SMPTE STANDARD

ANSI/SMPTE 117M-1991
Revision of
ANSI/SMPTE 117M-1985

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

1 Scope

This standard supplements American National Standards ANSI PH2.18-1985 and ANSI IT2.19-1990 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.

ANSI PH2.18-1985, Photography — Spectral Conditions

ANSI IT2.19-1990, Photography — Density Measurements — Geometric Conditions for Transmission Density

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 photosensitive 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 intergrated 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.

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4 American National Standard spectral density of photographic audio record on three-component subtractive color films

American National Standard spectral diffuse density of photographic audio record on three-component subtractive color films is American National Standard diffuse transmission density as measured with an instrument having a response of 20-nm bandwidth peaking at 800 nm ± 5 nm, with at least 80 percent 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 photo-surfaces 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.

SMPTE STANDARD

ANSI/SMPTE 153-1991
Revision of
ANSI/SMPTE 153-1985

for Motion-Picture Film (8-mm Type S) — 16-mm Film Perforated 8-mm Type S (1-4) — Printed Areas

1 Scope

This standard specifies the location and size of the printed picture area for negative/positive and reversal printing operations on 16-mm motion-picture film perforated 8-mm type S, 2R-1664 or 2R-1667, in row positions 1 and 4.

2 Dimensions

2.1 The dimensions shall be as given in figure 1 and table 1.

2.2 Dimension H is measured from the minus-2 perforation because this perforation position coincides with the perforation used to position the resulting 8-mm print in the projector. (See annex A.1.)

2.3 Two images may be printed on this film. The image area on the left side, not shown in the figure, is symmetrical but opposite in direction to that shown on the right side. The dimensions for each image area, however, are taken from the nearest edge of the film as shown.

NOTES

1 The reduction ratio of prints made from 16-mm negative or reversal originals shall be approximately 1.8:1. The correct ratio is controlled by dimensions C and D.

2 The vertical dimension B of the reduced 8-mm type S image of the original camera aperture image should be nominally centered on the horizontal centerline of the perforation although the exact location will be determined by dimension H and its tolerance.

3 The direction of film travel shown in figure 1 is to aid in illustrating the minus-2 perforation and is the direction of motion in the projector for the resulting 8-mm print if the figure is as seen from the light source of a projector used for direct front projection.

4 If photographic audio is to be applied to the print, it is necessary to consider the required compatibility between this standard and ANSI/SMPTE 182-1990 and the strong trade preference that a clear septum not appear between the edge of the printed picture and the edge of the printed track. Both standards allow overlap (double) printing of adjacent areas of the printed picture and printed track without permitting undesirable incursions of one area into the restricted area of the other. A suggested value of 0.0015 in (0.038 mm) more than minimum may be used until the values are established.

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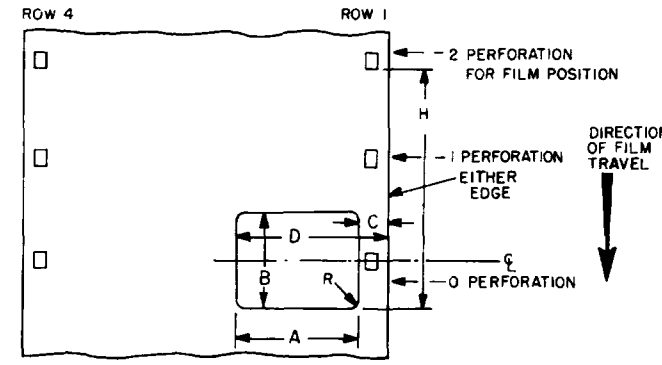

Figure 1

Table 1

Dimensions	Inches	Millimeters
A	0.228 ref	5.79 ref
B	0.163 min	4.14 min
C	0.058 max	1.47 max
D*	0.282 min	7.16 min
H	0.393 ± 0.002	9.98 ± 0.05
R	0.005 max	0.13 max

*See note 4.

Annex A (informative) Additional data

A.1 If prints are made with a step printer, the registration device should be in the minus-2 perforation, or that perforation which corresponds to the minus-2 perforation when the final print stage is reached, to obtain maximum benefit of cancellation as films are projected in accordance with ANSI/SMPTE 154-1988, which specifies the minus-2 perforation for projected films.

A.2 The parenthetical numerals have been added to the title of this standard to specify how the rows of perforations are placed on the film. This designation is necessary only when the film stock is wider than its end use and more than one combination of perforation rows is possible. The perforation rows are numbered starting at the reference edge, which is the edge nearest to that row of perforations which is retained in the slitting operation. The row of perforations which is discarded is given the number 0. Negative or intermediate films which are not slit may contain a 0-numbered row of perforations if that perforated row corresponds to the discard row of perforations on the subsequent print stock.

