

4. Calibration

- 4.1 Video Calibration. All video measurements of luminance levels shall be made in accordance with American National Standard Method of Measurement of Television Luminance Signal Levels, ANSI/IEEE 205-1958 (R 1972).
- 4.2 Audio Calibration. Calibration of short circuit tape flux on the reference tape shall be determined by means of the calibrated short-gap ferromagnetic core reproducer technique. This technique is described in the following references:

American National Standard Method of Measuring Recorded Flux of Magnetic Sound Records at Medium Wavelengths, ANSI/IEEE S17-1982.

McKNIGHT, J. G. Flux and flux frequency response measurements and standardization in magnetic recording. *Jour. SMPTE*, vol 78, no. 6, June 1969, pp. 437-472.

LOVICK, R. C.; BARTOW, R. E.; and SCHEG, R. F. Recording and calibration of super-8 magnetic reproducer test films. *Jour. SMPTE*, vol 78, no. 6, June 1969, pp. 173-181.

Proposed American National Standard
for motion-picture film (35-mm) —
photographic audio
reproduction characteristic

PH22.214M

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tem whose B-Chain has been aligned to Curve X of PH22.202M.

This standard specifies the electrical frequency response characteristics for photographic audio reproduction in motion-picture control rooms and indoor theaters. It is intended to assist in standardization of recording monitor and reproduction characteristics of motion-picture audio in studio dubbing theaters, review rooms, and indoor theaters. The standard covers that part of the motion-picture audio system from the transducer to the input terminals of the main fader.

1. Scope

3.4 A-Chain (Transducer System). The A part of a motion-picture audio system, as shown in Fig. 3, which extends from the transducer to the input terminals of the main fader. It is customary for the playback of pre-emphasized audio tracks. In some theaters, part of the de-emphasis characteristic may result from aperture loss. Wide-range audio tracks do not require use of this de-emphasis network and aperture loss will normally require correction. In addition, wide-range audio tracks may require the use of noise reduction decoding circuitry.

2. Reference Standard

The following American National Standard is intended to be used in conjunction with this standard:

PH22.202M, Motion Pictures — B-Chain Electro-Acoustic Response — Control Rooms and Indoor Theaters

3. Definitions

3.1 Complete Audio Reproduction System. Represented diagrammatically in Fig. 3 and used in studio dubbing theaters, review rooms, and indoor theaters; by convention consists of an A-Chain and a B-Chain.

3.2 Pre-emphasized Audio Track. A conventional photographic audio track, also known as Academy sound track, which is intended for playback over normally de-emphasized theater playback systems.

3.3 Wide-Range Audio Track. A photographic audio track which has not been pre-emphasized and is intended for playback over a theater sys-

3.5 B-Chain (Final Chain). The B part of a motion-picture reproduction system, as shown in Fig. 3, which extends from the input terminals of the main fader to the listening area of the room or auditorium. Two B-Chain characteristics are described in PH22.202M; a normal curve, N, typical of current practice and a wide-range curve referred to as Curve X.

3.6 Type O Theater. A theater in which only conventionally pre-emphasized motion pictures will be played.

3.7 Type N Theater. A theater in which both conventionally pre-emphasized motion pictures and wide-range pictures will be played.

4. Method of Measurement

The electrical response shall be measured at the fader input terminals, or at an equivalent position, using a high-impedance voltmeter accurate from 20 Hz to 20 kHz + 1 dB.

5. Characteristics

5.1 When a multifrequency photographic test film is played on the reproducer, the measured frequency response characteristic shall be within the tolerance of the curves given in Fig. 1 and Table 1.

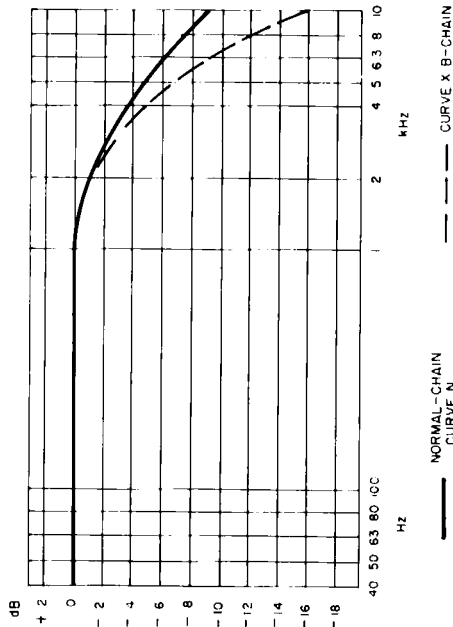


Fig. 1
A-Chain Characteristic

Table 1
A-Chain Frequency Response Characteristics (dB)

Frequencies (Hz)	Pre-emphasized Audio Track		Wide-Range Audio Track		Tolerances (dB)
	Normal B-Chain Curve N	Pre-emphasized Audio Track Curve X B-Chain	Normal B-Chain Curve N	Wide-Range Audio Track Curve X B-Chain	
40	0	0	0	0	± 2
63	0	0	0	0	± 2
125	0	0	0	0	± 1
250	0	0	0	0	± 1
500	0	0	0	0	± 1
1000	0	0	0	0	± 1
2000	-1.0	-1.0	0	0	± 1
2500	-2.0	-2.0	0	0	± 1
3150	-3.0	-3.0	0	0	± 1
4000	-4.0	-4.5	0	0	± 1
5000	-5.0	-6.5	0	0	± 1
6300	-6.0	-9.0	0	0	± 1
7100	-7.0	-10.5	0	0	± 1
8000	-7.5	-12.0	0	0	± 1
9000	-8.0	-14.0	0	0	± 1
10 000	-9.0	-16.0	0	0	± 1

5.1.2 Column 3 of Table 1 represents current practice for the playback of pre-emphasized audio tracks over a B-Chain described as Curve X in PH22.202M.

