Draft American National Standard

Dimensions for 70 mm Motion-Picture Film Perforated 65 mm, KS-1870

PH22.119

Revision of PH22.119-1967

1. Scope

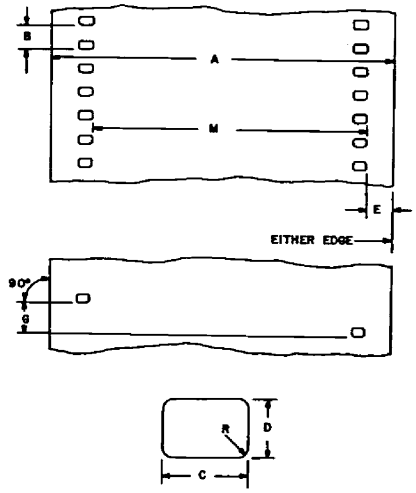
This standard specifies the cutting and perforating dimensions for 70 mm motion-picture film perforated 65 mm, with a KS-type perforation and a perforation pitch of 0.1870 in (4.750 mm).

2. Dimensions

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

2.2 The dimensions pertain to a safety film as defined in American National Standard Specifications for Motion-Picture Safety Film, PH22.31-1973 (R-1967).

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



	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 ± 0.003	5.46 ± 0.08
G	Perforation misalignment	0.002 max	0.05 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

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.

NOTE 2: The metric values in the table of dimensions are converted from the inch values in accordance with conversion principles outlined in American National Standard Practice for Inch-Millimeter Conversion for Industrial Use, B48.1-1947 (R-1933).

Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes 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-inch (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 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.

A4. Film described in this standard is used in making prints from 65 mm film described in American National Standard Dimensions for 65 mm Motion-Picture Film, KS-1866, PH22.145-1965.

Note that the 70 mm film used with 65 mm negative differs in its dimensions from the two films described by American National Standard Dimensions for 70 mm Unperforated and Perforated Film for Cameras Other Than Motion-Picture Cameras, PH1.20-1970, Type I and Type II. The perforations have the same size and pitch as those described by PH1.20-1970, 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 sound 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.

A5. 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.

Draft American National Standard

Dimensions for 65 mm Motion-Picture Film Perforated KS

PH22.145

Revision of
PH22.145-1965
and
PH22.118-1967

1. Scope

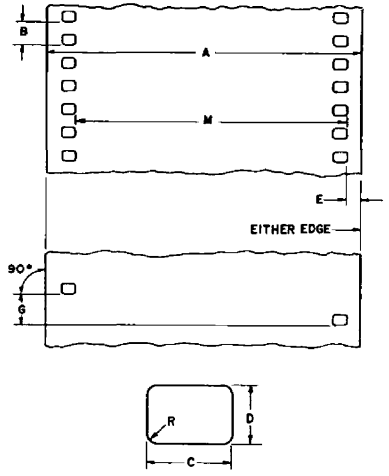
This standard specifies the cutting and perforating dimensions for 65 mm motion-picture film with a KS-type perforation and a perforation pitch of either 0.1866 or 0.1870 in (4.740 or 4.750 mm).

2. Dimensions

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

2.2 The dimensions pertain to a safety film as defined in American National Standard Specifications for Motion-Picture Safety Film, PH22.31-1973 (R-1967).

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



	Dimensions	Inches	Millimeters
A	Film width	2.558 ± 0.002	64.97 ± 0.05
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	0.117 ± 0.003	2.97 ± 0.08
G	Perforation misalignment	0.002 max	0.05 max
L	100 consecutive perforation pitches	18.700 ± 0.015	474.98 ± 0.38
L′	100 consecutive perforation pitches	18.660 ± 0.015	473.96 ± 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

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.

NOTE 2: The metric values in the table of dimensions are converted from the inch values in accordance with conversion principles outlined in American National Standard Practice for Inch-Millimeter Conversion for Industrial Use, B48.1-1947 (R-1933).

Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes 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 unprocessed negative. Shrinkage of the negative during aging and processing prior to printing will generally not exceed 0.2 percent. Thus, the processed negative stock is expected to be 0.3 ± 0.1 percent shorter than the unprocessed positive. This difference will minimize slippage between the two on the 12-inch (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 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 sucessive 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. Film of this size is generally used as a camera negative. There are two advantages in using this larger size. One is the possibility of producing large prints by contact printing for exhibition in special theaters designed to provide the audience with a large viewing angle. The other purpose is to serve as an original from which 35 mm prints can be produced by reduction with less grain and better definition than can be obtained by making contact prints from 35 mm negatives.

Prints may be made on 70 mm film. The appropriate film is described in American National Standard Dimensions for 70 mm Motion-Picture Film Perforated 65 mm, KS-1870, PH22.119-1967. Note that the 70 mm film used with 65 mm negative differs in its dimensions from the two films described by American National Standard Dimensions for 70 mm Unperforated and Perforated Film for Cameras Other Than Motion-Picture Cameras, PH1.20-1970, Type I and Type II. The perforations have the same size and pitch as those described by PH1.20-1970, 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 sound 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.

A5. 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.

Draft American National Standard

Dimensions for 8 mm Motion-Picture Film

Perforated Super 8, 1R

PH22.149

Revision of
PH22.149-1967

1. Scope

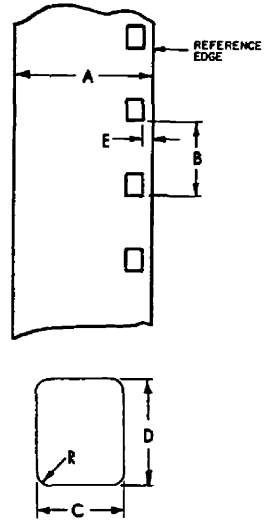
This standard specifies the cutting and perforating dimensions for 8 mm motion-picture film with super 8 perforations along one edge and a perforation pitch of either 0.1664 or 0.1667 in (4.227 or 4.234 mm).

2. Dimensions

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

2.2 The dimensions pertain to a safety film as defined in American National Standard Specifications for Motion-Picture Safety Film, PH22.31-1973 (R-1967).

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



	Dimensions	Inches	Millimeters
A	Film width	0.3140 ± 0.0015	7.976 ± 0.038
B	Perforation pitch (long)	0.1667 ± 0.0004	4.234 ± 0.010
B′	Perforation pitch (short)	0.1664 ± 0.0004	4.227 ± 0.010
C	Perforation width	0.0360 ± 0.0004	0.914 ± 0.010
D	Perforation height	0.0450 ± 0.0004	1.143 ± 0.010
E	Edge to perforation	0.020 ± 0.002	0.51 ± 0.05
L	100 consecutive perforation pitches	16.670 ± 0.017	423.42 ± 0.43
L′	100 consecutive perforation pitches	16.640 ± 0.017	422.66 ± 0.43
R	Radius of perforation fillet	0.005 ± 0.001	0.13 ± 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.

NOTE 2: The metric values in the table of dimensions are converted from the inch values in accordance with conversion principles outlined in American National Standard Practice for Inch-Millimeter Conversion for Industrial Use, B48.1-1947 (R-1933).

Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes 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 unprocessed negative. Shrinkage of the negative during aging and processing prior to printing will generally not exceed 0.2 percent. Thus, the processed negative stock is expected to be 0.3 ± 0.1 percent shorter than the unprocessed positive. This difference will minimize slippage between the two on the 12-inch (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 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 sucessive 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.

