



The attached SMPTE Engineering Document has been declared “Stable” by the controlling Technology Committee.

The SMPTE Operations Manual for Standards states:

A document should be stabilized if it is believed to be substantially correct, does not contain harmful or misleading recommendations, may still be relevant to equipment or practices in use, is stable, but does not represent current technology, and need not be subject to future reviews.

A Stable document shall still be made available and offered for sale by the Society, but it shall be prefaced by a cover page explaining its current status.

At any time, a Technology Committee may revise, amend, or otherwise initiate a new Project on a Stable document.

A Stable document is “In Force”, and not deprecated or withdrawn.

*** * * * ***

Note:

SMPTE “Stable” documents were previously described as “Archived” and the attached document may be marked as “Archived”. The status of a SMPTE document described as “Archived” is exactly as described above for a “Stable” document.

Stable documents may not adhere to the latest style and format of SMPTE documents, or to current usage of normative language. Suitable care should be taken in interpretation.

SMPTE STANDARD

SMPTE 56-2005Revision of
SMPTE 56-1996

for Motion-Picture Film Nomenclature for Studios and Processing Laboratories



Page 1 of 23 pages

1 General

1.1 Motion picture

A series of images presented in rapid succession with objects represented in successive positions either unchanged or changed and producing, because of the persistence of vision, the optical effect of a continuous picture.

1.2 Motion-picture film

A thin flexible strip of plastic, complying with a dimensional standard as defined herein, whose use is specific to the process of manufacturing a motion picture.

NOTE – Motion-picture film, perforated or unperforated, is usually described by a name relating to or designating that part of the system for which it was designed; i.e., the terms color negative, release positive, separation master positive, audio recording, electronic video recording, etc.

1.2.1 Raw stock

Raw stock is film which has not been exposed or processed.

1.2.2 Film base

Film base is the plastic material upon which a photographic emulsion or other material may be coated.

NOTE – All film base manufactured in the United States for motion-picture use since 1952 has been safety base.

1.2.2.1 Safety base

Safety base is the slow-burning film support used for motion-picture films which complies with SMPTE 223M.

1.3 Magnetic audio film

Magnetic audio film is a film base having film perforations along one or both edges and bearing a magnetic coating, either completely across the film or in stripes, the coating being capable of accepting and reproducing audio records.

NOTE – Unperforated materials usually are referred to as magnetic tape.

1.4 Perforations

Perforations are the regularly and accurately spaced holes that are punched throughout the length of motion-picture film. These holes are engaged by the teeth of various sprockets and pins by which the film is transported and positioned as it travels through cameras, processing machines, projectors, and other film-handling machinery.

1.4.1 Perforation pitch

The perforation pitch is the distance from the bottom edge of one perforation to the bottom edge of the next perforation, measured along the length of the film.

Motion-picture film stock is perforated in two formats, short and long pitch. In general, motion-picture film with short perforation pitch is used for negative or intermediate images. Release print film is generally perforated with long pitch to minimize slippage when continuously printed over a sprocket in contact with a short-pitch negative film closer to the axis of the sprocket.

NOTE – Perforations are being identified currently by two-letter designations such as BH (Bell & Howell), KS (Kodak Standard), DH (Dubray-Howell), or CS (CinemaScope). A numeral, such as 1866, designates the pitch in ten thousandths of an inch. A designation, 1R, 2R, etc., used with films having 16-mm, 8-mm type R, or 8-mm type S perforations, refers to the number of rows of perforations across the narrow dimension of the film.

1.4.2 35-mm perforation, BH-1866

The 35-mm negative perforation has sharp corners, curved sides, a nominal width of 0.110 in (2.79 mm), a height of 0.073 in (1.85 mm), and a pitch of 0.1866 in (4.740 mm) (SMPTE 93).

1.4.3 35-mm perforation, BH-1870

The 35-mm negative perforation has sharp corners, curved sides, a nominal width of 0.110 in (2.79 mm), a height of 0.073 in (1.85 mm), and a pitch of 0.1870 in (4.750 mm) (SMPTE 93).

1.4.4 35-mm perforation, KS-1866

The 35-mm positive perforation is rectangular in shape with a width of 0.110 in (2.79 mm), a height of 0.078 in (1.98 mm), a fillet in each corner with a radius of 0.020 in (0.51 mm), and a pitch of 0.1866 in (4.740 mm) (SMPTE 139).

