ANSI/SMPTE 200M-1988
Revision and Redesignation of
ANSI PH22.200M-1982

American National Standard

for motion-picture equipment (8-mm type S)—model 1 camera cartridge—camera run length, perforation cutout and end-of-run notch

Approved September 30, 1988 Sponsor: Society of Motion Picture and Television Engineers

1. Scope

1.1 This standard describes the camera run length, perforation cutout notch, and end-of-run notch of film supplied in 8-mm type S model 1 motion-picture film camera cartridges of 15- and 60-m (50- and 200-ft) nominal capacity, and the length of film returned to the customer.

1.2 The purpose of this standard is to provide a uniform basis for the operation of footage counters in cameras.

2. Referenced American National Standards

This standard is intended for use in conjunction with the following American National Standards:

ANSI/SMPTE 159.1-1986, Motion-Picture Film (8-mm Type S)—Model 1 Camera Cartridge, Cartridge-Camera Interface and Take-Up Core Drive

ANSI/SMPTE 197-1986, Motion-Picture Film (8-mm Type S)—50-Ft Model 1 Sound Camera Cartridge—Cartridge, Cartridge-Camera Interface and Take-Up Core

ANSI/SMPTE 205-1988, Motion-Picture Equipment (8-mm Type S)—Model 1 Camera Cartridge—Interface and Take-Up Core Drive (200-Ft Capacity)

3. Camera Run and Customer Return Lengths

3.1 15-m (50-ft) Capacity Cartridge

3.1.1 The camera run length of film may vary between 3666 and 3715 perforation pitch intervals (15.52 and 15.73 m [50.919 and 51.608 ft]). (See Note 1.) The overall length of the film shall be determined by the manufacturer and shall provide the camera run length specified.

3.1.2 The length of film returned to the customer shall contain a minimum of 3600 perforation pitch intervals. The customer return length shall be that portion of the camera run length available for subject matter which starts at least 13 perforation pitch intervals (55 mm [2.17 in]) after the frame located at the camera aperture, as the cartridge is supplied by the manufacturer, and ends at least 37 perforation pitch intervals (157 mm [6.18 in]) short of the limit as provided by a perforation cutout. (See Appendix A1.)

3.2 60-m (200-ft) Capacity Cartridge

3.2.1 The camera run length of film may vary between 14 450 and 14 530 perforation pitch intervals (61.18 and 61.52 m [200.722 and 201.837 ft]). (See Note 1.) The overall length of the film shall be determined by the manufacturer and shall provide the camera run length specified.

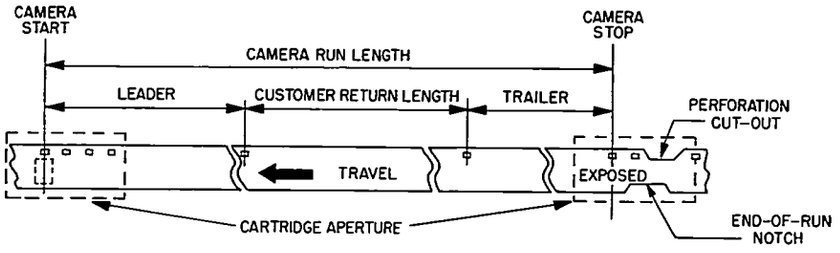


Fig. 1
Camera Run Length and Notches

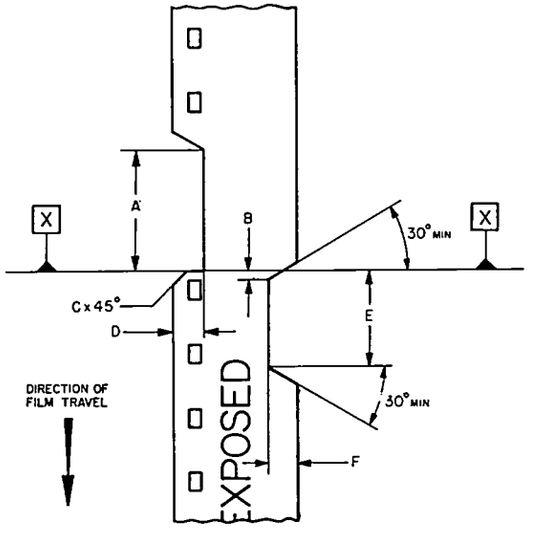


Fig. 2
Notch Dimensions

Dimensions	Millimeters		Inches	
A*	5.38	min	0.212	min
B†	0.30	max	0.012	max
C	0.55	max	0.022	max
D	1.50	min	0.059	min
E	4.75 ± 0.75		0.187 ± 0.030	
F	0.80	min	0.031	min

