

# American National Standard position, dimensions and reproducing speed of three 200-mil magnetic sound records on 35-mm and one record on 17.5-mm motion-picture film

Approved October 26, 1981

Secretariat: Society of Motion Picture and Television Engineers

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## 1. Scope

This standard specifies the position, dimensions, reproducing speed, and identity of the three 0.200-in (5.08-mm) magnetic sound records on 35-mm and one record on 17.5-mm motion-picture film.

## 2. Sound Records

**2.1** The lateral location and width of the magnetic sound records shall be as specified in the figure and table.

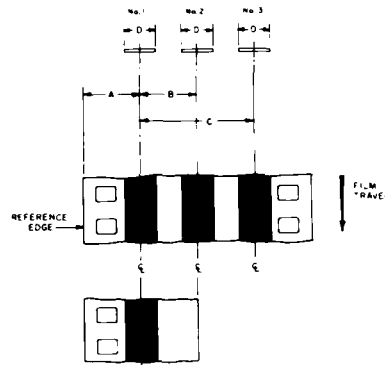
**2.1.1** The records shall be referred to by number, as shown in the figure, with record No. 1 nearest the reference edge.

**2.1.2** For recording on 17.5-mm motion-picture film, record No. 1 shall be used.

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

**2.3** With the direction of travel as shown in the figure, the magnetic coating is on the surface toward the observer.

**2.4** The sound 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 or in line.




Dimensions	Inches	Millimeters
A	0.339 ± 0.002	8.61 ± 0.05
B	0.350 ± 0.002	8.89 ± 0.05
C	0.700 ± 0.002	17.78 ± 0.05
D	0.200 ± 0.002	5.08 ± 0.05

## 3. Reproducing Speed

The recording shall be made so that the sound 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.

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## Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes 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  $\mu\text{m}$ ).

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.

### A2. Reproducing Head Gap Width

If precision measurements or calibrations are to be made on magnetic sound 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. Reference Standard

The film base used for the sound records conforming to this standard is usually made in accordance with American National Standard Dimensions for 35-mm Motion-Picture Film Perforated KS, ANSI PH22.139-1980, and is slit in half if a 17.5-mm film is needed.

### A5. Picture-Sound Synchronization

The film is used for sound records only. Any accompanying picture is on a separate photographic film. When sound 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 Recommended Practice on Sound and Picture Synchronization on Motion-Picture Film Relative to the Universal Leader for Magnetic and Photographic Tracks, RP 25-1968.

### A6. Magnetic Coating

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

ANSI PH22.21M-1981  
Revision of ANSI PH22.21-1975

# American National Standard specifications for camera usage of double-width 8-mm type R motion-picture film perforated two edges

Approved October 26, 1981

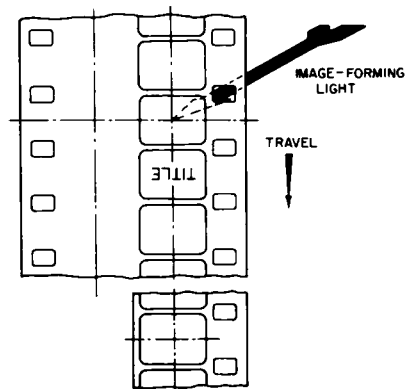
Secretariat: Society of Motion Picture and Television Engineers

## 1. Scope

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

## 2. Emulsion Position

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



Film as Seen from Inside Camera  
Looking Toward Camera Lens


## 3. Rate of Exposure

The normal rate of exposure shall be 18 frames per second for silent film and 24 frames per second for sound film.

## 4. Image Area Position

The dimensions of the camera aperture image and its position relative to the film-positioning perforation and reference edge shall be as specified in American National Standard Dimensions of Camera Aperture Image on 8-mm Type R (Regular 8) Motion-Picture Film, ANSI PH22.19-1976.

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ANSI PH22.174-1981  
Revision of ANSI PH22.174-1975

# American National Standard dimensions for 16-mm daylight-loading motion-picture camera spools (50- to 400-ft capacity)

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## 1. Scope

1.1 This standard specifies the dimensions for 16-mm daylight-loading motion-picture camera spools having capacities from 50 to 400 ft (15 to 120 m) of film.

1.2 This standard further specifies the configuration of the positioning of the spindle holes in the two flanges. These shall be identified as Styles 1, 2, and 3 (See Fig. 2).

## 2. Dimensions

The dimensions shall be as specified in Figures 1 and 2 and Tables 1 and 2.

## 3. Spindle Hole Alignment

In Styles 2 and 3, the alignment of the sides of the squares in the two flanges shall be such that a test bar 0.316 in (8.03 mm) square may be passed completely through the spool. The corner keyways in the two flanges of Style 2 shall be aligned with each other.

