standards and recommended practices

PROPOSED SMPTE RECOMMENDED PRACTICE RP 11

Tape Vacuum Guide Radius and Position for Recording Standard Video Records on 2-In. Magnetic Tape

Published here for a three-month period of trial and comment is Proposed SMPTE Recommended Practice RP 11, Tape Vacuum Guide Radius and Position for Recording Standard Video Records on 2-in. Magnetic Tape.

The proposal, initiated by the Society's Video Tape Recording Committee, was approved by that committee and the Standards Committee. Comments should be sent to Alex E. Alden, Staff Engineer, prior to January 15, 1962. If no adverse comments are received, the proposal will be submitted to the Board of Governors for approval.—AEA

1. *Scope*

This recommended practice specifies the tape vacuum guide radius and position for recording standard video records on 2-in. magnetic tape.

2. *Mechanical Dimensions*

2.1 The radius of the tape vacuum guide shall be 1.0334, +0.0000, −0.0005 in. (26.248, +0.000, −0.013mm).

2.2 The position of the vacuum guide shall be set so that the eccentricity of its center of curvature with respect to the axis of rotation of the video heads is as indicated in the table. The eccentricity shall be such that the extension of a line joining the center of curvature of the vacuum guide and the axis of rotation of the heads intersects the tape at the midpoint of its width. The center of curvature of the vacuum guide shall lie between the axis of rotation of the heads and the vacuum guide.

Vacuum Guide Radius		Eccentricity	
Inches	Millimeters	Inches	Millimeters
1.0334	26.248	0.0000	0.000
1.0333	26.246	0.0001	0.003
1.0332	26.243	0.0002	0.005
1.0331	26.241	0.0003	0.008
1.0330	26.238	0.0004	0.010
1.0329	26.236	0.0005	0.013

Note: These dimensions are based on a nominal tape thickness of 0.0014 inch (0.0356mm) and a radius of rotation of the magnetic head pole tips of 1.0329 inch min. to 1.0356 inch max.

APPENDIX

The achievement of tape playback interchangeability requires, among other things, that means be provided to accommodate variations of (a) the radius of rotation of the magnetic head pole tips, (b) the radius of the vacuum guide and (c) tape thickness. These effects are compensated by the stretching of the tape into a slot cavity in the vacuum guide by virtue of the radius of rotation of the magnetic head pole tips projecting beyond the unstretched oxide surface of the tape as held in the vacuum guide. Over the limits normally encountered, the stretching provides automatic compensation if the vacuum guide is positioned to give the minimum geometric distortion in the reproduced picture.

Proposed American Standards

The proposals published here have been approved by the engineering and Standards Committees and are submitted for a three-month period of trial and comment:

PH22.128, 8mm Flutter Test Film, Magnetic Type, Perforated IR-1500
PH22.129, 8mm Azimuth Test Film, Magnetic Type, Perforated IR-1500
PH22.130, 8mm 400-Cycle Signal Level Test Film, Magnetic Type, Perforated IR-1500
PH22.131, 8mm Multifrequency Test Film, Magnetic Type, Perforated IR-1500

Keeping abreast of the rapid growth of 8mm sound, the Sound Committee, under the chairmanship of James L. Pettus and the cooperation of Ellis W. D'Arcy, has developed a series of 8mm sound standards. Four of these standards are published here describing the test films the Society is adding to its present test film program. These four test films are, in effect, duplicates of the 16mm test films that have proven to be of great value over the past years.

All comments should be addressed to Alex E. Alden, Staff Engineer, at Society Headquarters prior to January 15, 1962. If no adverse comments are received by that date, the proposals will be submitted to ASA Sectional Committee PH22 for further processing.—*AEA*

Proposed American Standard

8mm Flutter Test Film, Magnetic Type, Perforated 1R-1500

PH22.128

1. Scope

This standard specifies a 3000 cps magnetic sound test film for use in determining the presence of flutter in 8mm magnetic sound reproducers.

2. Test Film

2.1 The test film shall have an originally recorded 0.025-in. minimum width magnetic sound record, the location and dimensions of which shall be as specified in the diagram and table.

2.2 With the direction of film travel as shown in the diagram, the magnetic coating shall be on the upper face of the film.

