117th SMPTE Technical Conference & Equipment Exhibit Sept. 28–Oct. 3, Century Plaza Hotel, Los Angeles, Calif.

Chairmen Appointed

SMPTE Conference Vice President **Harry Teitelbaum,** Hollywood Film Co., has appointed **Robert Gustafson,** Consolidated Film Industries, as Local Arrangements Chairman, and **Warren Strang,** Hollywood Film Co., as Exhibit Chairman.

Both chairmen bring strong experience to their jobs. Gustafson was Arrangements Chairman for the last Los Angeles Conference and Strang has held the exhibit chairmanship for the previous seven L.A. Exhibits.

On the program end of the Conference, two new Topic Chairmen were named by Program Chairman **Julian Hopkinson,** Agfa-Gevaert. **Ed DiGiulio,** Cinema Products Corp., was appointed Topic Chairman for *Newsgathering—Film Style.* **Phil Singer** was appointed Short Films Chairman. In other news about the program, the topic of *Facilities Engineering* has been changed to *Plant and Industrial Engineering,* with **William M. Donahue,** Technicolor, Inc., as Topic Chairman.

Mini Conference

A session is being set up, for Tuesday night Conference week, of special interest to students and technicians. The session has been termed a "Mini Conference" because its content will be a composite of all those subjects presented at the Conference as a whole. Tutorial papers, with general coverage of each subject, will be presented by leading experts in each field. Topic Chairman for the session is **Phil Cohen,** The Brooks Institute.

Call for Papers

Those interested in presenting papers at the 117th Conference are invited to submit their materials for consideration. The procedure for submission of papers is as follows: Write to Program Chairman Julian Hopkinson, one of the Topic Chairmen, or SMPTE Headquarters, for the necessary forms. Before May 13, prospective authors must send to Headquarters three copies of the author form, three copies of the author information sheets, and three copies of a synopsis or summary of the paper (500–750 words) on the SMPTE format sheets supplied.

Before August 8, the original and three copies of the manuscript must be sent to Headquarters. Authors will be notified shortly after submission of synopses about how their papers fit the program.

The list of Topic Chairmen appeared in the February *Journal,* p. 93.

standards and recommended practices

Approved American National Standards

On 25 November 1974, the American National Standards Institute approved three American National Standards: PH22.108-1974, Position, Dimensions and Reproducing Speed of Four 150-Mil Magnetic Sound Records on 35-mm Motion-Picture Film; PH22.137-1974, Position, Dimensions and Reproducing Speed of Four Magnetic Sound Records on 35-mm Motion-Picture Release Prints; and PH22.159.5-1974, Specifications for Camera Run Length, Perforation Cut-Out and End-of-Run Notches in 8-mm Type S (Super 8) Motion-Picture Film Model I Camera Cartridges (50-Ft, 15-M Capacity).

Inasmuch as compliance with American National Standards is purely voluntary, standards will become truly effective when broad publicity is given to their existence. ANSI and SMPTE would appreciate any personal influence to promote the use of these standards where such action is appropriate. Copies of the standards may be obtained for a nominal fee from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Draft American National Standards

Two Draft American National Standards are published here for a trial period and public review: PH22.86, Position, Dimensions and Reproducing Speed of Three 200-Mil Magnetic Sound Records on 35-mm and One Record on 17½-mm Motion-Picture Film, and PH22.97, Position, Dimensions and Reproducing Speed of 200-Mil Magnetic Sound Record on 16-mm Motion-Picture Film. The revisions do not reflect a technical change from the original version but have been updated and clarified to facilitate their use.

Comments should be addressed to Alex E. Alden, Staff Engineer, at Society Headquarters prior to 31 March 1975. The proposals have been submitted to American National Standards Committee PH22. All comments received through *Journal* publication will be reviewed before conclusion of Committee action.

Approved International Standards

The International Organization for Standardization (ISO) recently approved three International Standards, the technical content of which is published here. Complete copies of all International Standards are available from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

ISO 1020-1974, Cinematography — Spools, Daylight Loading Type for Double 8-mm Motion-Picture Cameras — Dimensions, is in complete agreement with American National Standard PH22.107-1964.

