

Standards and Recommended Practices

Approved American National Standards

Two American National Standards were approved by the American National Standards Institute on December 18, 1991: ANSI/SMPTE 159.1-1991, Motion-Picture Film (8-mm Type S) — Model 1 Camera Cartridge, Cartridge-Camera Interface and Take-Up Core Drive; and ANSI/SMPTE 159.2-1991, Motion-Picture Film (8-mm Type S) — Model 1 Camera Cartridge Aperture, Camera Aperture Profile, Film Position, Pressure Pad and Flatness. ANSI/SMPTE 159.1 is available from Society Headquarters for \$10.00 and ANSI/SMPTE 159.2 for \$13.00.

Proposed SMPTE Standard

Published here for a trial period and public review is Proposed SMPTE Standard SMPTE 243M, Motion-Picture Equipment — 35- and 70-mm Projection Lenses and Mounts. The proposal will be submitted to the American National Standards Institute for approval as an American National Standard if no adverse comments are received from publication. Comments should be addressed to Sherwin H. Becker, Director of Engineering, at Society Headquarters prior to October 1, 1992. Copies of the proposal are available for \$10.00 each.

Proposed Withdrawal of American National Standard

On the recommendation of the Committee on Film Technology, the Standards Committee has approved withdrawal of an

American National Standard: ANSI/SMPTE 107-1987, Motion-Picture Equipment (8-mm Type R) — Double 8-mm Camera Spools — 25-ft Capacity. Withdrawal was initiated on the basis of lack of use. The spools have been discontinued by the manufacturers. Comments should be addressed to Sherwin H. Becker at Society Headquarters prior to October 1, 1992. All comments from *Journal* publication will be reviewed prior to further processing of the withdrawal action.

Proposed Withdrawal of SMPTE Recommended Practice

A recommendation for withdrawal of an SMPTE Recommended Practice was approved by the Committee on Audio Recording and Reproduction Technology and the Standards Committee: RP 147-1987, Audio Channel Assignments of Multi-Channel Sub-Masters Used in Preparation for Two-Track Masters for Transfer to Video. The technology committee voted to withdraw the practice on the grounds that the rapid change in production practices for stereo television have made it obsolete. Comments should be addressed to Sherwin H. Becker at Society Headquarters, prior to October 1, 1992. All comments from *Journal* publication will be reviewed prior to withdrawal approval.

— Sherwin H. Becker, Director of Engineering

ANSI/SMPTE 159.1-1991
Revision of
ANSI/SMPTE 159.1-1986



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SMPTE STANDARD

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

1 Scope

This standard specifies the dimensions of the 8-mm type S motion-picture film camera cartridge and cartridge-camera interface. Also specified are the dimensions of the take-up core drive opening and critical dimensions of the take-up core as well as the driving force, direction of drive, and recommended drive ratio.

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.

ANSI/SMPTE 166-1988, Motion-Picture Film (8-mm Type S) — Sound and Silent Camera Cartridge Notches — Exposure Control and Stock Identification

3 Dimensions

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

3.2 The dimensions apply to an assembled cartridge with a film load at the time of manufacture.

3.3 Datum planes B, C, and A are referred to as first, second, and third, respectively. These planes, which are used for dimensioning, are

mutually perpendicular and are jointly called a datum reference frame.

3.3.1 Datum plane A is coincident with the center of a circle, located from plane B by the basic dimension T. The circle is in contact with the edges of the locating slot defined by dimensions A, O, P, and Q. The diameter of this circle is such that it applies regardless of feature size (RFS) of the locating slot. (See annex A.3.)

3.4 Datum features B, C, and A are primary, secondary, and tertiary, respectively.

3.4.1 Datum feature B is the unnotched, unlabeled surface of the cartridge. It is the primary datum feature and relates the cartridge to the datum reference frame by having a minimum of three points contact the first datum plane, B.

3.4.2 Datum feature C is the front seating surface of the cartridge. It is the secondary datum feature and relates the cartridge to the datum reference frame by having a minimum of two points contact the second datum plane, C.

3.5 Dimensions L, M, N, R₃, U, V, and W, measured from datum planes A and C to the depth of dimension E, as shown in the view of the label side, describe the extent of both triangular recessed areas. The inboard wall of the recessed area, defined by dimensions L and N, shall be a smooth surface and may be tilted sufficiently from the perpendicular to datum plane B to allow proper release from a mold, when the cartridge is manufactured in a molding process.

