SMPTE ST 119:2011
Revision of
SMPTE 119-2004

SMPTE STANDARD

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

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Approved
October 3, 2011

Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Administrative Practices.

SMPTE ST 119 was prepared by the Film Applications Technology Committee 20F.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Standard. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

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 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.
The keyword “reserved” indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword “forbidden” indicates “reserved” and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified the order of precedence of the types of normative information in this document shall be as follows. Normative prose shall be the authoritative definition. Tables shall be next, followed by formal languages, then figures, and then any other language forms.

3 Normative References

Note: All references in this document to other SMPTE documents use the current numbering style (e.g. SMPTE ST 145:2004) although, during a transitional phase, the document as published (printed or PDF) may bear an older designation (such as SMPTE 145-2004). Documents with the same root number (e.g. 145) and publication year (e.g. 2004) are functionally identical.

The following standards contain provisions which, through reference in this text, constitute provisions of this recommended practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this recommended practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE ST 145:2004, Motion-Picture Film (65-mm) — Perforated KS

SMPTE ST 223:2001, Motion-Picture Film — Safety Film

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

4 Dimensions

4.1 The dimensions shall be as given in Figure 1 and Table 1.

4.2 The dimensions pertain to a safety film as defined in SMPTE ST 223.

4.3 The dimensions apply at the time of cutting and perforating for film acclimated 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.

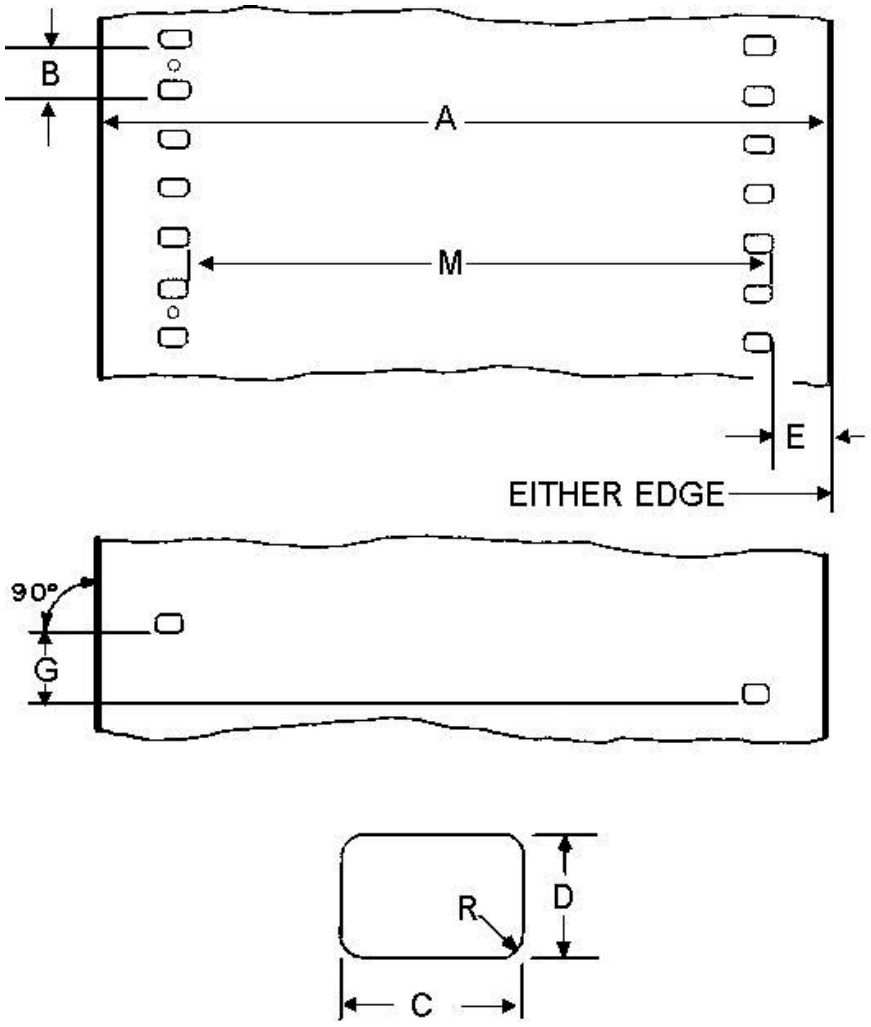

Figure 1 – 70-mm Perforated 65-mm

Table 1 – Specifications

	Dimensions	Inches	Millimeters
A	Film width	2.754 ± 0.002	69.95 ± 0.05
B	Perforation pitch	0.1870 ± 0.0004	4.75 ± 0.01
C	Perforation width	0.1100 ± 0.0004	2.794 ± 0.01
D	Perforation height	0.0780 ± 0.0004	1.981 ± 0.01
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

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 Older 70-mm Print Films were produced with a frameline location identifier; i.e., a punched perforation, an inked spot, or a latent image. This identifier was positioned at an interval of every five perforations along one edge, as shown in figure 1. (The identifier was used for positioning audio records on release prints.)

3 The inch values are the basic values from which the metric values were derived.

Annex A Additional Data (Informative)

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 ST 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.