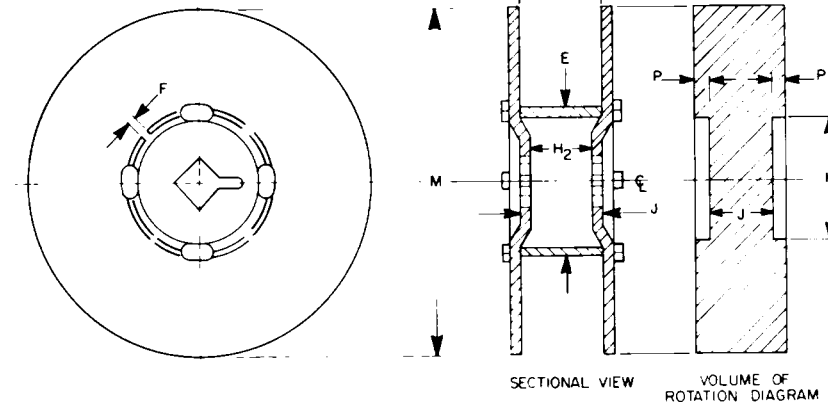



Figure 1

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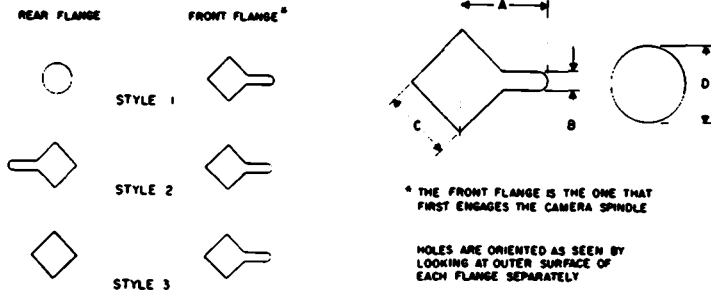


Figure 2

Table 1  
Nominal Spool Capacity

Dimensions	Feet	Meters	Inches	Millimeters
E	50	15	1.26 ± 0.02	32.0 ± 0.5
	100	30	1.26 ± 0.02	32.0 ± 0.5
	200	60	1.26 ± 0.02	32.0 ± 0.5
K	400	120	2.12 ± 0.02	53.8 ± 0.5
	50	15	1.00 min	25.4 min
	100	30	1.00 min	25.4 min
	200	60	1.00 min	25.4 min
M	400	120	1.50 min	38.1 min
	50	15	2.81 + 0.00 - 0.04	71.4 + 0.0 - 1.0
	100	30	3.62 + 0.00 - 0.04	91.9 + 0.0 - 1.0
	200	60	4.96 + 0.00 - 0.04	126.0 + 0.0 - 1.0
	400	120	6.65 + 0.00 - 0.04	168.9 + 0.0 - 1.0

Table 2  
Dimensions Common to Spools in Table 1

Dimensions	Inches	Millimeters
A Keyway depth	0.30 + 0.04 - 0.00	7.6 + 1.0 - 0.0
B Keyway width	0.12 + 0.02 - 0.00	3.0 + 0.5 - 0.0
C Side of square spindle hole	0.317 + 0.006 - 0.000	8.05 + 0.15 - 0.00
D Spindle hole diameter	0.317 - 0.006 - 0.000	8.05 + 0.15 - 0.00
F Film slot (See 4.1)	0.03 - 0.03 - 0.00	0.8 + 0.8 - 0.0
H: At periphery	0.632 + 0.014 - 0.000	16.05 + 0.36 - 0.00
H <sub>2</sub> Distance between flanges at spindle holes	0.630 min	16.00 min
J Overall thickness at spindle holes	0.73 - 0.00 - 0.02	18.5 + 0.0 - 0.5
P (See Note 5)	0.020 max	0.51 max

4. Specifications

4.1 Dimension F represents a slot in the spool core for attaching film. Its sides shall be straight, parallel, and 0.028 to 0.059 in (0.71 to 1.50 mm) apart. It is permissible for the slot sides to diverge in the center portion of the slot. Any divergence shall not be greater than one half the width of the slot.

4.2 Dimension J is the thickness of the spool within the K diameter zone, which is centered on the spindle hole axis of each flange.

4.3 The eccentricity of the core with respect to the spindle hole axis shall not exceed a total radius variation (total indicator reading) of 0.030 in (0.76 mm) for all spool sizes.

NOTE 1: The Style 2 configuration of spindle holes is recommended as the preferred standard for future design.

NOTE 2: Flanges shall be opaque and their inner surfaces shall have a low-reflectance characteristic.

NOTE 3: If the spool or spool hub is made from plastic or other dimensionally unstable material, spindle hole

Dimensions C and D shall be adjusted so that at least the minimum dimension is maintained throughout the normal use range of temperature and humidity.

NOTE 4: Rivet heads or other fastening devices, which extend beyond the outer surface of the flange, shall lie outside the K diameter zone but within the boundaries defined by the Volume of Rotation Diagram (i.e., 0.770 in [19.56 mm] max).

NOTE 5: A reference plane of rotation for each flange is defined by a plane perpendicular to the axis of the spindle and coincident with the surface of a flat 0.590 in (14.99 mm) diameter support in contact with flange and centered on the spindle hole axis of the flange. Dimension P is the distance measured outwardly from this reference plane of rotation to the farthest plane of rotation generated by any point on the flange outside the K diameter zone when the spool is rotated on an accurate, tight-fitting spindle.

NOTE 6: The maximum effective thickness of spools (including all the characteristics mentioned in Note 5) outside the K diameter zone has not been stated because it is a function of a spool's specific J value between the 0.590 in (14.99 mm) diameter reference zones on each flange. The largest such overall effective thickness, however, will be J max + 2P max = 0.770 in (19.56 mm).

NOTE 7: There may be other cutouts or holes in the hub area of the flanges within the limits of Dimensions K, provided the spool remains nominally in dynamic balance.