

# Standards and Recommended Practices

## Approved American National Standards

The American National Standards Institute approved two American National Standards on June 27, 1986: ANSI/SMPTE 163-1986, Motion-Picture Film (8-mm Type S) — Magnetic Striping — 35-mm Film Perforated 8-mm Type S, 5R; and ANSI/SMPTE 171-1986, Motion-Picture Film (35-mm) — Perforated 16-mm, 3R (1-3-0). Copies of the standards are available for a nominal fee from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

## Approved SMPTE Recommended Practices

Two SMPTE Recommended Practices were approved by the Society's Executive Committee for Standards Approval: RP 59-1986, Color and Luminance of Review Room Screens for Viewing Motion-Picture Materials Intended for Slides or Film Strips; and RP 18-1986, Specifications for Test Film for Subjective Checking of 16-mm Motion-Picture Audio Projectors. These and other SMPTE Recommended Practices are available from Society Headquarters for \$3.00 each.

— *Sherwin H. Becker, Manager of Engineering*

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# American National Standard for motion-picture film (8-mm type S) — magnetic striping — 35-mm film perforated — 8-mm type S, 5R

Approved June 27, 1986  
Sponsor: Society of Motion Picture and Television Engineers

## 1. Scope

This standard specifies the location and dimensions of the magnetic recording stripes and the balance stripes applied to 35-mm motion-picture film with four rows of 8-mm Type S perforations and one row of special perforations.

## 2. Referenced American National Standards

This standard is intended for use in conjunction with the following American National Standards:  
ANSI/SMPTE 161-1986, Motion-Picture Film (8-mm Type S)—Magnetic Striping  
ANSI PH22.165-1981, Dimensions for 35-mm Motion-Picture Film Perforated 8-mm Type S, 5R (1-3-5-7-0)

## 3. Dimensions

**3.1** The location and dimensions of the magnetic recording stripes and balance stripes shall be as given in the figure and table.  
**3.2** The magnetic striping material shall be applied to the surface of the film away from a camera or projector lens, for example, toward the light source of a projector arranged for direct front projection on a reflection-type screen.

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**3.3** The stripes designated as "recording" are made of a magnetic material and are intended for the audio record. The balance stripes may be stripes of magnetic or nonmagnetic material of such thickness that the balance and recording stripes project above the surface of the film to substantially the same degree.

## 4. Film Stock

The film stock used shall be safety type, cut and perforated in accordance with ANSI PH22.165-1981.

**NOTE 1:** The width and edge-to-perforation distance of the 8-mm slit strip shall be in accordance with ANSI PH22.165-1981. The location of the magnetic recording and balance stripes shall be in accordance with ANSI/SMPTE 161-1986. Consequently, it is not possible to take full advantage of the tolerance of both the slit width and the location of the magnetic recording and balance stripes.

**NOTE 2:** Tolerances for the recording stripes and balance stripes are specified to permit usage of a single wide stripe or two separate stripes where they are adjacent. If two stripes are used, the amount of separation between the stripes should be sufficient to permit slitting within the requisites of the standard without obtaining undesirable feather edges of magnetic material. The separation required is determined by laboratory practice.

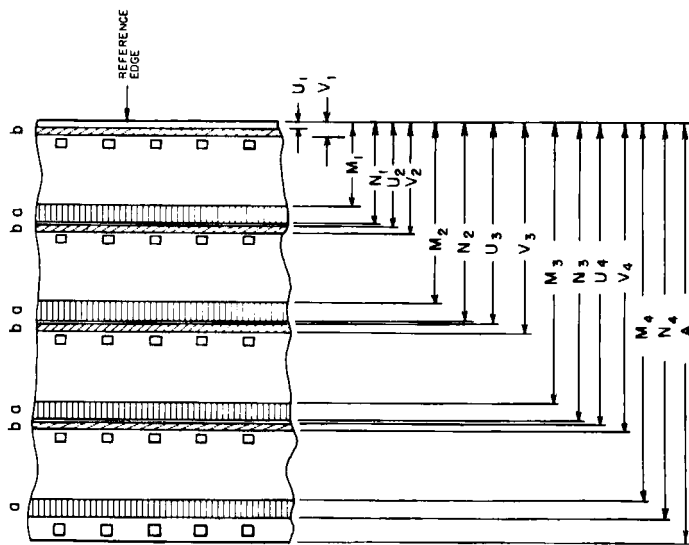
**NOTE 3:** Notwithstanding the tolerance on Dimensions  $M_1$ ,  $N_1$ ,  $M_2$ ,  $N_2$ ,  $M_3$ ,  $N_3$ ,  $M_4$  and  $N_4$ , the width of the stripe, Dimension  $N$  minus  $M$ , shall be 0.0250 in (0.635 mm) minimum.

