ANSI/SMPTE 241-1995
Revision of
ANSI/SMPTE 241-1989

SMPTE STANDARD

for Motion-Picture Equipment — 35- and 70-mm Projection Reels

1 Scope

1.1 This standard specifies the dimensions of 35-mm projection reels for motion-picture and television applications and 35- and 70-mm projection reels intended for use on combination 70/35-mm projectors and rewinds.

1.2 This standard does not apply to shipping reels as specified in ANSI/SMPTE 192.

2 Applications

2.1 For conventional application, the 2000-ft (610-m) capacity reel shall be preferred, except in applications where the practice is to combine reels.

2.2 For television application, the 3000-ft (914-m) capacity reel shall be preferred.

2.3 The 1000-ft (305-m) capacity reel is in general use for laboratory and television applications. It should not be used in theatrical projection because the tension on the 2-in (50.8-mm) core may be excessive.

3 Dimensions

3.1 The dimensions of the reels shall be as given in the figures and table.

3.2 Dimension F defines the area over which the reel thickness, specified by dimension C_2, applies.

3.3 Dimension M in figure 2 indicates a clearance for the driving pin in the reel hub.

3.4 Figure 4 illustrates an optional spindle hole for reel capacities of 3000 ft and less, but mandatory for large-capacity, 70-mm, and 35-mm combination reels. The four driving holes are intended for use on spindles whose diameter is 0.500 in + 0.000 in -- 0.005 in (12.70 mm + 0.00 mm -- 0.13 mm) and driven by a pin of 0.250-in (6.35-mm) nominal diameter, engaging in one of the driving holes.

3.5 Figure 5 illustrates the standard spindle hole for use with $\frac{5}{16}$-in spindles. This hole is preferred for reel capacities of 3000 ft and less.

3.6 The centerlines indicated for all figures are coincident.

American National Standard

Approved
January 3, 1995

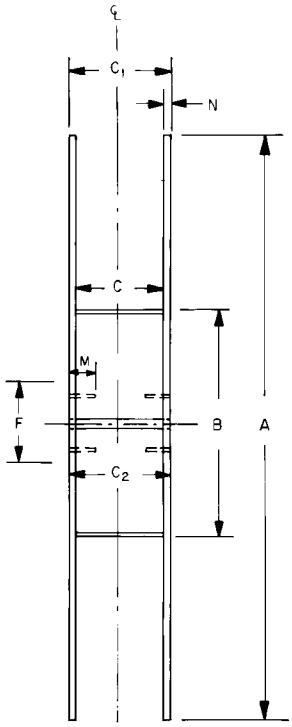

Figure 1 -- 35-mm reel

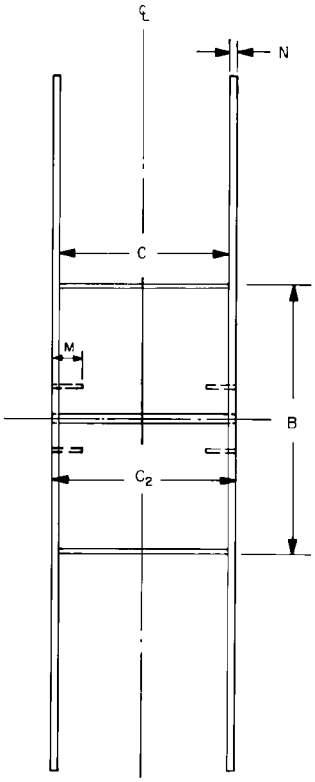

Figure 2 -- 70-mm reel

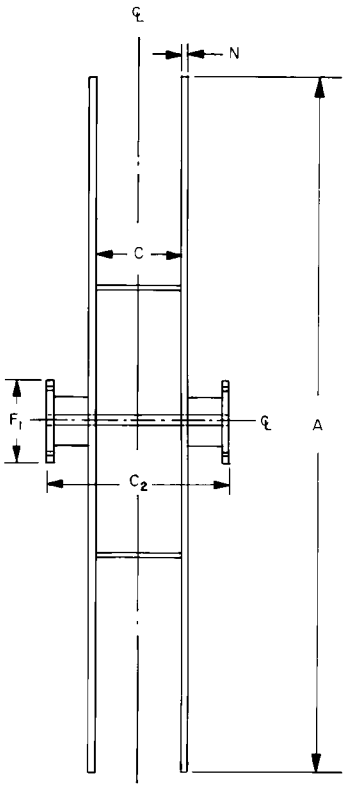

Figure 3 -- 35-mm reel for combination projectors

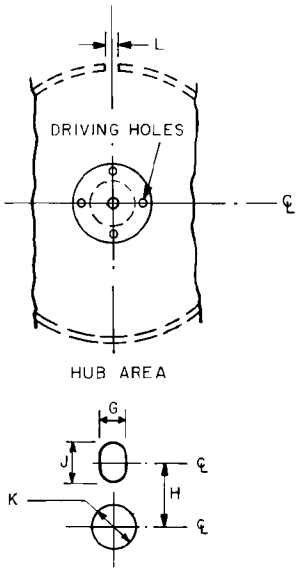

Figure 4 -- Enlargement of spindle and driving hole

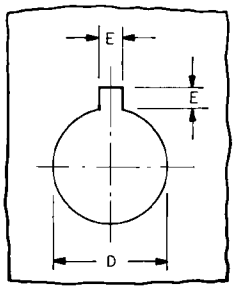

Figure 5 -- Enlarged view of hole in both flanges

Optional system (see 3.4)

