

*Audio Sync Pulse for 8-mm Type S Cameras,
Magnetic Audio Recorders and Rerecording Projectors*

**Cinematography — Spool, daylight loading type, for
35 mm motion-picture cameras (capacity 30 m — 100 ft) —
Dimensions**

1. Scope

This guideline specifies the characteristics of the audio sync pulse for 8-mm Type S cameras and film recorders and for magnetic tape recorders and sound projectors used for transfer of audio records from magnetic tape and film to a magnetic edge stripe on an 8-mm Type S print.

2. Terminology

2.1 Camera and Projector Classes

- 2.1.1 Class A. Speed controllable (self-resolving)
- 2.1.2 Class B. Speed uncontrollable

2.2 Sync Signal Phase

- 2.2.1 Open Shutter Sync. Sync occurs while the shutter is open.
- 2.2.2 Closed Shutter Sync. Sync occurs while the shutter is closed.

3. Camera Specifications

- 3.1 Sync Signal. The camera shall provide a sync pulse at frame rate (24 fps nominal) as a voltage pulse, tone burst, or other sync signal.
- 3.2 Photographic Sync Mark. The photographic sync mark shall be on the edge of the film opposite the sprocket holes and shall be approximately one frame in length.

4. Recorder Specifications

- 4.1 Location of Sync Signal
 - 4.1.1 Cassette Recorder. The signal shall be located on Track 4 in accordance with IEC and NAB standards for audio-visual cue pulses.
 - 4.1.2 Reel-to-Reel Quarter-Inch Tape Recorders
 - 4.1.2.1 The signal shall be located on Track 3 (right stereo channel) as specified in NAB Standard

Magnetic Tape Recording and Reproducing (Reel-to-Reel). Four-Track Stereophonic Recordings Section.

- 4.1.2.2 The signal shall be located on Track 4 of the four-channel quadrasonic recorders and stereo recorders with an extra sync head.

- 4.1.3 Full-Coat Film Recorders. The signal shall be located in the sound record position as specified in American National Standard Position, Dimensions and Reproducing Speed of Magnetic Sound Record on 8-mm Type S Motion-Picture Film, ANSI PH22-164-1982, on recorders using 8-mm Type S full-coat magnetic stock.

- 4.2 Recorded Signal Level. The signal shall be recorded at 10 dB below the reference level of 185 nWb/m at 315 Hz.

5. Projector Specifications

- 5.1 Sync Signal. The projector shall provide a sync pulse at frame rate (24 fps nominal) as a voltage pulse or a tone burst.
- 5.2 Sync Signal Phase. The sync pulse shall be generated immediately following the first shutter opening of a new frame.

NOTE: Socket-Pin Connections. Use of the 8-pin miniature socket (IEC Type 130-9/21) is recommended since it offers enough connections to accomplish all sync camera requirements. The connections shall be:

- Pin 1. Camera chassis ground (sync circuit common)
- Pin 2. 1/F (1-pulse-per-frame) signal
- Pin 3. 1/4F (1-pulse-per-4-frames) signal
- Pin 4. Motor circuit, positive speed control
- Pin 5. Motor circuit, negative speed control
- Pin 6. Tape recorder start/stop normally closed
- Pin 7. Tape recorder start/stop insulated common
- Pin 8. Tape recorder start/stop normally open

1 Scope and field of application

This International Standard specifies the dimensions and characteristics of the general purpose daylight loading spool with a nominal capacity of 30 m (100 ft) for use in 35 mm motion-picture cameras.

NOTE — The dimensions specified in this International Standard are in substantial agreement with corresponding dimensions for microfilm camera spools described in ISO 1116 (see the annex).

2 References

ISO 1101, *Technical drawings — Geometrical tolerancing — Tolerances of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings*. 1)

ISO 1116, *Microcopying — 16 mm and 35 mm microfilms, spools and reels*.

3 Dimensions

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

3.2 If the rivet heads or other fastening devices extend beyond the outer surface of the flange, they shall lie outside the K diameter area, but within the boundaries defined by the volume of rotation diagram.

3.3 Dimension F represents a slot in the spool core for attaching film. The slot sides, starting immediately adjacent to each flange and running a minimum distance of 6.0 mm (0.24 in) from each flange toward the other, should be straight, parallel, and 0.7 to 1.5 mm (0.03 to 0.06 in) apart. The slot sides may diverge over the remaining (central) portions of the slot.

3.4 Dimension J represents the thickness or effective thickness respectively of the spool within a K diameter area which is centred on the spindle hole axis of each flange.

3.5 A reference plane of rotation for each flange is defined by a plane perpendicular to the axis of the spindle and coincident with the surface of a flat 15.0 mm (0.59 in) diameter support which is in contact with the flange and centred on the spindle hole axis of the flange.

The dimension P is the distance measured outwardly from this reference plane 2) of rotation to the plane of rotation generated by the thickest and/or most eccentric point on the flange outside the K diameter area when the spool is rotated on an accurate tight-fitting spindle. This includes rivets or other fastening devices, variations in flange thickness, flatness and lateral runout of the flanges.

Selection of dimension P value is dependent upon the thickness of the material used for the flanges. According to the flange material thickness:

- a) the K diameter area may be depressed (with P greater than zero); or
- b) the outside surfaces of the flanges may be flat from spindle hole to periphery (with P equal to zero); or
- c) in the case of flanges made of very thin material, the K diameter area may be raised rather than recessed (effectively, P less than zero).

3.6 The maximum effective thickness of spools (including all the characteristics mentioned in 3.5) outside the K diameter area has not been stated because it is a function of a spool's specific J value between the 15.0 mm (0.59 in) diameter reference zones on each flange. The largest such overall effective thickness, however, will be $J_{max} - 2P_{max} = 38.90$ mm (1.530 in).

3.7 The eccentricity of the core with respect to the spindle hole axis, Z, should not exceed a total radius variation (total indicator reading) of 1.0 mm (0.04 in) for all spool sizes.

1) At present at the stage of draft. (Revision of ISO-R 1101:1-1985.)

2) The reference plane from which P is measured is not necessarily coincident with all points within the K diameter area, but only needs to be coincident with those which are in contact with the reference support which has a diameter smaller than K.