1.4.5 35-mm perforation, KS-1870

The 35-mm positive perforation is rectangular in shape with a width of 0.110 in (2.79 mm), a height of 0.078 in (1.98 mm), a fillet in each corner with a radius of 0.020 in (0.51 mm), and a pitch of 0.1870 in (4.750 mm) (SMPTE 139).

1.4.6 35-mm perforation, DH-1870

This perforation is rectangular in shape with a height of 0.073 in (1.85 mm), a width of 0.110 in (2.79 mm), a fillet in each corner with a radius of 0.013 in (0.33 mm), and a pitch of 0.1870 in (4.750 mm) (SMPTE 237).

1.4.7 35-mm perforation, CS-1870

This perforation is rectangular in shape with a height of 0.073 in (1.85 mm), a width of 0.078 in (1.98 mm), a fillet in each corner with a radius of 0.013 in (0.33 mm), and a pitch of 0.1870 in (4.750 mm) (SMPTE 102). The outer edge of this perforation is at a different distance from the edge of the film than the other 35-mm film perforations listed above.

1.4.8 65-mm motion-picture film, KS-1866

The 65-mm negative perforation is rectangular in shape with a width of 0.110 in (2.79 mm), a height of 0.078 in (1.98 mm), a fillet in each corner with a radius of 0.020 in (0.51 mm), and a pitch of 0.1866 in (4.740 mm) (SMPTE 145).

1.4.9 65-mm motion-picture film, KS-1870

This 65-mm negative perforation is the same as for 65-mm motion-picture film, KS-1866, except for the perforation pitch (SMPTE 145).

1.4.10 70-mm motion-picture film perforated 65-mm, KS-1870

The 70-mm positive perforation is rectangular in shape with a width of 0.110 in (2.79 mm), a height of 0.078 in (1.98 mm), a fillet in each corner with a radius of 0.020 in (0.51 mm), and a pitch of 0.1870 in (4.750 mm). This film is intended to be printed from 65-mm motion-picture film, KS-1866, or from an optically enlarged 35-mm anamorphic negative image. The additional margin width is designed to accommodate magnetic audio records (SMPTE 119).

NOTE – This 70-mm film perforated 65-mm is used for motion pictures. It should be distinguished from two other types of perforated 70-mm film which are used for still pictures. These are described in ANSI IT1.10.

1.4.11 16-mm perforation

The 16-mm perforation is rectangular in shape with a height of 0.050 in (1.27 mm), a width of 0.072 in (1.83 mm), and a fillet in each corner with a radius of 0.010 in (0.25 mm). It is used on the following films:

1.4.11.1 35-mm motion-picture film perforated 32-mm, 2R-2994

This is a 35-mm film with 16-mm perforations so arranged that if 1-1/2 mm are slit from each edge of the film and the film were slit down the middle, two 16-mm films would result, each having one row of perforations (SMPTE 73).

1.4.11.2 35-mm motion-picture film perforated 32-mm, 2R-3000

This is a 35-mm film with 16-mm perforations so arranged that when 1-1/2 mm are slit from each edge of the film and the film is slit down the middle, two 16-mm films result, each with one row of perforations (SMPTE 73).

1.4.11.3 35-mm motion-picture film perforated 16-mm, 3R-2994 (1-3-0)

This is a 35-mm film with 16-mm perforations (SMPTE 171).

NOTE – Numerals (e.g., 1-3-0) are added to the title of some standards to specify how the rows of perforations are placed on the film. The perforation rows are numbered starting at the reference edge. The reference edge is the edge nearest to that row of perforations which is retained in one of the 16-mm strips that may be generated by appropriate slitting of the parent 35-mm film. A row of perforations which is discarded is always given the number 0.

1.4.11.4 35-mm motion-picture film perforated 16-mm, 3R-3000 (1-3-0)

This is a 35-mm film with 16-mm perforations so arranged that if 3 mm are slit from the selvage edge of the film and the film were slit down the middle, two 16-mm films would result, each having one row of perforations (SMPTE 171).

1.4.11.5 16-mm motion-picture film, 1R-2994

This film is 16 mm in width, perforated along one edge only (SMPTE 109).

NOTE – The formats referred to as super 16 as well as regular 16 may be exposed on this film (SMPTE 7).

1.4.11.6 16-mm motion-picture film, 1R-3000

This film is 16 mm in width, perforated along one edge only (SMPTE 109).

