RP 92-1995
Revision of RP 92-1990

SMPTE RECOMMENDED PRACTICE

Specifications for Audio Level and Multifrequency Test Films for 8-mm Type S Audio Reproducers, Magnetic Type

1 Scope

This practice specifies two audio frequency test films to be used for adjusting the sensitivity and frequency response of 8-mm type S motion-picture magnetic audio reproducers; one operating at 24 and the other at 18 frames per second.

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 standard 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/IEEE 152-1992, Audio Program Level Measurements

ANSI/SMPTE 149-1994, Motion-Picture Film (8-mm Type S) — Perforated 1R

ANSI/SMPTE 164-1993, Motion-Picture Film (8-mm Type S) — Magnetic Audio Record — Position, Dimensions and Reproducing Speed

ANSI/SMPTE 223M-1991, Motion-Picture Film — Safety Film

3 Test film signal

3.1 Frequencies

3.1.1 Type 24 film

The audio record on the type 24 film shall be an original recording which will reproduce at the frequencies specified in clause 4 when the linear velocity of the film is 24 frames per second or approximately 20 ft (6.1 m) per minute (4 in or 10.2 cm per second).

3.1.2 Type 18 film

The audio record on the type 18 film shall be an original recording which will reproduce at the frequencies specified in clause 4 when the linear velocity of the film is 18 frames per second or approximately 15 ft (4.6 m) per minute (3 in or 7.6 cm per second).

3.2 Distortion

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

3.3 Audio record

The location and dimensions of the recorded audio record shall be in accordance with ANSI/SMPTE 164.

3.4 Signal fluctuation

The signal levels shall not fluctuate more than ± 0.5 dB within the test section lengths.

3.5 Flutter

The weighted peak flutter of the audio record shall not exceed ± 0.10% when measured in accordance with ANSI S4.3.

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3.6 Azimuth

The azimuth of the audio record shall be 90° ± 5′ to the reference edge of the film.

3.7 Signal identification

East test section and segment shall be preceded by voice announcements identifying the content. Voice announcements shall be recorded at a level approximately 10 dB below program level (see 4.4).

4 Test sections

4.1 Azimuth section

4.1.1 Frequency

A frequency of 5000 Hz for type 18 film or 6300 Hz for type 24 film ± 2% shall be recorded ahead of all other tones on the film.

4.1.2 Recorded level

The azimuth frequency shall be a recording having an rms short circuit flux per unit track width of 19.85 nWb/m for type 18 or 16.08 nWb/m for type 24.

4.1.3 Duration

The minimum duration of this section shall be 30 s.

4.1.4 Purpose

The purpose of this section is to confirm reproduce head azimuth before response check.

4.2 Reference frequency section

4.2.1 Frequency

A frequency of 400 Hz ± 2% shall be recorded ahead of the frequency response section.

4.2.2 Recorded level

The reference frequency shall be a recording having an rms short circuit flux per unit track width of 58.50 nWb/m ± 10 nWb/m (10 dB below program level).

4.2.3 Duration

The minimum duration of this section shall be 30 s.

4.2.4 Purpose

The purpose of this section is to establish a comparative reference level for the following frequency response section.

4.3 Frequency response section

4.3.1 Frequencies

The following test segment frequencies in hertz ± 2% shall be recorded in the order given:

5000 for type 18 or 6300 for type 24 azimuth / 400 reference level / 7500 for type 18 or 10000 and 8000 for type 24 / 6300 / 5000 / 3150 / 2000 / 1000 / 500 / 315 / 200 / 100 / 50 / 400 program level

4.3.2 Recorded levels

The values in table 1 may be expressed as a curve that is the composite of a) the inverse of the voltage attenuation of a single resistance-capacitance high-pass filter having a time constant, τ_1, and b) the voltage attenuation of a single resistance-capacitance low-pass filter having a time constant, τ_2. The ordinates of this curve, expressed in decibels, are

$$N_{(dB)} = -20 \log_{10} \omega\tau_1 \sqrt{\frac{1 + (\omega\tau_2)^2}{1 + (\omega\tau_1)^2}}$$

where $\omega = 2\pi f$, f = frequency in hertz, $\tau_1 = 3180$ μs, and $\tau_2 = 90$ μs.

4.3.3 Flux level variation

The film flux level at each frequency in respect to the value specified in 4.3.2 shall be as follows:

Type 24 film	
50 to 100 Hz	+ 1 –2 dB
200 to 5000 Hz	± 1 dB
6300 to 10 000 Hz	+ 1 –2 dB
Type 18 film	
50 to 100 Hz	+ 1 –2 dB
200 to 3150 Hz	± 1 dB
5000 to 7500 Hz	+ 1 –2 dB

4.3.4 Duration

The duration of frequency response test segments shall be approximately 10 s.

Table 1 – Flux level versus frequency

Frequency (Hz)	Short circuit flux (nWb/m)	Relative level (dB)
6300 azimuth (type 24 only)	16.08	–11.22
5000 azimuth (type 18 only)	19 .85	– 9. 39
400 reference level	58 .50	0
10 000 (type 24 only)	10.37	–15.03
8000 (type 24 only)	12.85	–13.17
7500 (type 18 only)	13.65	–12.64
6300	16.08	–11.22
5000	19.85	– 9. 39
3150	29.14	– 6. 05
2000	39.44	– 3. 43
1000	51.87	– 1. 04
500	57.56	– 0. 14
315	59.33	+ 0. 12
200	60.96	+ 0. 36
100	66.45	+ 1. 11
50	84.18	+ 3. 16
400 program leve	185.00	+10.00

4.4 Program level section

4.4.1 Frequency

A frequency of 400 Hz ± 2% shall be recorded after the frequency response section.

4.4.2 Recorded level

The program level frequency shall be a recording having an rms short circuit flux per unit track width of 185 nWb/m ± 10 nWb/m.

4.4.3 Duration

The minimum duration of this section shall be 30 s.

4.4.4 Purpose

The purpose of this section is to verify and reestablish the program level after the possible preceding adjustments.

5 Film stock

5.1 The film stock shall be full-coat, splice-free, of the low-shrinkage, safety type in compliance with ANSI/SMPTE 223, and cut and perforated in accordance with ANSI/SMPTE 149.

5.2 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.

5.3 The film shall be recorded and packaged within the temperature and humidity limits specified in 5.2. 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.

6 Identification

Each test film shall be suitably identified.

7 Calibration

7.1 Flux

The short circuit flux on the test film shall be determined by means of the calibrated short-gap ferromagnetic core reproducer technique. The technique is described in ANSI S4.6.

7.2 Level fluctuation

The signal level measurements specified in 3.4 shall be measured with a standard volume indicator conforming to ANSI/IEEE 152.

Annex A (informative)
Bibliography

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