

Standards and Recommended Practices

Approved SMPTE Recommended Practices

Three SMPTE Recommended Practices were approved by the Society: RP 51-1990, Screen Luminance and Viewing Conditions for 8-mm Review Rooms; RP 92-1990, Specifications for Audio Level and Multifrequency Test Film for 8-mm Type S Audio Reproducers, Magnetic Type; and RP 155-1990, Audio Levels and Indicators for Digital Audio Records on Digital Television Tape Recorders. The practices are available from Society Headquarters for \$5.00 each.

Proposed SMPTE Standard

A Proposed SMPTE Standard is published here for a trial period and public review: SMPTE 202M, Motion-Pictures — B-Chain Electro-acoustic Response — Dubbing Theaters, Review Rooms, and Indoor Theaters. The proposal will be submitted to the American National Standards Institute for approval if no adverse comments are received from publication. Comments

should be addressed to Sherwin H. Becker, Director of Engineering, at Society Headquarters prior to July 1, 1991. Copies are available from Headquarters for \$10.00.

Proposed Withdrawal of SMPTE Recommended Practice

On the recommendation of the Audio Recording and Reproduction Technology Committee, the Standards Committee has approved withdrawal of SMPTE Recommended Practice RP 137-1986, Data Tracks on Low-Dispersion Magnetic Coatings on 35-mm Motion-Picture Film, which was published in the August 1986 issue of the *Journal*. Withdrawal has been initiated because the film is no longer manufactured and the practice is not being used. Comments should be addressed to Sherwin H. Becker, at Society Headquarters prior to July 1, 1991. All comments from *Journal* publication will be reviewed prior to withdrawal approval.

—*Sherwin H. Becker, Director of Engineering*

SMPTE Standards Subscription Service

The Society provides a Standards Subscription Service to assist firms, libraries, and individuals in establishing and maintaining a complete and current file of approved American National Standards, SMPTE Recommended Practices, and SMPTE Engineering Guidelines in the motion-picture, television, and video magnetic recording fields. Through this service, the Society makes automatic distribution to standards subscribers of all new and revised standards, recommended practices, and guidelines that are approved during the calendar year in these fields.

For further information, write to: Standards Subscription Service, Engineering Dept., Society of Motion Picture and Television Engineers, 595 West Hartsdale Ave., White Plains, NY 10607.

SMPTe RECOMMENDED PRACTICE

RP 51-1990
Revision of RP 51-1986

Screen Luminance and Viewing Conditions for 8-mm Review Rooms



1 Scope

This practice specifies the screen luminance level and characteristics of the projection screen and the viewing conditions for 8-mm review rooms.

2 Viewing prints for general application

The luminance and conditions specified in ANS/SMPTe 196M-1986 shall apply to the review room for 8-mm prints intended to be viewed in a conventional theatrical manner; i.e., front projection in a darkened room. This is essentially 16 footlamberts ± 2 fl. (55 candelas per square meter ± 7 cd/m²).

3 Viewing prints for special purposes

3.1 Because of the multitudinous applications of 8-mm prints, they are occasionally intended to be viewed under conditions quite different from those defined in ANS/SMPTe 196M-1986. The most common departures include the following:

- (a) prints used as a background moving image in the design of a public place rather than as the focus of a viewer's attention as in a movie theater
- (b) prints used as a point of purchase (POP) selling tool in retail stores or trade expositions

Annex A (informative) Additional data

Prints are judged best on the type of screen to be used by the end user. Among the types of flat screens commonly used for 8-mm prints are plastic or glass rear screens, matte white vinyl screens, and lenticular vinyl screens. Specially formed screens are also used. The rear support member of these screens will have a concave curvature from side to

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- (c) prints used as a selling or instructional tool in compact, suitcase-style, rear-screen projectors
- (d) prints used in airplane cabins for entertainment of passengers
- (e) prints used in public locations for instruction or entertainment under high ambient-light levels
- (f) prints used in the home
- (g) prints used for photographic instrumentation data analysis

Experience has shown that modifications to the viewing conditions such as those above usually introduce more stringent limitations upon print density, color balance, etc., such that some prints that would be accepted under the conditions specified in ANS/SMPTe 196M-1986 become less satisfactory for those modified viewing conditions.

3.2 Prints intended for special applications should be judged in a review room with a screen that simulates the special purpose as closely as possible.

side only or be curved in two directions: i.e., from side to side and from top to bottom. These formed curved screens will have surfaces ranging from silver-colored lithographic foils to vinyl materials embossed with lenticules. These screens have various gains. Gain is a measure of reflectance. A matte white screen is arbitrarily designated

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to have a gain of approximately 1 for reference. For accurate comparisons, it has been determined that matte white screens have an actual gain in the range of 0.95 to 0.98.

Gain screens (those with a gain above 1) are available as treated screens which are flat as well as those embossed with lenticules.

Flat lenticular screens have gains ranging from 2 to as high as 20, depending on the design of the lenticules and the

screen material used. Flat gain screens which are not lenticular, such as the pearlescent surface, have gains from 1.2 to 2.5.

Special formed screens have gains ranging from 6 to 19 depending on the surface material used (flat or lenticular) and the spherical radius used in the rear support member.

Acceptable viewing angles of gain screens decrease inversely with increasing gain.

Annex B (informative) Bibliography

ANS/SMPTe 196M-1986, Motion-Picture Film — Screen Luminance and Viewing Conditions — Indoor Theater Projection

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SMPT E 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 editions of the standards indicated below.

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

ANSI/SMPTE 149-1988, Motion-Picture Film (8-mm Type S) — Perforated 1R

ANSI/SMPTE 164-1988, Motion-Picture Film (8-mm Type S) — Magnetic Audio Record — Position, Dimensions and Reproducing Speed

ANSI/SMPTE 223M-1985, Motion-Picture Film — Safety Film

IEEE Std 152-1953 (R1971), Volume Measurements of Electrical Speech and Program Waves

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 percent.

3.3 Audio record

The location and dimensions of the recorded audio record shall be in accordance with ANSI/SMPTE 164-1988.

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 percent when measured in accordance with ANSI S4.3-1982.

3.6 Azimuth

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

3.7 Signal identification

Each 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 percent 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 nanowebers per meter for type 18 or 16.08 nWb/m for type 24.

4.1.3 Duration

The minimum duration of this section shall be 30 seconds.

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 percent 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 seconds.

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 percent 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 10 000 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

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

where $\omega = 2\pi f$, f = frequency in hertz, $\tau_1 = 3180 \mu\text{s}$, and $\tau_2 = 90 \mu\text{s}$.

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	+ 1	-2 dB
50 to 100 Hz	± 1	dB
200 to 5000 Hz	+ 1	-2 dB
6300 to 10 000 Hz	+ 1	-2 dB

**Annex A (informative)
Bibliography**

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

4.4.3 Duration

The minimum duration of this section shall be 30 seconds.

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 223-1985, and cut and perforated in accordance with ANSI/SMPTE 149-1988.

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 S4.6-1982.

7.2 Level fluctuation

The signal level measurements specified in 3.4 shall be measured with a standard volume indicator conforming to IEEE Std 152-1953 (R1971).

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

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 seconds

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 level	185.00	+10.00

4.4 Program level section

4.4.1 Frequency

A frequency of 400 Hz ± 2 percent 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.