and Luminance of Review Room Screens for Viewing Motion-Picture Materials Intended for Slides or Film Strips; and RP 140-1986 (R1990), Position of Photographic Audio Record for Routine Test Signals. SMPTE Recommended Practices are available from Society Headquarters for a nominal charge.

— *Sherwin H. Becker, Director of Engineering*

## **SMPTE Standards Subscription Service**

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For further information, write to: Standards Subscription Service, Engineering Dept., Society of Motion Picture and Television Engineers, 595 West Hartsdale Ave., White Plains, NY 10607.

## for Video Recording — 2-in Magnetic Recording Tape



### 1 Scope

This standard specifies the dimensions for the width, thickness, and curvature of 2-in video magnetic recording tape.

### 3 Curvature

#### 3.1 Specification

The curvature of the tape shall not exceed 0.0625 in (1.588 mm) in 48 in (1219 mm).

#### 3.2 Measurement

Curvature shall be measured by constraining the tape to lie in a plane under zero tension and by positioning a 48 in (1219 mm) long straightedge, as shown in figure 1. The maximum deviation, C, of the tape edge from the straightedge shall be taken as the curvature.

### 2 Dimensions

#### 2.1 Width

The width of the tape shall be 2.0000 +0 -0.0025 in (50.800 +0 -0.064 mm).

#### 2.2 Thickness

The combined thickness of the base and magnetic material coating shall not exceed 0.0015 in (0.038 mm).

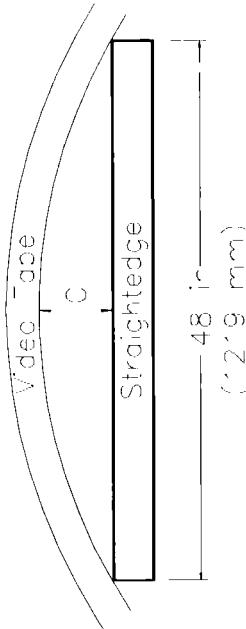


Figure 1

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Approved  
December 28, 1990

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## for Motion-Picture Film (16-mm)— Edge Numbers— Location and Spacing



### 1 Scope

#### 1.1 Specifications

This standard defines the location within which edge numbers will appear on 16-mm motion-picture film. The maximum interval between successive numbers is also specified.

### 2 Dimensions

#### 2.1 Latent-image numbers

The width dimension of the area on the edge of the film within which latent-image printed numbers shall appear is as shown by dimension A in figure 1 and table 1.

#### 2.2 Inked edge numbers

The width dimension of the area on the edge of the film within which inked edge numbers shall appear is as shown by dimension B in figure 1 and table 1.

### 3 Interval between numbers

#### 3.1 Latent-image numbers

The interval between consecutive latent-image numbers shall not exceed 40 frames. Where a 40-frame interval is used, the numbers will then indicate film footage, subject to a small correction for shrinkage of the film. A 20-frame interval is frequently used for latent numbering. Where a 20-frame interval is used, the numbers will indicate double the film footage.

#### 3.2 Inked edge numbers

The interval between inked edge numbers shall not exceed 40 frames. Where a 40-frame interval is used, the numbers will then indicate film footage, subject to a small correction for the shrinkage of the film. Where a 16-frame interval is used, the edge numbers will then indicate corresponding footage on 35-mm materials.

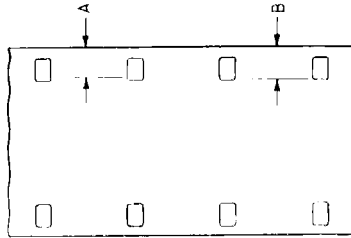


Figure 1

Table 1

Dimensions	Inches	Millimeters
A	0.093 max	2.36 max
B	0.108 max	2.74 max

#### 1.2 Application

This standard applies to latent-image printing of edge numbers as well as to any other method of printing such as inking.

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# SMPTE STANDARD

## for Motion-Picture Film (16-mm) — Magnetic Audio Records — Two Records on 16-mm Magnetic Film

Page 1 of 3 pages

### 1 Scope

1.1 This standard specifies the lateral positions and width dimensions of two 3.81 mm (0.150 in) magnetic audio records and a control track on 16-mm single-perforated magnetic recording film.