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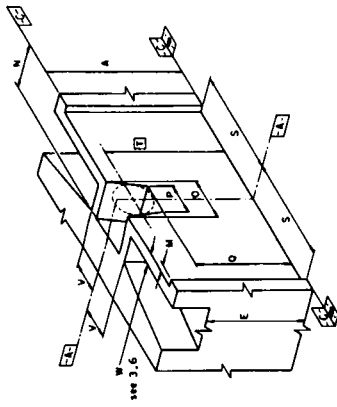


Figure 2 - Camera locating slot

3.8 Dimensions B and M are measured from datum plane C. Dimensions C, H, J, and S are measured from datum plane A.

3.9 The take-up core axis shall be located within 0.010 in (0.25 mm) of the true center formed by datum plane A and basic dimension Af.

3.10 Dimensions Aa, Ab, Ac, and Ad are diameters.

4 Take-up core drive

4.1 The direction of rotation for the core shall be clockwise when viewed from the core side of the cartridge.

4.2 After disengagement of any core anti-backup device, the cartridge shall operate with a nominal torque of 0.85 ounce-force inch with a permissible range of 0.5 to 1.5 ozf-in (6.0 x 10⁻³ newton meters with a permissible range of 3.5 x 10⁻³ to 10.6 x 10⁻³ N·m as applied to the cartridge. (See annex A.2.)

NOTES

1 Placement of the film data, such as name, number, length of load, and inclusion of any notches, shall be in accordance with ANSI/SMPTE 166-1988.

2 Although two driving lugs are shown in the core and are recommended, only one is essential for satisfactory operation.

Table 1

Dimensions	Inches	Millimeters
A	0.954 ± 0.010	24.23 ± 0.25
B	2.99 ± 0.01	75.9 ± 0.3
C	1.390 ± 0.010	35.31 ± 0.25
E	0.780 max	19.81 max
F	0.09 ± 0.01	2.3 ± 0.3
G	0.06 ± 0.01	1.5 ± 0.3
H	0.88 ± 0.03	22.4 ± 0.8
J	0.61 ± 0.03	15.5 ± 0.8
K	0.015 ± 0.010	0.38 ± 0.25
L	0.470 min	11.94 min
M	0.005 ± 0.003	0.13 ± 0.08
N	0.177 min	4.50 min
O	0.154 ± 0.004	3.91 ± 0.10
P	0.142 ± 0.004	3.61 ± 0.10
Q	0.770 ± 0.010	19.56 ± 0.25
R ₁	0.50 ± 0.10	12.7 ± 2.5
R ₂	0.25 ± 0.05	6.4 ± 1.3
R ₃	0.160 max	4.06 max
S	1.02 ± 0.01	25.9 ± 0.3
T	0.870 basic	22.10 basic
U	1.225 min	31.12 min
V	0.125 max	3.18 max
W	See 3.6	
Aa	0.680 max	17.27 max
Ab	0.575 min	14.60 min
Ac	0.327 max	8.31 max
Ad	0.264 max	6.71 max
Ae	0.015 max	0.38 max
Af*	1.608 basic	40.84 basic
Ag	0.100 min	2.54 min
Ah	0.040 ± 0.005	1.02 ± 0.13
Aj	0.020 max	0.51 max
Ak	45° nom	45° nom
Al	0.024 max	0.61 max

*See 3.9.

3.6 The thickness of the wall of the cartridge used for notching, dimension W in figure 2, shall be sufficient to withstand a force of at least 1 kgf or 2.2 lbf (10 N) while deflecting no more than 0.04 in (1 mm). (For purposes of measurement, the force is applied by a solid round pin of nominal 0.05-in (1.3-mm) diameter centered 0.03 in (0.8 mm) nominally above or below the film speed or filter notch coincident with dimension T on datum feature C.)