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(C) MAGNETIC RECORDING STRIPES (D) BALANCE STRIPES



Dimensions	Inches	Millimeters
A	1.377	nom
$M_1^*$	0.315 ± 0.002	8.00 ± 0.05
$M_2^*$	0.629 ± 0.002	15.98 ± 0.05
$M_3^*$	0.943 ± 0.002	23.95 ± 0.05
$M_4^*$	1.257 ± 0.002	31.93 ± 0.05
$N_1^*$	0.342 ± 0.002	8.69 ± 0.05
$N_2^*$	0.656 ± 0.002	16.66 ± 0.05
$N_3^*$	0.970 ± 0.002	24.64 ± 0.05
$N_4^*$	1.284 ± 0.002	32.61 ± 0.05
$U_1$	0.033 ± 0.003	0.84 ± 0.08
$U_2$	0.347 ± 0.003	8.81 ± 0.08
$U_3$	0.661 ± 0.003	16.79 ± 0.08
$U_4$	0.975 ± 0.003	24.76 ± 0.08
$V_1$	0.045 ± 0.003	1.14 ± 0.08
$V_2$	0.359 ± 0.003	9.12 ± 0.08
$V_3$	0.673 ± 0.003	17.09 ± 0.08
$V_4$	0.987 ± 0.003	25.07 ± 0.08

\*See Note 3.

# American National Standard motion-picture film (35-mm) — perforated 16-mm, 3R (1-3-0)

Approved June 27, 1986  
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## 1. Scope

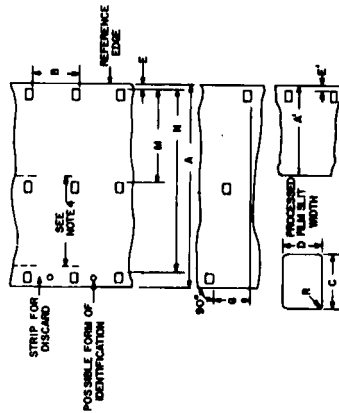
This standard specifies the cutting and perforating dimensions for 35-mm motion-picture film with 16-mm perforations in positions 1-3-0 and a perforation pitch of either 0.2994 or 0.3000 in (7.605 or 7.620 mm). The width of the 16-mm strip after processing and slitting is also specified.

## 2. Referenced American National Standards

This standard is intended for use in conjunction with the following American National Standards: ANSI PH22.75-1975 (R1982), Designation of A and B Windings for Motion-Picture Raw Stock ANSI/SMPTE 223M-1985, Motion-Picture Film—Safety Film

## 3. Dimensions

**3.1** The dimensions shall be as given in the figure and table.  
**3.2** The dimensions pertain to a safety film as defined in ANSI/SMPTE 223M-1985.



**3.3** Except for Dimensions A' and E', the dimensions apply at the time of cutting and perforating for film adjusted to a temperature of 23°C = 73°F (nominally converted to 73°F = 23°C) and a relative humidity of 50 ± 2 percent. The manufacturer may indicate other nominal temperature and humidity conditions under which the dimensions apply. Dimensions A' and E' apply immediately after slitting.

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	Dimensions	Inches	Millimeters
A	Film width	1.377 ± 0.001	34.975 ± 0.025
A'	Film width after processing and slitting	0.627 ± 0.002	15.93 ± 0.05
B	Perforation pitch (long)	0.3000 ± 0.0004	7.620 ± 0.010
B'	Perforation pitch (short)	0.2994 ± 0.0004	7.605 ± 0.010
C	Perforation width	0.0720 ± 0.0004	1.829 ± 0.010
D	Perforation height	0.0500 ± 0.0004	1.270 ± 0.010
E	Reference edge to first perforation row	0.0355 ± 0.0020	0.902 ± 0.051
E'	Edge to perforation after processing and slitting	max	0.03 max
G	Perforation misalignment	30.00 ± 0.03	762.0 ± 0.8
L	100 consecutive perforation pitches	29.94 ± 0.03	760.5 ± 0.8
L'	100 consecutive perforation pitches		
M	Reference edge side of first perforation row to second perforation row	0.628 ± 0.001	15.95 ± 0.03
N	Reference edge side of first perforation row to third perforation row	1.234 ± 0.001	31.34 ± 0.03
R	Radius of perforation fillet	0.010 ± 0.001	0.25 ± 0.03

**NOTE 1:** The title of this standard was established by the application of a nomenclature system developed for all film dimension standards. Each title provides an indication of the film width, a code designation for the perforation shape (BH, KS, DH, or CS) or the number of rows of perforations (1R, 2R, etc.), depending upon which is the significant factor, or the perforation pitch without the decimal point.

The numerals (1-3-0) 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. For 16 mm-type perforations on 35 mm-width film, a maximum of four usable rows of perforations is possible. The perforation rows shall be numbered starting at the reference edge. The reference edge is the edge nearest to that row of perforations which is retained in one of the 16-mm strips that may be generated by appropriate slitting of the parent 35-mm film. A row of perforations which is discarded will always be 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. For all films with nonsymmetrical perforation rows, there could be two

different windings for the same numbered rows of perforations. Film perforated 1-0 would be 1-0 regardless of winding, but depending on the location of the reference edge, the winding would be A or B, according to ANSI PH22.75-1975, which has been expanded to include all nonsymmetrically perforated film.

