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SMPTE STANDARD

ANSI/SMPTE 208M-1992
Revision, redesignation and consolidation of
ANSI PH22.208M-1984
and
ANSI/SMPTE 213M-1984

for Motion-Picture Film — 35- and 16-mm Magnetic Audio Records — Recorded Characteristics

1 Scope

This standard specifies the recorded characteristics of magnetic records on 35-mm motion-picture film intended for reproduction at 24 frames per second, and on 16-mm motion-picture film intended for reproduction at 24 frames per second. (See notes 1 and 2.)

2 Recorded characteristics

With a constant-amplitude sine-wave signal applied to the input of the recording system, the nominal characteristic of the short circuit magnetic flux versus frequency shall decrease with increasing frequency proportionately to the impedance of a parallel combination of a capacitance and a resistance having the time constant τ = 35 µs for 35-mm motion-picture film, and the time constant τ = 70 µs for 16-mm motion-picture film. (See note 3.)

The characteristics defined above are represented by the following equation:

$$L_\Phi = L_0 - 10 \log_{10} \left(1 + (2 \pi \tau)^2 f^2 \right) \text{ dB}$$

where L_Φ is the recorded relative short circuit magnetic flux level in decibels, f is the frequency in hertz, τ is the time constant described above, and L_0 is a constant calculated to make L_Φ = 0 at the reference frequency of 1 kHz for 35-mm motion-picture film, and to make L_Φ = 0 at the reference frequency of 400 Hz for 16-mm motion-picture film:

	for 35-mm film	for 16-mm film
L_0 =	0.20511	0.13238

Approximate numerical values for each curve are given in table 1.

Table 1 – Recorded characteristics

Frequency Hz	Relative level, dB	
	35-mm film 35 µs	16-mm film 70 µs
20	0.20	
31.5	0.20	0.13
40	0.20	0.13
50	0.20	0.13
63	0.20	0.13
80	0.20	0.13
100	0.20	0.12
125	0.20	0.12
160	0.20	0.11
200	0.20	0.10
250	0.19	0.08
315	0.18	0.05
400	0.17	0.00
500	0.15	–0.07
630	0.12	–0.19
800	0.07	–0.37
1000	0.00	–0.64
1250	–0.11	–1.01
1600	–0.30	–1.61
2000	–0.56	–2.36
2500	–0.94	–3.31
3150	–1.50	–4.52
4000	–2.28	–5.99
5000	–3.24	–7.53
6300	–4.45	–9.25
8000	–5.92	–11.13
10000	–7.46	–12.95
12500	–9.12	–14.81
14000	–10.00	–15.77
16000	–11.06	–16.90
20000	–12.88	

American National Standard

Approved
November 12, 1992

3 Tolerances

Magnetic audio records on motion-picture film shall be recorded to the characteristics specified in clause 2 with the tolerances shown in figure 1 for 35-mm magnetic audio records, and with the tolerances shown in figure 2 for 16-mm magnetic audio records.

NOTES

1 The film velocity of 35-mm film is also commonly stated as 18 inches per second or 457 millimeters per second, and historically stated as 90 feet or 27 meters per minute.

2 The film velocity of 16-mm film is also commonly stated as 7.2 inches per second or 183 millimeters per second, and historically stated as 36 feet or 11 meters per minute.

3 The time constant is only a convenience in defining the desired response curve and is never intended as a recommended electrical circuit.

