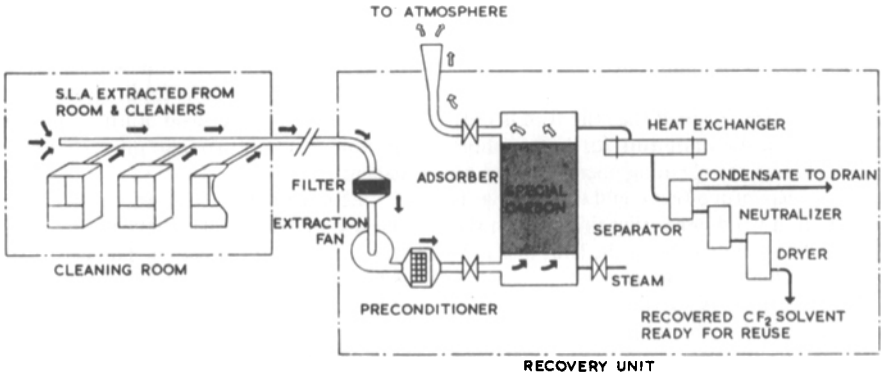



**Fig. 1. Diagram of solvent vapor-recovery system.**

conditioner device is a steam heated coil in a cylinder through which the SLA passes prior to its entry into the adsorber.

The carbon in the adsorber collects the solvent vapor by the process of adsorption, the stripped and cleaned air then passes to the outside atmosphere. When the carbon bed is fully charged, which is normally calculated on a time basis, because assessment by instrumentation is complicated and expensive, the adsorber is isolated from the incoming SLA and steam at a minimum pressure of 5 lb/in$^2$ (350 g/cm$^2$) is injected into it. The steam passes through the carbon, thereby stripping out the adsorbed solvent from the carbon bed in an enriched form. The steam and the enriched vapor then pass to the heat exchanger to be condensed and cooled.

After the condensing and cooling, the liquid solvent and the condensate flow by gravity first to the separator where the aqueous condensate is taken off and discharged to drain. The solvent then flows on to the the neutralizer, which is needed for some of the chlorinated solvents to remove free acid created by hydrolysis during the steam and solvent vapor cycle. The solvent now passes on to a special resin-type dryer where the water content is reduced to the required level. The solvent is then ready for immediate reuse.

The carbon adsorption type of equipment can be made entirely automatic by incorporating two carbon beds. When one unit is adsorbing, the other fully charged adsorber is in the steam-stripping cycle and vice versa.

### Summary

To summarize this survey, it would undoubtedly be correct to state that 1,1,1-trichloroethane has most of the desirable characteristics required of a film cleaning solvent. This statement appears to be supported by fifteen years of practical experience of numerous film laboratories throughout the world who use this solvent.

### Bibliography

1. D. W. Fassett et al, "Practical film cleaning for safety and effectiveness," *Jour. SMPTE, 67:* 572-589, Sept. 1958.
2. "Care and Handling of Television Film," Eastman Kodak Company, Videofilm Notes, publication H-40-9, 1976.

# Standards & Recommended Practices

### Approved American National Standards

On 2 February 1976, the American National Standards Institute approved four new standards on the Model II super 8 Camera Cartridge:

PH22.188-1976, Specifications for Camera Run Length of Film in 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges (50-ft, 15-m Capacity);

PH22.189-1976, Location of Film Loaded in 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges;

PH22.190-1976, Dimensions and Characteristics for 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridge, Cartridge-Camera Fit and Core Specifications;

PH22.191-1976, Dimensions and Location of Slots, Projections and Cartridge Hole for Indicating Film Speed, Color Balance and Film Identification for 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges.

Inasmuch as compliance with American National Standards is purely voluntary, these standards will become truly effective when broad publicity is given to their existence. ANSI and SMPTE would appreciate any personal influence to promote the use of these standards where such action is appropriate. Copies of the standards may be obtained for a nominal fee from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

### Proposed SMPTE Recommended Practices

Two proposed revisions of SMPTE Recommended Practices are published here for a trial period and public review:

RP 9, Dimensions of Double-Frame 35-mm 2 × 2 Slides for Precise Applications in Television, has been modified by deleting the specification on the position indicator notch which is not used in television applications. There are no other technical changes.

RP 16, Specifications of Tracking Control Record for 2-In Quadruplex Video Magnetic Tape Recordings, is a revision of the 1970 practice and reflects several technical changes which should be reviewed by those concerned.

Comments on the proposals should be addressed to Alex E. Alden, Manager of Engineering Services, at Society Headquarters prior to 1 November 1976. If no adverse criticism is received by that date, the Proposed SMPTE Recommended Practices will be submitted to the Board of Governors for final approval.

### Reaffirmation of SMPTE Recommended Practices

On the recommendation of the Society's Engineering and Standards Committees, the Board of Governors approved on 22 June 1976 the reaffirmation of the following SMPTE Recommended Practices:

RP 17-1964, A Photographic Recording Technique for Measuring High-Speed Camera Image Unsteadiness;

RP 22-1966, Specifying Graph Paper Used in Inter-Laboratory Exchange of Plotted Sensitometric Data;

RP 37-1969, Color Temperature for Color Television Studio Monitors.

Copies of these and other SMPTE Recommended Practices may be purchased from Society Headquarters at $1.00 per copy. — Alex E. Alden, Manager of Engineering Services

# American National Standard

## specifications for camera run length of film in 8-mm type S (super 8) model II motion-picture film camera cartridges (50-ft, 15-m capacity)

Approved February 2, 1976 Secretariat: Society of Motion Picture and Television Engineers



### 1. Scope

**1.1** This standard describes the camera run length of film supplied in Model II 8-mm Type S (super 8) motion-picture film camera cartridges of 50-ft (15-m) nominal capacity and the length of film returned to the customer.

