

developing machines, our prototype system has also been used successfully to indicate the speed of numerous other types of laboratory equipment. For general purposes, we have found it convenient to utilize chopper discs scored in the ratio of 48 slots/ft of film. These discs, when attached with pressure-sensitive adhesive to a rotating component of corresponding diameter or number of

sprocket teeth, provide a convenient and accurate means of checking the speed of the film without physically altering the equipment or introducing any added drag. In fact, where a strictly short-term study is required, chalk marks or stripes of white paint on the rotating member suffice to provide the proper signal. The addition of range switching and an ampli-

fied photoreflexive sensing pickup extends the speed range to 500,000 events/min. Both battery- and line-operated sensing systems can be purchased from the manufacturer.

The authors wish to gratefully acknowledge the help and creative ingenuity of the members of the shop and the engineering staffs.

standards and recommended practices

Approved American National Standards

The American National Standards Institute recently approved five American National Standards which are published here for your information. On September 11, 1969, approval was received on the revision of PH22.75, Designation of A and B Windings for Motion-Picture Raw Stock. The earlier issue covered only 16mm films; it has now been expanded to include all widths of nonsymmetrically perforated raw stock. The following revisions were approved on October 9, 1969: PH22.41, Dimensions of Photographic Sound Record on 16mm Motion-Picture Prints, is essentially an editorial redraft of the earlier issue, differing only in format and style to facilitate its use. PH22.65, Specifications for Scanning-Beam Uniformity Test Film for 35mm Motion-Picture Sound Reproducers, is essentially an editorial redraft of the earlier issue which describes a test film distributed by the Society. It should be noted that the width of the test section of the sound record has been reduced from 0.007 to 0.004 in maximum. On December 3, 1969, two additional revisions were approved. PH22.99, Specifications for 35mm Three-Record Azimuth Alignment Test Film, Magnetic Type and PH22.114, Specifications for 16mm Azimuth Alignment Test Film, Perforated One Edge, Magnetic Type, are both reaffirmations of the technical content of the previous issues but have been editorially modified to facilitate their use.

American National Standards Reaffirmed

On December 3, 1969, the American National Standards Institute, taking the recommendation of the SMPTE Engineering Committees and the American National Standards Committee PH22, reaffirmed without change the Standards listed below.

The date in parentheses is that of most recent *Journal* publication.

- PH22.4-1965, Dimensions of 35mm Motion-Picture Projection Reels (Aug. 1965)
- PH22.7-1964, Dimensions of 16mm Motion-Picture Camera Aperture Image (July 1964)
- PH22.9-1965, Specifications for Camera Usage of 16mm Motion-Picture Film, Perforated Two Edges (Aug. 1965)

- PH22.15-1964, Specifications for Camera Usage of 16mm Motion-Picture Film, Perforated One Edge (Feb. 1965)
- PH22.19-1964, Dimensions of 8mm Motion-Picture Camera Aperture Image (July 1964)
- PH22.21-1964, Specifications for Camera Usage of Double-Width 8mm Motion-Picture Film, Perforated Two Edges (Dec. 1964)
- PH22.22-1964, Specifications for Projector Usage of 8mm Motion-Picture Film, Perforated One Edge (Dec. 1964)
- PH22.24-1965, Dimensions of Transverse Cemented Splices on 16mm and 8mm Motion-Picture Film, Projection Type (Dec. 1965)
- PH22.27-1960, Method of Determining Transmission Density of Motion-Picture Films (Mar. 1948)
- PH22.48-1965, Location of Printed Areas in 16mm Picture and Sound Contact Printing (May 1965)
- PH22.74-1965, Specifications for Indicating the Zero Point for Focusing Scales on 16mm and 8mm Motion-Picture Cameras (May 1965)
- PH22.77-1965, Dimensions of Transverse Cemented Splices on 16mm and 8mm Motion-Picture Film, Laboratory Type (Dec. 1965)
- PH22.84-1964, Dimensions of Projection Lamps Double-Contact Medium Ring Base-Up Type (July 1964)
- PH22.85-1964, Dimensions of Projection Lamps Single-Contact Medium Prefocus Base-Down Type (July 1964)
- PH22.90-1964, Method for Determining Aperture Calibration of Motion-Picture Lenses (June 1964)
- PH22.107-1964, Dimensions of 8mm Motion-Picture Camera Spools (25-ft Capacity) (June 1964)
- PH22.111-1965, Dimensions of Exposed Areas for Picture and Photographic Sound on 35mm Motion-Picture Prints Made on Continuous Contact Printers (Dec. 1965)
- PH22.143-1965, Specifications for Length of Film on 8mm Motion-Picture Camera Spool (25-ft Capacity) (May 1965)
- PH22.144-1965, Dimensions and Optical Specifications of Test Slides and Transparencies for Television (May 1965)

