PROPOSED

SMPTE ENGINEERING GUIDELINE EG 7

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

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 quadraphonic 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

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

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 1101:1-1969.)

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.

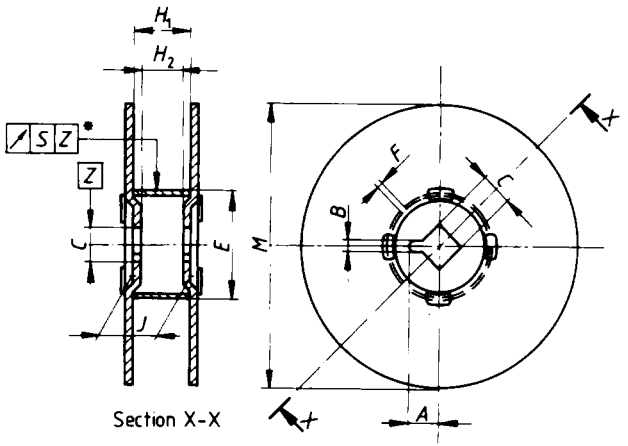

Figure 1 – Flange No. 1
(that which first engages the camera spindle)

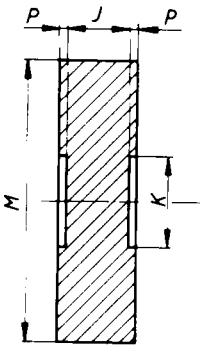

Figure 2 – Volume of rotation diagram

Table

Dimension	mm	in
A	7,6 $^{+1,0}_{0}$	0.30 $^{+0.04}_{0}$
B	3,1 $^{+0,4}_{0}$	0.12 $^{+0.02}_{0}$
C	8,05 $^{+0,15}_{0}$	0.317 $^{+0.006}_{0}$
D	5,40 min.	0.213 min.
E	32,0 ± 0,5	1.26 ± 0.02
F	0,7 $^{+0,8}_{0}$	0.03 $^{+0.03}_{0}$
H_1	35,10 $^{+0,40}_{0}$	1.382 $^{+0.016}_{0}$
H_2	35,00 min.	1.378 min.
J	37,9 $^{0}_{-0,8}$	1.49 $^{0}_{-0.03}$
K	25,5 min.[1]	1.00 min.
M	92,0 $^{0}_{-1,0}$	3.62 $^{0}_{-0.04}$
P (see 3.5)	0,50 max.	0.020 max.
L	8,15 ± 0,15	0.321 ± 0.006
U	11,2 $^{0}_{-0,2}$	0.44 $^{0}_{-0.01}$

1) The metric dimension specified is not a direct conversion from the basic inch dimension, but has been chosen to reflect current engineering practice in metric countries using the metric system.

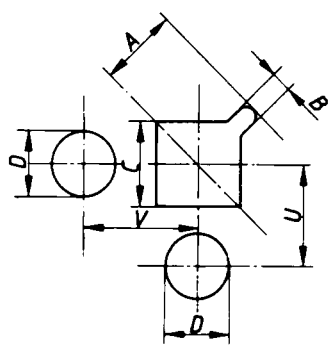

Figure 3 – Spindle and drive holes in flange No. 1 (see 4.2.3)

Figure 4 – Optional spindle hole – Types in flange No. 2 (see 4.2)

* See 3.7. This symbol signifies the runout of the cylindrical surface of the core with respect to the *Z* axis in the manner prescribed in ISO 1101.

4 Spindle hole alignment

4.1 The spindle holes provided in flanges 1 and 2 shall be of the shapes and combinations described in one of the following sub-clauses.

4.2 When square holes are used in both flanges, the alignment of the sides of the squares in the two flanges shall be such that a test bar 8,03 mm (0.316 in) square may be passed completely through the spool.

4.2.1 (Recommended for future construction)

Flanges Nos. 1 and 2 as in the figures, additional optional features are:

a) a second keyway opposite the keyway shown in flange No. 1;

b) a single keyway in flange No. 2.

4.2.2 (Permissible)

Flange No. 1 – as in figure 1 (optional: a second keyway opposite the keyway shown).

Flange No. 2 – round hole with diameter equal to the dimension *C*.

4.2.3 If drive holes are provided in the flanges, they shall be as shown in figure 3 and the table, except that the following option concerning offset drive holes also is acceptable:

The offset drive holes may be located anywhere on the circles which are described by the radii *L* and *V* so long as both holes are rotated an equal amount, and in the same direction from the position shown in the figure.

NOTES

1 When the loaded camera is viewed from the side, with the lens to the left and the bottom of the housing downward (regardless of whether the spool loading mechanism is visible from the side), both the supply and take-up spools rotate in a clockwise direction.

2 Flanges shall be opaque and have low reflectance characteristics.

Annex

(This annex does not form part of the standard.)

Spools for microfilm often employ offset drive holes and/or drive slot as described in ISO 1116. Such holes are optional in spools described in this International Standard covering spools for motion-picture films. Manufacturers who might wish to make a single type of spool for both purposes would need to take the drive holes or slot into account when planning the size of fastening devices and the size of the *K* diameter area described in this International Standard. That is, the minimum diameter of the *K* area (and thus, the circle described by the inner edges of fastening devices, if any) would have to be large enough (about 28,5 mm (1.12 in) minimum) to avoid interference with a drive slot.