4 This standard has substantially the same technical content as that of ISO 1188:1984 and ISO 1189:1986.

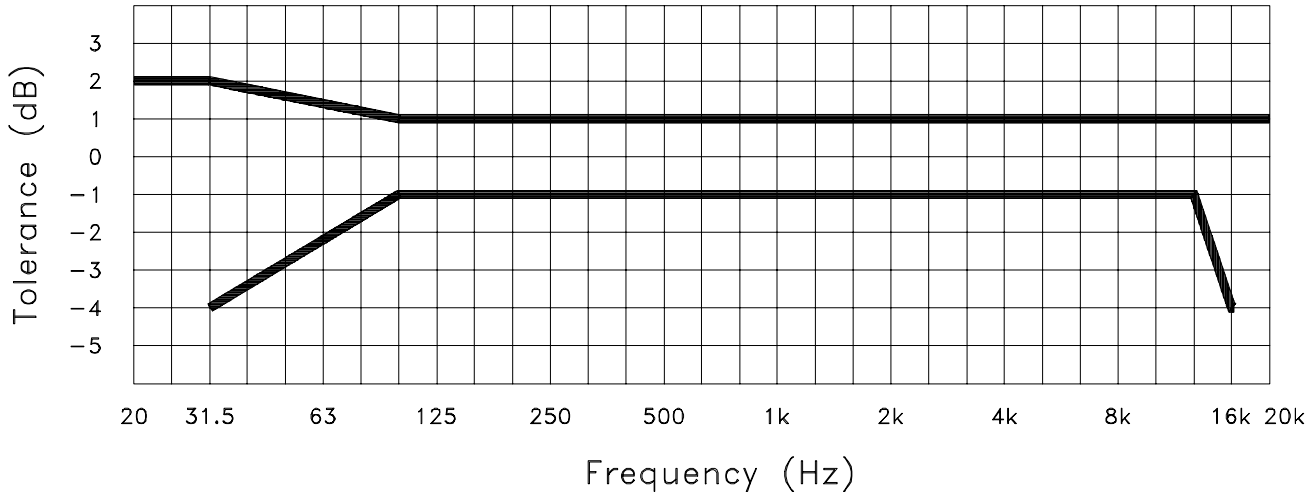

Figure 1 – Tolerance on 35-mm recorded records

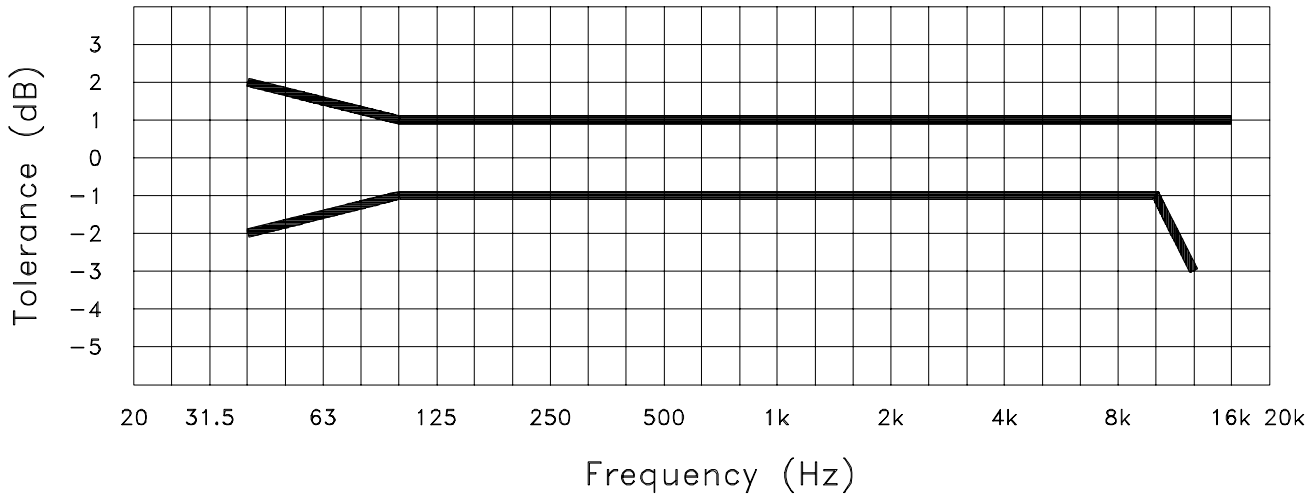

Figure 2 – Tolerance on 16-mm recorded records

Annex A (informative)
Bibliography

ISO 1188:1984, Cinematography — Recorded Characteristic for Magnetic Sound on Full-Coat 16 mm Motion-Picture Film — Specifications

ISO 1189:1986, Cinematography — Recorded Characteristic for Magnetic Sound Records on 35 mm Motion-Picture Film Excluding Striped Release Prints — Specifications