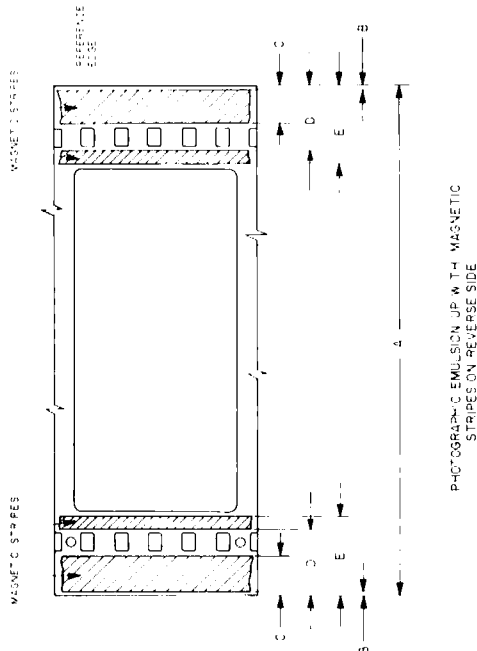


Proposed American National Standard
**for motion-picture film (70-mm) —
 magnetic striping —
 six-track audio release prints**

SMPTE 221

Page 2 of 2 pages



Dimensions	Inches	Millimeters
A (see A1 and A2)	2.754 ref	69.95 ref
B	0.008 ± 0.002	0.20 ± 0.05
C	0.208 ± 0.002	5.28 ± 0.05
D	0.330 ± 0.002	8.38 ± 0.05
E (see A4)	0.415 ± 0.002	10.54 ± 0.05

Appendix

The Appendix is not a part of this American National Standard, but is included for information purposes only.

- A1.** The dimensions specified in this standard are predicated on the use of unshrunk film. It is recognized, however, that some shrinkage may occur when striping a processed print. Specific measurements should take into account the overall width of the film as specified by Dimension A in ANSI PH22.119-1981.
- A2.** In practice, each pair of stripes is referenced to the closest edge in order to account for film shrinkage at the time of striping.
- A3.** Prints conforming to this standard are prepared in accordance with ANSI PH22.152-1983 and ANSI PH22.185-1980.
- A4.** The distance between the inside stripes should not be less than 1.912 in (48.56 mm) to prevent intrusion into the projectable image area.
- A5.** In no case should the stripes be allowed to intrude into the perforation area.

Page 1 of 2 pages

Sound Records on 70-mm Motion-Picture Release Prints

3. Dimensions

- 3.1** The location and dimensions of the recording stripes shall be as specified in the figure and table.
- 3.2** The magnetic stripes shall be on the side of the film which is away from the light source when used on a projector arranged for direct front projection on a reflection-type screen.

4. Film Stock

The film stock used shall be safety type, cut and perforated in accordance with ANSI PH22.119-1981.

Note: The reference edge is opposite the side of the film having the round hole every fifth perforation.

1. Scope

This standard specifies the location and dimensions of the magnetic recording stripes on 70-mm motion-picture film used for six-track magnetic audio release prints having a flat picture image with a maximum projection aperture of 1.914 x 0.870 in (48.62 x 22.10 mm).

2. Reference Standards

The following American National Standards are intended to be used in conjunction with this standard:

- ANSI PH22.119-1981, Dimensions for 70-mm Motion-Picture Film Perforated 65-mm, KS-1870
- ANSI PH22.152-1983, Motion-Picture Film (70-mm)—Projectable Image Area
- ANSI PH22.185-1980, Position, Dimensions and Reproducing Speed of Six-Magnetic

SMPTE 221

THIS PROPOSAL IS PUBLISHED FOR COMMENT ONLY

Proposed American National Standard
for television —
monitor system electro-acoustic response —
control and review rooms

SMPTÉ 222M

Page 1 of 5 pages

1. Scope

1.1 This standard specifies the method of measurement and characteristics for the monitor chain electro-acoustic response of television control and review rooms with volumes of 150 m³ (5300 ft³) and smaller. It is intended to assist in standardization of reproduction of program sound in television control and review rooms.