**NOTE 2:** The perforations in the 0-numbered discard row are provided with a visible means of identification.

**NOTE 3:** Dimension A' represents the film width and Dimension E' the edge-to-perforation distance after slitting a nominal 16-mm strip from the exposed and processed parent 35 mm-width film. In deriving the dimension of 0.627 in (15.93 mm), the specified film shrinkage characteristics described in Appendix A2 have been taken into account. Notwithstanding accumulation of tolerances, A' and E' shall be as specified.

**NOTE 4:** The dotted lines in the figure indicate the edge of the 16-mm cuts after slitting.

**NOTE 5:** The metric conversion of Dimension A is purposely chosen and shown to three decimal places to prevent the maximum width dimension from exceeding 35 mm.

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ANSI/SMPTE 171-1986

**Appendix**

(This Appendix is not part of the American National Standard, but is included for information only.)

**A1.** The user is reminded that, as a plastic, film can change dimensions temporarily due to moisture or temperature, or permanently due to solvent loss or strain effect.

**A2.** Film for positive use has a longitudinal pitch 0.2 percent longer than its companion negative. Shrinkage of the negative during aging and processing prior to printing will generally not exceed 0.2 percent. Thus, the negative stock is expected to be 0.3 = 0.1 percent shorter than the positive. This difference will minimize slippage between the two on the 12-in (305-mm) circumference sprocket of the printer, assuming a film thickness of 0.0055 to 0.0065 in (0.140 to 0.165 mm).

**A3.** The uniformity of pitch, hole size, and margin (Dimensions B, C, D, and E) is an important variable affect-

ing steadiness. Variations in these dimensions, from roll to roll, are of little significance compared to variations from one perforation to the next within any small group of consecutive perforations. As an example, the uniformity of the margin is uniquely critical for optical printing. During the printing process, the placement of the image on the film is usually with respect to successive lateral pairs of perforations at one-frame intervals. During subsequent projection, however, the portion of the image projected is usually located, not by these perforations, but by the edge of the film. The lateral steadiness of the projected image is, therefore, directly related to the frame-to-frame uniformity of the margin.

**A4.** For historical background on the development of this standard, refer to A. J. Miller and A. C. Robertson, "Motion-picture film—its size and dimensional characteristics," Jour. SMPTE, 74: 3-11, Jan. 1965.

**SMPTE RECOMMENDED PRACTICE**

**RP 59-1986**

*Color and Luminance of Review Room Screens for Viewing Motion-Picture Materials Intended for Slides or Film Strips*



**1. Scope**

This practice specifies the luminance (photometric brightness) and color quality of projection illumination in review rooms for prints on motion-picture film intended for ultimate use as slides or film strips.

( $x = 0.41$ ,  $y = 0.41$ ), which is the approximate color quality produced by a 3200 K (incandescent) lamp burned at its rated voltage as modified by normal lamphouse optics and heat-absorbing filter in the projector.

**3. Special Applications**

Prints balanced for higher color temperatures may be requested when use conditions are known to require them for optimum quality (such as for xenon or arc projection or for television). American National Standard for Motion-Picture Film—Screen Luminance and Viewing Conditions—Indoor Theater Projection. ANSI/SMPTE 196M-1986, encompasses the above specifications as part of a broader set of specifications and gives detailed descriptions of methods of measure-ment and surrounding conditions. SMPTE Recommended Practice RP 41-1983, Evaluation of Color Films Intended for Television, should be used when slides are specifically requested for television.

**2. Luminance Level**

The luminance (photometric brightness) at the center of the screen shall be  $16 \pm 2$  footlamberts ( $55 \pm 7$  candelas per square meter), measured within the standard observing area with the projector in complete operation but with no film in the aperture.

**3. Spectral Distribution**

The color quality of the projected light reflected from the screen surface shall approximate the spectral distribution of a black body at a color temperature between 3200 K ( $x = 0.42$ ,  $y = 0.40$ ) and 3450 K

**Appendix**

(This Appendix is not part of the SMPTE Recommended Practice, but is included for information only.)

It is the purpose of this practice to specify the brightness and color quality of standard review room conditions for the subjective evaluation of motion-picture prints in the laboratory when the intended use of the prints will be as slides or film strips.

They are the same from laboratory to laboratory, there should be greater consistency in "standard" prints from various sources.

Because the conditions of ultimate use may vary greatly in terms of such factors as screen brightness and ambient light, it is quite possible that prints may be ordered at densities greater or less than normal.

If the viewing conditions used to establish "normal" print-laboratory conditions of density and color balance for any labo-

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