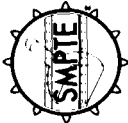


# SMPTE RECOMMENDED PRACTICE

## Specifications for Flutter Test Film for 16-mm Audio Reproducers, Magnetic Type



### 1 Scope

This practice specifies a test film for determining the presence of flutter in 16-mm motion-picture magnetic audio reproducers operating at approximately 36 ft (11 m) per minute.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions in this practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

ANSI S4.3-1982, Method for Measurement of Weighted Peak Flutter of Sound Recording and Reproducing Equipment

ANSI S4.6-1982, Method of Measuring Recorded Flux of Magnetic Sound Records at Medium Wave-lengths

ANSI/SMPTE 97-1989, Motion-Picture Film (16-mm) — 200-Mil Edge-Position Magnetic Audio Record

ANSI/SMPTE 109-1986, Motion-Picture Film (16-mm) — Perforated 1R

ANSI/SMPTE 223M-1991, Motion-Picture Film — Safety Film

### 3 Test film signal

#### 3.1 Frequency

The audio record shall be an original recording which will reproduce at a frequency of 3150 Hz  $\pm$  25 Hz when the linear speed of the film is 24 perforations per second or approximately 36 ft per minute (7.2 in or 183 mm per second).

#### 3.2 Distortion

The total harmonic distortion of the recorded signals shall not exceed 0.5%.

#### 3.3 Audio record

The audio record shall be recorded so that it extends from the perforations on one side of the film to the opposite edge, or from one edge of the film to the other.

#### 3.4 Record level

The flutter test tone shall not be more than 10 dB down from the equivalent reference level of 400 Hz at 185 nanowebers per meter after correct equalization of 70  $\mu$ s.

#### 3.5 Flutter

The weighted peak flutter of the audio record shall not exceed  $\pm$  0.1% when measured in accordance with ANSI S4.3-1982.

#### 3.6 Azimuth

The azimuth of the audio record shall be 90°  $\pm$  3° to the reference edge of the film.

### 4 Film stock

4.1 The film stock shall be full-coat, splice-free, and of the low-shrinkage, safety type in compliance with ANSI/SMPTE 223M-1991.

4.2 Test films shall be made on a base cut and perforated in accordance with ANSI/SMPTE 109-1986.

4.3 The film stock shall be conditioned for 10 days at 20°C  $\pm$  3°C (68°F  $\pm$  5.4°F) at a relative humidity of (50  $\pm$  10)% prior to recording.

4.4 The film shall be recorded and packaged within the temperature and humidity limits specified in 4.3. The recorded film shall be packaged in a metal can and sealed either with a low-moisture permeability plastic tape or a fabric tape having a moisture barrier.

### 5 Identification

Each test film shall be identified by a suitable identification marking.

### 6 Calibration

#### 6.1 Flux

The short circuit flux shall be determined by means of the calibrated short-gap ferromagnetic core reproducer technique. This technique is described in ANSI S4.6-1982.

#### 6.2 Level

The signal level specified in 3.4 shall be measured with an rms voltmeter calibrated in decibels with an accuracy of  $\pm$  0.1 dB over the bandwidth 31.5 Hz to 16 kHz.

#### 6.3 Calibration

The test film shall be calibrated on a reproducing head made in accordance with ANSI/SMPTE 97-1989.

NOTE — A test film conforming to this practice is available from the Society of Motion Picture and Television Engineers.

# SMPTÉ RECOMMENDED PRACTICE

## Specifications for 70-mm Projector Alignment and Screen Image Quality Test Film

RP 91-1992  
Revision of RP 91-1987



Page 1 of 5 pages

### 1 Scope

1.1 This practice specifies a test film for quantitative measurements of 70-mm projector alignment and screen image quality.

1.2 This practice also describes the artwork and dimensions for a test chart to be used as the original subject for the manufacture of a master negative.

### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions in this practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

ANSI/SMPTÉ 119-1988, Motion-Picture Film (70-mm)  
— Perforated 65-mm, KS-1870

ANSI/SMPTÉ 185-1987, Motion-Picture Film (70-mm)  
— Position, Dimensions and Reproducing Speed —  
Six Magnetic Records on Release Prints

### 3 Test film prints

3.1 A reproduction of the test chart is shown in figure 1.

3.2 The positive resolution charts are modified NBS resolution test charts with a luminance ratio of 100:1 (see figure 2).

3.3 The area between the logos (SMPTÉ and 70-PA) is to be used to insert a gray patch, if necessary, as a densitometric control in the exposure and processing of the original negative and subsequent prints.

3.4 The test film shall be produced as a 70-mm print with a neutral image on color positive film manufactured in accordance with ANSI/SMPTÉ 119-1988.

