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STABILIZED 2012

REAFFIRMED 2006

SMPTE STANDARD

SMPTE 159.2-2001
Revision of
ANSI/SMPTE 159.2-1996

for Motion-Picture Film (8-mm Type S) — Model 1 Camera Cartridge — Aperture, Profile, Film Position, Pressure Pad and Flatness

1 Scope

This standard specifies the dimensions and location of the cartridge aperture, pressure pad, and characteristics essential to the appropriate flatness of the cartridge pressure pad. Also specified are the position of the 8-mm type S motion-picture film and its required clearances in the cartridge aperture.

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 159.1-2001, Motion-Picture Film (8-mm Type S) — Model 1 Camera Cartridge — Cartridge-Camera Interface and Take-Up Core Drive

3 Dimensions

3.1 The dimensions shown in figure 2 and table 2 shall apply to an assembled cartridge with a film load at the time of manufacture. The dimensions shown in figures 1 and 3 and tables 1 and 3 shall apply to a cartridge that is fully assembled, but does not contain film.

3.2 The datum planes and datum features used for dimensioning shall be as defined in 3.3, 3.3.1, 3.4, 3.4.1, and 3.4.2 of SMPTE 159.1.

3.3 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.

3.4 All dimensions in table 1, except dimensions A and C, apply at the front surface of the pressure pad. A draft of 5° to the recess area shall be permitted as well as an inside or outside radius of 0.005 in (0.13 mm) at all corners to provide satisfactory mold release.

3.5 Dimension A denotes the maximum penetration, from datum plane C, of the camera film alignment guide wings or the camera claw into the recessed area of the cartridge pressure pad.

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

3.7 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 figure 3). The actual camera aperture bosses may deviate from this shape.

3.8 Dimension G_2 specifies the clearance for film in the camera aperture area based on T_2, the thickness of the film in the center of the picture area (see note 1).

3.9 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.

