Cinematography — Motion-picture prints and sound records for international exchange of television programmes — Specifications

1 Scope and field of application

1.1 This International Standard specifies the identification code and requirements for motion-picture prints and sound records intended for the international exchange of television programmes.

1.2 This International Standard is in complete agreement with CCIR Recommendation 265-3.

1.3 It is not the intent of this International Standard to imply that all the types and combinations of prints listed are preferred or recommended for exchange of television programmes — only that they are acceptable. Those recommended by the CCIR for the exchange of programmes are listed in 4.10.

2 References

2.1 Film dimensions

ISO 69, *Cinematography — 16 mm motion-picture raw stock film — Cutting and perforating dimensions.*

ISO 491, *Cinematography — 35 mm motion-picture film and magnetic film — Cutting and perforating dimensions.*

ISO 1700, *Cinematography — 8 mm Type S motion-picture raw stock film — Cutting and perforating dimensions.*

2.2 Picture images

ISO 26, *Cinematography — Projector usage of 16 mm motion-picture films for direct front projection — Specifications.*

ISO 466, *Cinematography — Image produced by 16 mm motion-picture camera aperture — Position and dimensions.*

ISO 1223, *Cinematography — Picture areas for motion-picture films and slides for television — Position and dimensions.*

ISO 1781, *Cinematography — Projector usage of 8 mm Type S motion-picture film for direct front projection.*

ISO 2895, *Cinematography — Screen luminance for review room projection of motion-picture film intended for indoor theatres.*

ISO 2906, *Cinematography — 35 mm motion-picture film — Image area produced by camera aperture.*

ISO 2907, *Cinematography — 35 mm motion-picture film — Projectable image area.*

ISO 2939, *Cinematography — Picture image area and photographic sound record on 35 mm motion-picture release prints — Position and dimensions.*

ISO 3645, *Cinematography — Image area produced by 8 mm Type S motion-picture camera aperture and maximum projectable image area — Positions and dimensions.*

ISO 4243, *Cinematography — Picture image area and photographic sound record on 16 mm motion-picture release prints — Positions and dimensions.*

ISO 6036, *Cinematography — Colour films and slides for television — Density specifications.*[1]

1) At present at the stage of draft.

2.3 Sound records

ISO 70, *Cinematography — Monophonic 35 mm negative photographic sound record on 35 mm motion-picture film — Position and maximum width dimensions.*

ISO 71, *Cinematography — 16 mm negative photographic sound record on 16 mm, 35/16 mm and 35/32 mm motion-picture film — Positions and dimensions.*

ISO 162, *Cinematography — Recording and reproducing head gaps for three magnetic sound records on 35 mm motion-picture film containing no picture — Positions and width dimensions.*

ISO 490, *Cinematography — Magnetic stripes and magnetic recording head gaps for sound record on 16 mm motion-picture film perforated along one edge (Type 1) — Positions and width dimensions.*

ISO 1188, *Cinematography — Recording characteristic for magnetic sound record on 16 mm motion-picture film — Specifications.*

ISO 1189, *Cinematography — Recorded characteristic for magnetic sound records on 35 mm motion-picture film — Specifications.*

ISO 2862, *Cinematography — Single-track magnetic sound record on 35 mm motion-picture films — Position and dimensions.*

ISO 2939, *Cinematography — Picture image area and photographic sound record on 35 mm motion-picture release prints — Positions and dimensions.*

ISO 2968, *Cinematography — Recording characteristics for magnetic sound record on 8 mm Type S motion-picture prints and full-coat magnetic film perforated 8 mm Type S — Specifications.*

ISO 4242, *Cinematography — Recording head gaps for two magnetic sound records on 16 mm magnetic film — Positions and width dimensions.*

ISO 4244, *Cinematography — Photographic sound record on 8 mm Type S motion-picture prints — Positions and width dimensions.*

2.4 General

ISO 5, *Photography — Determination of diffuse transmission density.*

ISO 543, *Cinematography — Motion-picture safety film — Definition, testing and marking.*

ISO 1039, *Cinematography — Cores for motion-picture and magnetic film rolls — Dimensions.*

ISO 1793, *Cinematography — Reels for 16 mm motion-picture projectors (up to and including 120 m capacity : 18 cm size) — Dimensions.*

ISO 3642, *Cinematography — Cemented or welded splices on 8 mm Type S motion-picture film for projector use — Dimensions.*

ISO 3647, *Cinematography — Spindles for 16 mm motion-picture camera spools and projector reels — Dimensions.*

ISO 3773, *Cinematography — Tape splices for 8 mm Type S motion-picture film for projector use — Dimensions.*

ISO 4241, *Cinematography — Leaders and run-out trailers for 35 mm and 16 mm release prints — Specifications.*