ISO 2895-1974, Cinematography — Screen Luminance for Review Room Projection of Motion-Picture Film Intended for Indoor Theatres, and ISO 2910-1974, Cinematography — Screen Luminance for the Projection of Motion-Picture Films in Indoor Theatres, are not in accord with American National Standards as specified in PH22.100, PH22.133 and PH22.124. The recommended value is lower and the tolerances are broader than those specified by USA engineering practice for screen luminance.

ISO is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

The International Standards published here were developed by Technical Committee 36 on Cinematography. The work of this Committee is administered by the Engineering Department of the SMPTE which functions as the Secretariat in ANSI's name. A report of the last meeting of the Committee was published in the February 1974 *Journal of the SMPTE.* The next meeting is scheduled for the spring of 1976 in Paris, France. — Alex. E. Alden, *Staff Engineer*

ANSI PH22.108–1974
Revision of PH22.108-1958

American National Standard

position, dimensions and reproducing speed of four 150-mil magnetic sound records on 35-mm motion-picture film

Approved November 25, 1974 Secretariat: Society of Motion Picture and Television Engineers, Inc.

1. Scope

This standard specifies the position, dimensions, reproducing speed and identity of the four nominal 0.152-in (3.86-mm) magnetic sound records on 35-mm motion-picture film.

2. Sound Records

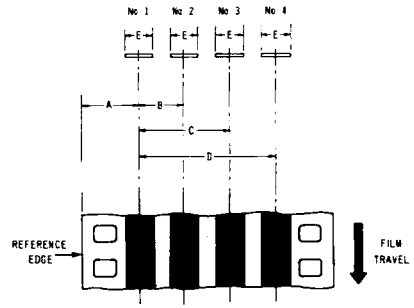
2.1 The lateral location and width of the four magnetic sound records shall be as specified in the figure and table.

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

2.2 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.

2.3 With the direction of travel as shown in the figure, the magnetic coating is on the upper surface of the film.

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	0.314 ± 0.002	7.98 ± 0.05
B	0.250 ± 0.002	6.35 ± 0.05
C	0.500 ± 0.002	12.70 ± 0.05
D	0.750 ± 0.002	19.05 ± 0.05
E	0.152 ± 0.002	3.86 ± 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 feet [27 meters] per minute or 18 inches [46 centimeters] per second) which is 24 frames per second.

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 meter 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 inch (0.008 to 0.015 mm).

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 take into account 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, PH22.139-1974.

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 RP 25-1968, Sound and Picture Synchronization on Motion-Picture Film Relative to the Universal Leader for Magnetic and Photographic Tracks.

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.

American National Standard

position, dimensions and reproducing speed of four magnetic sound records on 35-mm motion-picture release prints

Approved November 25, 1974 Secretariat: Society of Motion Picture and Television Engineers, Inc.

1. Scope

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

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

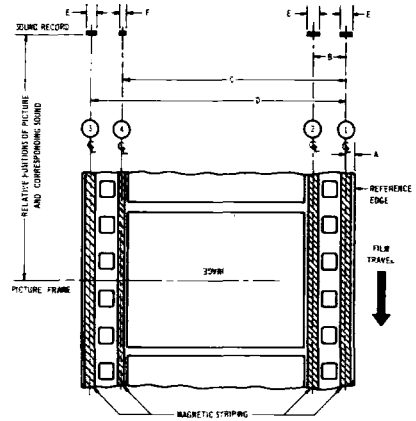
2. Sound Records

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. 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.

2.2 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.

2.3 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.



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

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.

3. Reproducing Speed

The recordings shall be made so that the sound records will reproduce properly at 96 perforations per second (approximately 90 feet [27 meters] per minute or 18 inches [46 centimeters] per second) which is 24 frames per second.

4. Longitudinal Picture-Sound Displacement

The magnetic sound 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

(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 meter 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 inch (0.008 to 0.015 mm).

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 take into account 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

Motion-picture prints conforming to this standard are usually made on film made in accordance with American National Standard Dimensions for 35-mm Motion-Picture Film, CS-1870, PH22.102-1974, with magnetic striping done in accordance with American National Standard Dimensions of Magnetic Striping of 35-mm Motion-Picture Film for Four-Track Magnetic Sound Release Prints, PH22.177-1970, and projected in accordance with American National Standard Specifications for Projector Usage of 35-mm Release Prints with Four-Track Magnetic Sound Records, PH22.103-1966 (R1971).