*See 4.2
†See 4.6

3.2.2 The length of film returned to the customer shall contain a minimum of 14 400 perforation pitch intervals. The customer return length shall be that portion of the camera run length available for subject matter which starts at least 13 perforation pitch intervals (55 mm [2.17 in]) after the frame located at the camera aperture, as the cartridge is supplied by the manufacturer, and ends at least 37 perforation pitch intervals (157 mm [618 in]) short of the limit as provided by a perforation cutout. (See Appendix A1.)

3.3 The end of the film shall have a visual marking in the frame area, and a means shall be provided of stopping the final portion of the film in the film cartridge aperture, affording the user visual confirmation that all the film has been exposed. (See Appendix A2.)

4. Perforation Cutout and End-of-Run Notches

4.1 The dimensions shall be as given in Fig. 2 and the table.

4.2 Datum line X (see Fig. 2) is established by the leading edge of the perforation cutout, which is the last edge of the film to be contacted by the camera pull-down claw. It is recognized that in some manufacturing operations the perforation cutout notch leading edge may intersect a perforation. When a perforation is intersected, Datum line X is established by the leading edge of the perforation.

4.3 The beveled cut shown at the trailing edge of the perforation cutout is not a requirement of this standard. Some bevel is desirable, however, to reduce the possibility of catching or snagging the edge of the notch in the internal mechanism of the cartridge.

4.4 The 30-degree minimum beveled cuts at the ends of the end-of-run notch are to facilitate the entry of the camera's sensing finger and to reduce the possibility of catching or snagging the edge of the notch in the internal mechanism of the cartridge.

4.5 The inside and outside corners of the notches shall have a maximum radius of 0.3 mm (0.01 in).

4.6 Dimension B for the end-of-run notch shown in Fig. 2 is expressed as a maximum to ensure a minimum notch length. There is no functional need to specify a maximum notch length. The trailing edge of the notch, specified by dimension B, may approach or cross datum line X so that the notch length could extend to the end of the film, provided the notch depth, dimension F, is maintained.

NOTE 1: A nominal pitch, based on 72 perforation pitch intervals per foot, of 4.234 mm (0.1667 in) is assumed for all comparisons of the number of perforation pitch intervals in a given film length.

NOTE 2: The sum of the minimum customer return length, leader, and trailer is intentionally less than the minimum camera run length. This difference provides a tolerance for the film processor in unloading the cartridge, making processing machine splices, and the like.

Appendix

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

A1. The lengths specified for the leader and trailer are necessary to avoid image fogging near the aperture. The leader and trailer also provide space for identification numbers and allow for manufacturing variability of film lengths.

A2. For sound cartridges, it is suggested that positive means of stopping the film at the end of the camera run be provided to prevent the film end from being completely wound into the cartridge. This could be accomplished by a mechanical latching arrangement activated by changes in the film path through the cartridge at the time that film transport through the picture aperture ceases as a result of the presence of the perforation cutout notch. A technique to accomplish this involves the use of a projection over which a hole in the film can be made to drop during the collapse of the loop between the picture and sound recording areas of the cartridge.

A3. When a punch and die set is used to cut both perforation and end-of-run notches simultaneously, the dimension equivalent to dimension E may utilize the entire range from 4.00 to 5.50 mm (0.157 to 0.217 in). However, the set may be designed with a dimension equivalent to dimension E of 5.18 to 5.50 mm (0.204 to 0.217 in) to ensure that the minimum for dimension E is met.

A4. The dimensions established for the end-of-run notch will permit the use of the cutout in the upper half of the cartridge pressure pad.

ANSI/SMPTE 206-1988
Revision and Redesignation of
ANSI PH22.206-1982

American National Standard for motion-picture equipment (8-mm type S)—model 1 sound camera cartridge—aperture, profile, film position, pressure pad and flatness (200-ft capacity)

Approved September 30, 1988

Sponsor: Society of Motion Picture and Television Engineers

1. Scope

This standard specifies the dimensions and location of the cartridge aperture, pressure pad, and characteristics necessary for its appropriate flatness, clearance, and location of film in the camera aperture of 200-ft (60-m) capacity 8-mm type S model 1 sound motion-picture film camera cartridges.