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

American National Standard

designation of a and b windings for motion-picture raw stock

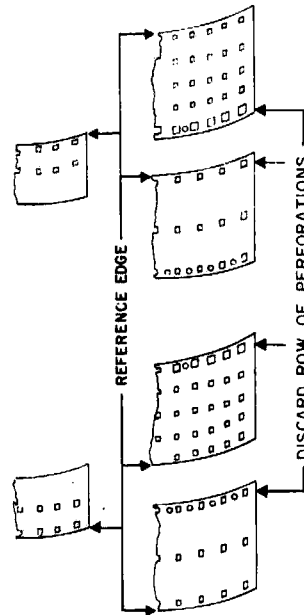
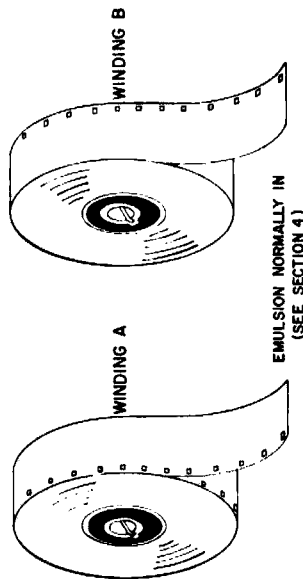
Approved September 11, 1969

Sponsor: Society of Motion Picture and Television Engineers, Inc.

Page 1 of 2 pages

1. Scope

This standard specifies a method for designating the type of winding for rolls of single-row perforated and multiple-row, nonsymmetrically perforated motion-picture raw stock films in terms of the position of the perforations. A method for designating the photographic emulsion orientation is also specified.



CAUTION NOTICE: The American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five (5) years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.

Copyright © 1969 by American National Standards Institute, 1430 Broadway, New York, N.Y. 10018

2. Reference Edge of Film

2.1 For single-row perforated raw stock, the reference edge shall be that edge closest to the perforations.

2.2 For multiple-row, nonsymmetrically perforated raw stock, the reference edge shall be that edge closest to a row of perforations which may be retained if the film is subsequently slit into narrower widths.

3. Winding Designation

The winding of the film shall be designated A or B. When a roll of motion-picture raw stock is held so that the roll of film is above and away from the observer and the film end unwinds from the side of the roll which is toward the observer and down, Winding A shall have the reference edge of the film along the left side; Winding B shall have the reference edge of the film along the right side. No preference for either type of winding is implied, since both types are required

Appendix

(The Appendix is not a part of this American National Standard, but is included to facilitate its use.)

Some 16mm films are supplied on spools with a square hole in one flange and a round hole in the other. Since the flange orientation is important to a customer when

for use on existing equipment. The film may be wound on cores for darkroom loading or on spools for daylight loading.

4. Emulsion Orientation Designation

If the emulsion side of the film is in, it shall face toward the center of the wound roll and the prefix letters EI preceding the winding designation of A or B is optional. If the emulsion side of the film is out, it shall face away from the center of the wound roll and the winding designation of A or B will be preceded by the letters EO and written as EOA or EOB.