1.2 It does not apply where the recorded sound is intended for reproduction under theater listening conditions, i.e., to motion picture or public address systems. This standard does not cover equalization standards for other parts of the system, such as fixed or variable equalization applied for noise reduction around tape recorders, or the like.

2. Reference Standards

The following American National Standards are intended to be used in conjunction with this standard:

- ANSI S1.4-1983, Specification for Sound Level Meters
- ANSI S1.11-1966 (R1976), Specifications for Octave, Half-Octave and Third-Octave Band Filter Sets
- ANSI S1.13-1971 (R1976), Methods for the Measurement of Sound Pressure Levels

3. Definitions

3.1 Complete Sound Reproduction System: Represented diagrammatically in Fig. 1 and used in television control and review rooms, consisting of a main chain and a monitor chain.

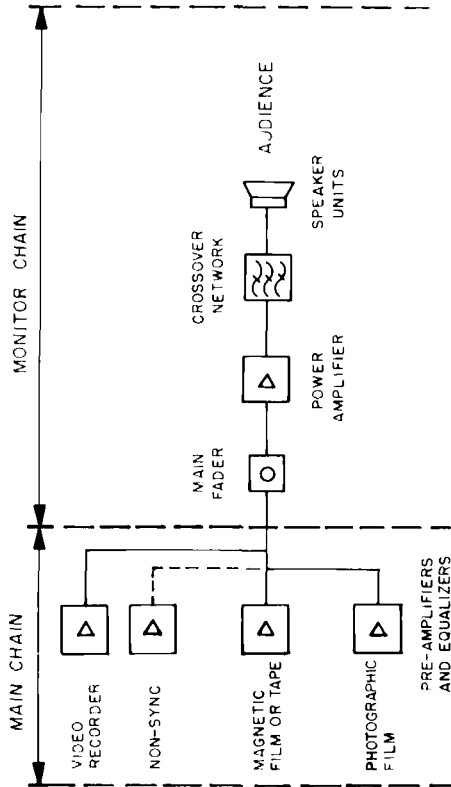


Fig. 1
Complete Television Sound Reproducing System

Page 2 of 5 pages

3.2 Main Chain: That part of the television audio system which includes input transducers, audio, and the audio portion of video tape and/or disk recorders, pre-transmitter audio signal processing, and the aural transmitter.

3.3 Monitor Chain: That part of the television audio system which includes the monitor fader, monitor equalization, monitor loudspeaker, and room acoustics of the monitor environment.

3.4 Electro-Acoustic Response: The electro-acoustic response of the monitor chain at a point is the sound pressure level expressed in decibels with respect to a reference level of 20 μPa at 1 kHz measured over the bandwidth of the measuring system in use (see appendix) over a given frequency range measured at a given position in the listening area when pink noise is applied to the input of the monitor system. The overall electro-acoustic response is made by averaging points in the room by the method specified in 4.2.

3.5 Pink Noise: A continuous spectrum of random noise exceeding the bandwidth of the object under test having constant energy per constant percentage of bandwidth (equal energy per octave).

4. Method of Measurement

4.1 The electro-acoustic response shall be measured with the equipment and instruments arranged in accordance with Fig. 2.

4.2 Sound pressure level vs frequency measurements shall be made as follows:

- (a) in dubbing control rooms, at each of the principal listening areas
- (b) in review rooms, at a sufficient number of positions to cover the listening area

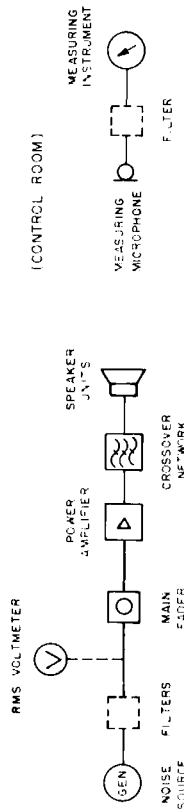


Fig. 2
Method of Measurement of Monitor Chain
(Optional Equipment Shown with Dotted Lines)

To obtain a valid representation of the acoustic response throughout the listening area, it is suggested that at least three positions be averaged when employing whole-octave bands, and at least five positions when employing third-octave bands.