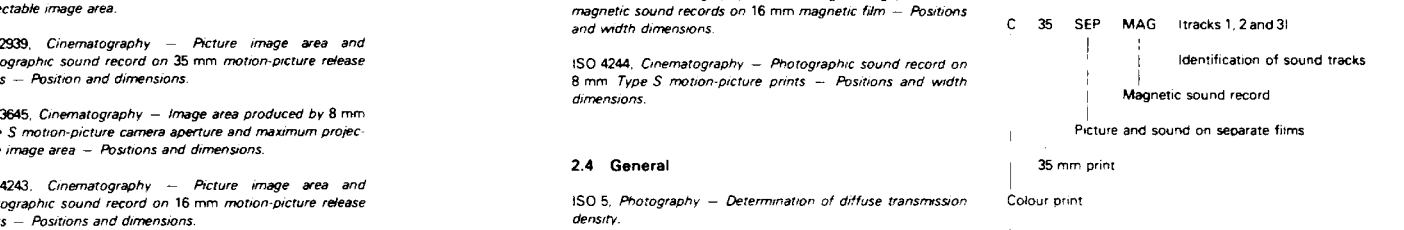
3 Identification code

3.1 The identification code shall be composed as shown in 3.2 and consist of letter combinations to indicate the following :

B	— Black-and-white print
C	— Colour print
T	— Unperforated magnetic tape
35	— 35 mm print
16	— 16 mm print
8S	— 8 mm Type S
MUTE	— Film with no sound record
COM	— Combined sound and picture print
MAG	— Magnetic sound record
OPT	— Photographic sound record
SEP	— Separate sound and picture print (For multiple sound records, identify the tracks used)

3.2 The order of notation shall be as shown in the following examples.

Examples



35 mm print with a photographic sound record is 35 COMOPT.

16 mm print with a magnetic stripe and sound record is 16 COMMAG.

35 mm print with separate ('unmarried') magnetic sound is 35 SEPMAG.

16 mm print with no sound record is 16 MUTE.

3.3 If the sound and picture films are of the same width, this is indicated by a single number. If not, then two numbers, separated by a stroke, are used, the first indicating the width of the picture film.

Examples

35 mm colour picture print with magnetic sound record on 16 mm film is C 35/16 SEPMAG.

16 mm black-and-white picture print with photographic sound record on 35 mm film is B 16/35 SEPOPT.

3.4 If the sound record is carried on 6,25 mm (1/4 in) tape (unperforated), the second width number is replaced by the letter "T".

Example

16 mm colour picture print with sound on magnetic tape is C 16/T SEPMAG.

3.5 If multiple sound records are on separate films, an identification of the tracks utilized must be added after the word "SEPMAG".

Examples

for 35 mm film	SEPMAG	(tracks 1 and 2)
	or SEPMAG	(track 1)
	or SEPMAG	(tracks 1 and 3)
	etc.	
for 16 mm film	SEPMAG	(edge track)
	SEPMAG	(both tracks)
	etc.	

4 General requirements

4.1 Cutting and perforating dimensions of the motion-picture films shall be as listed below.

4.1.1 For 35 mm film with picture, as specified for Type P perforation in ISO 491 with pitch dimension *B* equal to 4,75 mm (0.187 0 in).

4.1.2 For 35 mm magnetic film for 35 SEPMAG, as specified for Type P perforation in ISO 491 with pitch dimension *B* equal to 4,75 mm (0.187 0 in).

4.1.3 For 16 mm film with picture, as specified in ISO 69.

4.1.4 For 16 mm magnetic film for 16 SEPMAG, as specified in ISO 69.

4.1.5 All 8 mm Type S films shall be as specified in ISO 1700.

4.2 All motion-picture films shall be of the safety type, as defined in ISO 543.

4.3 The picture printed images shall be a positive type and shall have dimensions as listed below.

4.3.1 For 35 mm films, as specified in ISO 2907 and ISO 2939.

4.3.2 For 16 mm films, as specified in ISO 466.

4.3.3 For 8 mm Type S film, as specified in ISO 3645.

4.3.4 When films are produced for television by conventional cinematographic methods, allowances should be made for the loss of picture area that occurs both in film-scanning and in domestic receivers. The television scanned area, the action field and the title area shall conform to ISO 1223.

4.4 The normal position for the emulsion side of 35 mm film is recognized internationally as facing the light source when projecting onto a reflection-type screen.

NOTE – The actual emulsion position should be indicated on the leader and on the label of the film container. (NORMAL for preferred position or REVERSED.)

For 16 mm film, the emulsion position is dependent on the process of preparation and either emulsion-to-light source or emulsion-to-objective-lens orientation may be encountered. The actual emulsion position should be indicated on the leader and the label of the film by clear statement or diagram.

4.5 The projection rate shall be 24 or 25 frames per second. The frame rate should accompany any reference to programme duration.

