

# SMPTE RECOMMENDED PRACTICE

**RP 78-2002**

Revision of RP 78-1997

## Specifications for Azimuth Test Film for 16-mm Audio Projectors, Magnetic Type



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### 1 Scope

This practice specifies a test film for use in aligning the azimuth of magnetic head gaps in 16-mm motion-picture audio projectors operating at approximately 36 ft (11 m) per minute.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

AES 6-1982, Method for Measurement of Weighted Peak Flutter of Sound Recording and Reproducing Equipment

AES 7-1982 (R1992), Method of Measuring Recorded Flux of Magnetic Sound Records at Medium Wavelengths

ANSI/SMPTE 109-1998, Motion-Picture Film (16-mm) — Perforated 1R

SMPTE 97-1999, Motion-Picture Film (16-mm) — 200-Mil Edge-Position Magnetic Audio Record

SMPTE 223M-2001, Motion-Picture Film — Safety Film

### 3 Test film signal

#### 3.1 Frequency

The audio record shall be an original recording which will reproduce at a frequency of  $7000 \text{ Hz} \pm 100 \text{ Hz}$  when the linear speed of the film is 24 perforations per second or approximately 36 ft per minute (7.2 in or 183 mm per second).

#### 3.2 Distortion

The total harmonic distortion of the recorded signals shall not exceed 0.5%.

#### 3.3 Audio record

The audio record shall be recorded so that it extends from the perforations on one side of the film to the opposite edge, or from one edge of the film to the other.

### **3.4 Recorded level**

The azimuth test tone shall not be more than 10 dB down from the equivalent reference level of 400 Hz at 185 nanowebers per meter after correct equalization of 70  $\mu$ s.

### **3.5 Flutter**

The weighted peak flutter of the audio record shall not exceed  $\pm 0.1\%$  when measured in accordance with AES 6.

### **3.6 Azimuth**

The azimuth of the audio record shall be  $90^\circ \pm 3'$  to the reference edge of the film.

## **4 Film stock**

**4.1** The film stock shall be full-coat, splice-free, and of the low-shrinkage, safety type in compliance with SMPTE 223M.

**4.2** Test films shall be made on a base cut and perforated in accordance with short-pitch dimensions specified in ANSI/SMPTE 109.

**4.3** The film stock shall be conditioned for 10 days at  $20^\circ\text{C} \pm 3^\circ\text{C}$  ( $68^\circ\text{F} \pm 5.4^\circ\text{F}$ ) at a relative humidity of  $(50 \pm 10)\%$  prior to recording.

**4.4** The film shall be recorded and packaged within the temperature and humidity limits specified in 4.3. 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.

## **5 Identification**

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

## **6 Calibration**

### **6.1 Flux**

The short circuit flux shall be determined by means of the calibrated short-gap ferromagnetic core reproducer technique. This technique is described in AES 7.

### **6.2 Level**

The signal level specified in 3.4 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.

### **6.3 Reproducing head**

The test film shall be calibrated on a reproducing head made in accordance with ANSI/SMPTE 97.

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