1.2 This standard also specifies the reproducing velocity of the film travel.

### 2 Audio record

2.1 The lateral location and width of each magnetic audio record shall be as specified in figure 1 and table 1.

2.2 The recording shall be made so that the azimuth of each record is at an angle of  $90 \pm 5^\circ$  to the reference edge of the film.

2.3 With the direction of travel as shown in figure 1, the magnetic coating shall be on the surface toward the observer.

### 3 Reproducing speed

The recording shall be made so that the audio records will reproduce properly at 24 perforations per second (approximately 11 m [36 ft] per minute or 183 mm [7.2 in] per second), which is 24 frames per second.

### 4 Track usage

4.1 For recording single records, the center track position shall be used. However, for international exchange, interchangeability is facilitated by placing identical information on both tracks.

4.2 For recording stereo programs, the center track position shall be used for the left-hand channel.

4.3 For recording two languages, the center track shall be used for the primary language and the edge track position shall be used for the secondary language.

4.4 The control track shall be used for recording other information and for address systems in analog or digital form.

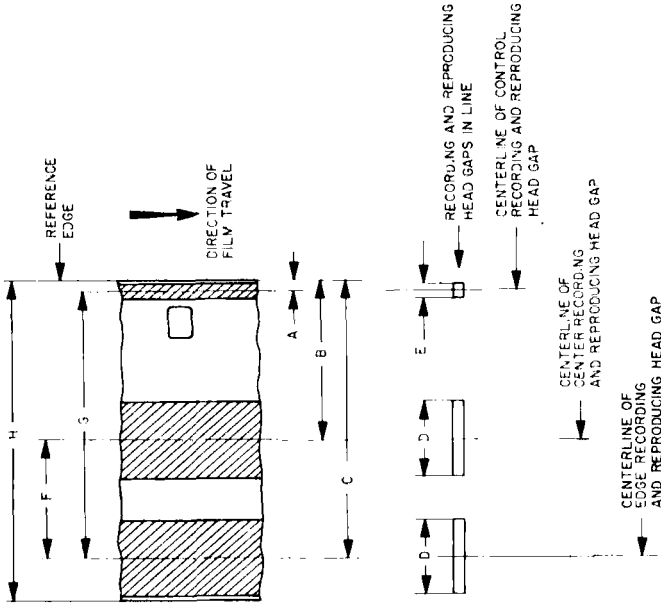


Figure 1

Table 1

Dimension	Millimeters	Inches
A	0.46 ± 0.05	0.018 ± 0.002
B	7.95 ± 0.05	0.313 ± 0.002
C	13.89 ± 0.05	0.547 ± 0.002
D	3.81 +0 -0.10	0.150 +0 -0.004
E	0.71 +0 -0.10	0.028 +0 -0.004
F	5.95 nom	0.234 nom
G*	13.45 nom	0.529 nom
H	15.95 ref	0.628 ref

\*Dimension G deviates from standard conversion procedures to reflect the practice in countries using the English system.

**Annex A (informative)  
Additional data**

**A.1 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 the uncertainties both 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  $\mu$ m).

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.

**Annex B (informative)  
Bibliography**

ANSI/SMPTE 109-1986, Motion-Picture Film (16-mm) — Perforated TR

**A.2 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.

**A.3 Erase heads**

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

**A.4 Picture-sound synchronization**

The film is used for audio records only. Any accompanying picture is on a separate photographic film. When audio records are intended to be used in synchronization with pictorial material found on a separate film, the picture-sound relationship should be in accordance with SMPTE RP 25-1984.

**A.5 Magnetic coating**

The dimensions of the magnetic coating are not specified, but it is assumed that the coating is wide enough to permit the placement of the audio records in accordance with this standard.

SMPTE RP 25-1984 (R1989), Audio and Picture Synchronization on Motion-Picture Film Relative to the Universal Leader for Magnetic and Photographic Records

**SMPTE STANDARD**

**ANSI/SMPTE 215-1990**  
Revision of  
ANSI/SMPTE 215-1984

**for Motion-Picture Film (65-mm) —  
Camera Aperture Image**

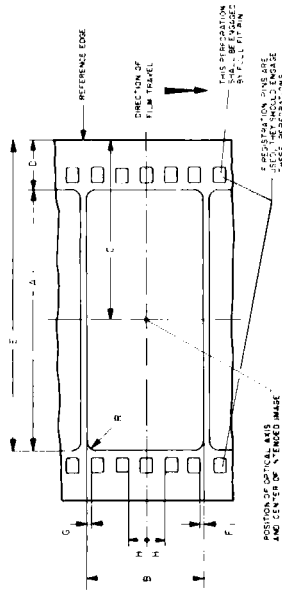


**1 Scope**

This standard specifies the dimensions of the camera aperture image 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 65-mm motion-picture cameras.