Annex B (informative) Bibliography

ANSI/SMPTE 154-1988, Motion-Picture Film (8-mm Type S) — Projectable Image Area and Projector Usage

ANSI/SMPTE 157-1988, Motion-Picture Film (8-mm Type S) — Camera Aperture Image and Usage

ANSI/SMPTE 168-1986, Motion-Picture Film (16-mm) — Perforated 8-mm Type S, (1-4)

ANSI/SMPTE 182-1990, Motion-Picture Film (8-mm Type S) — Photographic Audio Record — Release Prints

SMPTE STANDARD

ANSI/SMPTE 179-1991
Revision of
ANSI/SMPTE 179-1985

for Motion-Picture Film (8-mm Type S) — 35-mm Film Perforated 2R (1-0) and 5R (1-3-5-7-0) — Printed Areas

1 Scope

This standard specifies the location and size of the 8-mm type S printed picture areas for negative and intermediate optical reduction printing on 35-mm motion-picture film perforated 2R-1664 in row positions 1 and 0 and for print films derived by optical or contact printing on 35-mm film perforated 5R-1667 in row positions 1, 3, 5, 7, and 0.

2 Dimensions

2.1 The dimensions shall be as given in figure 1 and table 1.

2.2 Dimensions A, B, and H apply to all images. The differences in values from the reference perforation, dimensions B through L, excluding H, establish the minimum area to be printed. For convenience, and to avoid unnecessary addition and subtraction in applying this standard, a reference dimension of 0.311 in (7.90 mm) from the positioning perforation is suggested.

NOTES

1 The vertical dimension B of the reduced 8-mm type S image of the original camera aperture image should be nominally centered on the horizontal centerline of the perforation although the exact location will be determined by dimension H and its tolerance.

2 The direction of film travel shown in figure 1 is to aid in illustrating the minus-2 perforation and is the direction of motion in the projector for the resulting 8-mm print if figure 1 is as seen from the light source of a projector used for direct front projection.

3 If photographic audio is to be applied to the print, it is necessary to consider the required compatibility between this standard and ANSI/SMPTE 182-1990, and the strong trade preference that a clear septum not appear between the edge of the printed picture and the edge of the printed track. Both standards allow overlap (double) printing of adjacent areas of the printed picture and printed track without permitting undesirable incursions of one area into the unrestricted area of the other. A suggested value of 0.0015 in (0.038 mm) less than maximum may be used until the values are established.

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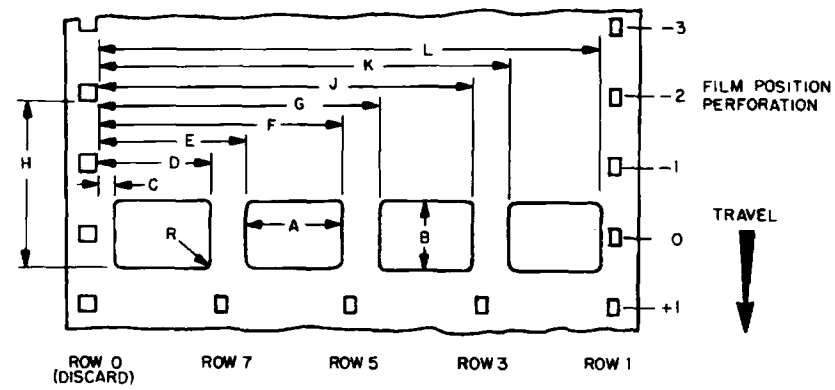

Figure 1

Table 1

Dimensions	Inches	Millimeters
A	0.228 ref	5.79 ref
B	0.163 min	4.14 min
C*	0.047 max	1.19 max
D	0.271 min	6.88 min
E*	0.361 max	9.17 max
F	0.585 min	14.86 min
G*	0.675 max	17.14 max
H†	0.393 ± 0.002	9.98 ± 0.05
J	0.899 min	22.83 min
K*	0.989 max	25.12 max
L	1.213 min	30.81 min
R	0.005 max	0.13 max

*See note 3.
†See note 2 and annex A.1.

Annex A (informative)
Additional data

A.1 If prints are made with a step printer, the registration device should be in the minus-2 perforation, or that perforation which corresponds to the minus-2 perforation, when the final print stage is reached, to obtain maximum benefit of cancellation as films are projected in accordance with ANSI/SMPTE 154-1998, which specifies the minus-2 position for projected films.

A.2 The row position numbers appearing in the scope of this standard specify how the rows of perforations are placed on the film. This designation is necessary only when the film stock is wider than its end use and more than one combination of perforation rows is possible. The perforation rows are numbered starting at the reference edge, which is the edge nearest that row of perforations which is retained in the slitting operation. The row of perforations which is discarded is given the number 0. Negative or intermediate films which are not slit may contain a 0-numbered row of perforations if that perforated row corresponds to the discard row of perforations on the subsequent print stock.

