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>
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SMPTE STANDARD

SMPTE 40-2002
Revision of
ANSI/SMPTE 40-1997

for Motion-Picture Film (35-mm) — Release Prints — Photographic Audio Records

1 Scope

1.1 This standard specifies the position, dimensions, and reproducing speed of variable-area and variable-density photographic audio records on 35-mm motion-picture release prints.

1.2 This standard also specifies the longitudinal picture-audio displacement.

2 Audio records

The dimensions and location of the audio records shall be as specified in figure 1 and table 1.

3 Longitudinal picture-audio displacement

3.1 The audio record on the film shall be displaced longitudinally from the center of the corresponding picture by a distance of 21 frames ± 1/2 frame in the direction of film travel during normal projection.

3.2 Although picture and audio are correctly synchronized with a displacement of 21 frames ± 1/2 frame on the film, normal playback of motion pictures occurs in theaters where the relatively slow speed of sound means that the audio should precede the picture at the screen if subjectively correct synchronism is to be achieved in the middle of the theater (see annex A).

4 Reproducing speed

The recordings shall be made so that the audio records will reproduce properly at 96 perforations (18 in [457 mm]) per second which is 24 frames per second.

NOTES

1 Motion-picture prints conforming to this standard are usually projected in accordance with SMPTE 194.

2 Motion-picture prints conforming to this standard are usually made on film made in accordance with long-pitch dimensions specified in ANSI/SMPTE 139.

3 Dimensions A and B, describing the printed area of the sound record, are established by SMPTE 111, and are shown in table 1 as nominal values for reference only.

Approved
July 26, 2002

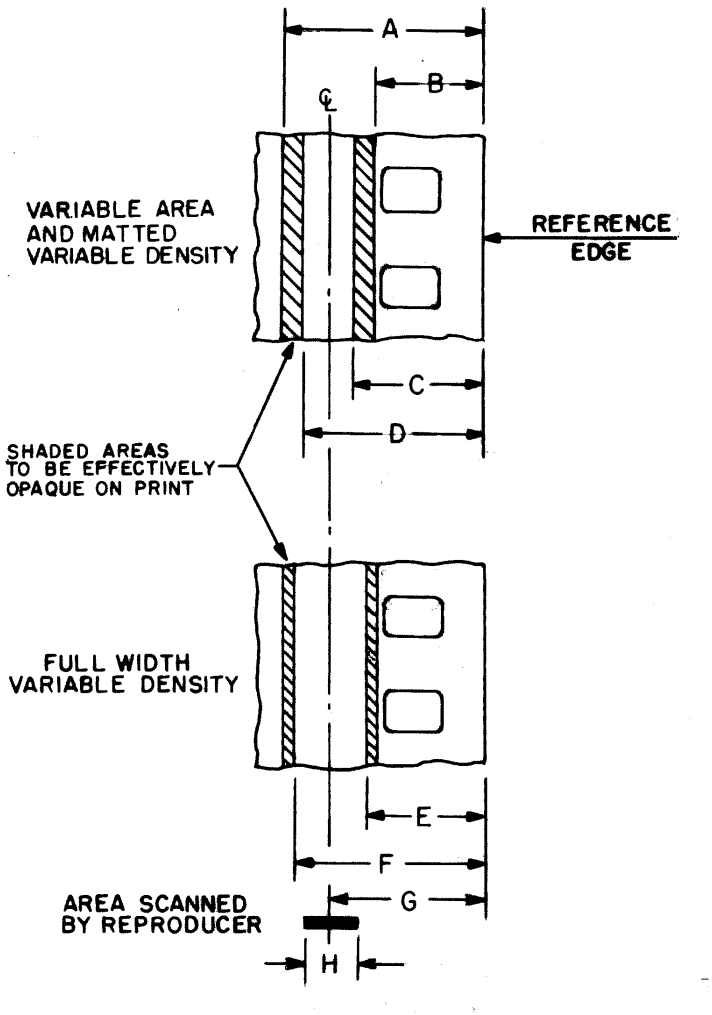

Figure 1 – Dimensions

Table 1 – Specifications

Dimensions	Inches	Millimeters
A	0.308 nom	7.82 nom
B	0.192 nom	4.88 nom
C	0.205 ± 0.001	5.21 ± 0.03
D	0.281 ± 0.001	7.14 ± 0.03
E	0.193 $^{+\ 0.004}_{-\ 0.000}$	4.90 $^{+\ 0.10}_{-\ 0.00}$
F	0.293 $^{+\ 0.000}_{-\ 0.004}$	7.44 $^{+\ 0.00}_{-\ 0.10}$
G	0.243 ± 0.001	6.17 ± 0.03
H	0.084 ± 0.001	2.13 ± 0.03

Annex A (informative)
Explanatory notes

In the average theater, it is necessary to emit the sound pulses before the corresponding picture frame is positioned in the aperture. Since sound travels approximately 1100 ft per second or about 50 ft per frame during the normal projection rate of 24 frames per second, the projectionist can place the sound and picture in synchronization in the theater where he wishes by varying the length of the threading path in the projector.

For example, if the positioning of frame 21 at the scanning point brings the corresponding picture and sound to the screen and the speaker at the same instant, then positioning frame 20 at the scanning point would give synchronism at about 50 ft from the screen.

Annex B (informative)
Bibliography

ANSI/SMPTE 139-1996, Motion-Picture Film (35-mm) — Perforated KS

SMPTE 111-2001, Motion-Picture Film (35-mm) — Prints Made on Continuous Contact Printers — Exposed Areas for Picture and Audio

SMPTE 194-2002, Motion-Picture Film (35-mm) — Projector Usage — Release Prints Having Four Perforations per Frame