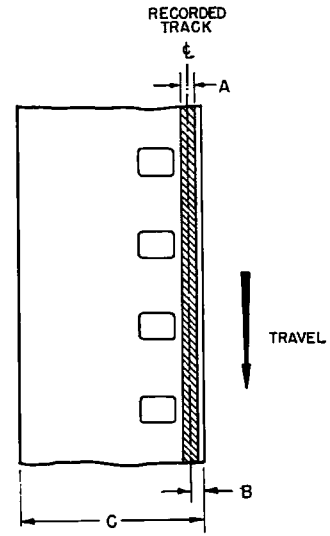
2.3 The recorded frequency shall be 3000 ± 25 cps with a film rate of 24 perforations per second (approximately 18 ft per minute).

2.4 The recorded level shall have an average intensity of 10 gauss with a tolerance of +0 −3 db.

2.5 The total rms flutter of the sound record shall not exceed 0.10 percent and the flutter amplitude, at any single flutter rate, shall not exceed 0.05 percent (as defined in American Standard Method for Determining Flutter Content of Sound Recorders and Reproducers, Z57.1-1954). (See Section 6.)

3. Film Stock

The film stock shall be of the low-shrinkage safety type, cut and perforated in accordance with American Standard Dimensions for 8mm Motion-Picture Film, PH22.17-1954. (See Section 6.)



4. Length of Film

The film shall be supplied in 100-ft lengths, stocked and furnished on spools with 2-in. hubs.

5. Identification

The film shall have identification markings at both ends.

Dimensions	Inches	Millimeters
A	0.025 min	0.64 min
B	0.015 ± 0.001	0.38 ± 0.03
C	0.314 nom	7.98 nom

6. Revision of American Standards Referred to in This Document

When the following American Standards referred to in this document are superseded by a revision approved by the American Standards Association, Incorporated, the revision shall apply:

American Standard Dimensions for 8mm Motion-Picture Film, PH22.17-1954;

American Standard Method for Determining Flutter Content of Sound Recorders and Reproducers, Z57.1-1954.

APPENDIX

(This Appendix is not a part of Proposed American Standard 8mm Flutter Test Film, Magnetic Type, Perforated 1R-1500, PH22.128, but is included to facilitate its use.)

It is recognized that there are certain desirable features in a test film of this kind that will simplify its use in measuring flutter. Because of the variety of flutter-measuring meters, one such feature is reasonable uniformity of the level of reproduction throughout the length of the test film. Therefore, it is recommended that the variations in the output level throughout the length of the test film, as measured by a VU-type meter, shall be less than ± 1 db. Short-term level variations, as for example those resulting from drop-outs, may cause some difficulty in the use of this film. Since these do not lend themselves to precise manufacturing specifications, maximum care should be exercised in the preparation of this film to minimize these variations.

Proposed American Standard

8mm Azimuth Test Film, Magnetic Type, Perforated 1R-1500

PH22.129

1. Scope

This standard specifies a test film having a magnetic sound record to be used for aligning the azimuth of magnetic heads on 8mm magnetic recording and reproducing equipment.

2. Test Film

2.1 The test film shall have an originally recorded 0.025-in. minimum-width magnetic sound record, the location and dimensions of which shall be as specified in the diagram and table.

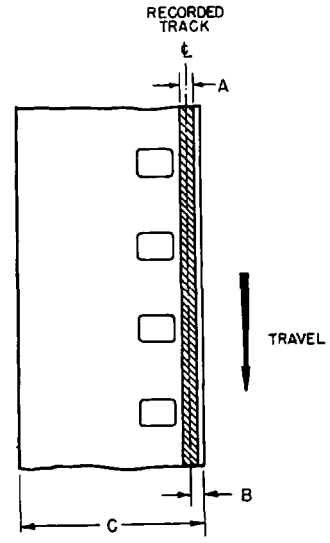
2.2 With the direction of film travel as shown in the diagram, the magnetic coating shall be on the upper face of the film.

2.3 The frequency of the sound record shall be approximately 7000 cps when the film travel rate is 24 perforations per second (approximately 18 ft per minute).

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

2.5 The recorded level shall have an average intensity of 10 gauss with a tolerance of +0 −3 db.

2.6 The recorded signal steadiness, when reproduced on high quality equipment and measured with a VU meter, shall be held to a tolerance of ± 0.5 db through any 100-ft length of film. Exception may be made for occasional rapid level fluctuations such as may be caused by "drop-outs."