Annex B (informative)
Bibliography

ANSI/SMPTE 154-1988, Motion-Picture Film (8-mm Type S) — Projectable Image Area and Projector Usage

ANSI/SMPTE 157-1988, Motion-Picture Film (8-mm Type S) — Camera Aperture image and Usage

ANSI/SMPTE 165-1988, Motion-Picture Film (35-mm) — Perforated 8-mm Type S, 5R (1-3-5-7-0)

ANSI/SMPTE 182-1990, Motion-Picture Film (8-mm Type S) — Photographic Audio Record — Release Prints

SMPTE STANDARD

ANSI/SMPTE 181-1991
Revision of
ANSI/SMPTE 181-1985

for Motion-Picture Film (8-mm Type S) — 16-mm Film Perforated 8-mm Type S (1-3) — Printed Areas

1 Scope

This standard specifies the location and size of the 8-mm type S printed picture areas for negative/positive and reversal printing on 16-mm motion-picture film perforated 8-mm type S, 2R-1667 and 2R-1664 in row positions 1 and 3.

2 Dimensions

2.1 The dimensions shall be as given in figure 1 and table 1.

2.2 Dimensions A, B, and H apply to all images. The differences in values from the reference perforation, dimensions B through F, establish the minimum area to be printed. For convenience, and to avoid unnecessary addition and subtraction in applying this standard, a reference dimension of 0.311 in (7.90 mm) from the positioning perforation is suggested.

NOTES

1 The reduction ratio of prints made from 16-mm negatives or reversal originals shall be approximately 1.8:1. The correct ratio is controlled by dimensions C through F.

2 The vertical dimension B of the reduced 8-mm type S image of the original camera aperture image should be nominally centered on the horizontal centerline of the perforation although the exact location will be determined by dimension H and its tolerance.

3 The direction of film travel shown in figure 1 is to aid in illustrating the minus-2 perforation and is the direction of motion in the projector for the resulting 8-mm print if figure 1 is as seen from the light source of a projector used for direct front projection.

4 If photographic audio is to be applied to the print, it is necessary to consider the required compatibility between this standard and ANSI/SMPTE 182-1990, and the strong trade preference that a clear septum not appear between the edge of the printed picture and the edge of the printed track. Both standards allow overlap (double) printing of adjacent areas of the printed picture and printed track without permitting undesirable incursions of one area into the unrestricted area of the other. A suggested value of 0.0015 in (0.038 mm) more than minimum may be used until the values are established.

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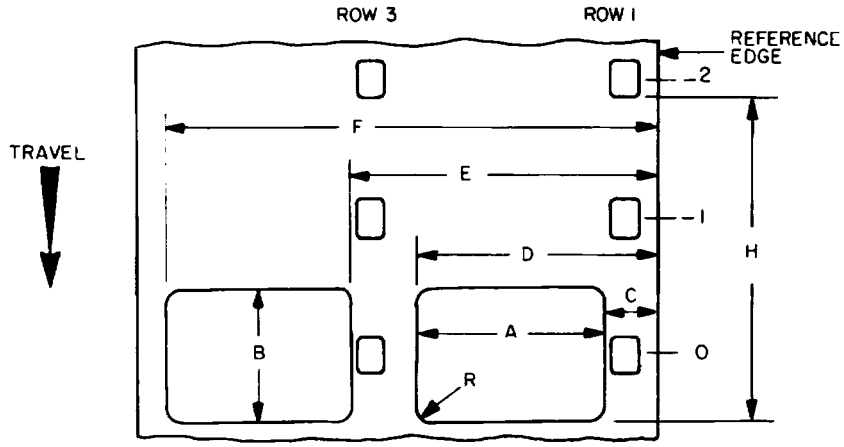

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A	0.228 ref	5.79 ref
B	0.163 min	4.14 min
C	0.058 max	1.47 max
D*	0.282 min	7.16 min
E	0.372 max	9.45 max
F*	0.596 min	15.14 min
H†	0.393 ± 0.002	9.98 ± 0.05
R	0.005 max	0.13 max

*See note 4.
†See note 3 and annex A.1.

Annex A (informative)
Additional data

A.1 If prints are made with a step printer, the registration device should be in the minus–2 perforation, or that perforation which corresponds to the minus–2 perforation, when the final print stage is reached, to obtain maximum benefit of cancellation as films are projected in accordance with ANSI/SMPTE 154-1988, which specifies the minus–2 position for projected films.

A.2 The parenthetical numerals have been added to the title of this standard to specify how the rows of perforations are placed on the film. This designation is necessary only when the film stock is wider than its end use and more than one combination of perforation rows is possible. The perforation rows are numbered starting at the reference edge , which is the edge nearest to that row of perforations which is retained in the slitting operation. The row of perforations which is discarded is given the number 0. Negative or intermediate films which are not slit may contain a 0-numbered row of perforations if that perforated row corresponds to the discard row of perforations on the subsequent print stock.

Annex B (informative)
Bibliography

ANSI/SMPTE 151-1987, Motion-Picture Film (8-mm Type S) — 16-mm Film Perforated 8-mm Type S, (1-3)

ANSI/SMPTE 154-1988, Motion-Picture Film (8-mm Type S) — Projectable Image Area and Projector Usage

ANSI/SMPTE 157-1988, Motion-Picture Film (8-mm Type S) — Camera Aperture Image and Usage

ANSI/SMPTE 182-1990, Motion-Picture Film (8-mm Type S) — Photographic Audio Record — Release Prints