4.6 The leader and trailer shall be in accordance with ISO 4241.

4.6.1 The minimum length of the identification leader shall be 42 frames, and the protection leader 1,83 m (6 ft) for 35 mm and 0,76 (2.5 ft) for 16 mm.

4.6.2 The minimum information given on the identification leader shall be as follows :

Name of sending organization
Title of programme
Code word
Position of emulsion
Total programme duration and picture frequency
Total number of reels
Reel number
Duration or length of the film on the reel
Number of sound records (see 4.6.6)

4.6.3 The identification leader shall have the same type of base and perforation as the film to which it is attached. Leaders shall be attached to the film in such a manner that the emulsion on both leader and film is facing the same direction.

4.6.4 Combined picture and sound films shall have a start mark on the frameline, one frame ahead of the first picture frame or the beginning of the sound, whichever is the earlier.

4.6.5 In the case of a SEPMAG-type film, a synchronization mark corresponding to the mark on the picture film leader should also be placed on the magnetic film.

4.6.6 The codes 16 SEPMAG and 35 SEPMAG, together with an identification of the tracks used, shall always be marked on the leaders of both films to indicate whether one, two or three sound tracks are provided.

4.7 Film splices shall be in accordance with appropriate national and international standards.

4.8 All film densities specified are measured in singly-diffused light. The spectral characteristic of the densitometer shall comply with ISO 5 for diffuse visual density, Type Vi-b.

4.8.1 For monochrome film, the density corresponding to television white level shall be 0,3 to 0,4 but, in the case of dyed-base film (film base containing an antihalation density in the base), the total density corresponding to television white level shall not exceed 0,5.

NOTE – The maximum density of a film is determined by the scene contrast and the film transfer characteristic. The gradation in areas in the film having densities in excess of 1,6 above that corresponding to white level may be distorted or lost entirely. (See note in 4.8.2.)

4.8.2 For colour film, the density corresponding to television white shall be as specified in ISO 6036.

NOTE – The maximum density of a film is determined by the scene contrast and the film transfer characteristic. Shadow areas, in which the reproduction of detail is not essential to the picture, may have densities in the range of 2,0 to 2,5, but it is recognized that in such areas both image gradation and colour may be distorted or lost entirely. The density range for optimum colour reproduction is expected to be between 0,5 and 1,7.

Television white level preferably corresponds to a fully-lit object in the scene, having a reflectance of about 60 %. This results in reproduction of fully-lit human faces having reflectances of about 15 to 35 % at film densities between 0,2 and 0,5 greater than the density corresponding to television white level.

4.8.3 Recognizing that ultimate reproduction of white in television systems will be either CIE Illuminant C or CIE Illuminant D_{65}, both 35 mm and 16 mm colour films shall be balanced for projection by an illumination system approximating in spectral distribution to a black body at a colour temperature of 5 400 ± 400 K, with a luminance at the centre of the screen in a review room as specified in ISO 2895.

NOTE – Recommended conditions for viewing television films in a special review room are described in the annex, and are now being prepared for International Standardization.

4.9 Films may be transported on flanged reels or on cores as specified in ISO 1039 and ISO 1793. The boxes in which films are transported should be identified with labels carrying the same information as the corresponding film leader (see 4.6.2).

NOTE – It is recommended that if cores are used, their outer diameter be not less than 75 mm (2.95 in).

The diameter of a flanged reel or the outer diameter of the film on a core shall not exceed 380 mm (15 in). It is desirable that 16 mm films exceeding 300 m (1 000 ft) in length be on flanged reels.

NOTE – Cores and reels intended for films with magnetic sound stripe should be made of non-magnetic material.

4.10 Combinations recommended for exchange

The international exchange of recorded television programmes on black-and-white and colour (B and C types) films should be effected by means of one of the following types :

1 – 35 COMOPT
2 – 16 COMOPT
3 – 16 COMMAG
4 – 16 SEPMAG
5 – 35 MUTE
6 – 16 MUTE
7 – 35 COMMAG
8 – 35 SEPMAG

NOTE – Films of Types 7 and 8 cannot be exchanged until there is agreement between the organizations concerned.

5 Requirements for sound records

The lateral location and dimensions of sound records shall be as listed below.

5.1 For 35 COMOPT, as specified in ISO 70 and ISO 2939.

5.2 For 16 COMOPT, as specified in ISO 71.

5.3 For 16 COMMAG, as specified in ISO 490.

5.3.1 The magnetic stripe shall be on the side of the film that faces the light source of a projector arranged for direct projection on a reflection-type screen.

5.3.2 No recording shall be made on the balance stripe.

5.4 For 16 SEPMAG, with two sound records, as specified in ISO 4242.[1]

If the SEPMAG form with two sound records is used, the centre track shall be Record No. 1 and the edge track Record No. 2 (see figure 1).

