RP 109-1994
Revision of RP 109-1982

SMPTE RECOMMENDED PRACTICE

Spectral Response of Photographic Audio Reproducers for 8-mm Type S Motion-Picture Film

1 Scope

This practice specifies the spectral response of the photographic audio reproducer light source and receptor as a unit, including any optical filtering that may be interposed.

2 Spectral response

2.1 The peak or maximum response of the combined audio reproducer light source, filter, and receptor shall be at 550 nm + 130 – 0 nm.

2.2 The integrated response of the unit to all wavelengths greater than 800 nm shall be less than 5% of the total integrated response measured from 400 nm to 800 nm.

Annex A (informative)
Additional data

Dyes used in positive color films for projection usually have a layer order with the magenta dye on top, the cyan dye in the middle, and the yellow dye on the bottom (nearest the support). For reversal color films, the yellow dye layer is usually on top with the magenta dye in the middle, and the cyan dye on the bottom. The production of an audio track recording with maximum resolution is most conveniently accomplished in the top dye layer with progressive spread as the audio track image lies further below the top surface. Therefore, the magenta dye layer is not only the most favorably located single layer for reproduction with good resolution, but also the dye layer which contributes the maximum to visual image resolution. The absorption maximum for magenta dye is approximately 550 nm.

Photoreceptors having a maximum response of 550 nm and a useful output signal level leading to a sufficient signal-to-noise ratio have not been demonstrated. The signal-to-noise ratio may be improved by optical filters which remove the longer wavelengths; however, the maximum response of approximately 680 nm does not fully utilize the best capabilities of existing films.

Dyes used in color films often have a relatively high transmission for wavelengths greater than 800 nm. Dirt and other film support imperfections may have an effective optical density, which is relatively high at all wavelengths including those greater than 800 nm. The purpose of limiting the spectral response of the audio reproducer is to use advantageously the absorption of the dye image to modulate the scanning beam while obtaining the minimum contribution from dirt particles and other nonfunctional absorbers. This provides nearly the maximum signal-to-noise ratio of which the dye record is capable.

A tungsten filament light source emits its peak energy and a typical silicon photoreceptor is most sensitive at wavelengths of about 850 nm to 1000 nm. Filters that transmit energy for wavelengths shorter than 800 nm and reflect or absorb wavelengths longer than 800 nm can be used to introduce a bandpass limitation that provides the response specified in clause 2 in a reproducer employing a tungsten filament source and a conventional silicon photoreceptor.

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