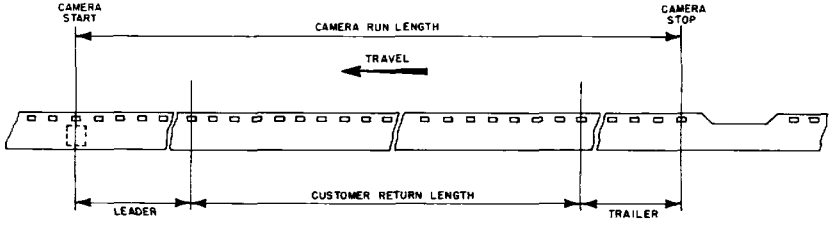
**1.2** The purpose of this standard is to provide a uniform basis for the operation of footage counters in cameras.

### 2. Specifications

**2.1** The camera run length of film may vary between 3,670 perforation pitches (15.5 m or 51 ft) and 3,710 perforation pitches (15.7 m or 51.5 ft). (See Note 1.) The overall length of the film is to be determined by the manufacturer to provide the camera run length specified.

**2.2** A complete film as returned to the customer shall contain a minimum customer return length of 3,600 perforation pitches (15.2 m or 50 ft). The customer return length shall be that portion of the camera run length available for subject matter which starts at least 35 perforation pitches (approximately 148 mm or 5.8 in) after the frame which forms the camera aperture, as the cartridge is supplied by the manufacturer, and ends at least 35 perforation pitches (148 mm or 5.8 in) short of the limit as provided by a perforation cutout. (See Appendix A1.)

**2.3** The start of the film should have a suitable visual marking in the frame area. The end should have the perforations cut out over a minimum length of two pitches so that the film will stop in the camera aperture. The cutout also gives the user visual confirmation that all film has been exposed. The shape and location of the cutout notch are not significant and are left to the discretion of the manufacturer.










NOTE 1: A nominal pitch, based on 72 perforation pitches per foot, of 4.234 mm (0.1667 in) is assumed for all comparisons of the number of perforation pitches in a given film length. This assumption is based on American National Standard Dimensions for 8-mm Motion-Picture Film Perforated 8-mm Type S (Super 8), IR, PH22.149-1975.

NOTE 2: In addition to this standard, there are available the following American National Standards relating to super 8 Model II film camera cartridges:

PH22.189-1976, Location of Film Loaded in 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges

PH22.190-1976, Dimensions and Characteristics for 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridge, Cartridge-Camera Fit and Core Specifications

PH22.191-1976, Dimensions and Location of Slots, Projections and Cartridge Hole for Indicating Film Speed, Color Balance and Film Identification for 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges

### Appendix

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

**A1.** The lengths of the leader and trailer are necessary to ensure that the fog produced near the aperture is removed. The material removed also provides space for identification numbers and allows for manufacturing variability of film lengths.

**A2.** The film lengths specified in this standard are based on a maximum film thickness of 0.108 mm (0.0043 in).

ANSI PH22.189–1976

# American National Standard
## location of film loaded in 8-mm type S (super 8) model II motion-picture film camera cartridges

Approved February 2, 1976

Secretariat: Society of Motion Picture and Television Engineers



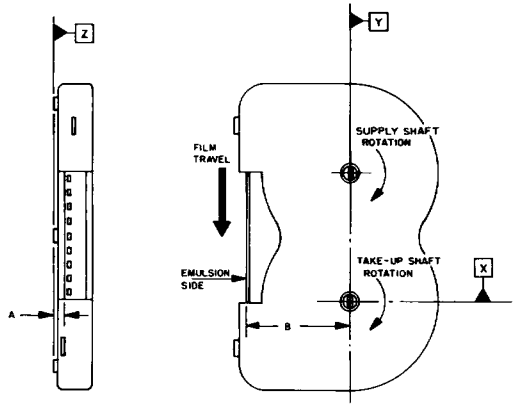
### 1. Scope

This standard specifies the location of the film loaded in 8-mm Type S (super 8) Model II motion-picture camera cartridges.

### 2. Dimensions

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

**2.2** Dimensions A and B apply where the film enters and leaves the cartridge (the space provided for the camera film guide, aperture and pressure plate) and are measured to the emulsion side edges of the film, respectively. (The edges of the film are specified because film curl would have to be taken into account if Dimension B applied at other locations. However, the film plane is parallel within the tolerance of Dimension B.)




| Dimensions | Millimeters* | Inches |
|---|---|---|
| A† | 2.6 ± 0.1 | 0.102 ± 0.004 |
| B | 33.0 ± 0.5 | 1.30 ± 0.02 |

*The metric system is the primary measuring system for this standard.
†Inch dimension intentionally carried one additional decimal place.





**2.3** Datum planes used for dimensioning are coincident with the surfaces that engage mating camera parts when the cartridge is properly aligned in the camera. The datum planes are mutually perpendicular.

**2.3.1** Datum Plane Z (primary) is established from the extremities of the three seating bosses (lugs).

**2.3.2** Datum Plane Y (secondary) is established coincident with the axes of the cartridge take-up core opening and the supply core opening.

**2.3.3** Datum Plane X (tertiary) is also established coincident with the axis of the cartridge take-up core opening.

NOTE: In addition to this standard, there are available the following American National Standards relating to super 8 Model II film camera cartridges:

PH22.188-1976, Specifications for Camera Run Length of Film in 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges (50-Ft, 15-m Capacity)

PH22.190-1976, Dimensions and Characteristics for 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridge, Cartridge-Camera Fit and Core Specifications

PH22.191-1976, Dimensions and Location of Slots, Projections and Cartridge Hole for Indicating Film Speed, Color Balance and Film Identification for 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges

# American National Standard

## dimensions and characteristics for 8-mm type S (super 8) model II motion-picture film camera cartridge, cartridge-camera fit and core specifications

Approved February 2, 1976 Secretariat: Society of Motion Picture and Television Engineers



### 1. Scope

This standard specifies the external dimensions for the cartridge-camera fit and core specifications for 8-mm Type S (super 8) Model II motion-picture film camera cartridges.