Approved
June 6, 2001

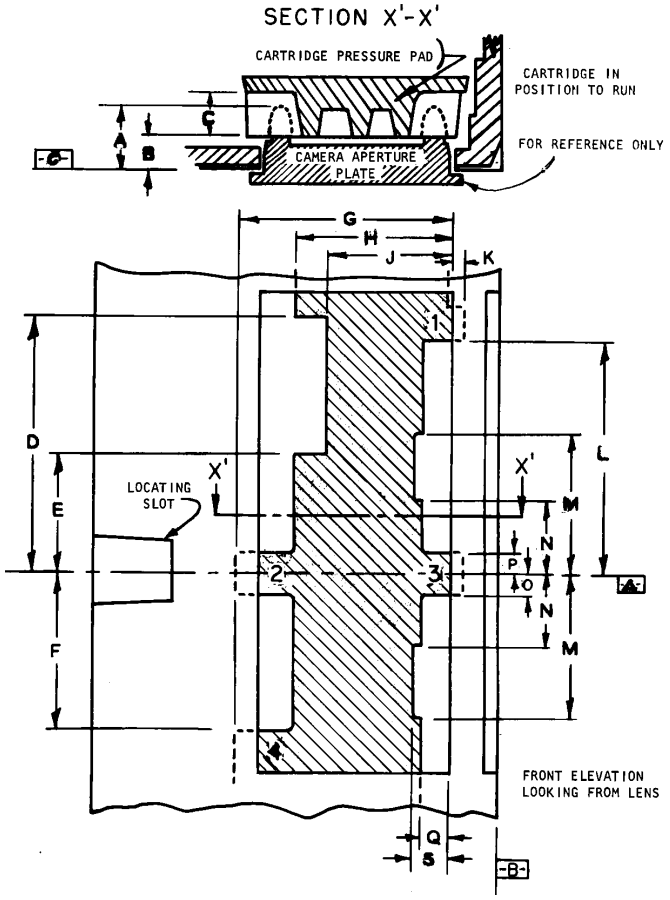

Figure 1 – Cartridge pressure pad

Table 1 – Pressure pad dimensions

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

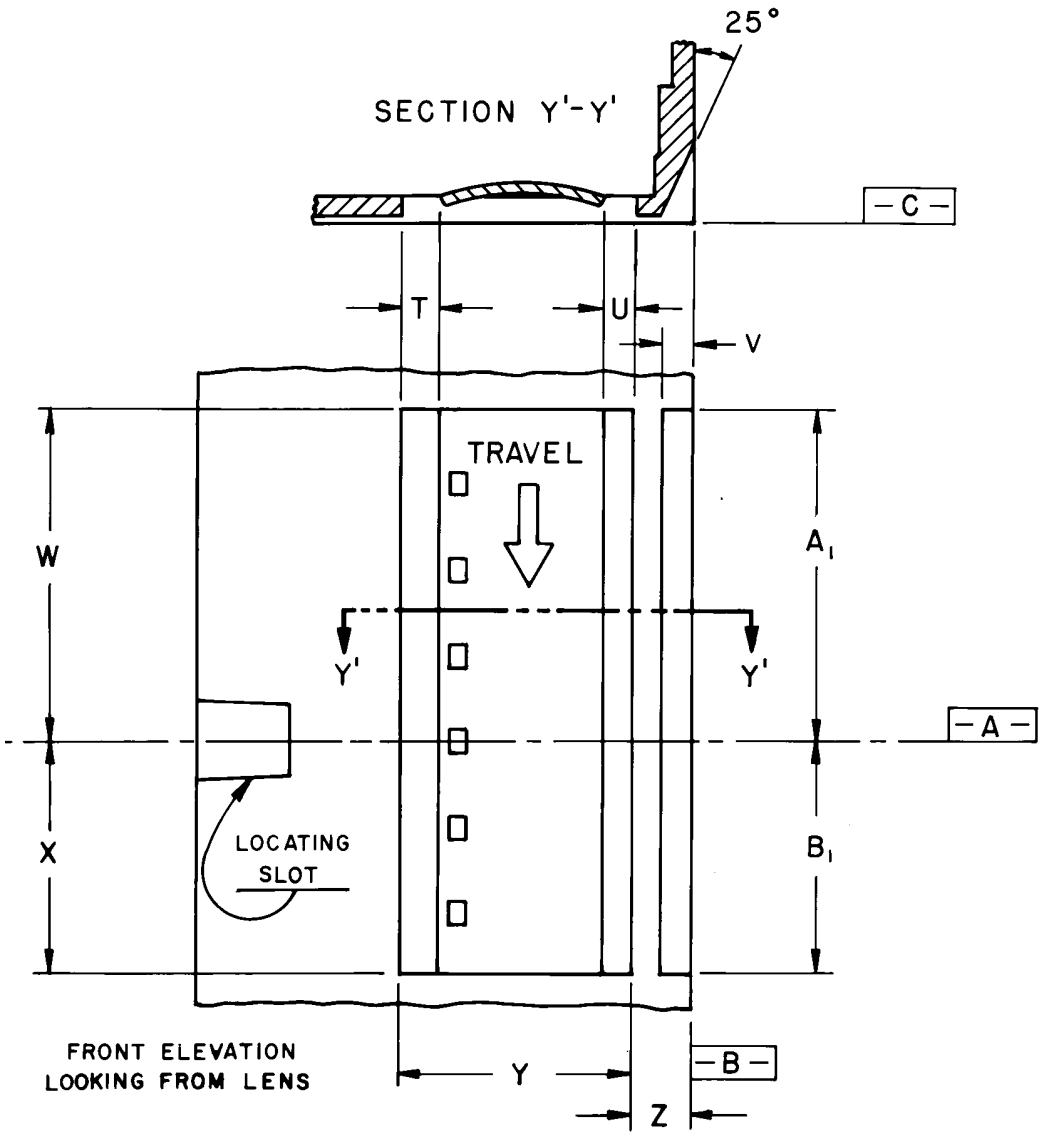

Figure 2 – Cartridge aperture opening and film position

Table 2 – Aperture dimensions

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

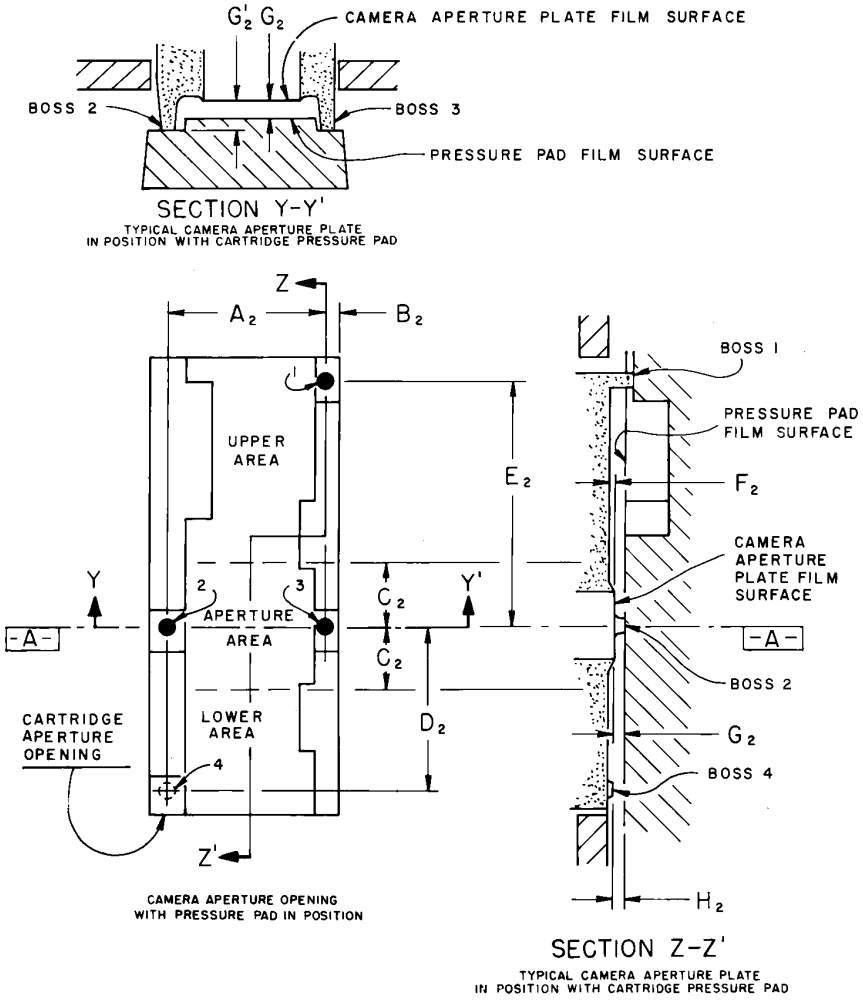

Figure 3 – Pressure pad flatness reference surfaces

Table 3 – Flatness dimensions

Dimensions[1]	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[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

[1] Dimensions are measured from the zero plane defined by surfaces 1, 2, and 3 (see 3.7, figure 3, and note 2).
[2] See 3.8.

3.10 The upper and lower pad areas extend from dimension C_2 to the top and bottom of the cartridge pressure pad within the area described by dimension H minus dimension Q.

3.11 Dimension H_2 is intended to apply from a plane as described by 3.7.

3.12 The plus values given for the pressure pad film surface flatness tolerances shall be directed toward the lens (see table 4 and note 2).

3.13 Surface 4 of the cartridge pressure pad and boss 4 of the camera aperture are delineated to aid in seating the cartridge pressure pad to the camera aperture plate. They serve no function when the pressure pad is in operating position (see note 3).

NOTES

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.

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. 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 annex A.3).

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

Table 4 – Flatness tolerances on pressure pad film surface

