SMPTE RECOMMENDED PRACTICE

RP 77-2004
Revision of RP 77-1994

Specifications for Azimuth Test Film for 35-mm Studio Audio Reproducers, Magnetic Type

1 Scope

This practice specifies a test film for use in aligning the azimuth of magnetic head gaps in 35-mm motion-picture audio reproducers operating at 90 ft (27 m) per minute and designed for one-, three-, four-, and six-track audio systems.

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.

ANSI S4 .3-1982 (R1992), Method for Measurement of Weighted Peak Flutter of Sound Recording and Reproducing Equipment

ANSI S4. 6-1982 (R1992), Method of Measuring Recorded Flux of Magnetic Sound Records at Medium Wavelengths

ANSI/SMPTE 86-1996, Motion-Picture Film — Magnetic Audio Records — Two, Three, Four and Six Records on 35-mm and One Record on 17.5-mm Magnetic Film

SMPTE 139-2003, Motion-Picture Film (35-mm) — Perforated KS

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

IEC 60268-17 (1990-10), Sound System Equipment, Part 17, Standard Volume Indicators

3 Test film signal

3.1 Recorded frequency

The audio record on the film shall be an original recording which will reproduce at a frequency of 12.5 kHz ± 100 Hz when the linear velocity of the film is 96 perforations per second, which is approximately 90 ft (27 m) per minute (18 in [45.7 cm] per second).

3.2 Distortion

The total harmonic distortion of the recorded signals shall not exceed 1%.

Approved
November 8, 2004

3.3 Audio record

The location and dimensions of the audio record shall be in accordance with ANSI/SMPTE 86. The audio record may also be recorded so that it extends across the film nominally between the inner edges of the perforating rows.

3.4 Recorded level

The recorded signal as calibrated in 6.1 shall have a recorded level of 6.0 dB ± 1.5 dB below the reference level of a frequency of 1000 Hz having an rms short circuit flux per unit track width of 200 nanowebers per meter (0 dB). The signal level shall not fluctuate more than ± 0.5 dB within the test film length.

3.5 Flutter

The weighted peak flutter of the audio record shall not exceed ± 0.04% when measured in accordance with ANSI S4.3.

3.6 Azimuth

The azimuth of the audio record shall be 90° ± 1' to the reference edge of the film.

3.7 Signal phase

The recorded signal across the recorded width shall be in an in-phase relationship. A recording made as described in annex A is considered to be in phase.

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 The difference in compliance between triacetate and polyester bases will establish different head wear patterns. A change from one base to the other may cause a temporary loss of high-frequency response until a new wear pattern is established. Therefore, it is recommended that users employ test films having the same film base as used in production recording for any given recorder/reproducer.

4.2.1 Test films made on triacetate base shall be cut and perforated in accordance with long-pitch dimensions specified in SMPTE 139.

4.2.2 Test films made on polyester base shall be perforated in accordance with short-pitch dimensions specified in SMPTE 139.

4.3 The film stock shall be conditioned for 10 days at 20°C ± 3°C (68°F ± 5.4°F) at a relative humidity of (50 ± 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 on the test film shall be determined by means of the calibrated short-gap ferromagnetic core reproducer technique. This technique, including extrapolation to short wavelengths, is described in ANSI S4.6.

6.2 Level

The signal level measurements specified in 3. 4 shall be measured with a standard volume indicator conforming to IEC 60268-17.

Annex A (informative)
In-phase relationship

In-phase relationship of the audio 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 the same manner.

The 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.