NOTE: Many 35mm multiple-row, nonsymmetrically perforated films contain a discard row of perforations usually having some form of visible identification. It has been the practice to identify the winding orientation by this visible identification, such as L or R. Temporarily, some manufacturers may wish to supplement the new A and B film identification with L (which is now B) or R (which is now A).

requesting A or B winding for his product, it may be desirable for a manufacturer to identify the flange orientation when spools with dissimilar holes are used.

American National Standard

specifications for 35mm three-record azimuth alignment test film, magnetic type

Approved December 3, 1969

Sponsor: Society of Motion Picture and Television Engineers, Inc.

Page 1 of 2 pages

1. Scope

This standard specifies a test film having three magnetic sound records to be used for aligning the azimuth of magnetic heads on 35mm magnetic recording and reproducing equipment where the head width is not greater than 0.200 in.

2. Test Film

2.1 The test film shall have an original recording having a wave shape that is approximately sinusoidal. The frequency of the sound record shall be approximately 8 kHz when the film travel rate is 96 perforations per second (approximately 90 ft per minute).

2.2 The sound record shall be recorded at 90° with reference to the edge of the film within ± 3 minutes of arc.

2.3 The recorded level at 8 kHz shall be that level which results from an input current to the magnetic head which is 1 dB below the 400-Hz current input which would give a total harmonic distortion of 2½ percent when that 400-Hz tone is reproduced.

2.4 The recorded signal uniformity, when reproduced on high-quality equipment and measured with a vu meter, shall be held to a tolerance of ± 0.5 dB. Exception may be made for occasional rapid level fluctuations such as may be caused by "drop-outs."

2.5 The location and dimensions of the sound records shall be in accordance with American National Standard Dimensions for 200-Mil Magnetic Sound Records on 35mm and 17-1/2mm Motion-Picture Film, PH22.86-1962 (Reaffirmed 1969).

2.6 The coated side and direction of travel shall be as specified in ANSI PH22.86-1962, and the base shall be coated from one row of perforations to the other row, or from edge to edge.

2.7 The recorded signal in each of the three records shall be in exact in-phase relationship to the other two. (See Appendix.)

3. Film Stock

The film stock used shall be of the low-shrinkage, safety type, cut and perforated in accordance with American National Standard Dimensions for 35mm Motion-Picture Film, KS-1870, PH22.36-1964 (Reaffirmed 1969).

4. Film Length

The film shall be supplied in 50-ft lengths or multiples thereof, stocked and furnished on cores not less than 2 in. in diameter.

5. Identification

The film shall have identification markings at both ends.

NOTE: A test film conforming to this standard is available from the Society of Motion Picture and Television Engineers.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five (5) years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.



Copyright © 1969 by American National Standards Institute 1430 Broadway, New York, N.Y. 10018

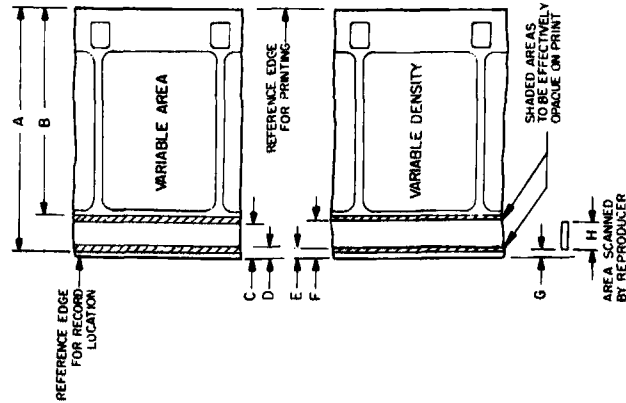
American National Standard

dimensions of photographic sound record on 16mm motion-picture prints

Approved October 9, 1969

Sponsor: Society of Motion Picture and Television Engineers, Inc.

Page 1 of 2 pages



1. Scope

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

1.2 This standard also specifies the area scanned in the sound reproducer.

2. Dimensions

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

3. Picture-Sound Separation

The sound record on the film shall be displaced from the center of the corresponding picture by a distance of 26 frames $\pm 1/2$ 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 American National Standard Specifications for Projector Usage of 16mm Motion-Picture Film Perforated One Edge, PH22.16-1965 (Reaffirmed 1969).