3.7 Dimension A specifies the normal overall thickness of the cartridge.

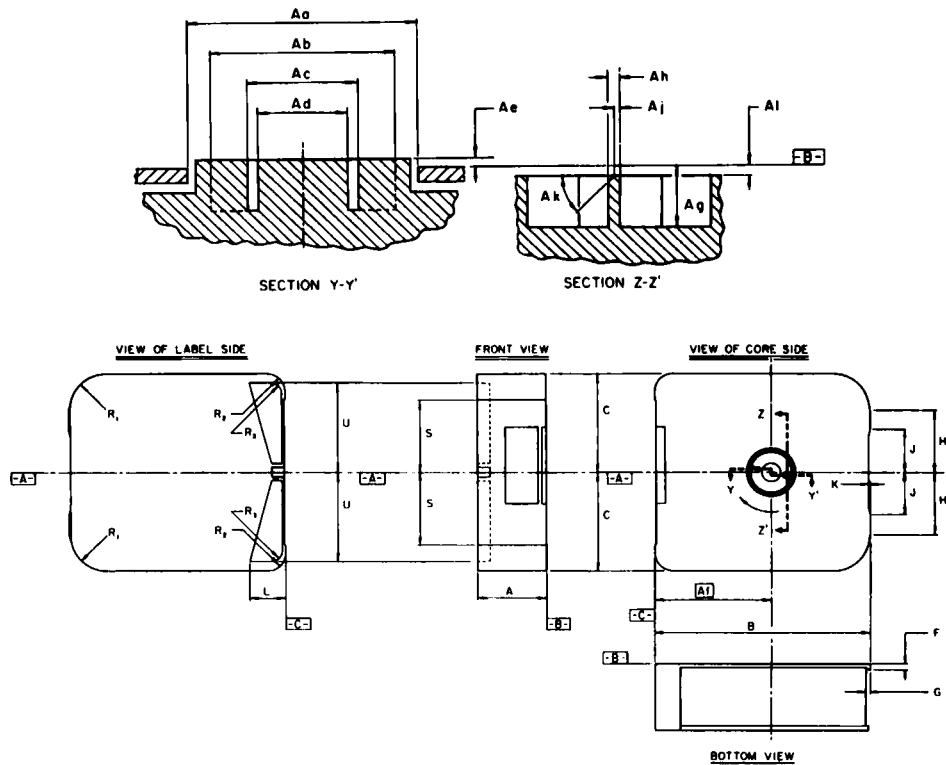


Figure 1 - Cartridge

**Annex A (informative)
Additional data**

A.1 In designing the camera driver, consideration should be given to the fact that tooth-on-tooth engagement of the core lug on the camera driver pin is a possibility.

A.2 It is recommended that the core be tendency driven (by some form of slip-drive mechanism) with a drive ratio of at least one turn of the core for every fifteen strokes of the pull-down claw.

A.3 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 of exerting locating forces on appropriate surfaces of the cartridge.

**Annex B (informative)
Bibliography**

ANSI/SMPTE 159.2-1991, Motion-Picture Film (8-mm Type S) — Model 1 Camera Cartridge Aperture, Camera Aperture Profile, Film Position, Pressure Pad and Flatness

SMPTE STANDARD

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



Page 1 of 6 pages

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.

ANSI/SMPTE 159.1-1991, 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 ANSI/SMPTE 159.1-1991.

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 degrees 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 G₂ specifies the clearance for film in the camera aperture area based on T₂, the thickness of the film in the center of the picture area. (See note 1.)

3.9 Dimension G₁ 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.

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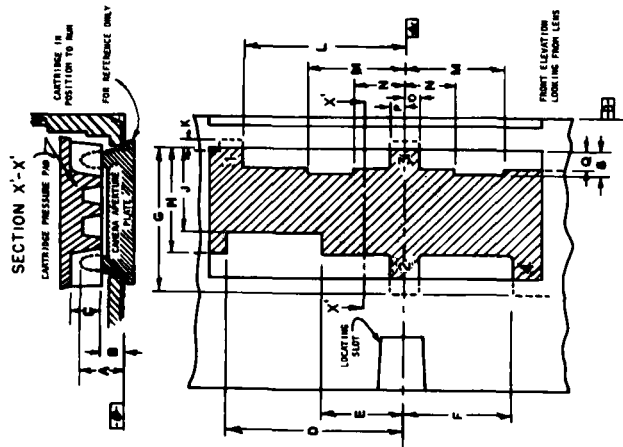