### 2. Dimensions and Characteristics

**2.1** The dimensions shall be as given in the figures and tables and apply to an assembled cartridge containing a film load.

**2.2** Datum planes used for dimensioning are coincident with the surfaces that engage mating camera parts when the cartridge is properly aligned in the camera. The datum planes are mutually perpendicular.

**2.2.1** Datum Plane Z (primary) is established from the extremities of the three seating bosses (lugs) 1, 2 and 3 (Dimension L).

**2.2.2** Datum Plane Y (secondary) is established coincident with the axes of the cartridge take-up core opening, Dimension $W_2$, and the supply core opening, Dimension $W_3$.

**2.2.3** Datum Plane X (tertiary) is also established coincident with the axis of the cartridge take-up core opening, Dimension $W_2$.

**2.3** The bosses (lugs), $L_1$, $L_2$ and $L_3$, which establish Datum Plane Z and engage mating surfaces to locate laterally the cartridge in the camera, shall be nominally flat.

**2.4** The centerline for the supply shaft, Dimension F, also applies to the identification side view.

**2.5** If tape is used to seal the cartridge, it should fall within the values established by Dimensions $A_1$, $A_2$, C and D.

**2.6** The coaxiality of the core post, Dimension f, and the core drive openings, Dimensions j and k (Figure 2), with the openings in the cartridge, Dimensions $W_2$ and J (Figure 1), should be within 0.4 mm (0.016 in).

**2.7** Regardless of the method of constructing the light trap, a clearance of 1.0 to 1.7 mm (0.04 to 0.07 in) is required during rotation.

**2.8** Dimensions a, b and d (Figure 2) are measured as the cartridge is supplied by the manufacturer and apply whether or not a spring is used to load the core toward Datum Plane Z.

**2.9** The minimum torque required for the take-up spindle at the start of drive should be 0.00343 newton meters.







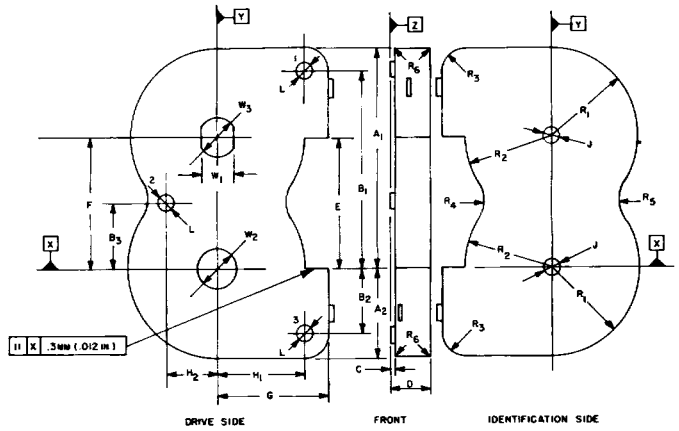



Fig. 1

Table 1

| Dimensions | Millimeters* | Inches |
|---|---|---|
| $A_1$† | 72.5 ± 0.45 | 2.854 ± 0.018 |
| $A_2$ | 29.5 ± 0.3 | 1.16 ± 0.01 |
| $B_1$ | 65.5 ± 0.3 | 2.58 ± 0.01 |
| $B_2$ | 22.5 ± 0.3 | 0.89 ± 0.01 |
| $B_3$ | 21.5 ± 0.3 | 0.85 ± 0.01 |
| C† | 0.30 + 0.00 − 0.20 | 0.012 + 0.000 − 0.008 |
| D† | 13.30 + 0.65 − 0.20 | 0.524 + 0.026 − 0.008 |
| E | 43.0 ± 0.3 | 1.69 ± 0.01 |
| F | 43.0 ± 0.15 | 1.69 ± 0.006 |
| G† | 36.5 ± 0.20 | 1.437 ± 0.008 |
| $H_1$ | 29.3 ± 0.3 | 1.15 ± 0.01 |
| $H_2$ | 17.5 ± 0.3 | 0.69 ± 0.01 |
| J (diameter)† | 7.0 ± 0.20 | 0.276 ± 0.008 |
| $L_{1,2,3}$ (diameter) | 5.3 max | 0.21 max |
| $W_1$† | 12.0 + 0.15 − 0.00 | 0.472 + 0.006 − 0.000 |
| $W_2$ (diameter)† | 12.0 + 0.15 − 0.00 | 0.472 + 0.006 − 0.000 |
| $W_3$ (diameter)† | 12.4 ± 0.10 | 0.488 ± 0.004 |
| $R_1$ | 29.5 ± 0.3 | 1.16 ± 0.01 |
| $R_2$ | 28.5 ± 0.3 | 1.12 ± 0.01 |
| $R_3$ | 8.0 ± 0.3 | 0.31 ± 0.01 |
| $R_4$ | 10.0 ± 0.3 | 0.39 ± 0.01 |
| $R_5$ | 10.0 ± 0.3 | 0.39 ± 0.01 |
| $R_6$ | 1.0 max | 0.04 max |

*The metric system is primary for this standard.
†Inch values intentionally carried an additional decimal place.