Draft American National Standard

Dimensions for 16 mm Motion-Picture Film Perforated Super 8, (1-3)

PH22.151

Revision of
PH22.151-1967
and
PH22.150-1967

1. Scope

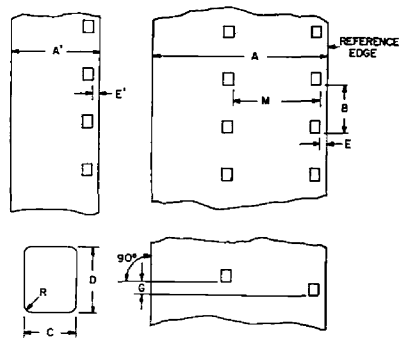
This standard specifies the cutting and perforating dimensions for 16 mm motion-picture film with super 8 perforations in positions 1 and 3 and a perforation pitch of either 0.1664 or 0.1667 in (4.227 or 4.234 mm). The width of the 8 mm strip after processing and slitting is also specified.

2. Dimensions

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

2.2 The dimensions pertain to a safety film as defined in American National Standard Specifications for Motion-Picture Safety Film, PH22.31-1973 (R-1967).

2.3 Except for Dimensions A′ and E′, the dimensions apply at the time of cutting and perforating for film adjusted to a temperature of 23 ± 1°C (nominally converted to 73 ± 2°F) and a relative humidity of 50 ± 2 percent. The manufacturer may indicate other nominal humidity conditions under which the dimensions apply. Dimensions A′ and E′ apply immediately after processing and slitting.



Dimensions		Inches	Millimeters
A	Film width	0.628 ± 0.001	15.95 ± 0.03
A′	Film width after slitting	0.314 ± 0.002	7.98 ± 0.05
B	Perforation pitch (long)	0.1667 ± 0.0004	4.234 ± 0.010
B′	Perforation pitch (short)	0.1664 ± 0.0004	4.227 ± 0.010
C	Perforation width	0.0360 ± 0.0004	0.914 ± 0.010
D	Perforation height	0.0450 ± 0.0004	1.143 ± 0.010
E	Edge to perforation	0.020 ± 0.002	0.51 ± 0.05
E′	Edge to perforation after slitting	0.020 ± 0.002	0.51 ± 0.05
G	Perforation misalignment	0.001 max	0.03 max
L	100 consecutive perforation pitches	16.670 ± 0.017	423.42 ± 0.43
L′	100 consecutive perforation pitches	16.640 ± 0.017	422.66 ± 0.43
M	Lateral perforation displacement	0.314 ± 0.001	7.98 ± 0.03
R	Radius of perforation fillet	0.005 ± 0.001	0.13 ± 0.03

NOTE 1: The principal use of film stock perforated 0.1667 inch is for the production of prints. The principal use of the stock perforated 0.1664 inch is as an intermediate film in the production of prints.

NOTE 2: The metric values in the table of dimensions are converted from the inch values in accordance with conversion principles outlined in American National Standard Practice for Inch-Millimeter Conversion for Industrial Use, B48.1-1947 (R-1933).

NOTE 3: 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) 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 shall be numbered starting at the reference edge. The reference edge is that edge of the strip nearest to the perforations which is retained on one of the slit prints that is not discarded in any subsequent slitting. The designation 1 through 4 of 16 mm films indicates that the perforations are in row

1 — adjacent to the reference edge
2 — on the reference side of center
3 — on the nonreference side of center
4 — adjacent to the nonreference edge

when the film end is observed from the base side with the wound roll above and away from the point of observation.

There can be two different windings for the same numbered rows of perforations. This applies, however, only when the film is perforated in the 1-3 position and the designation of the film would be 1-3, regardless of winding. Winding could be A or B, depending upon the location of the reference edge. (Refer to American National Standard Designation of A and B Windings for Motion-Picture Raw Stock, PH22.75-1969.)

Appendix

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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 unprocessed negative. Shrinkage of the negative during aging and processing prior to printing will generally not exceed 0.2 percent. Thus, the processed negative stock is expected to be 0.3 ± 0.1 percent shorter than the unprocessed positive. This difference will minimize slippage between the two on the 12-inch (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 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 sucessive 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.