3.4.1 The printing shall be chosen so that, after processing, there is cancellation of the image spread in the resolution targets specified in 3.2 at 80 lines per millimeter. If used, the gray patch density will provide a convenient densitometric control in the exposure and processing after the characteristics of the system have been established.

3.4.2 The method of printing shall produce less than 0.20% (arbitrary) vertical image unsteadiness on the test print.

3.4.3 The print shall contain magnetic stripes in accordance with ANSI/SMPTÉ 185-1987.

### 4 Dimensions

4.1 The dimensions of the original test chart shall be 25X the dimensions given in table 1. This requirement is necessary because the NBS resolution test charts can be prepared for a 25X reduction. For practical purposes, a smaller original chart can be prepared provided that the NBS resolution charts can be accurately reduced in size by a known ratio which shall then apply to all the other dimensions on the test chart.

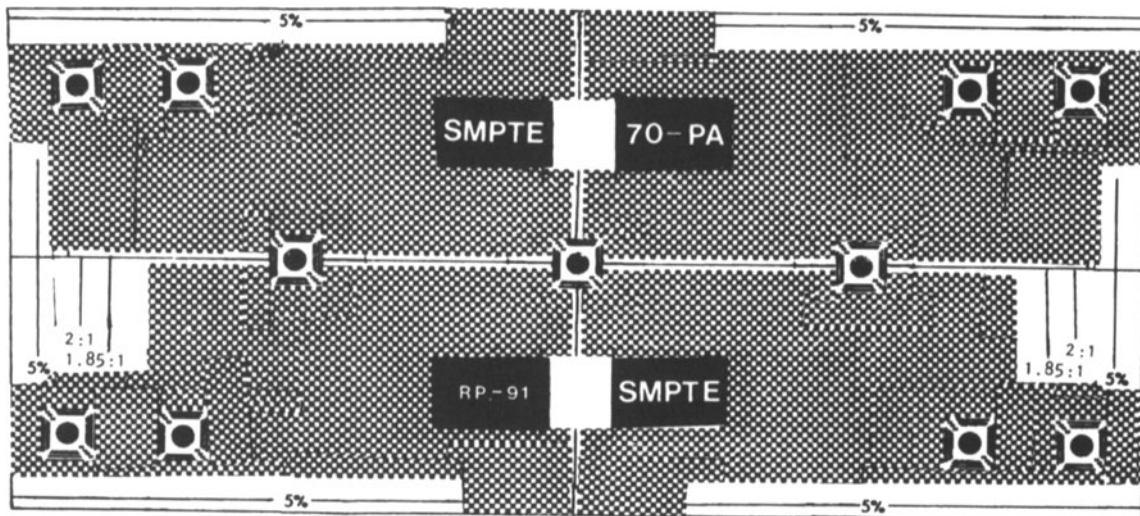


Figure 1 - Reproduction of test chart

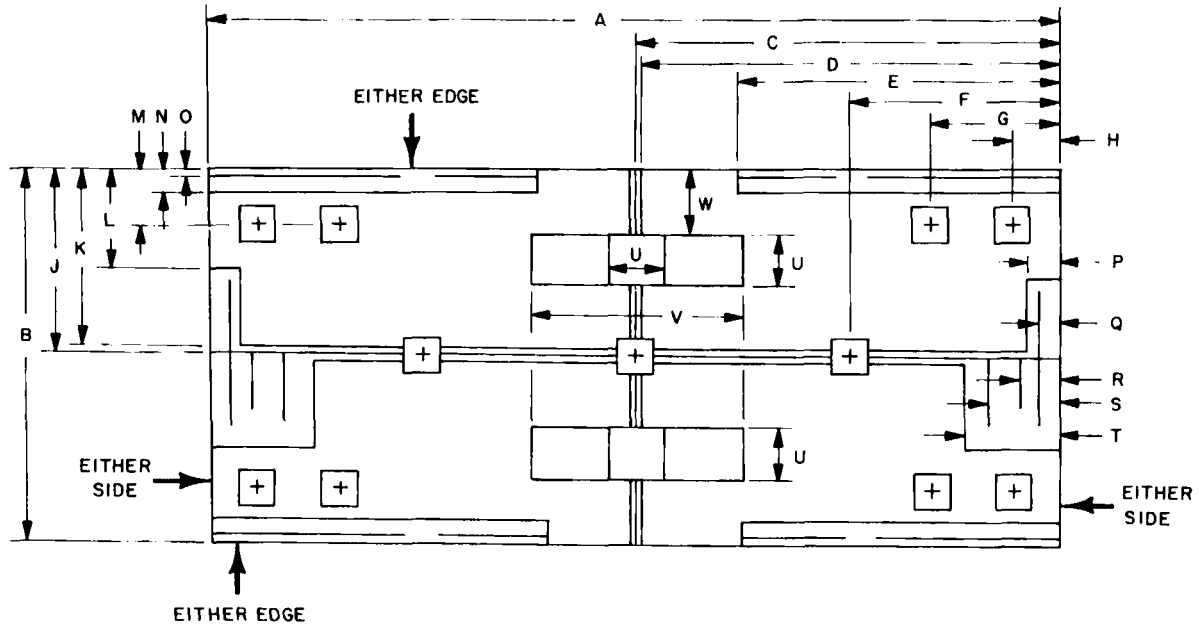


Figure 3 - Test chart dimensions

Table 1 - Dimensions

Dimensions	Inches	Millimeters
A*	1.912	48.56
B*	0.870	22.10
C*	0.956	24.28
D	0.946	24.03
E	0.600	15.24
F	0.478	12.14
G	0.300	7.62
H	0.125	3.18
J*	0.435	11.05
K	0.425	10.80
L	0.275	6.98
M	0.130	3.30
N	0.045	1.14
O*	0.022	0.56
P	0.096	2.44
Q*	1.22	31.13
R*	0.086	2.18
S*	0.151	3.84
T	0.215	5.46
U	0.125	3.18
V	0.560	14.22
W	0.155	3.94

\*See 4.6 for tolerances.



Figure 2 - Resolution chart

horizontal centerline and the top and bottom of the test chart.

4.5 The checkerboard background shall contain 100 squares vertically and 220 squares horizontally.

4.6 The dimensions marked with an asterisk in the table shall be within tolerances of 0.002 in (0.05 mm) on the print. All other dimensions are nominal.

4.2 The modified NBS resolution test chart shall be placed on the original test chart as specified by the dimensions in figure 3.

4.3 The densitometric control area specified in 3.3 shall be not less than 5.0 mm x 5.0 mm on the 70-mm film.

4.4 The gray patches, along with the SMPTE logo, should be placed midway between the