A5. Longitudinal Picture-Sound Displacement

As a working procedure, the accuracy of picture-sound 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 feet (15 meters) separating the loudspeaker from the observer. Otherwise, nonstandard prints may be produced.

ANSI PH22.159.5–1974
Revision of PH22.159.5-1968

American National Standard

specifications for camera run length, perforation cut-out and end-of-run notches in 8-mm type s (super 8) motion-picture film model I camera cartridges (50-ft, 15-m capacity)

Approved November 25, 1974 Secretariat: Society of Motion Picture and Television Engineers, Inc.

1. Scope

1.1 This standard describes the camera run length of film supplied in an 8-mm Type S (super 8) motion-picture film Model I camera cartridge of 50-ft (15-meter) nominal capacity and the length of film returned to the customer. Its purpose is to provide a uniform basis for the operation of footage counters in cameras.

1.2 This standard also specifies the dimensions and location of a perforation cut-out notch and a notch in the unperforated side of 8-mm Type S (super 8) camera films which may be used to indicate automatically the end of run.

2. Specifications

2.1 Camera Run Length

2.1.1 The camera run length of film may vary between 3666 perforation pitches (15.5 m or 51.0 ft) and 3710 perforation pitches (15.7 m or 51.5 ft). (See Notes 1 and 2.) The overall length of the film is to be determined by the manufacturer to provide the camera run length specified.

2.1.2 A complete film as returned to the customer shall contain a minimum customer return length of 3600 perforation pitches (15.2 m or 50.0 ft). The customer return length shall be that portion of the camera run length available for subject matter which starts at least 13 perforation pitches (55 mm or 2.2 inches) after the frame which forms the camera aperture, as the cartridge is supplied by the manufacturer, and ends at least 37 perforation pitches (157 mm or 6.2 inches) short of the final frame of the camera run length limited by the perforation cut-out.

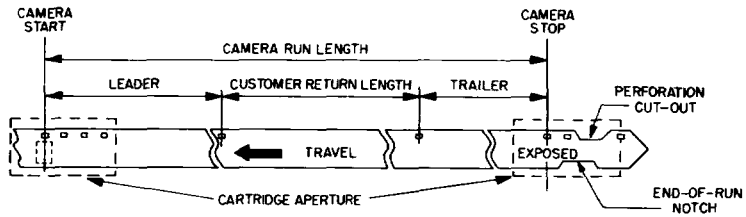


Figure 1
Camera Run Length and Notches

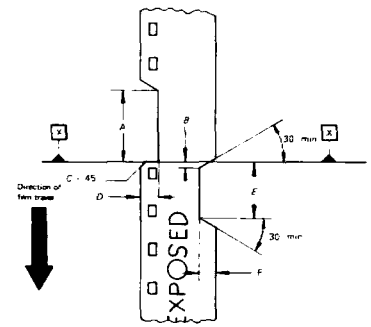


Figure 2
Notch Dimensions

Dimensions	Millimeters*	Inches
A†	5.38 min	0.212 min
B‡	0.3 max	0.012 max
C	0.55 max	0.022 max
D	1.50 min	0.059 min
E	4.52 ± 0.50	0.178 ± 0.020
F	0.80 min	0.031 min

*Metric units are primary.
†See 2.2.2.
‡See 2.2.6.

2.1.3 The end of the film shall have a visual marking in the frame area, and the perforations shall be cut out so that the final portion of the film stops in the film cartridge aperture providing the user with visual confirmation that all the film has been exposed.

2.2 Perforation Cut-Out and End-of-Run Notches

2.2.1 The dimensions shall be as given in Figure 2 and the table.

2.2.2 Datum Line X is established by the leading edge of the perforation cut-out. It is nominally perpendicular to the edge of the film.

2.2.3 The beveled cut at the trailing end of the perforation cut-out is shown as a matter of convenience and not as a specification. Some bevel is desirable, however, to reduce the possibility of catching or snagging the edge of the notch in the internal mechanism of the cartridge.

2.2.4 The beveled cuts of 30 degrees minimum at the ends of the end-of-run notch are to facilitate the entry of the camera sensing finger and to reduce the possibility of catching or snagging the edge of the notch in the internal mechanism of the cartridge.