1) ISO 4242 is to be used both for 16 SEPMAG having a single track and for 16 SEPMAG having a centre track and an edge track both of 4,0 mm (0.158 in) width.

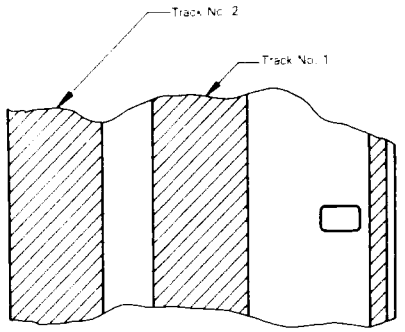


Figure 1 — 16 SEPMAG with two sound records

5.5 For 35 SEPMAG with three sound records, as specified in ISO 162.

5.5.1 Multiple magnetic records on a single 35 mm film used as separate tracks shall be located and designated as shown in figure 2.

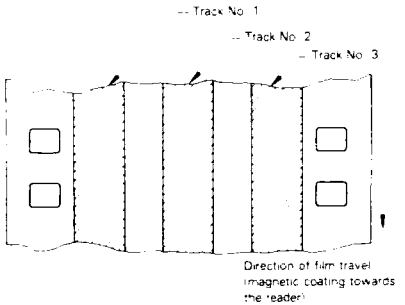


Figure 2 — 35 SEPMAG with three sound records
(If only one sound record is supplied it shall be recorded on track No. 1)

5.5.2 If two or three sound tracks are provided, they shall be recorded synchronously on the film.

6 Requirements for sound recording

6.1 COMOPT types

6.1.1 The preferred types of photographic sound records are variable area, bilateral or double bilateral.

6.1.2 The nominal photographic sound-recording characteristic for 35 mm and 16 mm film is that which produces a constant modulation of the optical transmission of the positive sound record, independent of frequency within the given frequency range, when a sine-wave signal of constant amplitude is fed into the input of the photographic recording channel.

The corresponding nominal reproducing characteristic is that which produces a sine-wave output signal whose level is independent of frequency when reproducing a sound record recorded with the nominal recording characteristic specified above.

6.1.3 The audio-frequency range shall be no less than 50 Hz to 5 kHz for 16 mm prints and no less than 40 Hz to 8 kHz for 35 mm prints as minimum and 15 kHz maximum, for either film size.

6.2 COMMAG and SEPMAG types

The recording and reproducing characteristics shall be as follows.

6.2.1 For 16 MAG, a time constant of 70 µs.

6.2.2 For 35 MAG, as specified in ISO 1189 (a time constant of 35 µs).

6.3 The COM and SEP types should not be combined. If one or more sound records are provided on a separate film, only the SEP shall be used for reproduction.

6.4 The separate sound records shall be recorded to be reproduced at the same projection rate as the picture film if they are on the same film width. A projection rate of 24 to 25 frames per second is acceptable.

Annex

Viewing conditions

(This annex forms part of the standard.)

The television monitor and the home receiver present relatively small pictures and are usually viewed with other illuminated objects present. These differences from theatrical viewing and programming call for a different preview condition. The necessary conditions are a relatively small picture of a specified colour and brightness, surrounded by a relatively large field of the same colour at a lower brightness. The large visible surround serves two important functions : it provides a standard correlate of the ambient field of view of the television screen, which has a marked effect on the apparent contrast of the picture ; it also provides a constant adaptation field against which to refer the colour balance of the picture when making judgments of colour balance.

This practice conforms closely to practices in many countries. In Canada, CTP 1-1968, *Viewing rooms for evaluation of* 16 mm *colour film for television,* describes such a viewing room. Practices in the European Broadcasting Union are given in Tech 3091-E, *Viewing conditions for the appraisal, by means of optical projection, of colour films intended for television presentation,* first edition, September 1970. In the USA, proposed SMPTE Recommended Practice RP 41, *Evaluation of colour films intended for television,* covers this subject.

The general characteristics of the viewing practice are :

a) a screen chromaticity equivalent to 5 400 ± 400 K;

b) a screen luminance of 137 ± 13,7 cd/m² (40 ± 4 fL), open gate;

c) the luminance of the light surround is approximately 1/10 of the screen illumination;

d) the viewing screen shall be of such size that the viewing audience may be seated at a distance from the screen equal to 4 to 6 times the screen height. Its size shall be sufficiently small so that a visible surround area of approximately 8 times the screen area is possible.

NOTE — Experiments have established that the same colour balance and density for prints is preferred under the darkened room condition (see 4.8.3) as under the light-surround condition described above. However, it is possible, because of visual adaptation, for an observer in the darkened room to judge as acceptable some prints which would be recognized as less acceptable in the presence of the lighted surround.