**Annex A (informative)**

**Control of resolution and definition in the preparation of test prints**

A.1 It has been found that producing test prints with resolution at 80 lines per millimeter requires careful selection of the materials and equipment used, and careful control of the operations. Inasmuch as a measuring tool should be better than the system it is designed to measure, it is desirable that the test film meet the specifications detailed herein.

A.2 The background checkerboard pattern provides for a 50% transmission of the incident radiant energy so as to be more nearly consistent with the projection performance of an average release print.

A.3 Image densities referred to in this annex are intended for a more precise definition of one system shown to be applicable, and are measured in accordance with ANSI IT2.19-1990. Selection of a film for producing the negative must take into consideration image spread charac-

teristics such that, in conjunction with the print films, all image densities that are useful, there is substantial image spread cancellation in the resolution range of interest. Accordingly, the final print will resolve 80 lines per millimeter with the lines and spaces equal in width.

A.4 Selection of a film for producing the dye-image print must take into consideration not only the requirements of 3.4.1, but also image spread characteristics compatible with the negative and projection characteristics suitable for theatrical projection.

A.5 Preparation of the test prints with a resolution and steadiness adequate for the film's purpose requires great care in the selection and operation of the printer. Satisfactory results can be obtained only with a step-contact printer employing registration pins.

**Annex B (informative)**

**Bibliography**

- ANSI IT2.19-1990, Photography — Density Measurements — Geometric Conditions for Transmission Density

**PROPOSED SMPTE STANDARD**

**for Motion-Picture Film (35-mm) —  
Motion-Picture Prints —  
Projectable Image Area**

**1 Scope**

Style A: General theatrical release prints commonly referred to as nonanamorphic or wide screen;

Style B: Theatrical release prints with an anamorphic image;

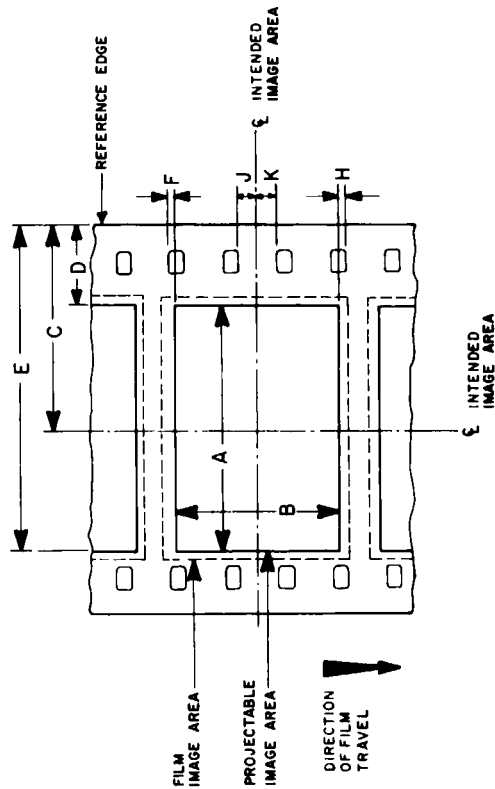
Style C: Classic theatrical prints.