3. Film Stock

The film stock used shall be of the low-shrinkage safety type, cut and perforated in accordance with American Standard Dimensions for 8mm Motion-Picture Film, PH-22.17-1954. (See Section 6.)

Dimensions	Inches	Millimeters
A	0.025 min	0.64 min
B	0.015 ± 0.001	0.38 ± 0.03
C	0.314 nom	7.98 nom

4. Length of Film

The film shall be supplied in 100-ft lengths, stocked and furnished on spools with 2-in. hubs.

5. Identification

The film shall have identification markings at both ends.

6. Revision of American Standard Referred to in This Document

When the following American Standard referred to in this document is superseded by a revision approved by the American Standards Association, Incorporated, the revision shall apply:

American Standard Dimensions for 8mm Motion-Picture Film, PH22.17-1954.

Proposed American Standard

8mm 400-Cycle Signal Level Test Film, Magnetic Type, Perforated 1R-1500

PH22.130

1. Scope

This standard specifies a 400-cycle signal level magnetic test film for use in controlling magnetic sound recording levels and standardizing methods of signal-to-noise measurements on 8mm magnetic sound systems.

2. Test Film

2.1 Dimensions of Sound Record. The test film shall have an originally recorded 0.025-in. minimum-width magnetic sound record, the location and dimensions of which shall be as specified in the diagram and table.

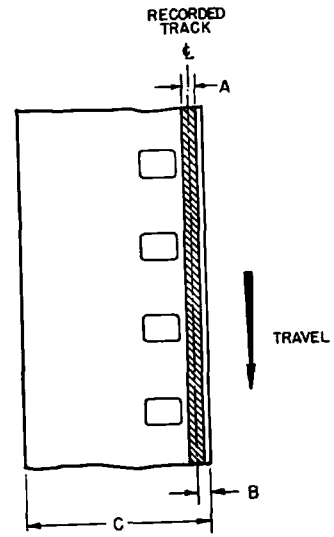
2.2 Magnetic Coating. With the direction of film travel as shown in the diagram, the magnetic coating shall be on the upper face of the film.

2.3 Test Frequency. The recorded frequency shall be 400 ± 4 cycles per second.

2.4 Mean Film Speed. In recording and reproducing, the film shall pass through the equipment at a rate of 24 perforations per second (approximately 18 ft per minute) with a mean film speed tolerance of ±0.5 percent.

2.5 Distortion. The total harmonic distortion of the recorded signal frequency shall not exceed 3.0 percent.

2.6 Signal Level Fluctuation. The level fluctuation of the test film shall be within ±1 db.



2.7 Permissible Flutter. The total flutter shall be within ±0.1 percent.

2.8 Recorded Signal Level. The magnetic record shall have a recorded intensity of 10 ± 0.5 gauss which is to be determined by the method of calibration specified in 6.1.

3. Film Stock

The film stock used for the test film shall be cut and perforated in accordance with American Standard Dimensions for 8mm Motion-Picture Film, PH22.17-1954. (See Section 7).

Dimensions	Inches	Millimeters
A	0.025 min	0.64 min
B	0.015 ± 0.001	0.38 ± 0.03
C	0.314 nom	7.98 nom

4. Length of Film

The film shall be supplied in 100-ft lengths, stocked and furnished on spools with 2-in. hubs.

5. Identification

Each test film shall be provided with a suitable leader, title and trailer, and shall be accompanied by a calibration of the level of the frequency recordings.

6. Calibration

6.1 The film shall be calibrated in accordance with the inductive loop method as described in the following reference:

Robert Schwartz, "Absolute measurement of signal strength on magnetic recordings: phase II," *Jour. SMPTE*, 66: 119–122, Mar. 1957.

6.2 Calibration Tolerance. The calibration shall be within ±½ db of the true signal level.

7. Revision of American Standard Referred to in This Document

When the following American Standard referred to in this document is superseded by a revision approved by the American Standards Association, Incorporated, the revision shall apply:

American Standard Dimensions for 8mm Motion-Picture Film, PH22.17-1954.

