SMPTE 139-2003
Revision of
ANSI/SMPTE 139-1996

SMPTE STANDARD

for Motion-Picture Film (35-mm) — Perforated KS

1 Scope

This standard specifies the cutting and perforating dimensions for 35-mm motion-picture film with a KS-type perforation and a perforation pitch of either 0.1866 in or 0.1870 in (4.740 mm or 4.750 mm).

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the edition indicated was 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 standard indicated below.

SMPTE 223M-2001, 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 SMPTE 223M.

3.3 The dimensions apply at the time of cutting and perforating for film adjusted to a temperature of 23°C ± 1°C (nominally converted to 73°F ± 2°F) and a relative humidity of (50 ± 2)%. The manufacturer may indicate other nominal temperature and humidity conditions under which the dimensions apply.

NOTES

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.

2 The metric conversion of dimension A is purposely chosen and shown to three decimal places to prevent the maximum width dimensions from exceeding 35 mm.

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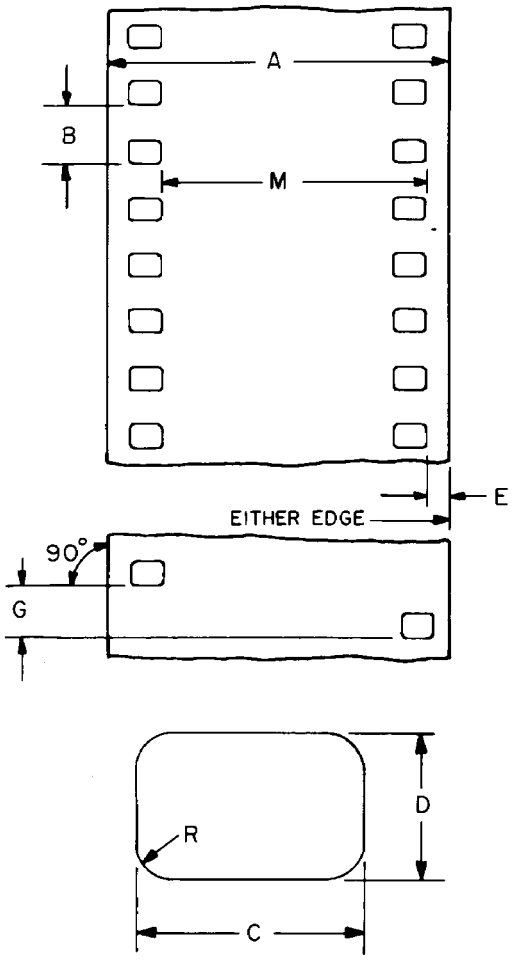

Figure 1 – Dimensions

Table 1 – Specifications

Dimensions		Inches			Millimeters		
A	Film width	1.377	±	0.001	34.975	±	0.025
B	Perforation pitch (long)	0.1870	±	0.0004	4.750	±	0.010
B'	Perforation pitch (short)	0.1866	±	0.0004	4.740	±	0.010
C	Perforation width	0.1100	±	0.0004	2.794	±	0.010
D	Perforation height	0.0780	±	0.0004	1.981	±	0.010
E	Edge to perforation	0.079	±	0.002	2.01	±	0.05
G	Perforation misalignment	0.001		max	0.03		max
L	100 consecutive perforation pitches (long)	18.700	±	0.015	474.98	±	0.38
L'	100 consecutive perforation pitches (short)	18.660	±	0.015	473.96	±	0.38
M	Lateral perforation displacement	1.109	±	0.001	28.17	±	0.03
R	Radius of perforation fillet	0.020	±	0.001	0.51	±	0.03

Annex A (informative)
Additional data

A.1 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.

A.2 Film for positive use has a longitudinal pitch 0.2% longer than its companion negative. Shrinkage of the negative during aging and processing prior to printing will generally not exceed 0.2%. Thus, the negative stock is expected to be 0.3% ± 0.1% 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 in to 0.0065 in (0.140 mm to 0.165 mm).

A.3 The uniformity of pitch, hole size, and margin (dimensions B, C, D, and E) is an important variable affecting 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.

A.4 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," Journal of the SMPTE, 74: 3-11, January 1965.