

**SMPTE RECOMMENDED PRACTICE**

RP 62-1989

*Specifications for Flutter Test Film for  
8-mm Type S Audio Reproducers, Magnetic Type***1. Scope**

This practice specifies two test films for determining the presence of flutter in 8-mm type S motion-picture magnetic audio reproducers, one operating at approximately 20 ft (6.1 m) and another at approximately 15 ft (4.6 m) per minute.

**2. Test Film Signal****2.1 Frequency**

2.1.1 Type 24 Film. The audio record on type 24 film shall be an original recording which will reproduce at a frequency of 3150 Hz  $\pm$  25 Hz when the linear velocity of the film is 24 frames per second or approximately 20 ft (6.1 m) per minute (4 in or 102 mm per second).

2.1.2 Type 18 Film. The audio record on type 18 film shall be an original recording which will reproduce at a frequency of 3150 Hz  $\pm$  25 Hz when the linear velocity of the film is 18 frames per second or approximately 15 ft (4.6 m) per minute (3 in or 76 mm per second).

2.2 Distortion. The total harmonic distortion of the recorded signals shall not exceed 0.5 percent.

2.3 Audio Record. The location and dimensions of the audio record shall be in accordance with American National Standard for Motion Picture Film (8-mm Type S)—Magnetic Audio Record—Position, Dimensions and Reproducing Speed, ANSI/SMPTE 164-1988. The audio record may also be recorded so that it extends from one edge of the film to the other.

2.4 Recorded Level. The flutter test tone shall be not more than 10 dB down from the equivalent reference level of 3150 Hz at 185 nanowebers per meter after correct equalization of 90  $\mu$ s.

2.5 Flutter. The weighted peak flutter of the audio record shall not exceed 0.10 percent when measured in accordance with American National Standard Method for Measurement of Weighted Peak Flutter of Sound Recording and Reproducing Equipment, ANSI S4.3-1982.

2.6 Azimuth. The azimuth of the audio record shall be 90°  $\pm$  5° to the reference edge of the film.

**3. Film Stock**

3.1 The film stock shall be magnetic full-coat, splice-free, of the polyester, safety type in compliance with American National Standard for Motion-Picture Film—Safety Film, ANSI/SMPTE 223M-1985, and cut and perforated in accordance with American National Standard for Motion-Picture Film (8-mm Type S)—Perforated 1R, ANSI/SMPTE 149-1988.

3.2 The film stock shall be conditioned for 10 days at 20°C  $\pm$  3°C (68°F  $\pm$  5.4°F) at a relative humidity of 50  $\pm$  10 percent prior to recording.

3.3 The film shall be recorded and packaged within the temperature and humidity limits specified in 3.2. The recorded film shall be packaged in a metal can and sealed either with a low-moisture permeability plastic tape or a fabric tape having a moisture barrier.

**4. Identification**

Each test film shall be identified by a suitable identification marking.

**5. Calibration**

5.1 Flux. The short circuit flux shall be determined by means of the calibrated short-gap ferromagnetic core reproducer technique. This technique is described in American National Standard Method of Measuring Recorded Flux of Magnetic Sound Records at Medium Wavelengths, ANSI S4.6-1982.

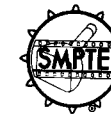
5.2 Level. The signal level specified in 2.4 shall be measured with an rms voltmeter calibrated in decibels with an accuracy of  $\pm$  0.1 dB over the bandwidth 31.5 Hz to 16 kHz.

5.3 Reproducing Head. The test film shall be calibrated on a reproducing head made in accordance with ANSI/SMPTE 164-1988.

NOTE: Test films made in accordance with this practice are available from the Society of Motion Picture and Television Engineers.

**SMPTE RECOMMENDED PRACTICE**

RP 70-1989

*Specifications for Flutter Test Film for  
16-mm Audio Reproducers, Photographic Type***1. Scope**

This practice specifies a test film for determining the presence of flutter in 16-mm motion-picture photographic audio reproducers operating at approximately 36 ft (11 m) per minute.

**2. Test Film Signal**

2.1 Frequency. The audio record shall reproduce at a frequency of 3150 Hz  $\pm$  25 Hz when the linear velocity of the film is 24 perforations per second or approximately 36 ft per minute (7.2 in or 18.3 cm per second).

2.2 Distortion. The total harmonic distortion of the recorded signals shall not exceed 0.5 percent.

2.3 Location and Dimensions. The location and dimensions of the recorded audio record shall be in accordance with American National Standard for Motion-Picture Film (16-mm)—Photographic Sound Records—Prints, ANSI/SMPTE 41-1989.

2.4 Recording. The test film shall have an originally-recorded, variable-area audio track. The geometrical modulation of this recording shall be 80  $\pm$  5 percent of the maximum nominal geometrical amplitude of 0.055 in (1.40 mm). This is equivalent to an rms nominal geometrical amplitude of 0.0440 in  $\pm$  0.0028 in (1.118 mm  $\pm$  0.071 mm).

2.5 Signal Fluctuation. The output level of the film shall be constant within  $\pm$  0.25 dB. This is equivalent to a peak-to-peak amplitude tolerance of approximately 2.9 percent of the 80-percent modulation or  $\pm$  0.0013 in (0.033 mm).

2.6 Density. The density of the dark portion of the audio track shall be between 1.2 and 1.4 and shall be uniform throughout the length of the film within a tolerance of  $\pm$  0.05. The combined base and fog density shall be 0.05  $\pm$  0.01. All densities shall be measured in conformity with American National Standard for Photography—Density Measurements—Geometric Conditions for Transmission Density, ANSI IT2.19-1989.

2.7 Flutter. The weighted peak flutter of the audio record shall not exceed  $\pm$  0.10 percent when meas-

ured in accordance with American National Standard Method for Measurement of Weighted Peak Flutter of Sound Recording and Reproducing Equipment, ANSI S4.3-1982.

2.8 Azimuth. The azimuth of the audio record shall be 90°  $\pm$  3° to the reference edge of the film.

**3. Film Stock**

3.1 The film stock, preferably polyester, shall be splice-free, of the low-shrinkage, safety type in compliance with American National Standard for Motion-Picture Film—Safety Film, ANSI/SMPTE 223M-1985, and cut and perforated in accordance with long-pitch dimensions specified in American National Standard for Motion-Picture Film (16-mm)—Perforated 1R, ANSI/SMPTE 109-1986.

3.2 In the event that triacetate film stock is used, it shall be splice-free and shall have a maximum lengthwise shrinkage of 0.50 percent when tested as follows: At least 20 strips of film approximately 31 inches in length shall be cut for measurement of shrinkage. After normal development and drying (not over 80°F [27°C]), the strips shall be placed at least 1/4 in apart in racks and kept for seven days in an oven maintained at 120°F (49°C) and a relative humidity of 20 percent. The strips shall then be removed, reconditioned thoroughly to 50 percent relative humidity at 70°F (21°C), and the shrinkage measured by a suitable method. The percent shrinkage shall then be calculated on the basis of deviation from the nominal dimension for the length of 100 consecutive perforation intervals given in ANSI/SMPTE 109-1986.

**4. Identification**

Each test film shall be identified by a suitable identification marking. The marking shall be printed lengthwise in the picture area and the spacing between consecutive titles shall be approximately 12 in (305 mm).

NOTE: A test film made in accordance with this practice is available from the Society of Motion Picture and Television Engineers.