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SMPTE RECOMMENDED PRACTICE

RP 81-2004
Revision of RP 81-1999

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

1 Scope

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 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE 109-2003, Motion-Picture Film (16-mm) — Perforated 1R and 2R

SMPTE 223M-2001, Motion-Picture Film — Safety Film

3 Test film

3.1 The test film shall be a directly-recorded positive or a print made directly from an original negative.

3.2 The audio record on the film shall reproduce at a frequency of 1000 Hz ± 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/s).

3.3 At full modulation, the test record shall have a width of 0.0050 in ± 0.0003 in (0.127 mm ± 0.008 mm), as measured between opposite amplitude peaks. The waveform shall be sinusoidal.

3.4 The test record shall move laterally at a uniform rate from one edge of the scanned area to the other, as specified in figure 1.

3.5 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 ± 0.8 dB with respect to the average signal amplitude.

Approved
November 8, 2004

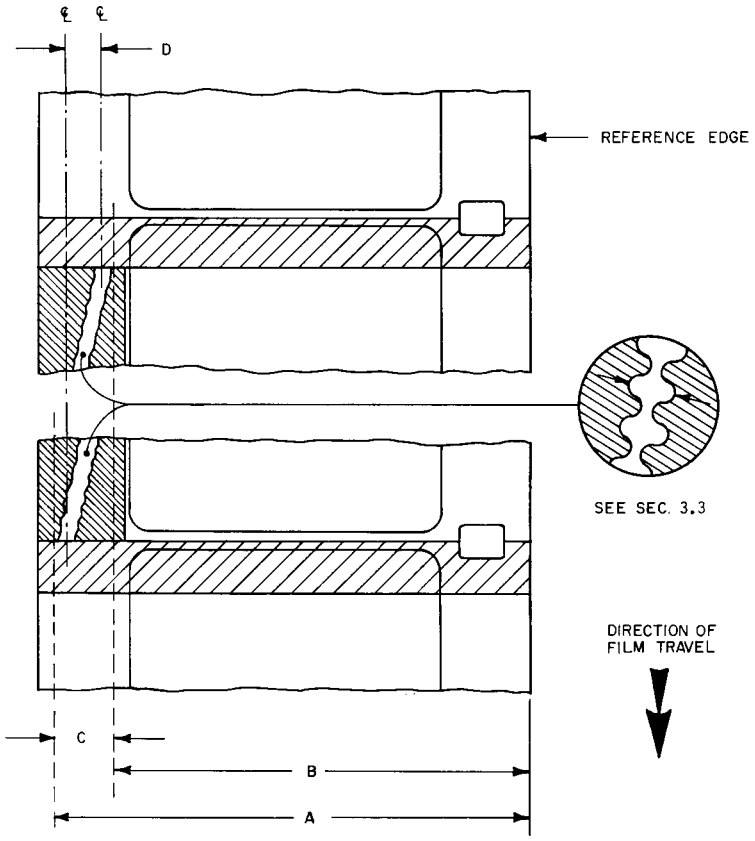

Figure 1 – Scanning beam

Table 1 – Specifications

Dimensions Inch	es	Millimeters
A 0.604	+ 0.000 – 0.001	15.34 + 0.00 – 0.03
B 0.536	+ 0.000 – 0.001	13.61 + 0.03 – 0.00
C	0.068 nom	1.73 nom
D	0.063 nom	1.60 nom

4 Definitions

4.1 edges: For the purpose of this practice, the edge of the test track nearest the nonperforated edge of the film shall be called the outboard edge, and the opposite edge shall be called the inboard edge.

4.2 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.

4.3 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.

5 Dimensions

The dimensions and position of the audio track shall be as specified in figure 1 and table 1. 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 frameline 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.

6 Film stock

6.1 The film stock, preferably polyester, shall be splice-free, of the low-shrinkage, safety type in accordance with SMPTE 223M, and cut and perforated in accordance with long-pitch dimensions specified in SMPTE 109.

6.2 In the event that triacetate film stock is used, it shall be splice-free and shall have a maximum lengthwise shrinkage of 0.50% 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°F [27°C]), the strips shall be placed at least 1¤4 in apart in racks and kept for seven days in an oven maintained at 120°F (49°C) and a relative humidity of 20%. The strips shall then be removed, reconditioned thoroughly to 50% relative humidity at 70°F (21°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 SMPTE 109.

7 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 ± 0.5 dB.

8 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 by SMPTE 41 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.

9 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 record shall be approximately 30 ft (9.14 m).

Annex A (informative)
Additional data

Before using the test film described in this practice, it is recommended that correct placement of the scanning beam be determined by means of a buzz-track test film as specified in SMPTE RP 67.

The uniformity of scanning-beam illumination should be measured by means of a standard volume indicator as specified in ANSI/IEEE 152, 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.

Annex B (informative)
Bibliography

ANSI/IEEE 152-1992, Audio Program Level Measurement

SMPTE 41-1999, Motion-Picture Film (16-mm) — Photographic Audio Records - Prints

SMPTE RP 67-2002, Specifications for Buzz-Track Test Film for 16-mm Motion-Picture Audio Reproducers, Photographic Type