

for Motion-Picture Film (70-mm) — Perforated 65-mm, KS-1870



1 Scope

This standard specifies the cutting and perforating dimensions for 70-mm motion-picture film perforated 65-mm, with a KS-type perforation and a perforation pitch of 0.1870 in (4.750 mm).

2 Dimensions

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

2.2 The dimensions pertain to a safety film as defined in SMPTE 223M.

2.3 The dimensions apply at the time of cutting and perforating for film adjusted to a temperature of $23^{\circ}\text{C} \pm 1^{\circ}\text{C}$ (nominally converted to $73^{\circ}\text{F} \pm 2^{\circ}\text{F}$) and a relative humidity of $(50 \pm 2)\%$. The manufacturer may indicate other nominal temperature and humidity conditions under which the dimensions apply.

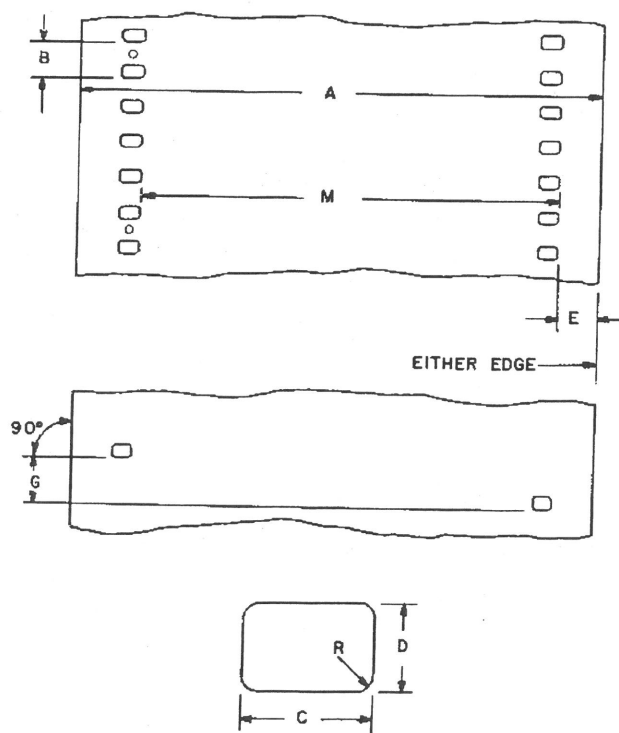


Figure 1 – 70-mm perforated 65-mm

Table 1 – Specifications

Dimensions		Inches	Millimeters
A	Film width	2.754 ± 0.002	69.95 ± 0.05
B	Perforation pitch	0.1870 ± 0.0004	4.750 ± 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	0.215 ± 0.002	5.46 ± 0.05
G	Perforation misalignment	0.001 max	0.03 max
L	100 consecutive perforation pitches	18.700 ± 0.015	474.98 ± 0.38
M	Lateral perforation displacement	2.214 ± 0.003	56.24 ± 0.08
R	Radius of perforation fillet	0.020 ± 0.001	0.51 ± 0.03

2.4 A frameline location identifier, i.e., a punched perforation, an inked spot, or a latent image, shall be positioned at an interval of every five perforations along one edge, as shown in figure 1. (The identifier is used for positioning audio records on release prints.)

NOTE – 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.

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 strain effect or, in some film base materials, due to solvent or plasticizer loss.

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 Film described in this standard is used in making prints from 65-mm film described in SMPTE 145.

Note that the 70-mm film used with 65-mm negative differs in its dimensions from the two films described by ISO 14546. The perforations have the same size and pitch as those described by ISO 14546, type II, but the margin and distance between perforations are different. Consequently, dimension M is the same in both 65-mm KS-1870 and KS-1866 films and also for 70-mm film perforated 65-mm, KS-1870. The increased space provided by a larger margin E is used to make room for magnetic audio records. Note that the image usually placed on this film is five pitches high. The manufacture of the film is based on this idea and best results accrue from using this format.

A.5 For historical background on the development of this standard, refer to Miller, A.J. and Robertson, A.C. Motion-picture film — Its size and dimensional characteristics. Journal of the SMPTE 74: 3-11; January 1965.

Annex B (informative)
Bibliography

SMPTE 145-1999, Motion-Picture Film (65-mm) — Perforated KS

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

ISO 14546:2000, Photography — Aerial Films and Spools — Dimensions