NOTE 2: Motion-picture prints described in this standard are printed in accordance with American National Standard Location of Printed Areas in 16mm Picture and Sound Contract Printing, PH22.48-1965 (Reaffirmed 1969).

| Dimensions | Inches | Millimeters |
|------------|-------------------|-----------------|
| A | 0.610 nom | 15.49 nom |
| B | 0.513 nom | 13.03 nom |
| C | 0.088 \pm 0.002 | 2.24 \pm 0.05 |
| D | 0.028 \pm 0.002 | 0.71 \pm 0.05 |
| E | 0.018 \pm 0.002 | 0.46 \pm 0.05 |
| F | 0.098 \pm 0.002 | 2.49 \pm 0.05 |
| G | 0.023 \pm 0.001 | 0.58 \pm 0.03 |
| H | 0.071 nom | 1.80 nom |

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five (5) years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.



Copyright © 1969 by American National Standards Institute 1430 Broadway, New York, N.Y. 10018

American National Standard

specifications for 16mm azimuth alignment test film, perforated one edge, magnetic type

Approved December 3, 1969

Sponsor: Society of Motion Picture and Television Engineers, Inc.

1. Scope

This standard specifies a test film having a magnetic sound record to be used for aligning the azimuth of magnetic heads on 16mm magnetic recording and reproducing equipment.

2. Test Film

2.1 The test film shall have an original recording having a wave shape that is approximately sinusoidal. The frequency of the sound record shall be approximately 7 kHz when the film travel rate is 24 perforations per second (approximately 36 ft per minute).

2.2 The sound record shall be recorded at 90° with reference to the edge of the film within ± 3 minutes of arc.

2.3 The recorded level at 7 kHz shall be that level which results from an input current to the magnetic head which is equal to 1 kHz current input which would give a total harmonic distortion of 3 percent when that 1 kHz tone is reproduced.

2.4 The recorded signal uniformity, when reproduced on high-quality equipment and measured with a vu meter, shall be held to a tolerance of ± 0.5 dB. Exception may be made for occasional rapid level fluctuations such as may be caused by "drop-outs."

2.5 The location and dimensions of the sound record shall be in accordance with American National Standard Dimensions for 200-Mil Magnetic Sound Record on 16mm Film Base, Perforated 1R-3000, PH22.97-1964 (Reaffirmed 1969).

2.6 The coated side and direction of travel shall be as specified in ANSI PH22.97-1964, and the base shall be coated from edge to edge.

3. Film Stock

The film stock used shall be of the low-shrinkage, safety type, cut and perforated in accordance with American National Standard Dimensions for 16mm Motion-Picture Film, 1R-3000, PH22.12-1964 (Reaffirmed 1969).

4. Film Length

The film shall be supplied in 100-ft lengths, stocked and furnished on cores not less than 2 in. in diameter.

5. Identification

The film shall have identification markings at both ends.

NOTE: A test film conforming to this standard is available from the Society of Motion Picture and Television Engineers.

NOTE 3: 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 to the film edge on the other.

Appendix

(The Appendix is not a part of this American National Standard, but is included to facilitate its use.)

A1. As a working procedure, the accuracy of picture-sound separation 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 of distance from loudspeaker to audience.

A2. Dimensions C and D which determine the record width are based on present-day equipment design. It is recommended that all future equipment be designed for a record width of 0.060 ± 0.001 in. and that existing equipment be modified to produce prints having Dimension C minus D as close as practicable to 0.060 ± 0.001 in.

Appendix

(The Appendix is not a part of this American National Standard, but is included to facilitate its use.)

In-phase relationship of the sound records as printed by a multiple-head recorder can be assured if the individual coils of the recording head are similar and are assembled in a similar manner.