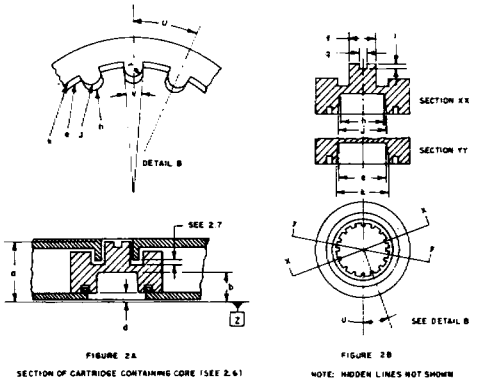



FIGURE 2A
SECTION OF CARTRIDGE CONTAINING CORE (SEE 2.6)

FIGURE 2B
NOTE: HIDDEN LINES NOT SHOWN

Fig. 2

Table 2

| Dimensions | Millimeters* | Inches |
|---|---|---|
| a† | 12.8 ± 0.3 | 0.504 ± 0.012 |
| b† | 7.2 ± 0.2 | 0.283 ± 0.008 |
| d† | 2.2 ± 0.2 | 0.087 ± 0.008 |
| e (diameter)† | 10.1 ± 0.1 | 0.398 ± 0.004 |
| f (diameter)† | 5.5 $^{+0.0}_{-0.2}$ | 0.217 $^{+0.000}_{-0.008}$ |
| g | 1.2 ± 0.2 | 0.05 ± 0.008 |
| h (diameter)† | 9.0 $^{+0.2}_{-0.0}$ | 0.354 $^{+0.008}_{-0.000}$ |
| j (diameter)† | 9.2 ± 0.1 | 0.362 ± 0.004 |
| k (diameter)† | 10.3 ± 0.1 | 0.406 ± 0.004 |
| l | 1.2 ± 0.2 | 0.05 ± 0.008 |
| r | one half the value derived from v | |
| u | 22½ degrees nominal | |
| v | 10 ± ½ degrees | |

*The metric system is primary for this standard.
†Inch values intentionally carried an additional decimal place.

NOTE 1: In addition to this standard, there are available the following American National Standards relating to super 8 Model II film camera cartridges:

PH22.188-1976, Specifications for Camera Run Length of Film in 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges (50-Ft, 15-m Capacity)

PH22.189-1976, Location of Film Loaded in 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges

PH22.191-1976, Dimensions and Location of Slots, Projections and Cartridge Hole for Indicating Film Speed, Color Balance and Film Identification for 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridges

NOTE 2: The user's attention is called to the possibility that compliance with this standard may require use of an invention covered by patent rights.

By publication of this standard, no position is taken with respect to the validity of any patent rights in connection therewith. The patent holder has, however, filed a statement that it will not assert any claims for infringement which necessarily result from compliance with this standard. Details may be obtained from the publisher.

No representation or warranty is made or implied that this is the only waiver that may be required to avoid infringement in the use of this standard.

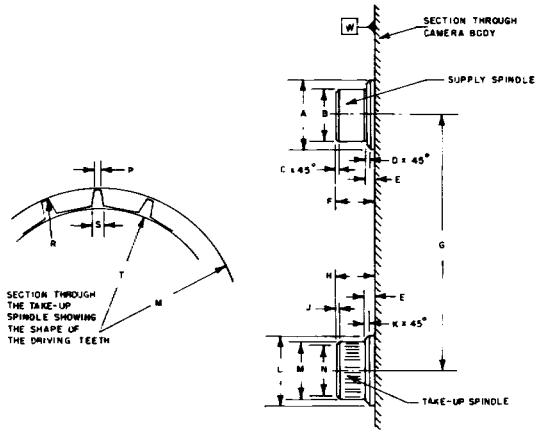




## Appendix

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

Figure 3 and Table 3 provide dimensions and specifications to aid in camera design.




DATUM PLANE W ENGAGES THE THREE BOSSES FORMING DATUM PLANE Z OF THE CARTRIDGE

Fig. 3

Table 3

| Dimensions | Millimeters* | Inches |
|---|---|---|
| A (diameter) | 11.95 $^{+0.00}_{-0.03}$ | 0.470 $^{+0.000}_{-0.001}$ |
| B (diameter) | 8.96 $^{+0.00}_{-0.04}$ | 0.353 $^{+0.000}_{-0.002}$ |
| C | 0.50 ± 0.010 | 0.020 ± 0.0004 |
| D | 0.70 ± 0.010 | 0.028 ± 0.0004 |
| E | 1.90 ± 0.03 | 0.075 ± 0.001 |
| F | 6.70 ± 0.30 | 0.264 ± 0.012 |
| G | 43.00 ± 0.05 | 1.693 ± 0.002 |
| H | 7.65 ± 0.20 | 0.301 ± 0.008 |
| J | 0.50 ± 0.10 | 0.020 ± 0.004 |
| K | 0.70 ± 0.10 | 0.28 ± 0.004 |
| L (diameter) | 11.95 $^{+0.00}_{-0.03}$ | 0.470 $^{+0.000}_{-0.001}$ |
| M (diameter) | 9.96 $^{+0.000}_{-0.040}$ | 0.392 $^{+0.0000}_{-0.0016}$ |
| N (diameter) | 8.6 $^{+0.00}_{-0.10}$ | 0.339 $^{+0.000}_{-0.004}$ |
| P | 0.35 ± 0.10 | 0.138 ± 0.004 |
| R | 0.10 max | 0.004 max |
| S | 0.40 ± 0.10 | 0.016 ± 0.004 |
| T (diameter) | 8.70 ± 0.10 | 0.343 ± 0.004 |

*The metric system is primary for this standard.

# American National Standard

## dimensions and location of slots, projections and cartridge hole for indicating film speed, color balance and film identification for 8-mm type S (super 8) model II motion-picture film camera cartridges

Approved February 2, 1976

Secretariat: Society of Motion Picture and Television Engineers



### 1. Scope

**1.1** This standard specifies the dimensions and location of cartridge slots, projections and a hole for the 8-mm Type S (super 8) Model II motion-picture film camera cartridge to preset cameras in accordance with the effective film speed and insert or exclude a color-balancing filter.

**1.2** This standard also describes the area available for visible film identification.

### 2. Dimensions and Characteristics

**2.1** The location of the hole, slots and projections for effective film speeds and for film sensitivity identification shall be as specified in the figures and tables.