2.2.5 The inside and outside corners of the notches may have a radius of 0.3 mm (0.01 inch) maximum.

2.2.6 Dimension B for the end-of-run notch shown in Figure 2 is expressed as a maximum to ensure a minimum notch length. There is no functional need to specify a maximum notch length. The trailing edge of the notch, specified by Dimension B, may approach or cross Datum Line X so that the notch length could extend to the end of the film provided the notch depth, Dimension F, is maintained.

NOTE 1: A nominal pitch, based on 72 perforation pitches per foot, of 4.234 mm (0.1667 inch) is assumed for all comparisons of the number of perforation pitches in a given film length. This assumption is based on American National Standard Dimensions for 8 mm Motion-Picture Film, Perforated Super 8, IR-1667, PH22.149-1967.

NOTE 2: The sum of the minimum customer return length (3600 perforation pitches), leader (13 perforation pitches), and trailer (37 perforation pitches) is intentionally less than the minimum camera run length (3666 perforation pitches). The 16 perforation pitch difference represents a tolerance for the film processor in unloading the cartridge, making processing machine splices, and the like.

NOTE 3: In addition to this standard, there are available the following American National Standards relating to super 8 film Model I camera cartridges:

PH22.159.1-1968 (R1973), Specifications for Super 8 Motion-Picture Film Camera Cartridge and Cartridge-Camera Fit.

PH22.159.2-1968 (R1973), Specifications for Cartridge Aperture and Pressure Pad and Position of Film in the Super 8 Motion-Picture Film Camera Cartridge

PH22.159.3-1968, Specifications for Super 8 Motion-Picture Film Camera Cartridge Pressure Pad Flatness and Camera Aperture Profile

PH22.159.4-1968 (R1973), Dimensions and Characteristics of the Take-Up Core Drive for Super 8 Motion-Picture Film Camera Cartridges

PH22.166-1970, Specifications for Super 8 Motion-Picture Film Camera Cartridge Notches for Exposure Control and Stock Identification

Appendix

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

A1. The length of the leader and trailer is necessary to ensure that the fog produced near the aperture is removed. The material removed also provides space for identification numbers and allows for manufacturing variability of film length.

A2. The dimensional specifications of the end-of-run notch have been established to allow use of the cut-out designated by Dimensions M and N in the upper half of the cartridge pressure plate, as specified in American National Standard PH22.159.2-1968.

Draft American National Standard

Position, Dimensions and Reproducing Speed of Three 200-Mil Magnetic Sound Records on 35-mm and One Record on 17½-mm Motion-Picture Film

PH22.86

Revision of PH22.86-1962

1. Scope

This standard specifies the position, dimensions, reproducing speed and identity of the three nominal 200-mil (5.08-mm) magnetic sound records on 35-mm and one record on 17½-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.

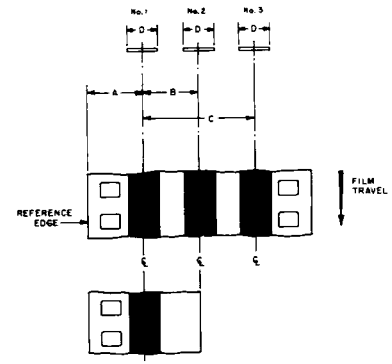
2.1.1 The records shall be referred to by number, as shown in the figure, with record No. 1 nearest the reference edge.

2.1.2 For recording on 17½-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° ± 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 feet [27 meters] per minute or 18 inches [46 centimeters] per second) which is 24 frames per second.

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 meter 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 inch (0.008 to 0.015 mm).

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 take into account 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, PH22.139-1974, and is slit in half if a 17½-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 RP 25-1968, Sound and Picture Synchronization on Motion-Picture Film Relative to the Universal Leader for Magnetic and Photographic Tracks.

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.

Draft American National Standard

Position, Dimensions and Reproducing Speed of 200-Mil Magnetic Sound Record on 16-mm Motion-Picture Film

PH22.97

Revision of PH22.97-1964

1. Scope

This standard specifies the position, dimensions and reproducing speed of the nominal 200-mil (5.08-mm) magnetic sound record on 16-mm motion-picture film.