**2 Dimensions**

The dimensions shall be as specified in figure 1 and table 1. They shall apply to measurements of the images formed on freshly exposed and processed film.



**Figure 1 — Film as seen from inside camera looking toward lens**

**Table 1**

Dimensions	Inches	Millimeters
A*	2.066 nom	52.48 nom
B	0.906 + 0.020 - 0	23.01 + 0.51 - 0
C	1.279 nom	32.49 nom
D	0.246 max	6.25 max
E	2.312 min	58.72 min
F = G	within 0.008	within 0.20
H = H	nominally equal	nominally equal
R	0.020 max	0.51 max

\*Dimension A is derived and is given for information only.

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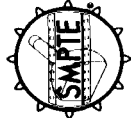
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# SMPTE STANDARD

## for Motion-Picture Film (8-mm Type S) — Photographic Audio Record — Release Prints



Page 1 of 2 pages

### 1 Scope

1.1 This standard specifies the lateral location and dimensions of the photographic audio record on 8-mm type S motion-picture prints. (See annex A.)

1.2 This standard also specifies the width of the scanned area and its location with respect to the corresponding picture frame as the specification of the picture-audio displacement.

### 2 Audio record

The lateral location and dimensions of the photographic audio record shall be as given in figure 1 and table 1.

### 3 Picture-audio displacement

The photographic audio record on the film shall precede the center of the corresponding picture by a distance of 22 frames  $\pm 1/2$  frame.

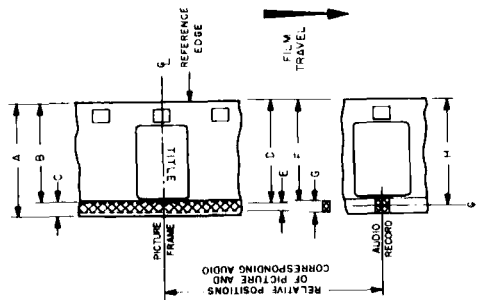


Figure 1

Table 1

Dimensions	Inches	Millimeters*
A Film width	0.314 ref	7.98 ref
B	$0.283 \pm 0.001$	$7.19 \pm 0.03$
C Printed width	0.030 min	0.75 min
D	$0.288 \pm 0.001$	$7.32 \pm 0.03$
E Modulated width (100%)	0.020 max	0.50 max
F	$0.285 \pm 0.001$	$7.25 \pm 0.03$
G Scanned width	$0.025 \pm 0.001$	$0.66 \pm 0.03$
H Audio record centerline	$0.298 \pm 0.001$	$7.57 \pm 0.03$

\*Millimeter dimensions deviate from standard conversions to reflect practices in countries using the metric system.

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SMPTE 182-1990

Notes to table 1:

1 The density in the area between the printed photographic audio record and the printed photographic picture record should be equal to the audio record print density. Occasionally, some clear area adjacent to the audio track may be observed. This is not objectionable so long as it does not encroach on the minimum tolerances for the printed area. Usually, the area between the printed photographic audio record and the edge of the film will be maximum density.

2 To prevent clear septum areas when the film is slit larger than its normal width of 0.314 in (7.98 mm), it may be necessary to have a printed width (dimension C) of 0.032 in (0.81 mm), when dimension C is at its minimum.

### Annex A (Informative) Application

The slit width (dimension A) of 8-mm type S film containing a photographic audio record must be held to tighter tolerances than are necessary for other uses. For these more critical uses, the slit width tolerance should be  $\pm 0.001$  in (0.03 mm).

Dimension B is, at its minimum, to provide for a possible slit width of 0.315 in (8.00 mm), the maximum permitted for photographic audio use. The minimum specification for dimension B will allow the picture and audio track to have a common edge during printing.

3 It is anticipated that the printed width, dimension C, will be utilized in the production of variable-density audio records.

4 The dimensions and specifications do not provide for anticipated projector weave allowance and the tolerances should not be mutually exclusive.