Areas[1)]	Inches	Millimeters
Aperture area (within dimension C_2)[2)]	+ 0.0058 – T_2 max	+ 0.147 – T_2 max
	+ 0.0048 – T_2 min	+ 0.122 – T_2 min
Upper area[2)]	+ 0.0078 – T_2 max	+ 0.198 – T_2 max
	+ 0.0038 – T_2 min	+ 0.097 – T_2 min
Lower area[2)]	+ 0.0078 – T_2 max	+ 0.198 – T_2 max
	+ 0.0018 – T_2 min	+ 0.046 – T_2 min

[1)] Dimensions are measured from the zero plane defined by surfaces 1, 2, and 3 (see 3.7, figure 3, and note 2).
[2)] See 3.8.

Annex A (informative)
Additional data

A.1 A force of 8 oz to 14 oz (2.2 N to 3.9 N) must be exerted on the pressure pad for proper seating against the camera aperture plate.

A.2 The two cut-out areas in the pressure pad permit the use of fingers for side-guiding. A force of 1.5 oz to 2.5 oz (0.42 N to 0.70 N) per finger is adequate to ensure picture steadiness if proper take-up torque is applied to the cartridge.

A.3 Although sufficient recess from the front surface of the pressure pad to allow for camera claw and camera aperture guide finger penetration, as defined by dimension C and 3.5, must be provided, additional portions of the pad surface may be recessed also.

A.4 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 SMPTE 157, as minus-2 from the perforation adjacent to the image formed by the camera aperture. The horizontal centerline of the camera aperture should nominally coincide with datum plane A.

A.5 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.

Annex B (informative)
Bibliography

SMPTE 157-1999, Motion-Picture Film (8-mm Type S) — Camera Aperture Image and Usage

SMPTE 166-1999, Motion-Picture Film (8-mm Type S) — Exposure Control and Stock Identification — Sound and Silent Camera Cartridge Notches