2. Sound Record

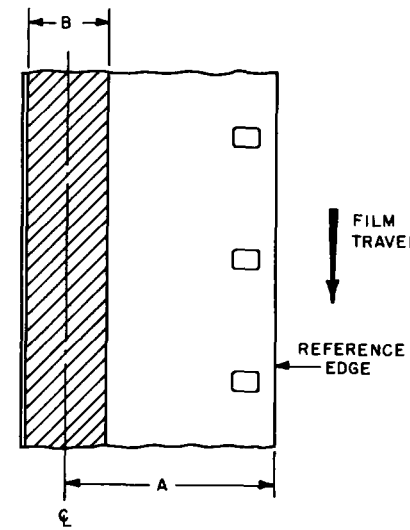
2.1 *The lateral location and width of the magnetic sound record* shall be as specified in the figure and table.

2.2 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.

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

3. Reproducing Speed

The recording shall be made so that the sound record will reproduce properly at 24 perforations per second (approximately 36 feet [11 meters] per minute or 7.2 inches [18.3 centimeters] per second) which is 24 frames per second.



Dimensions	Inches	Millimeters
A	0.525 ± 0.002	13.34 ± 0.05
B	0.200 ± 0.002	5.08 ± 0.05

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 meter 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 inch (0.008 to 0.015 mm).

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 take into account 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 16-mm Motion-Picture Film Perforated 1R, PH22.109-1974.

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 RP 25-1968, Sound and Picture Synchronization on Motion-Picture Film Relative to the Universal Leader for Magnetic and Photographic Tracks.

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.

Cinematography — Spools, daylight loading type for double-8 mm motion-picture cameras — Dimensions

1 SCOPE AND FIELD OF APPLICATION

1.1 This International Standard specifies the dimensions of daylight loading spools of nominal capacities 7,5 m (25 ft), 15 m (50 ft) and 30 m (100 ft) for double-8 mm Type R motion-picture film.

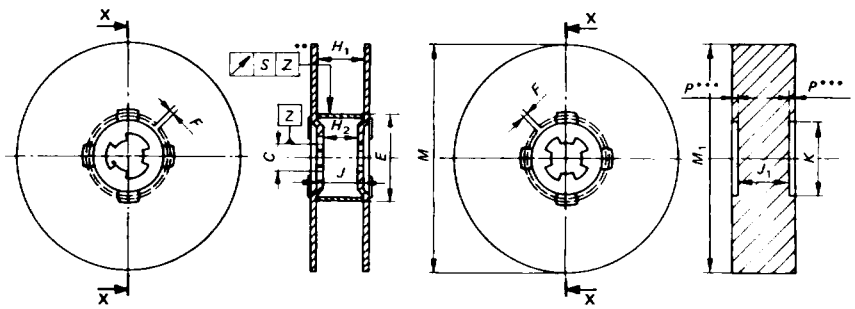
1.2 Spools for high-speed cameras generally should be more carefully balanced and are not necessarily covered by this International Standard.

2 REFERENCES

ISO 486, *Cinematography — 16 mm motion-picture film perforated 8 mm Type R — Cutting and perforating dimensions.*

ISO . . , *Cinematography — Spindles for 8 mm Type R motion-picture cameras and projectors — Dimensions.*[1)]

1) In preparation.



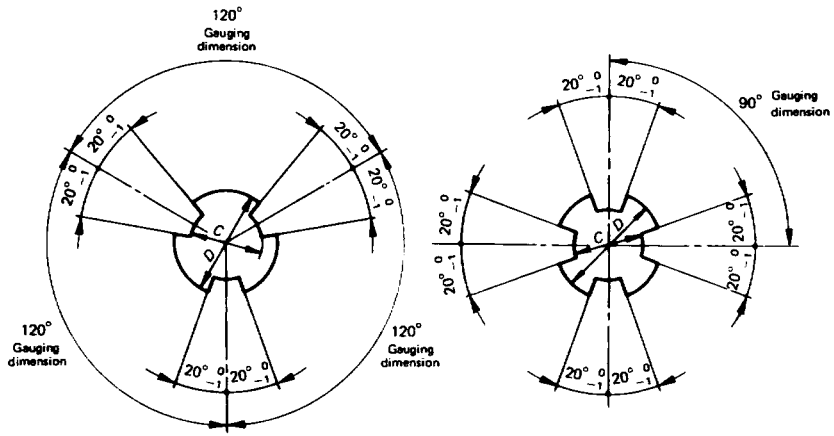


FIGURE – **Dimensions of daylight loading spools for double-8 mm motion-picture cameras**

* Flange I is provided on the side which engages the take-up spindle.