2. Referenced American National Standards

This standard is intended for use in conjunction with the following American National Standards:

ANSI/SMPTE 157-1988, Motion-Picture Film (8-mm Type S)—Camera Aperture Image and Usage

ANSI/SMPTE 205-1988, Motion-Picture Equipment (8-mm Type S)—Model 1 Camera Cartridge—Interface and Take-Up Core Drive (200-Ft Capacity)

3. Dimensions

3.1 The dimensions shall be as given in the figures and tables.

3.2 The dimensions shown in Figs. 1 and 3 and Tables 1 and 3 apply to a cartridge that is fully assembled but does not contain film. The dimensions shown in Fig. 2 and Table 2 apply to an assembled cartridge with a film load at the time of manufacture.

3.3 The datum planes and datum features used for dimensioning are as defined in Secs. 2.3, 2.3.1, 2.4, 2.4.1, and 2.4.2 of ANSI/SMPTE 205-1988.

3.4 Dimensions T and U denote the lateral location of the film in the cartridge before insertion in the camera. After insertion, dimension T becomes 0.060 in (1.52 mm) minimum and dimension U becomes 0.050 in (1.27 mm) minimum.

3.5 All dimensions in Table 1, except dimensions A and C, apply at the front surface of the pressure pad. A draft of 5 degrees to the recess area is permitted as well as an inside or outside radius of 0.005 in (0.13 mm) at all corners to provide satisfactory mold release when the pressure pad is manufactured in a molding process.

3.6 Dimension A denotes the space available from datum plane C for penetration of the camera film alignment guide wings or the camera claw into the recessed area of the cartridge pressure pad.

3.7 Dimension B is measured from datum plane C and determines the operating position of the cartridge pressure pad.

American National Standards Institute, 1430 Broadway, New York, N.Y. 10018

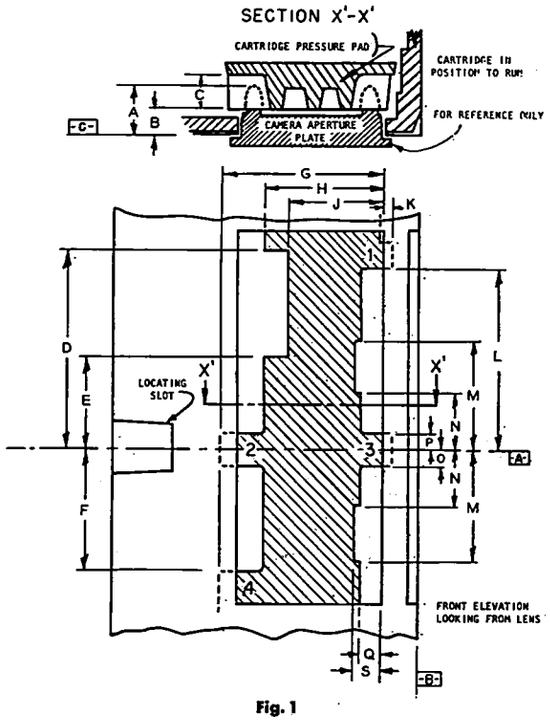


Fig. 1
Cartridge Pressure Pad

Table 1

Dimensions	Inches	Millimeters
A	0.150 max	3.81 max
B	0.077 ± 0.005	1.96 ± 0.13
C	0.090 min	2.29 min
D	0.540 min	13.72 min
E	0.260 max	6.60 max
F	0.360 ± 0.020	9.14 ± 0.51
G	0.455 min	11.56 min
H	0.365 max	9.27 max
J	0.300 max	7.62 max
K	0.000 min	0.00 min
L	0.540 ± 0.020	13.72 ± 0.51
M	0.300 min	7.62 min
N	0.140 max	3.56 max
O	0.058 ± 0.022	1.47 ± 0.56
P	0.038 ± 0.022	0.97 ± 0.56
Q	0.055 min	1.40 min
S	0.090 min	2.29 min