**2.2** The dimensions for the film spectral sensitivity (filter) hole or projection apply if the cartridge is loaded with a color film balanced for tungsten-light exposure. This hole or projection is not included if the cartridge is loaded with color film for daylight exposure.

**2.3** The two slots and the projection used to specify the film speed and the hole and the projection used to identify the inclusion of a tungsten-type film load are mutually independent and redundant in the cartridge to allow design flexibility for choice of use in cameras.

**2.4** The dimensions and specifications of the external characteristics of the camera cartridge and the location of the datum planes used for dimensional reference are specified in American National Standard Dimensions and Characteristics for 8-mm Type S (Super 8) Model II Motion-Picture Film Camera Cartridge, Cartridge-Camera Fit and Core Specifications, PH22.190-1976.

**2.5** Datum planes used for dimensioning are coincident with the surfaces that engage mating camera parts when the cartridge is properly aligned in the camera. The datum planes are mutually perpendicular.

**2.5.1** Datum Plane Z (primary) is established from the extremities of the three seating bosses (lugs) 1, 2 and 3.

**2.5.2** Datum Plane Y (secondary) is established coincident with the axes of the cartridge take-up core opening and the supply core opening.

**2.5.3** Datum Plane X (tertiary) is also established coincident with the axis of the cartridge take-up core opening.

**2.6** The corners of two slots for film speed may be rounded to 0.10 mm (0.004 in) radius maximum.

**2.7** The top and bottom corners of the projections for film speed and film identification may be rounded to 1.5 mm (0.06 in) maximum.

**2.8** If visual inscription of film data such as film name, number and length of load is to be provided, it should be on the label side of the cartridge (Figure 2) and the film type and speed should also be contained within the area specified.







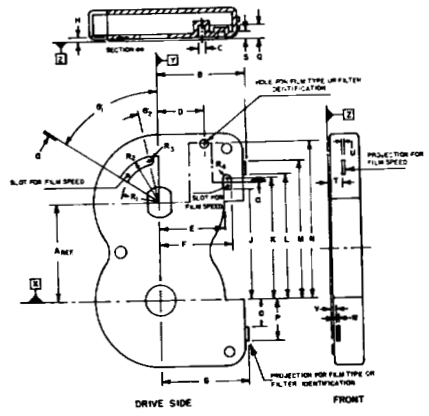



Fig. 1

Table 1
Angles and Dimensions

| Dimensions | Millimeters* | Inches |
|---|---|---|
| A | 43.0 ref | 1.69 ref |
| B | 38.5 $^{+0.0}_{-0.3}$ | 1.52 $^{+0.00}_{-0.01}$ |
| C (diameter) | 3.0 min | 0.12 min |
| D† | 21.0 ± 0.2 | 0.827 ± 0.008 |
| E† | 27.8 ± 0.2 | 1.094 ± 0.008 |
| F† | 30.8 ± 0.2 | 1.213 ± 0.008 |
| G | 38.5 $^{+0.0}_{-0.3}$ | 1.52 $^{+0.00}_{-0.01}$ |
| H† | 1.35 min | 0.053 min |
| J | See Table 2 | |
| K | 52.5 min | 2.07 min |
| L | 55.5 ± 0.4 | 2.18 ± 0.02 |
| M | 61.5 ± 0.4 | 2.42 ± 0.02 |
| N† | 68.00 ± 0.35 | 2.677 ± 0.014 |
| O | 12.5 ± 0.4 | 0.49 ± 0.02 |
| P | 18.5 ± 0.4 | 0.73 ± 0.02 |
| Q† | 6.0 min | 0.236 min |
| $R_1$ | 16.1 ± 0.3 | 0.63 ± 0.01 |
| $R_2$ | 19.9 ± 0.3 | 0.78 ± 0.01 |
| $R_3$† | 1.9 ± 0.3 | 0.075 ± 0.012 |
| $R_4$ | 1.5 ± 0.3 | 0.06 ± 0.01 |
| S† | 2.7 ± 0.2 | 0.106 ± 0.008 |
| T | See Table 2 | |
| U | 1.5 min | 0.06 min |
| V | 1.1 ± 0.3 | 0.04 ± 0.01 |
| W | 1.5 min | 0.06 min |
| Angles | | |
| $\theta_1$ | See Table 2 | |
| $\theta_2$ | 10 ± ½ degrees | |

*Millimeter dimensions are primary.
†Inch values intentionally carried an additional decimal place.

Table 2
Dimensions Controlling Film Speed Values

| Film Speed DIN | Film Speed ASA | $\theta_1$* Degrees | J† Millimeters** | J† Inches | T‡ Millimeters | T‡ Inches |
|---|---|---|---|---|---|---|
| 13 | 16 | 22 | 51.0 | 2.01 | 11.6 | 0.457 |
| 14 | 20 | 26 | 50.5 | 1.99 | 10.85 | 0.427 |
| 15 | 25 | 30 | 50.0 | 1.97 | 10.1 | 0.398 |
| 16 | 32 | 34 | 49.5 | 1.95 | 9.35 | 0.368 |
| 17 | 40 | 38 | 49.0 | 1.93 | 8.6 | 0.339 |
| 18 | 50 | 42 | 48.5 | 1.91 | 7.85 | 0.309 |
| 19 | 64 | 46 | 48.0 | 1.89 | 7.1 | 0.280 |
| 20 | 80 | 50 | 47.5 | 1.87 | 6.35 | 0.250 |
| 21 | 100 | 54 | 47.0 | 1.85 | 5.6 | 0.220 |
| 22 | 125 | 58 | 46.5 | 1.83 | 4.85 | 0.191 |
| 23 | 160 | 62 | 46.0 | 1.81 | 4.1 | 0.161 |
| 24 | 200 | 66 | 45.5 | 1.79 | 3.35 | 0.132 |
| 25 | 250 | 70 | 45.0 | 1.77 | 2.6 | 0.102 |
| 26 | 320 | 74 | 44.5 | 1.75 | 1.85 | 0.073 |
| 27 | 400 | 78 | 44.0 | 1.73 | 1.1 | 0.043 |

*Tolerance for all values ± ½ degree
†Tolerance for all values ± 0.1 mm (0.004 in)
‡Tolerance for all values ± 0.3 mm (0.012 in)
**Millimeter dimensions are primary.