Proposed American Standard

8mm Multifrequency Test Film, Magnetic Type, Perforated 1R-1500

PH22.131

1. Scope

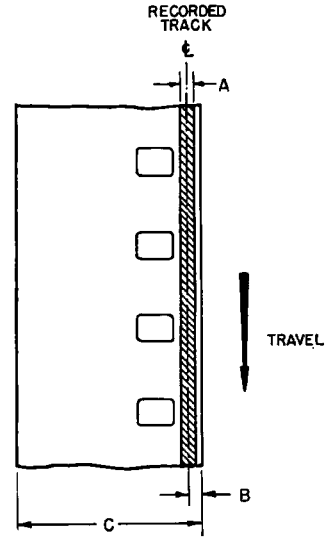
This standard specifies a multifrequency magnetic sound test film for use in standardizing the replay chain for 8mm magnetic sound film.

2. Test Film

2.1 Dimensions of Sound Record. The test film shall have an originally recorded 0.025-in. minimum-width magnetic sound record, the location and dimensions of which shall be as specified in the diagram and table.

2.2 Magnetic Coating. With the direction of film travel as shown in the diagram, the magnetic coating shall be on the upper face of the film.

2.3 Film Content. The film shall contain the following recorded frequencies:



Frequency, cycles	Tone Footage, feet	Signal Levels* db ref. 10 gauss	absolute level gauss	Frequency, cycles	Tone Footage, feet	Signal Levels db ref.. 10 gauss	absolute level gauss
7000**	15	+ 2.2		2000	3	0.15	
400	6	—10	3.16	3000	3	1.3	
50	3	—27.7		4000	3	1.7	
100	3	—21.7		5000	3	1.95	
200	3	—15.75		6000	3	2.1	
300	3	—12.3		7000	3	2.2	
500	3	— 8.1		400	6	—10	3.16
1000	3	— 3.15					

Dimensions	Inches	Millimeters
A	0.025 min	0.64 min
B	0.015 ± 0.001	0.38 ± 0.03
C	0.314 nom	7.98 nom

*The signal level tolerance shall be within ± 1.5 db.
**For azimuth adjustment.

2.4 Mean Film Speed. In recording and reproducing, the film shall pass through the equipment at a rate of 24 perforations per second (approximately 18 ft per minute) with a mean film speed tolerance of ±0.5 percent.

2.5 Frequency Tolerance. The recorded frequency signal shall not vary in excess of ±2 percent of the nominal frequency of each portion of the test track.

2.6 Reference Signal Level. The 400-cycle signal shall be −10 db absolute level (3.16 gauss) with reference to Proposed American Standard 8mm 400-Cycle Signal Level Test Film, Magnetic Type, Perforated IR-1500, PH22.130.

2.7 Permissible Flutter. The total RMS flutter shall be within ±0.1 percent as measured in accordance with American Standard Method for Determining Flutter Content of Sound Recorders and Reproducers, Z57.1-1954. (See Section 7.)

2.8 Distortion. The total harmonic distortion at any of the recorded frequencies below 3000 cycles shall not exceed 3.0 percent.

3. Film Stock

The film stock used for the test film shall be cut and perforated in accordance with American Standard Dimensions for 8mm Motion-Picture Film, PH22.17-1954. (See Section 7.)

4. Length of Film

The film shall be supplied in 100-ft lengths, stocked and furnished on spools with 2-in. hubs.

5. Identification

Each test film shall be provided with a suitable leader, title, and trailer.

6. Calibration

6.1 The film shall be calibrated in accordance with the short-gap method as described in the following references:

J. D. Bick, "Methods of measuring surface induction of magnetic tape," *J. Audio Eng. Soc., 1*: 4, Jan. 1953. Reprinted, *Jour. SMPTE, 60*: 516-525, Apr. (Pt. II) 1953;

E. D. Daniel and P. E. Axon, "The reproduction of signals recorded on magnetic tape," *Proc. IEE, Part III*: 157, May 1953;

Robert Schwartz, Sheldon I. Wilpon and Frank A. Comerci, "Absolute measurement of signal strength on magnetic recordings," *Jour. SMPTE, 64*: 1–5, Jan. 1955.

6.2 Film Calibration. Each test film frequency shall be measured with a calibrated head as described in 6.1. The readings so determined shall be supplied with the test film.

6.3 Calibration Tolerance. The Calibration shall be within ±½ db of the true signal level.

7. Revision of American Standards Referred to in This Document

When the following American Standards referred to in this document are superseded by a revision approved by the American Standards Association, Incorporated, the revision shall apply:

American Standard Dimensions for 8mm Motion-Picture Film, PH22.17-1954;

American Standard Method for Determining Flutter Content of Sound Recorders and Reproducers, Z57.1-1954.