** See 3.7.

*** See 3.5 for an explanation of *P*.

TABLE – **Dimensions of double-8 mm nominal spool sizes**

Dimension	Nominal spool size	mm	in
C	7,5 m 15 m 30 m	7,30 $^{+0,20}_{0}$	0.287 $^{+0.008}_{0}$
D	7,5 m 15 m 30 m	9,8 $^{+0,2}_{0}$	0.38 $^{+0.01}_{0}$
E	7,5 m	19,0 ± 0,3	0.75 ± 0.01
	15 m 30 m	32,0 ± 0,5	1.26 ± 0.02
F	7,5 m 15 m 30 m	see 3.2	
H_1	7,5 m 15 m 30 m	16,05 $^{+0,35}_{0}$	0.632 $^{+0.014}_{0}$
H_2	7,5 m 15 m 30 m	16,00 min.	0.630 min.
J and J_1	7,5 m 15 m 30 m	18,5 $^{0}_{-0,4}$	0.73 $^{0}_{-0.02}$
K	7,5 m	15,6 min.	0.61 min.
	15 m 30 m	25,5 min.	1.00 min.
M and M_1	7,5 m	52,0 $^{0}_{-0,8}$	2.05 $^{0}_{-0.03}$
	15 m	71,5 $^{0}_{-1,0}$	2.81 $^{0}_{-0.04}$
	30 m	92,0 $^{0}_{-1,0}$	3.62 $^{0}_{-0.04}$
P (See 3.5)	7,5 m	0,40 max.	0.016 max.
	15 m 30 m	0,50 max.	0.020 max.
S	7,5 m	0,5	0.02
	15 m 30 m	0,8	0.03

3 DIMENSIONS AND CHARACTERISTICS

3.1 If rivet heads, or other fastening devices, extend beyond the outer surfaces of the flanges, they shall lie at a diameter larger than the minimum *K* diameter and shall be within the boundaries defined by other portions of the volume of rotation diagram.

3.2 Dimension *F* represents a slot in the spool core for attaching the film. Its design and dimensions are critical if a spool is to operate satisfactorily, both in self-threading cameras and cassette-loaded cameras. In self-threading cameras the film shall, without fail, seek out and easily slide into the slot, but for cassette-loaded cameras the slot shall resist extraction of the film by action of the clock-spring at the end of the first camera exposure run.

Starting at a point adjacent to the four-splined flange and running at least one-half the core width, the slot shall be designed to meet manual-threading, self-threading, and cassette-loading requirements. Slot sides may diverge over the remaining one-half of the core width. One way of accomplishing this is to design the slot in the form of a weaving channel with an effective separation of 0,15 to 0,25 mm (0.006 to 0.010 in) between the teeth on one side of the slot and the teeth on the other side of the slot as measured with a wide, stiff blade-gauge which shall slip easily into this zone.

3.3 Dimension H_2 is the space between the flanges inside the core, but outside the *D* diameter zone.

3.4 Dimensions *J* and J_1 represent the thickness and effective thickness respectively of the spool within the *K* diameter area which is centred on the spindle hole axis of each flange.

3.5 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 15,0 mm (0.59 in) diameter support which is in contact with the flange and centred on the spindle hole axis of the flange.

The dimension *P* is the distance measured outwardly from this reference plane[1] of rotation to the farthest plane of rotation described by any point on the flange outside the *K* diameter area when the spool is rotated on an accurate, tight-fitting spindle. This includes rivets or other fastening devices, variations in flange thickness, flatness, and lateral runout of the flanges.

Selection of a dimension *P* value is dependent upon the thickness of the material used for the flanges. According to the flange material thickness :

a) the *K* diameter area may be depressed (with *P* greater than zero), or

b) the outside surfaces of the flanges may be flat from spindle hole area to periphery (with *P* equal to zero), or

c) in the case of flanges made of very thin material, the *K* diameter area may be raised rather than recessed (effectively, *P* less than zero).

3.6 The maximum effective thickness of spools (including all the characteristics mentioned in 3.5) outside the *K* diameter area has not been stated because it is a function of a spool's specific J_1 value between the 15,0 mm (0.59 in) diameter reference zones on each flange. The largest overall effective thickness, however, will be J_1 max. + 2 X *P* max. = 19,5 mm (0.77 in).