NOTE 1: In addition to this standard, there are available the following American National Standards relating to super 8 Model II film camera cartridges:

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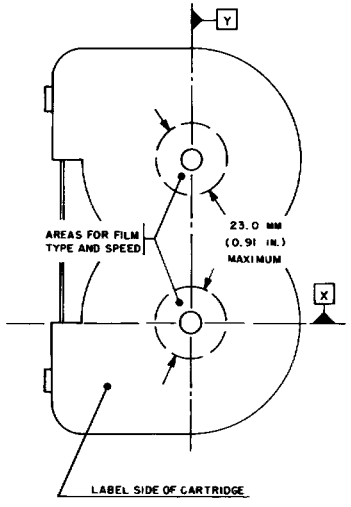


Fig. 2
Cartridge Area for Visible Information or Product Identification



# PROPOSED

# SMPTE RECOMMENDED PRACTICE

**RP 9**
*Revision of RP 9-1966*

## *Dimensions of Double-Frame 35-mm 2x2 Slides for Precise Applications in Television*



*Introduction*

The use of 2x2 slides has increased enormously in many television stations. The handling of these slides is or will be by automatic or remote methods. Slides containing titles or geometric material must not tilt. In many sequences, slides bear related subject matter and it is necessary to lap-dissolve between them. Under these conditions, it is important that the material be accurately located on the film clip and that the film clip be accurately located in the mount. This is achieved in this practice by locating the picture information relative to the sprocket holes of the film clip and then using the sprocket holes to locate the clip in the mount. The dimensions and tolerances specified below are based on the fact that information on successive slides will register in a suitable television slide projector within the equivalent of ± 5 television lines in a horizontal and vertical direction when the Datum B and Datum C edges of the mount are against the stops in the projector.

Television scanned area has an aspect ratio of 4:3. The mask dimensions shown in Figure 2 are sufficiently larger than those of the scanned area to permit convenient use.

1. *Scope*

1.1 This practice specifies dimensions and tolerances for a double-frame 35-mm film clip and an associated 2x2-in mount which are intended to ensure that picture information is accurately and consistently positioned in a suitable slide projector.

1.2 The slide mount described in Section 3 represents one suitable method for attaining accurate and consistent positioning of picture information in a suitable slide projector. The use of alternate methods of mounting the film clip to within the same accuracy shall be considered as meeting the requirements of this practice.

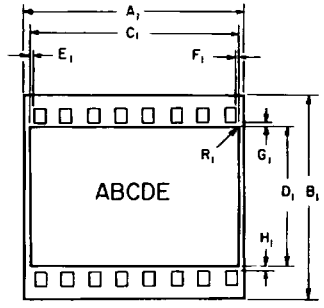


**Figure 1**
**Location of Image on Film**

**Table 1**

| Dimensions | Inches | Millimeters |
|---|---|---|
| $A_1$ | 1.496 ± 0.004 | 38.00 ± 0.10 |
| $B_1$* | 1.377 nom | 34.98 nom |
| $C_1$ | 1.429 ± 0.012 | 36.30 ± 0.30 |
| $D_1$ | 0.964 ± 0.012 | 24.49 ± 0.30 |
| $E_1$-$F_1$ | 0 ± 0.004 | 0 ± 0.10 |
| $G_1$-$H_1$ | 0 ± 0.004 | 0 ± 0.10 |
| $R_1$ | 0.016 max | 0.41 max |

*For information only

1.3 This practice is not intended to replace or to void American National Standard Dimensions of Image Areas and Mounts for Slides and Opaques for Television, PH22.94-1973, or American National Standard Dimensions for Projector Slides, PH3.43-1969.