1.4.11.7 16-mm motion-picture film, 2R-2994

This film is 16 mm in width, perforated along both edges (SMPTE 109).

1.4.11.8 16-mm motion-picture film, 2R-3000

This film is 16 mm in width, perforated along both edges (SMPTE 109).

1.4.12 8-mm type R perforation

The 8-mm type R perforation is rectangular in shape with a height of 0.050 in (1.27 mm), a width of 0.072 in (1.83 mm), and a fillet in each corner with a radius of 0.010 in (0.25 mm). This perforation is identical to the 16-mm perforation described in 1.4.11 above, but for 8-mm use has a pitch of 0.1500 in or 0.1497 in (3.810 mm or 3.802 mm). It is used on the following films:

1.4.12.1 35-mm motion-picture film perforated 8-mm type R, 5R-1500

This is a 35-mm film with 8-mm perforations so arranged that if 3 mm are slit from the selvage edge (identified by circular holes between perforations) and the film slit three times more, four 8-mm type R films would result, each having one row of perforations.

1.4.12.2 35-mm motion-picture film perforated 8-mm type R, 2R-1497

This is a 35-mm film with 8-mm type R perforations along each edge.

1.4.12.3 35-mm motion-picture film perforated 8-mm type R, 4R-1500

This is a 35-mm film with 8-mm perforations so arranged that when 1-1/2 mm are slit from each edge and the film slit down the middle, two 16-mm films result which, when slit down the middle, produce four 8-mm type R films, each having one row of perforations.

1.4.12.4 16-mm motion-picture film perforated 8-mm type R, 2R-1500

This is a film 16 mm in width which when slit down the middle results in two 8-mm type R films, each having one row of perforations (SMPTE 239).

1.4.13 8-mm type S perforation

The 8-mm type S perforation is rectangular in shape, with a height of 0.045 in (1.14 mm), a width of 0.036 in (0.91 mm), and a fillet in each corner with a radius of 0.005 in (0.13 mm). It is used in the following films:

1.4.13.1 35-mm motion-picture film perforated 8-mm type S, 2R-1664 (1-0)

This is a 35-mm film with 8-mm type S perforations on each edge (SMPTE 169).

1.4.13.2 35-mm motion-picture film perforated 8-mm type S, 5R-1667 (1-3-5-7-0)

This is a 35-mm film with 8-mm type S perforations so arranged that when 0.030 in (0.76 mm) is slit from one edge and 0.091 in (2.31 mm) is slit from the factory-marked selvage (discard) edge of the film and slit three more times, four 8-mm type S films would result, each having one row of perforations (SMPTE 165).

1.4.13.3 16-mm motion-picture film perforated 8-mm type S, 2R-1664 (1-4)

This is a 16-mm film with 8-mm type S perforations on each edge of the film (SMPTE 168).

1.4.13.4 16-mm motion-picture film perforated 8-mm type S, 2R-1667 (1-4)

This is a 16-mm film with 8-mm type S perforations on each edge of the film so arranged that when the film is slit down the middle, two 8-mm type S films result, each having one row of perforations (SMPTE 168).

1.4.13.5 16-mm motion-picture film perforated 8-mm type S, 2R-1664 (1-3)

(SMPTE 151)

1.4.13.6 16-mm motion-picture film perforated 8-mm type S, 2R-1667 (1-3)

This is a film 16 mm in width which when slit down the middle results in two 8-mm type S films (SMPTE 151).

1.4.13.7 8-mm motion-picture film perforated 8-mm type S, 1R-1664

(SMPTE 149)

1.4.13.8 8-mm motion-picture film perforated 8-mm type S, 1R-1667

This film is 8 mm in width with a single row of 8-mm type S perforations (SMPTE 149).

1.4.13.9 35-mm motion-picture film perforated 35-mm and 8-mm type S, KS 2R-1866/S8 3R-1664

This is a 35-mm film with 35-mm perforations down each edge and three rows of 8-mm type S perforations arranged to produce three like 8-mm type S images.

1.4.13.10 35-mm motion-picture film perforated 35-mm and 8-mm type S, KS 2R-1870/S8 3R-1667

This is a 35-mm film with 35-mm perforations down each edge and three rows of 8-mm type S perforations arranged so that when 0.218 in (5.54 mm) is slit from each edge and the remaining film slit twice more, three 8-mm type S films would result, each having one row of perforations.