1) The reference plane from which *P* is measured is not necessarily coincident with all points within the *K* diameter area but only needs to be coincident with those which are in contact with the reference support which has a diameter smaller than *K*.

3.7 The eccentricity of the core with respect to the spindle hole axis, Z, shall not exceed a *total* radius variation (total indicator reading) of

0,5 mm (0.2 in) for a 7,5 m spool,

0,8 mm (0.3 in) for a 15 m spool,

0,8 mm (0.3 in) for a 30 m spool.

3.8 When a thin flange material is used for flanges, annexes B and C shall be taken into account.

3.9 Flanges shall be opaque and their surfaces shall have low reflectance characteristics.

NOTE – When the loaded camera is viewed from the side, with the lens to the left, and the bottom of the housing downward (regardless of whether or not the spool loading mechanism is visible from that side), both the supply and take-up spools rotate in a clockwise direction.

4 MARKING

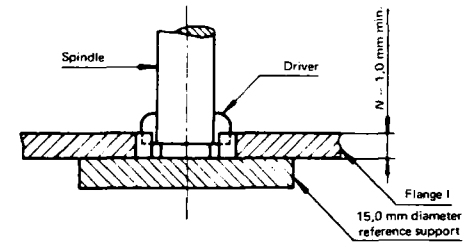
To facilitate distinguishing between a roll of film which has been exposed along the first side (one-half width) only and one which has not been exposed at all or has been exposed along both the first and second sides (both one-half widths), the flanges of spools shall be marked prominently as follows :

Film manufacturers' raw stock spools		Camera accessory spools	
	Numeral	Numeral and/or phrase	
Flange with 4-splined spindle hole	1	2	No phrase (or numeral) necessary if phrase shown below is included on other flange
Flange with 3-splined spindle hole	2	1	Phrase as follows or equivalent : "Film when on this spool is half exposed".

Attention is called to the fact that if a camera accessory spool wound with the first exposure run of film is removed from the camera, identification of the film exposure status is more obvious if the spool has been marked with a phrase instead of (or in addition to) numerals. Some camera accessory spools have identical 4-spline holes in each flange. (Supply spindles of such cameras have one small lug or none at all.) Both flanges of such accessory spools shall be marked with the phrase above; to ensure proper orientation for the second exposure in this case, in addition to the phrase, it is helpful to have the numeral 1 on one flange and the numeral 2 on the other.

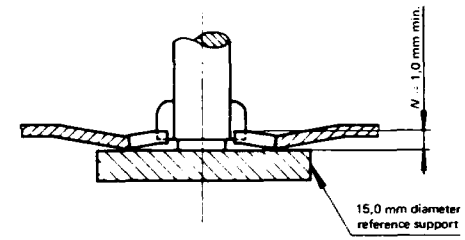
ANNEX A

Some cameras have spindle drive lugs which do not extend to the base of the spindle. For this reason, it is recommended that a minimum distance, *N*, of 1,0 mm (0.04 in) be maintained between the inside surface of each spline (at least in flange I) and the surface of the same 15,0 mm (0.59 in) diameter reference support described in 3.5.



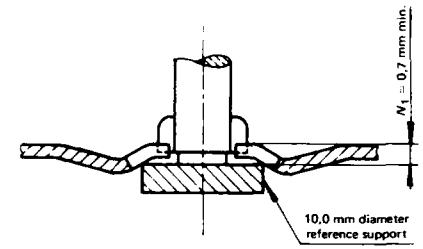
ANNEX B

If very thin flange materials are used for spools, *N* and *J* might be maintained by embossing somewhat as illustrated below :



ANNEX C

Some cameras have spool support washers as small as 10,0 mm in diameter. Such small washers are not recommended for future construction, since they lie almost entirely within the *D* diameter zone and provide too little support. This is especially serious if the camera also has short spindle drive lugs (explained in annex A) and is used with a spool embossed as explained in annex B. To protect such old cameras, it is recommended that embossed spools observe, in addition to *N*, a minimum dimension N_1 of 0,7 mm (0.03 in) measured in the same manner as *N* but to a reference support 10,0 mm in diameter.