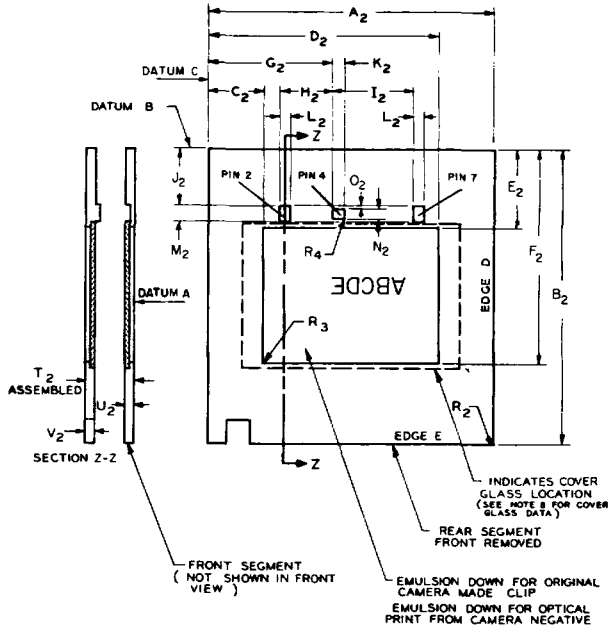


**Figure 2**
**Slide Mount**

**Table 2**

| Dimensions | Inches | Millimeters |
|---|---|---|
| $A_2$ | 1.984 ± 0.004 | 50.39 ± 0.10 |
| $B_2$ | 1.984 ± 0.004 | 50.39 ± 0.10 |
| $C_2$ | 0.3780 ± 0.0020 | 9.601 ± 0.051 |
| $D_2$ | 1.6060 ± 0.0020 | 40.792 ± 0.051 |
| $E_2$ | 0.5244 ± 0.0020 | 13.320 ± 0.051 |
| $F_2$ | 1.4496 ± 0.0020 | 36.820 ± 0.051 |
| $G_2$ | 0.8602 ± 0.0017 | 21.849 ± 0.043 |
| $H_2$ | 0.3681 ± 0.0020 | 9.350 ± 0.051 |
| $I_2$ | 0.5659 ± 0.0010 | 14.374 ± 0.025 |
| $J_2$* | 0.3831 ± 0.0025 | 9.731 ± 0.064 |
| $K_2$ | 0.0768 ± 0.0005 | 1.951 ± 0.013 |
| $L_2$ | 0.0656 ± 0.0010 | 1.666 ± 0.025 |
| $M_2$ | 0.1088 ± 0.0005 | 2.764 ± 0.013 |
| $N_2$ | 0.1000 ± 0.0010 | 2.540 ± 0.025 |
| $O_2$ | 0.0036 ± 0.0020 | 0.091 ± 0.051 |
| $R_2$ | 0.062 max | 1.57 max |
| $R_3$ | 0.062 max | 1.57 max |
| $R_4$ | 0.018 ± 0.002 | 0.46 ± 0.05 |
| $T_2$ | 0.115 ± 0.005 | 2.92 ± 0.13 |
| $U_2$ | 0.060 ± 0.002 | 1.52 ± 0.05 |
| $V_2$ | 0.060 ± 0.002 | 1.52 ± 0.05 |

*See Note 5.





2. *Double-Frame 35-mm Film Clip*

2.1 The film for double-frame 35-mm film clips to be mounted and used in compliance with this practice shall be in accordance with American National Standard Dimensions for 35 mm Motion-Picture Film Perforated KS, PH22.36-1974, and shall be of low-shrinkage safety film base.

2.2 The camera used for exposure shall produce an image on the film the dimensions of which are in accordance with American National Standard Picture Sizes for Roll Film, 35 mm Film, and 126 Film Still-Picture Cameras, PH3.39-1972.

2.3 The location of the image on the film and the length of the film clip shall be in accordance with Figure 1 and Table 1 (see Note 10).

3. *Slide Mount*

3.1 The mount for the double-frame 35-mm film clip shall be manufactured in accordance with Figure 2 and Table 2.

3.2 Slide mounts produced in accordance with this practice shall meet the dimensional tolerances of Figure 2 and Table 2 for at least one year following manufacture.

3.3 In the event that both halves of the mount are hinged together, the hinge shall be located along Edge E. In the absence of a hinge, Datum B shall be identified in an appropriate manner on the external edge of the mount.

**Notes**

1. The surfaces indicated by Datum A shall be plane within 0.002 in (0.05 mm).
2. The edges indicated by Datums B and C and Edge D shall be straight within 0.002 in (0.05 mm).
3. Datums B and C and Edge D shall be perpendicular to Datum plane A within 1 degree.
4. Datum C and Edge D shall be perpendicular to Datum B within 0.002 in (0.05 mm).
5. Pins 2 and 7 must not depart from Dimension $J_2$ by more than 0.0020 in (0.051 mm) with respect to each other.
6. The pins must maintain their indicated dimensions at least 0.010 in (0.25 mm) beyond the emulsion position.
7. The pins should extend through the film clip but must not project beyond either exterior surface of the slide mount.
8. Cover glass should be built into the mount on each side of the film surface. This glass should be nominally 0.030 in (0.76 mm) thick and should be treated to reduce Newton's Rings where film contacts the glass. When the mount is assembled, there should be sufficient space between the cover glasses to accommodate a film thickness of 0.006 in (0.15 mm) in a snug manner.
9. Material shrinkage and other practical considerations should be taken into account when choosing dimensions and tolerances for manufacturing purposes. The dimensions and tolerances in Table 2 provide a guide for the final product.
10. The recommended emulsion position is that of an original reversal camera film.
11. Slide mounts manufactured in accordance with the reference edges specified as Datums B and C will *have minimum position variations among different* mounts when these edges are against the projector stops. When Edges D and E are against the projector stops, slightly poorer positioning accuracy results due to the added dimensional tolerances of $A_2$ and $B_2$.

# PROPOSED

# SMPTE RECOMMENDED PRACTICE

**RP 16**
Revision of
RP 16-1970

## *Specifications of Tracking Control Record for 2-in Quadruplex Video Magnetic Tape Recordings*



1. *Scope*

This practice specifies the recorded dimensional relationships among (a) tracking control signal, (b) frame pulse signal and (c) vertical synchronizing signal for 2-in (50.8 mm) quadruplex video magnetic tape recordings.

2. *Dimensions*

2.1 The dimensional relationships among the tracking control record, frame pulse record and video record, not specified elsewhere in this practice, shall be as specified in Figs. 1a and 1b and the table.

2.2 Dimensions pertaining to the video, audio and control records on 2-in magnetic tape shall be as specified in American National Standard Dimensions of Video, Audio and Tracking Control Records on 2-inch Video Magnetic Tape Quadruplex Recorded at 15 and 7.5 in/s, C98.6-1973.

3. *Magnetic Coating*

With the direction of tape motion shown, the magnetic coating is on the surface facing the observer.

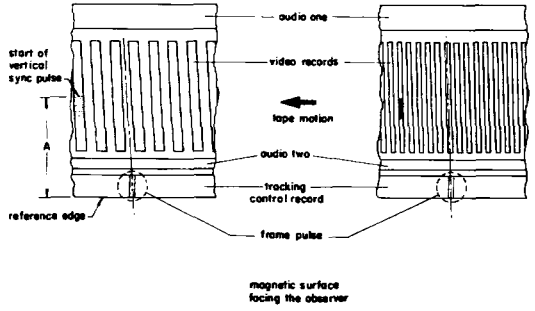


**Fig. 1a. 15 in /sec**

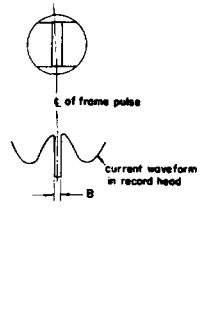


**Fig. 1b. 7.5 in /sec**

**Fig. 1c. Enlargement of Frame Pulse Area**

| | Inch | | Millimeter | |
|---|---|---|---|---|
| Dimension | Minimum | Maximum | Minimum | Maximum |
| A | 1.135 | 1.165 | 28.83 | 29.59 |

4. *Frame Pulse*

4.1 A pulse to identify the position of the vertical synchronizing pulse shall be superimposed on the tracking control signal.