Figure 1 - Cartridge pressure pad

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

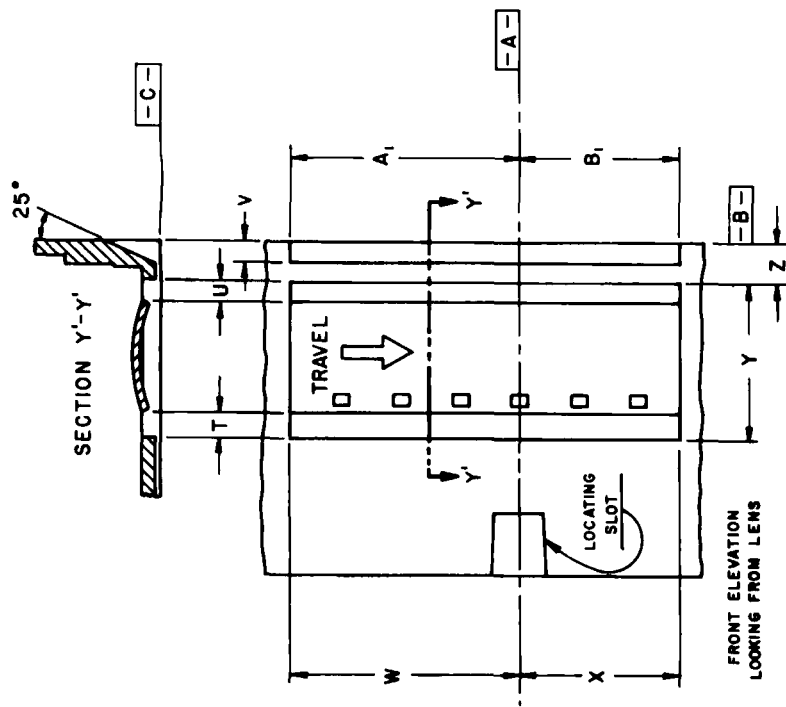


Figure 2 - Cartridge aperture opening and film position

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

NOTES

3.10 The upper and lower pad areas extend from dimension C₂ to the top and bottom of the cartridge pressure pad within the area described by dimension H minus dimension Q.

3.11 Dimension H₂ 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.)

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 F₂ specifies the amount of recess for this purpose.

2 It is intended that the film surface of the cartridge pressure pad be flat, or milled 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*	Inches	Millimeters
Aperture area (within dimension C ₂)†	+ 0.0058 - T ₂ max + 0.0048 - T ₂ min	+ 0.147 - T ₂ max + 0.122 - T ₂ min
Upper area‡	+ 0.0078 - T ₂ max + 0.0038 - T ₂ min	+ 0.198 - T ₂ max + 0.097 - T ₂ min
Lower area‡	+ 0.0078 - T ₂ max + 0.0018 - T ₂ min	+ 0.198 - T ₂ max + 0.046 - T ₂ min

* Dimensions are measured from the zero plane defined by surfaces 1, 2, and 3. (See 3.7, figure 3, and note 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 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 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 localizing 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.

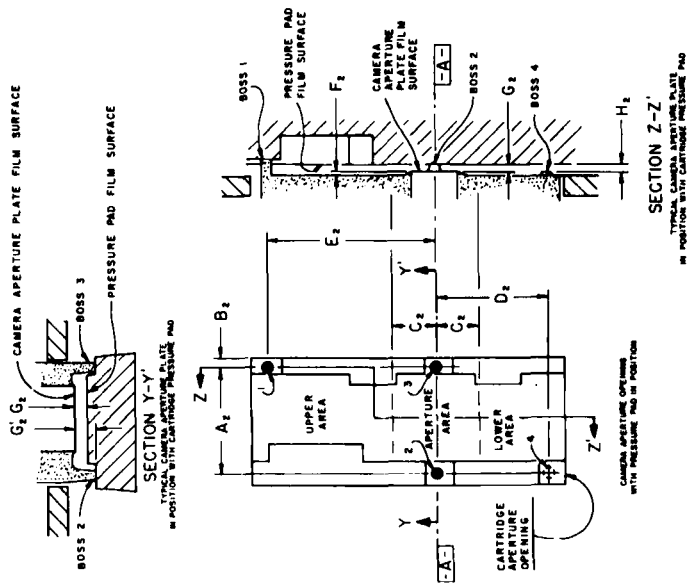


Figure 3 - Pressure pad flatness reference surfaces

Table 3

Dimensions*	Inches	Millimeters
A ₂	0.378 ± 0.001	9.60 ± 0.03
B ₂	+ 0.002 - 0.000	+ 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

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