Cinematography — Screen luminance for review room projection of motion-picture film intended for indoor theatres

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the luminance and the distribution of luminance of screens in review rooms intended for viewing motion-picture prints for projection in indoor theatres.

2 REFERENCES

ISO 2910, *Cinematography — Screen luminance for projection of films in indoor theatres.*

ISO . . . , *Cinematography — Stray light in motion-picture theatres and review rooms.* [1]

3 MEASUREMENT OF LUMINANCE

3.1 The luminances specified are measured with the projector operating at normal projection speed without film in the gate.

3.2 The screen luminance shall be measured with a photometer having an acceptance angle not greater than 2° (recommended value 1,5°) and having the spectral sensitivity of a Standard Observer agreed to by the International Commission on Illumination in 1924 and adopted in 1933 by the International Committee of Weights and Measures.

3.3 The measurements shall be taken with the photometer located at approximately 1 m (39 in) above the floor, at a distance from the screen equal to the width of the screen and on the centre line of the viewing area.

4 LUMINANCE LEVEL

The luminance measured at the centre of the screen measured from the centre of the viewing area (see 3.3) shall be $40 \begin{smallmatrix}+25\\0\end{smallmatrix}$ cd/m²,*

It is recommended that projectors in the same review rooms be balanced with regard to spectral and photometric characteristics.

NOTE – Due to the difference in print densities, the range of luminance level used in certain countries is 40 to 50 cd/m², and in other countries is 48 to 65 cd/m². In the international exchange of release prints, the prevailing range of screen luminance in certain countries should be noted.

5 LUMINANCE DISTRIBUTION

The luminance measured on the horizontal centre line of the screen at a distance from the screen edges equal to 5 % of the width of the screen shall be equal and at least 60 % of that at the centre, and not more than 85 %, the recommended value being 75 %.

NOTE – **Spectral characteristic** : To view 35 mm and 70 mm colour films, it is recommended that xenon lamps or high intensity carbon arc light sources be used. Filters imitating the spectral characteristics and having the same equivalent colour temperature are permitted when incandescent lamps or other types of light sources are used.

1) In preparation.

* The name nit has been used for this unit.

Cinematography — Screen luminance for the projection of motion-picture films in indoor theatres

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the luminance and the distribution of luminance of screens for viewing projected motion-picture films in indoor theatres. It is not the intent of this International Standard to include the projection of 8 mm (Type S or Type R) motion-picture prints in indoor theatres.

2 REFERENCES

ISO 2895, *Cinematography — Screen luminance for review room projection of motion-picture films intended for indoor theatres.* [1]

ISO . . . , *Cinematography — Stray light in motion-picture theatres and review rooms.* [2]

3 MEASUREMENT OF LUMINANCE

3.1 The luminances specified are measured with the projector operating at normal projection speed without film in the gate.

3.2 The screen luminance shall be measured with a photometer having an acceptance angle not greater than 2° (recommended value 1,5°) and having the spectral sensitivity of a Standard Observer agreed to by the International Commission on Illumination in 1924 and adopted in 1933 by the International Committee of Weights and Measures.

3.3 The measurements shall be taken with the photometer located at approximately 1 m above the floor at two points on a transverse line across the theatre at a position two-thirds of the distance from the screen to the back row of seats (measured from the screen), and at a distance of one-half the screen width to each side of the longitudinal axis of the theatre.

4 LUMINANCE LEVEL

The luminance measured at the centre of the screen (see 3.3) shall be $40 \begin{smallmatrix}+25\\-10\end{smallmatrix}$ cd/m²* ($11.7 \begin{smallmatrix}+7.3\\-2.9\end{smallmatrix}$ ftL).

It is recommended that projectors in the same theatre be balanced with regard to spectral and photometric characteristics.

NOTES

1 In the case of 16 mm film, the luminance of the screen may be reduced to a minimum of 25 cd/m² (7.3 ftL).

2 In the case of 70 mm film, the luminance of the screen may be increased to a maximum of 100 cd/m² (29.2 ftL).

5 LUMINANCE DISTRIBUTION

The luminance measured on the horizontal centre line of the screen at a distance from the screen edges equal to 10 % of the width of the screen, when measured from the two points specified in 3.3, shall be at least 50 % and not more than 85 % of the luminance measured at the centre, the recommended value being 70 %.

1) At present at the stage of draft.

2) In preparation.

* The name nit has been used for this unit.