4.2 One pulse shall be recorded per television frame to identify the vertical blanking interval that is preceded by a full horizontal line when the tape is recorded at 15 in/s (381 mm/s) and to identify the vertical blanking interval that is preceded by a half horizontal line when the tape is recorded at 7.5 in/s (190.5 mm/s). (See Appendix A5.)

To assist in certain restricted types of color editing, alternate frame pulses may be omitted. Since omission of alternate frame pulses may result in slightly lengthened lock-up time in tape replay, users may wish to obtain prior agreement before distributing such tapes.





4.3 The pulse shall be positioned so that the centerline of the recorded pulse and the extended centerline of the area between the second and third video tracks after the track containing the vertical synchronizing pulse shall intersect within ± 0.002 in (± 0.05 mm) at the reference edge of the tape when the recording is made at 15 in/s tape speed (Fig. 1a). The pulse shall be positioned so that the centerline of the recorded pulse and the extended centerline of the fifth video track after the track containing the vertical synchronizing pulse shall intersect within ± 0.002 in at the reference edge of the tape when the recording is made at 7.5 in/s tape speed (Fig. 1b).

4.4 The amplitude of the frame pulse shall be 150 ± 25 percent of the peak-to-peak value of the sinusoidal tracking control signal current in the record head.

4.5 The polarity of the pulse with respect to the tracking control signal shall be as shown in Fig. 1c.

4.6 The pulse shall be 150 ± 30 μsec wide at the 50 percent amplitude points of the current waveform in the record head. The rise and fall times of the pulse shall be 15 ± 10 μsec measured between the 10 and 90 percent points on the waveform.

Widths observable and measurable on developed tape will vary with recording level and properties of the developing solution. (See Appendix A4.)

5. *Tracking Control Signal*

5.1 The frequency of the tracking control signal shall be four times the field frequency of the television video signal.

5.2 The amplitude of the tracking control signal current in the recording head shall be such that the tape is driven to the verge of saturation. This amplitude can be established by the method described in Appendix A1.

5.3 The tracking control signal shall be positioned so that a point of maximum record current and the extended centerline of the area between the second and third video tracks after the track containing the vertical synchronizing pulse shall coincide within ± 0.001 in (± 0.03 mm) at the reference edge of the tape when the recording is made at 15 in/s tape speed.

The tracking control signal shall be positioned so that a point of maximum record current and the extended centerline of the fifth video track after the track containing the vertical synchronizing pulse shall coincide within ± 0.001 in (± 0.03 mm) at the reference edge of the tape when the recording is made at 7.5 in/s tape speed.

5.4 The point of maximum record current coinciding with the frame pulse shall be one that immediately follows an area on the control record to which a south-seeking pole of a compass will be attracted.

5.5 The wave shape of the tracking control signal current in the record head should be sinusoidal.

## Appendix

(The Appendix is not a part of this SMPTE Recommended Practice, but is included for information purposes only.)

A1. The transfer characteristic of magnetic tape is nonlinear. The $B_r$, $I_r$ curve of the tape as recorded has a shape indicated in Fig. 2a. When a sinusoidal record current (Fig. 2c) is applied to the record head, the resulting recorded flux density is as shown in Fig. 2b. The playback voltage waveform (Fig. 2d) is the first derivative of the recorded flux. Thus, the zero axis crossing region of the reproducing signal corresponds to the maximum recorded flux region. The verge of saturation is considered to be the condition where the recorded flux waveform is just noticeably flattened on its peaks. This flattening of the flux peaks results in an inflection in the reproducing signal waveform in the zero axis crossing region. The verge of saturation can thus be determined by increasing the record current until a barely perceptible inflection occurs in the zero axis crossing region of the reproducing signal.

A2. Areas to which a compass is attracted (see Section 5.4) do not coincide with point of maximum record current. The compass will be attracted to two areas (X, as shown in Fig. 2) adjacent to the point where the record current crosses the zero axis. The two areas will appear as bars when the track is developed with carbonyl iron or an equivalent material.

A3. The location of vertical sync and the frame pulse, as specified herein, will apply only if the recorder video head and capstan servos are referenced to a synchronizing signal that is in time coincidence with the video at the recorder.

A4. Recordings made in accordance with this frame pulse specification will reproduce satisfactorily on equipment presently in use without requiring equipment modification. However, modification of existing recording equipment to meet this specification may be made by users or manufacturers in order to increase the overall reliability of the frame pulse recovery. Recordings made according to earlier versions of RP 16 contain less energy in the recorded frame pulse and this fact should be taken into account in the design of new equipment.

A5. In present practice, this pulse is derived from the vertical sync signal that is preceded by a half horizontal line, for both the 15 in/s case and the 7.5 in/s case. The placement on the tape specified by Sec. 4.2 is a consequence of the displacement between the video head wheel and the control-track head which records this pulse.

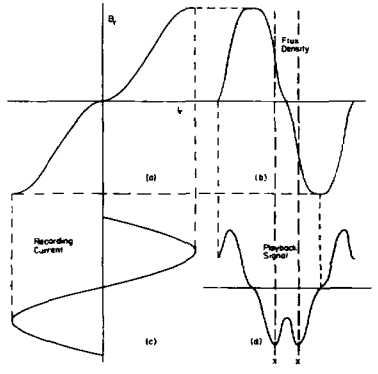


**Fig. 2**