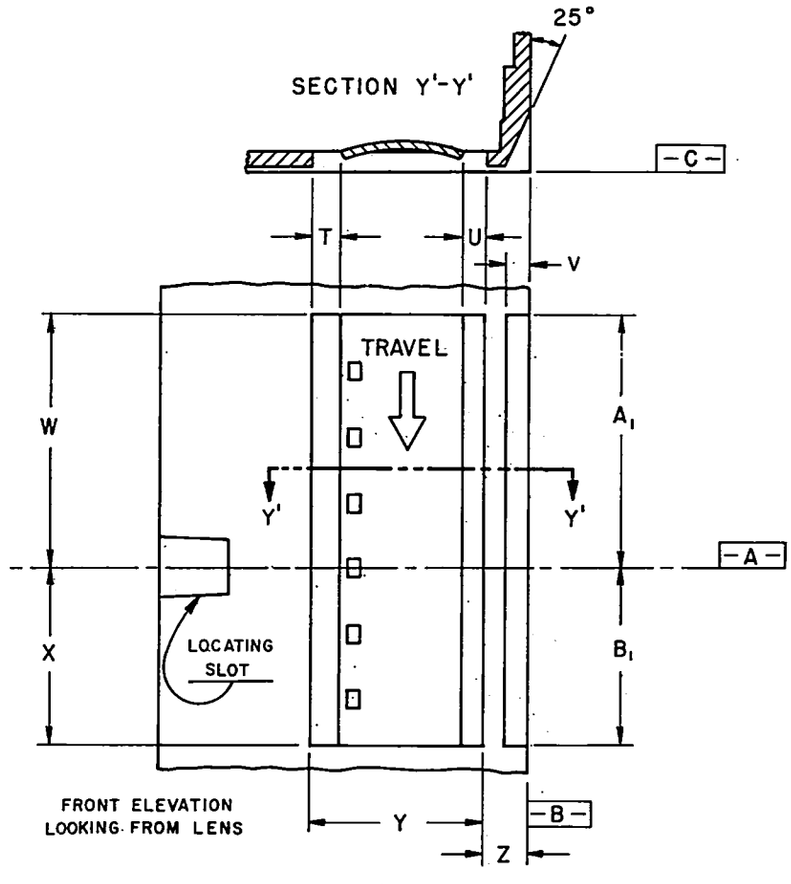
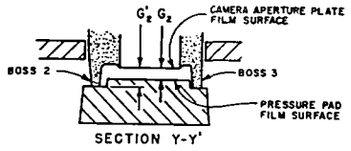


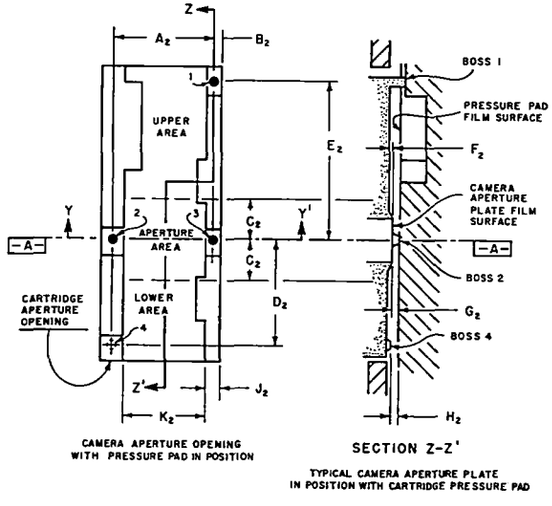
Fig. 2
Cartridge Aperture Opening and Film Position

Table 2

Dimensions	Inches	Millimeters
T	0.050 min	1.27 min
U	0.040 min	1.02 min
V	0.061 ± 0.006	1.55 ± 0.15
W	0.648 ± 0.006	16.46 ± 0.15
X	0.451 ± 0.006	11.46 ± 0.15
Y	0.451 ± 0.004	11.46 ± 0.10
Z	0.111 ± 0.003	2.82 ± 0.08
A_1	0.642 min	16.31 min
B_1	0.445 min	11.30 min



TYPICAL CAMERA APERTURE PLATE IN POSITION WITH CARTRIDGE PRESSURE PAD



CAMERA APERTURE OPENING WITH PRESSURE PAD IN POSITION

TYPICAL CAMERA APERTURE PLATE IN POSITION WITH CARTRIDGE PRESSURE PAD

Fig. 3
Pressure Pad Flatness Reference Surfaces

Table 3
Pressure Pad Dimensions

Dimensions	Inches	Millimeters
A_2	0.378 ± 0.001	9.60 ± 0.03
B_2	0.030 + 0.002 — 0.000	0.76 + 0.05 — 0.00
C_2	0.153 nom	3.89 nom
D_2	0.393 ± 0.001	9.98 ± 0.03
E_2	0.590 ± 0.001	14.99 ± 0.03
F_2	0.005 min	0.13 min
G_2	T_2 + 0.0007 min T_2 + 0.0012 max	T_2 + 0.018 min T_2 + 0.030 max
G'_2	0.0065 min 0.0070 max	0.165 min 0.178 max
H_2	0.004 min	0.10 min
J_2	0.055 min	1.40 min
K_2	0.310 max	7.87 max