1.5 Photographic emulsion

A photographic emulsion consists of dispersions of light-sensitive materials in a colloidal medium, usually gelatin, carried as a thin layer on film base.

NOTE – Photographic materials are usually designated as negative or positive types according to their light sensitivity (speed) or usage; negative emulsions, in general, being more sensitive than positive emulsions.

1.5.1 Black-and-white film

Black-and-white film carries an emulsion in which, after processing, brightness values of a scene are reproduced only in tones of the gray scale.

NOTE – Color prints may also be made on black-and-white film by such methods as iron toning, color development, or imbibition (dye transfer).

1.5.2 Color film

Color film carries one or more emulsions in which, after processing, brightness values of a scene are reproduced in terms of color scales.

1.5.3 Reversal film

A reversal film is one which, after chemical reversal processing, produces an image having a scale of brightness values directly corresponding to that of the original exposure. Chemical reversal includes first development, bleaching, and redevelopment.

1.5.4 Direct reversal film

A direct reversal film is one which, processed in a developer and fixing bath, produces an image having a scale of brightness values directly corresponding to that of the original exposure. In this case, reversal is due to the emulsion rather than to the use of a chemical reversal process subsequent to exposure.

1.6 Image (photographic)

An image is any photographically obtained likeness in a processed photosensitive material.

1.6.1 Latent image

A latent image is the invisible image registered on a photographic emulsion due to the reaction produced in the emulsion by exposure to radiant energy.

NOTE – This image becomes visible after development.

1.6.2 Picture image

A picture image is a photographically obtained likeness of any object on photographic material.

1.6.3 Audio image

An audio image is a photographically obtained audio record.

1.6.4 Negative image

A negative image is a photographic image in which the brightness scale is approximately inverted with respect to the brightness scale of the original subject. In color negatives, the hue scale is usually, but not necessarily, complementary to the hue scale of the original subject and the brightness scale is inverted.

1.6.5 Positive image

A positive image is a photographic replica in which the tones of the gray scale or color values of the originally photographed subject are represented in their natural order.

1.6.6 Black-and-white image

A black-and-white image is an image produced on a black-and-white film.

1.6.7 Color image

A color image is an image produced on a color film.

1.6.8 Anamorphic image

An anamorphic image is an image which has been produced by an optical system having different horizontal and vertical magnifications.

NOTE – Equal horizontal and vertical magnification is assumed unless the term anamorphic is applied specifically.

1.7 Aspect ratio

Aspect ratio is the ratio of width to height of a projected picture image.

NOTE – This is the more common usage, although the term is also applied to photographic images and to camera, printer, and projector apertures.

1.8 Synchronism

Synchronism is the relation between the picture and audio with respect either to the physical location on the film or films or to the time at which corresponding picture and audio are seen and heard.

1.8.1 Projection synchronism

Projection synchronism is the time relation between picture and corresponding audio in a projection print.

NOTE – The audio record on a projection print is, in most cases, in advance of the corresponding picture. The displacement is specified in picture frames in the following standards:

<u>Audio record</u>	<u>Standard</u>
70-mm magnetic*	SMPTE 185
35-mm photographic	SMPTE 40
35-mm magnetic*	SMPTE 137
16-mm photographic	SMPTE 41
16-mm magnetic	SMPTE 112
8-mm type S magnetic	SMPTE 164

*In this case, the audio is behind the corresponding picture.

1.8.2 Editorial synchronism

Editorial synchronism is the relationship between the picture and audio film during the editorial process.

NOTE – During the editorial process, the audio record and corresponding picture, whether on the same or separate films, are kept in alignment and not offset as for projection. Many composite release negatives are supplied in editorial synchronism.

1.8.3 Camera synchronism

Camera synchronism is the relation between picture and audio record in a composite camera original.

NOTE – Camera synchronism is generally not the same as editorial synchronism. In 16-mm single systems, the two are normally in projection synchronism but this is not the case for most 35-mm single systems (i.e., where picture and audio are recorded on the same film).

1.9 Exposure

Exposure is the process of subjecting a photographic film to suitable intensity of radiant energy for a given time in such manner that it may produce a latent image on an emulsion.

NOTE – Exposure = intensity × time.

1.10 Processing

Processing is the generic term applied to the total operation necessary to produce a permanent visible image on exposed film.