5.1.3 Wide-range audio tracks should be played back with a flat A-Chain, as shown in column 4 of Table 1.

Appendix

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

A1. For reference purposes only, Fig. 2 and Table 2 show the overall A+B Chain figures for the playback of pre-emphasized (column 2) and wide-range (column 3) photographic audio tracks. The wide-range characteristic uses Curve X.

A2. The figures in Fig. 2 (solid curve) and Table 2 (column 2) represent the average of 150 theater replay curves measured in six countries between 1971 and 1975, adjusted slightly to take into account current international practice. This curve is intended to ensure satisfactory playback of typically pre-emphasized photographic audio tracks.

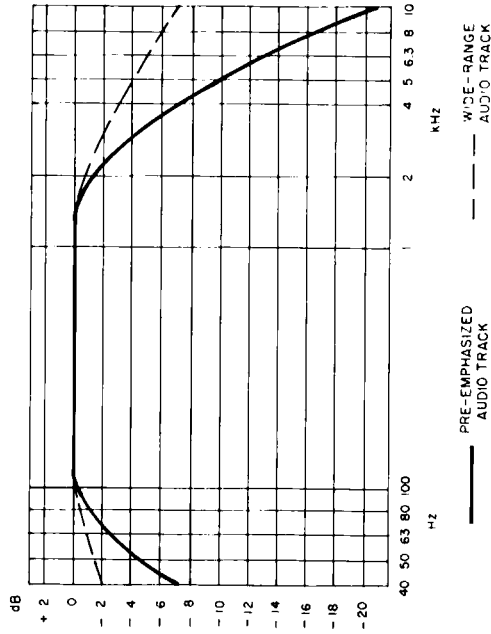


Fig. 2
A + B Chain Characteristic

Proposed American National Standard
for motion-picture film (65-mm) —
camera aperture image

PH22.215

Table 2
Electro-Acoustic Characteristics (dB)

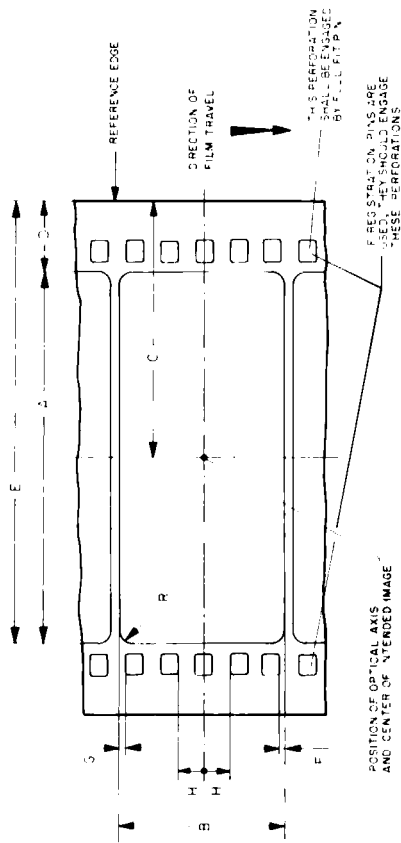
Frequencies	Pre-emphasized Audio Track	Wide-Range Audio Track
40	-7.0	-2.0
63	-3.0	0
125	0	0
250	0	0
500	0	0
1000	0	0
2000	-1.0	0
2500	-3.0	-1.0
3150	-5.0	-2.0
4000	-7.5	-3.0
5000	-10.5	-4.0
6300	-14.0	-5.0
7100	-16.0	-5.5
8000	-18.0	-6.0
9000	-20.5	-6.5
10 000	-23.0	-7.0

1. Scope

This standard specifies the dimensions of the camera aperture image and the relative positions of the vertical and horizontal centerlines of the intended image area with respect to the reference edge and the perforations of the camera negative film for 65-mm motion-picture cameras.

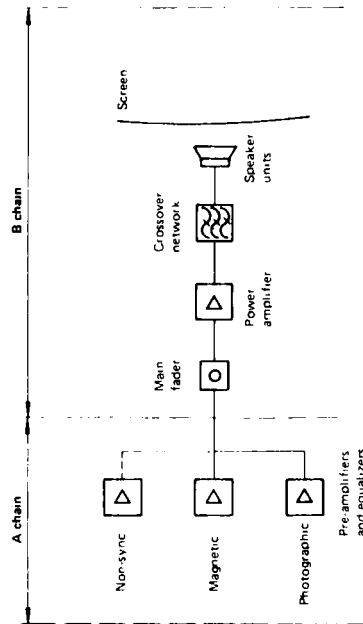
2. Dimensions

The dimensions shall be as specified in the figure and table. They shall apply to measurements of the images formed on freshly exposed and processed film.



Film as Seen from Inside Camera Looking Toward Lens

Fig. 3
Complete Theatrical Audio Reproducing System



Dimensions	Inches	Millimeters
A*	2.066	52.48
B	0.906 + 0.020	23.01 + 0.51
C	1.279 nom	32.49 nom
D	0.246 max	6.25 max
E	2.312 min	58.72 min
F = G	within 0.008	within 0.20
H = H	nominally equal	nominally equal
R	0.020 max	0.51 max

*Dimension A is derived and is given for information only.