This relationship is accomplished by connecting the winding in series so that the end of each coil is connected

to the beginning of the next coil maintaining a consistent direction of winding.

The relationship is also accomplished in a parallel-type connection if the corresponding beginning leads are connected together and the corresponding ending leads are connected together and the direction of winding of each coil is kept consistent with other coils.

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five (5) years from the date of publication. For more information, contact the American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.



Copyright © 1969 by American National Standards Institute 1430 Broadway, New York, N.Y. 10018

American National Standard

specifications for scanning-beam uniformity test film for 35mm motion-picture sound reproducers

Approved October 9, 1969

Sponsor: Society of Motion Picture and Television Engineers, Inc.

Page 1 of 2 pages

1. Scope

This standard describes a film that may be used for determining the uniformity of scanning-beam illumination in 35mm motion-picture sound reproducers.

2. Test Film

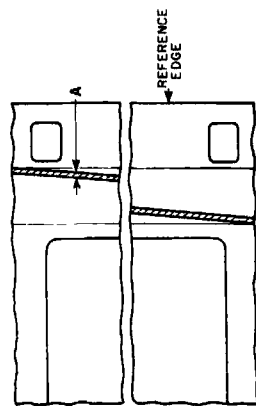
2.1 Type. The test film shall be a print from an original negative.

2.2 Dimensions. The dimensions and location of the sound record shall be as specified in the figure and table. In any one test film, the width of the sound track shall not vary more than 5 percent of the average sound record width.

2.3 Position. The track shall move uniformly 0.081 in. from one edge of the scanned area to the other, as shown in the figure. The recording method shall be such as to expose only the indicated track area within the reproducer scanning width.

2.4 Recording. The sound record shall be a square-wave recording having pulse rise-and-fall times of less than 30 microseconds. At a film velocity of 18 in./s, the pulse-repetition rate shall be 1,000 pulses per second ± 20 pps.

2.5 Density. The exposed areas of the film shall have a minimum diffuse density of 2.0 above base density measured in an area of normal sound record width (60 mils) of half-track exposed for the purpose outside the snake track



| Dimension | Inch | Millimeter |
|-----------|-----------|------------|
| A | 0.002 min | 0.05 min |
| | 0.004 max | 0.10 max |

region. Variations from average shall not exceed 0.1. The unexposed areas shall have a maximum density of 0.10 above base density with variations from average of not more than 0.015.

2.6 Location. The sound record location shall comply with American National Standard Dimensions of Photographic Sound Record on 35mm Motion-Picture Prints, PH22.40-1967, and the film used shall be cut and perforated in accordance with American National Standard Dimensions for 35mm Motion-Picture Film, KS-1870, PH22.36-1964 (Reaffirmed 1969).

2.7 Length. The length of this film shall be approximately 8 ft.

NOTE A test film conforming to this standard is available from the Society of Motion Picture and Television Engineers.

Appendix

(The Appendix is not a part of this American National Standard, but is included to facilitate its use.)

Before the test film described in this document is used, it is recommended that correct placement of the scanning beam be determined by means of a buzz-track test film, as specified in American National Standard Specifications for Buzz-Track Test Film for 35mm Motion-Picture Sound Reproducers, Photographic Type, PH22.68-1962 (Reaffirmed 1969).

The uniformity of scanning-beam illumination may be measured by means of a decibel meter connected to the output of the sound projector amplifier. The illumination

of the scanning beam should be adjusted according to the instructions furnished by the manufacturer and the variation of the output as registered on the decibel meter should be observed. The illumination is considered satisfactorily uniform when the output reading, as measured by the meter, is within $\pm 1\frac{1}{2}$ dB across the entire scanning slit. The test film made in accordance with this standard is not intended for positioning of the scanning beam. A change in pulse-repetition rate is usually heard as the test film sound record reaches either end of the scanning beam.

CAUTION NOTICE This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five (5) years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 1430 Broadway, New York, N. Y. 10018.



Copyright © 1969 by American National Standards Institute 1430 Broadway, New York, N. Y. 10018