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SMPTE 117M-2001
Revision of
ANSI/SMPTE 117M-1996

SMPTE STANDARD

for Motion-Picture Film — Photographic Audio Density — Spectral Diffuse Density Measurement

1 Scope

This standard supplements ISO 5-2 and ISO 5-3 by specifying spectral conditions suitable for determining the sensitometric characteristics of photographic audio records on three-component subtractive color films having records made up of dye images plus silver or a metallic salt. It does not apply to the density measurement of records composed of dyes only. The conditions of this standard are applicable to systems of audio reproduction using the S-1 photosurface. It is recognized that there are other types of photosurfaces used for photographic audio reproduction that do not fall within the scope of this standard. This standard defines a practical condition by means of which it is expected that most density measurements will be made.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. 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.

ISO 5-2:2001, Photography — Density Measurements — Part 2: Geometric Conditions for Transmission Density

ISO 5-3:1995, Photography — Density Measurements — Part 3: Spectral Conditions

3 Terminology used in the densitometry of photographic color audio records

3.1 Peak response

The peak response of a densitometer is the wavelength to which the densitometer has the greatest response, including such factors as the spectral emission of the light source, the combined spectral transmission of all optical filters in the light path, and the spectral sensitivity of the photo-sensitive receptor.

3.2 Bandwidth

The bandwidth of a densitometer is the range of wavelengths to which the densitometer is sensitive. In a practical densitometer, this range of wavelengths is not sharply defined; but, for the purposes of this standard, the bandwidth shall be considered to lie between those wavelengths that excite, in the photo-sensitive receptor, one half the current which is excited at the wavelength of peak response. These limiting wavelengths are to be measured or computed using the light source, all operating optical filters, and the photo-sensitive receptor of the densitometer.

3.3 Overall response

The overall response of a densitometer is the integrated response of the densitometer to all wavelengths, including such factors as the spectral emission of the light source, the combined spectral transmission of all optical filters in the light path, and the spectral sensitivity of the photo-sensitive receptor.

Approved
June 6, 2001

4 Spectral density of photographic audio record on three-component subtractive color films

Spectral diffuse density of photographic audio record on three-component subtractive color films is diffuse transmission density as measured with an instrument having a response of 20-nm bandwidth peaking at 800 nm $\pm$ 5 nm, with at least 80% of the overall response of the instrument falling within the 20-nm bandwidth.

Annex A (informative)
Additional data

In three-component subtractive color films, dyes or color couplers are used to form the photographic image. These color materials are designed primarily for the visual region, but audio-record reproduction via the S-1 photosurfaces uses the infrared region of approximately 700 nm to 900 nm, which is far enough away from the visual region so that the color materials cannot be used efficiently, but close enough so that they produce a measurable effect. The spectral characteristics of this effect depend on the type of light-absorbing material used for the audio record, and on the manner in which the audio record is processed. Therefore, in order to obtain uniformity of audio record densitometry among different films and density-measuring instruments, it is necessary to specify the spectral conditions under which these density measurements are made. It is the aim of this standard to define these conditions sufficiently to ensure reasonable uniformity of density measurements, yet not so rigidly as to make impractical the obtaining of such measurements.