Table 4
Flatness Tolerances on Pressure Pad Film Surface

Areas	Inches	Millimeters
Aperture Area (within Dimension C)	+ 0.0058 — T_2 + 0.0048 — T_2	+ 0.147 — T_2 + 0.122 — T_2
Upper Area	+ 0.0078 — T_2 + 0.0038 — T_2	+ 0.198 — T_2 + 0.097 — T_2
Lower Area	+ 0.0078 — T_2 + 0.0018 — T_2	+ 0.198 — T_2 + 0.046 — T_2

Dimensions are measured from the zero plane defined by Surfaces 1, 2, and 3. (See Sec. 3.8, Fig. 3, and Note 2.)

3.8 Dimensions relative to the surface of the pressure pad are measured from a plane established through Surfaces 1, 2, and 3, as defined by 0.060-in (1.52-mm) diameter circles dimensionally centered. (See Fig. 3.) The actual camera aperture bosses may deviate from this shape.

3.9 Dimension G_2 specifies the clearance for film in the camera aperture area, based on Dimension T_2, the thickness of the film in the center of the picture area. (See Note 1.)

3.10 Dimension G'_2 specifies the extension of the camera aperture plate boss points (corresponding to 1, 2, and 3) beyond the aperture plate plane at the aperture opening.

3.11 The upper and lower pad areas extend from dimension C_2 to the top and bottom of the cartridge pressure pad within dimension K_2.

3.12 Dimension H_2 is intended to apply from a plane as described in Sec. 3.8.

3.13 The plus values given for the pressure pad film surface flatness tolerances are to be directed toward the lens. (See Note 2.)

3.14 Surface 4 of the cartridge pressure pad and Boss 4 of the camera aperture are established to aid in seating the cartridge pressure pad to the camera aperture plate. They serve no function once the pressure pad is in operating position. (See Note 3.)

NOTE 1: It is considered good practice to relieve the camera aperture plate above and below the picture area to allow a clearance for film transport and minimize the possibility of film pinching. Dimension F_2 specifies the amount of recess for this purpose.

NOTE 2: It is intended that the film surface of the cartridge pressure pad be flat, or molded as a flat plane. Pits or depressions, however, which do not interfere with the film flatness are acceptable. Relief in the pad surface equal to the sound stripe thickness may be provided beneath those areas of the film which are striped by adding material to the backing of the film. Tolerances for the flatness on the 8-mm type S cartridge pressure pad film surface are specified to account for slight warpage in molding if the pressure pad is made from a plastic material. (See Appendix A3.)

NOTE 3: Three lugs, Nos. 1, 2, and 3, on the pressure pad are intended to touch the camera aperture plate and thereby determine the film plane alignment and the clearance allowed for the thickness of the film. Lug 4 should not touch the camera aperture plate.

Appendix

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

A1. A force of 8 to 14 oz (2.2 to 3.9 N) must be exerted on the pressure pad for proper seating against the camera aperture plate.

A2. The two cutout areas in the pressure pad permit the use of fingers for side-guiding. A force of 1.5 to 2.5 oz (0.42 to 0.70 N) per finger is adequate to ensure picture steadiness.

A3. Other portions of the pressure pad front surface may be recessed in addition to the required recesses, defined by dimension C in Sec. 3.5, for camera claw and camera aperture guide finger penetration.

A4. The cartridge pressure pad recess, defined by dimensions D, E, and J, is available for camera claw film transport engagement. The perforation used for the film vertical registration at its stopping position is specified in ANSI/SMPTE 157-1988, as minus 2 from the perforation adjacent to the image formed by the camera aperture. The horizontal centerline of the camera aperture should coincide nominally with datum plane A.

A5. To provide a consistent method of measurement, it is recommended that a cartridge gauging fixture be used which incorporates datum surfaces, a locating pin, and means for exerting locating forces on appropriate surfaces of the cartridge. For pressure pad measurements, a second fixture, incorporating three 0.060-in (1.52-mm) diameter bosses and a means for exerting the appropriate pressure pad seating force, is recommended.