Averaging shall be done by the sum of the squares of the sound pressure levels as follows:

$$L = 10 \log_{10} \left(\frac{1}{N} \sum_{k=1}^N \text{antilog}_{10} \left(\frac{L_k}{10} \right) \right)$$

where N is the number of positions and L_k is the sound pressure level at each position. If the range of sound pressure levels lies within 4 dB, simple arithmetic averaging is sufficiently accurate to be used.

4.3 It is recommended that measurements be made at a normal seated head height between 1 and 1.5 m (3.3 and 4.9 ft), and not closer than

- (a) 1.5 m (4.9 ft) to any wall
- (b) 2 m (6.6 ft) to the loudspeakers.

4.4 A suitable single loudspeaker sound pressure level with pink noise is 85 dB (flat or linear), but the spectral level in any third-octave band shall exceed the background noise in the band by at least 10 dB, or by 4 dB if adjusted according to Table 4 in ANSI S1.13-1971.

4.5 It is recommended that measurements be made with a microphone small enough so that high-frequency response errors due to diffraction effects about the microphone are minimized. A microphone having a difference between the direct 0° incidence and random incidence responses less than the tolerance specified in Table 1 is preferred. See Appendix A5.

5. Characteristics

The electro-acoustic response of the monitor chain shall be within the tolerance of the curve in Table 1 and Fig. 3. This response is satisfactory for monitoring of all types of tracks at the monitor point in Fig. 1, including monitoring of film tracks after appropriate de-emphasis, such as an Academy filter for monaural tracks, has been applied.

4.6 Measurements of low-frequency response in small rooms are strongly influenced by individual room modes. The effect of room modes can be minimized by averaging the response at a large number of locations in the room. See Appendix A4.

Table 1
Monitor Chain Characteristic

Central Frequencies of One-Third Octave Bands Hz	Characteristic dB	Tolerances ± dB
31.5	-10	3 8
40	-7	3 7
50	-5	3 6
63	-3	3 5
80	-1	3 4
100	0	3 3
125	0	3 3
160	0	3 3
200	0	3 3
250	0	3 3
315	0	3 3
400	0	3 3
500	0	3 3
630	0	3 3
800	0	3 3
1000	0	3 3
1250	0	3 3
1600	0	3 3
2000	0	3 3
2500	-0.5	3 3
3150	-1.0	3 3
4000	-1.5	3 3
5000	-2.0	3 3
6300	-2.5	3 3
8000	-3.0	3 3
10 000	-3.5	3 3
12 500	-4.0	3 3
16 000	-4.5	3 3

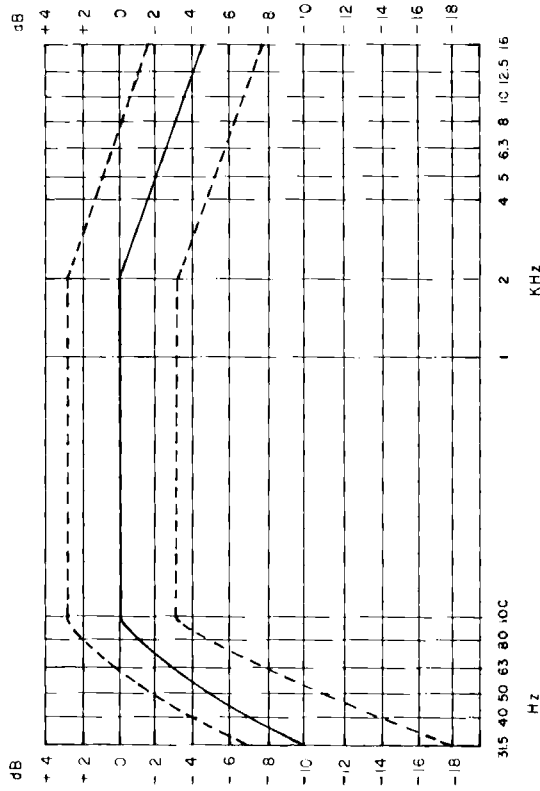


Fig. 3
Curve of Monitor Chain Characteristic

NOTE: Tolerances are based upon 1/3 octave measurements. If 1/1 octave measurements are used, reduce tolerance by 1 dB.