Preferred system (see 3.5)

Table 1-- Specifications

	Dimensions	Inches		Millimeters	
A	(1000 ft, 305 m)	9.90	+ 0.00 -- 0.02	251.5	+ 0.0 -- 5.1
A	(2000 ft, 610 m)	15.00	+ 0.00 -- 0.05	381.0	+ 0.0 -- 1.3
A	(3000 ft, 914 m)	16.90	+ 0.00 -- 0.05	429.3	+ 0.0 -- 1.3
A	(4000 ft, 1219 m)	21.75	± 0.03	552.4	± 0.8
A	(4300 ft, 1300 m)	21.00	± 0.06	533.4	± 1.5
A	(5600 ft, 1700 m)	23.70	± 0.06	602.0	± 1.5
A	(5800 ft, 1775 m)	24.50	± 0.06	622.3	± 1.5
B	(1000 ft)	1.95	± 0.10	49.5	± 2.5
B	(2000 ft)	5.00	± 0.10	127.0	± 2.5
B	(3000 ft)	5.00	± 0.10	127.0	± 2.5
B	(4000 ft)	8.00	± 0.03	203.2	± 0.8
B	(4300 ft)	7.00	± 0.03	177.8	± 0.8
B	(5600 ft)	8.00	± 0.03	203.2	± 0.8
B	(5800 ft)	8.00	± 0.03	203.2	± 0.8
C	(35-mm)	1.530	+ 0.075 -- 0.030	38.86	+ 1.90 -- 0.76
C	(70-mm)	2.87	± 0.03	72.9	± 0.8
C	(35-mm combination)	1.530	+ 0.00 -- 0.03	38.86	+ 0.0 -- 0.8
C_1	(35-mm)	1.885	+ 0.075 -- 0.030	47.88	+ 1.90 -- 0.76
C_2	(35-mm up to 3000 ft)	1.625	+ 0.075 -- 0.030	41.28	+ 1.90 -- 0.76
C_2	(35-mm above 4000 ft)	1.625	+ 0.175 -- 0.030	41.28	+ 4.44 -- 0.76
C_2	(70-mm and 35-mm combination)	3.41	± 0.03	86.6	± 0.8
D		0.317	+ 0.002 -- 0.000	8.05	+ 0.05 -- 0.00
E		0.150	± 0.010	3.81	± 0.25
F		2.25	min	57.2	min
F_1		2.50	min	63.5	min
G		0.265	± 0.002	6.73	± 0.05
H		0.782	nom	19.86	nom
J		0.375	nom	9.52	nom
K	(diameter)	0.505	+ 0.003 -- 0.000	12.83	+ 0.08 -- 0.00
L	(threading slot, 35-mm)	0.035	nom	0.89	nom
L	(threading slot, 70-mm and 35-mm combination	0.060	nom	1.52	nom
M		0.75	min	19.0	min
N	(flange thickness)	0.27	nom	6.9	nom

Annex A (informative)
Additional data

A.1 Specifications for the reels are based on good engineering design of film-winding equipment and on minimum tension variation between hub and rim. Film tension in a projector feed and take-up mechanism should be kept low to avoid perforation damage. In order to maintain low tension where a constant-torque clutch device is used, it is necessary to keep the quotient B/A (hub diameter B divided by flange diameter A) as large as possible. In this standard, the quotient is 0.333, which maintains the initial film tension to final film tension within the 3:1 ratio. Complete interchangeability may require some adjustment in the take-up and hold-back tensions of the projector, maintaining the lowest film tension possible and still wind a full reel.

A.2 In designing reels of the size and weight described in this standard, it is the practice to chamfer the spindle hole to facilitate placing the reel on the spindle. The degree of chamfer should be in accordance with good engineering practice, and should not reduce the bearing surface of the spindle hole on the spindle to the point of endangering reel stability.

A.3 Although this standard does not preclude reels of other diameters or design, the rim-to-hub ratio referred to in A.1 remains a factor of consideration for any projector with an uncompensated constant-torque clutch in the feed or take-up mechanism.

A.4 To minimize perforation damage, projector operators using large-capacity reels are cautioned against allowing film slack to accumulate. Film wound too loosely may slip on itself causing scratches and cinch marks.

Annex B (informative)
Bibliography

ANSI/SMPTE 192-1991, Motion-Picture Equipment (35-mm) ---- Shipping Reels for Prints