

# SMPTE RECOMMENDED PRACTICE

RP 81-1984

## Specifications for Scanning-Beam Uniformity Test Film for 16-mm Motion-Picture Photographic Audio Reproducers



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**1. Scope**

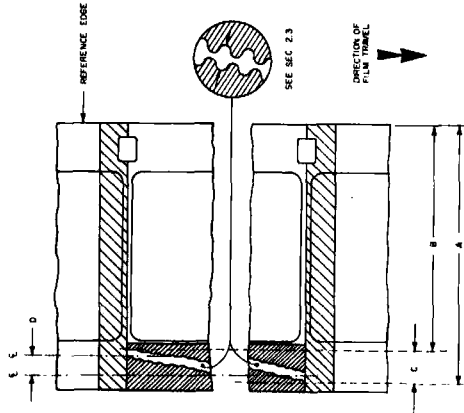
1.1 This practice describes a test film to determine the uniformity of scanning-beam illumination in 16-mm motion-picture photographic audio reproducers. (This test film is not intended to be used for the determination of the correct position of the scanning beam with respect to the reference edge of the film).

**2. Test Film**

- 2.1 The test film shall be a directly recorded positive or a print made directly from an original negative.
- 2.2 The audio record on the film shall reproduce at a frequency of  $1000 \pm 20$  Hz when the linear velocity of the film is 24 perforations per second or approximately 36 ft/min (7.2 in or 18.3 cm/sec).
- 2.3 At full modulation, the test record shall have a width of  $0.0050 \pm 0.003$  in ( $0.127 \pm 0.008$  mm), as measured between opposite amplitude peaks. The waveform shall be sinusoidal.
- 2.4 The test record shall move laterally at a uniform rate from one edge of the scanned area to the other, as specified in the figure.
- 2.5 In any one test film, the combined effect of variation in modulation width and density of the exposed and unexposed areas shall result in a signal amplitude variation not exceeding  $\pm 0.8$  dB with respect to the average signal amplitude.

**3. Definitions**

- 3.1 Edges. The edge of the test track nearest the non-perforated edge of the film shall be called the outboard edge, and the opposite edge shall be called the inboard edge.
- 3.2 Centerline Sweep. The centerline sweep of the test track is defined as the lateral displacement of the centerline of the test track from its initial position to its final position. Dimension D is the nominal centerline sweep.
- 3.3 Total Test Track Sweep. The total test track sweep is defined as the sum of the centerline sweep and the overall width of the test track. Dimension C is the nominal total sweep.



Dimensions	Inches	Millimeters
A	$0.604 \pm 0.000$ $- 0.001$	$15.34 \pm 0.00$ $- 0.03$
B	$0.536 \pm 0.001$ $- 0.000$	$13.61 \pm 0.03$ $- 0.00$
C	$0.068$ nom	$1.73$ nom
D	$0.063$ nom	$1.60$ nom

**4. Dimensions**

The dimensions and position of the audio track shall be as specified in the figure and table. Dimension A extends to the outboard edge of the test track in its initial position. Dimension B extends to the inboard edge of the test track in its final position. Dimensions A and B shall be measured at points opposite the first image area framing next to the start and end splice of the test record negative. Dimension C, nominal total sweep, is  $0.002$  in ( $0.05$  mm) less than the width of the scanning slit to avoid scanning of the edge of the slit.

**5. Film Stock**

5.1 The film stock, preferably polyester, shall be splice-free, of the low-shrinkage, safety type in accordance with American National Standard Specifications for Motion-Picture Safety Film, ANSI PH22-31M-1980, and cut and perforated in accordance with long-pitch dimensions specified in American National Standard Dimensions for 16-mm Motion-Picture Film Perforated IR, ANSI PH22-109-1980.

5.2 In the event that triacetate film stock is used, it shall be splice-free and shall have a maximum lengthwise shrinkage of 0.50 percent when tested as follows: At least 20 strips of film approximately 31 inches in length shall be cut for measurement of shrinkage. After normal development and drying (not over  $80^\circ\text{F}$  [ $27^\circ\text{C}$ ]), the strips shall be placed at least  $\frac{1}{4}$  in apart in racks and kept for seven days in an oven maintained at  $120^\circ\text{F}$  ( $49^\circ\text{C}$ ) and a relative humidity of 20 percent. The strips shall then be removed, reconditioned thoroughly to 50 percent relative humidity at  $70^\circ\text{F}$  ( $21^\circ\text{C}$ ), and the shrinkage measured by a suitable method. The percent shrinkage shall then be calculated on the basis of deviation from the nominal dimension for the length of 100 consecutive perforation intervals given in ANSI PH22-109-1980.

**6. Density**

The exposed track area shall have a minimum diffuse density of 1.20 including base density and the

unexposed track area shall have a maximum density of 0.10 above base density. The longitudinal variations of these specified densities shall not result in a reproduced output variation exceeding  $\pm 0.5$  dB.

**7. Width of Exposed Area**

The overall width of the exposed track area shall exceed the maximum variation in the scanned area by no less than 0.010 in (0.25 mm) on each side of the slit. The maximum width of the scanning slit as specified in American National Standard Dimensions of Photographic Sound Records on 16-mm Motion-Picture Prints, ANSI PH22-41-1983, is 0.071 in (1.80 mm). This requires a minimum printed width of 0.107 in (2.72 mm) to ensure a dense area adjacent to the scanned area.

**8. Test Film Length**

Each test film shall carry a minimum of three identical prints of the total length of the test record. In each, the test record shall start near the edge of the film and travel toward the image area. The minimum recommended length of the test film should be approximately 30 ft (9.14 m).

Note: A test film conforming to this practice is available from the Society of Motion Picture and Television Engineers.

**Appendix**

(The Appendix is not a part of this SMPTE Recommended Practice, but is included for information purposes only.)

Before using the test film described in this document, it is recommended that correct placement of the scanning beam be determined by means of a buzz-track test film as specified in SMPTE Recommended Practice RP 67-1983. Specifications for Buzz-Track Test Film for 16-mm Motion-Picture Sound Reproducers, Photographic Type.

The uniformity of scanning-beam illumination should be measured by means of a standard volume indicator as specified in American National Standard Volume Meas-

urements of Electrical Speech and Program Waves, ANSI/IEEE 152-1953 (R1976), connected to the output of the optical audio reproducer amplifier. The illumination of the scanning beam should be adjusted according to the instructions furnished by the equipment manufacturer. Variations of the output of the meter should be observed while running the full length of one track print, spliced into a loop, through the equipment.

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