1.1 This standard specifies the maximum dimensions of the film image area intended for projection from a 35-mm motion-picture film and the placement of this area relative to the perforations and the reference edge of the film.

**2 Dimensions**

1.2 This standard specifies three types of image areas intended for theatrical projection (see annex A.4):

The dimensions shall be as given in figure 1 and table 1.



View as seen through film toward lens

Figure 1 — Projectable image area

**Table 1 - Dimensions**

Dimensions	Inches	Millimeters
A	0.825 nom	20.96 nom
B (style A)	11.33 min	11.33 min
	0.446 min	12.70 max
B (style B)	0.500 max	17.53 max
	0.690 max	15.29 nom
B (style C)	0.602 nom	18.75 ref
	0.738 ref	8.23 min
C*	0.324 min	29.24 max
D	1.151 max	within 0.30
E	within 0.012	nominally equal
F = H	nominally equal	nominally equal
J = K	nominally equal	nominally equal

\* See A.1.

**NOTES**

**1 Projector aperture**

Dimensions B, D, and E define the image area on the film that is available for projection. They do not define the opening in the projection aperture plate. The size of this opening may differ from dimensions A and B, for example, because of the physical separation necessary between the aperture plate and the film to avoid scratching the film, the slant of the marginal rays accepted by the projection lens, etc.

**2 Actual projected area**

It is recognized that, in many cases, the actual film image

area that is projected may be smaller than the projectable maximum and, in some cases, may be nonrectangular (for example, an irregular four-sided figure bound by either straight or curved lines). Such departures may result from equipment considerations, such as slight inconsistencies among lenses, screen sizes, etc.; from geometric limitations such as the screen surface being at an angle other than 90° from the projection axis, or being nonplanar or both; and from aesthetic considerations such as pictorial composition within more restrictive image limits. In the absence of specific instructions to the contrary, it is intended that the actual projected film image area be the largest appropriately-shaped figure that can be inscribed within the specified dimensions.

**Annex A (informative)  
General Information**

**A.1 Centerlines**

The centerlines of the image area are given for convenience in interpreting the standard, facilitating such applications as the optical design of equipment, and assisting in the understanding of suitable mechanical embodiments related to projectable image area. Note that the centerline of the projectable image area is displaced from the centerline of the film by 0.050 in (1.27 mm) nominal.

**A.2 Related standards**

ANSI/SMPTE 59-1991 and ANSI/SMPTE 111-1988 define image areas for other important phases of motion-picture operations and are consistent with this standard and with one another under currently acceptable commercial practices.

**A.3 Image area for television**

It is recognized the home television receivers are adjusted to show a distribution of picture sizes ranging downward from the maximum. Guides to picture composition, based upon a statistical survey of receivers in use, are presented in SMPTE RP 27.3-1989. Note that some portion of the audience will see the entire transmitted area, but for clarity in presentation of critical information over broadcast television, such information should be confined to a smaller, central area.

**A.4 Typical aspect ratios for nonanamorphic theatrical projection**

For aesthetic and practical reasons, theatrical projection may present 35-mm images in such a manner that the full

width of the projectable area is shown but the projected height is less than maximum. Photography designed primarily for theatrical exhibition recognizes this and is composed for the more elongated rectangles. Several aspect ratios for the final projected picture are recognized through usage:

**Table A.1 - Nonanamorphic aspect ratios**

Style	Aspect Ratio	Projectable Image Height	
		Inches	Millimeters
A	1.85:1	0.446 min	11.33 min
A	1.66:1	0.497 ref	12.62 ref
C	1.37:1	0.602 nom	15.29 nom

To help ensure correct vertical centering (framing) of the projected image, hard matte printing may be used in producing the duplicate negative used for release printing of theatrical prints. A hard matte with an image height of at least 0.505 in (12.83 mm) may be used for all style A aspect ratios (1.66:1 or greater). Note that prints intended for a style C aspect ratio (1.37:1) will normally have an image height of at least 0.630 in (16.00 mm) as specified in

**Annex B (informative)  
Bibliography**

- ANSI PH22.55-1983, Motion-Picture Film — Leaders and Cue Marks — 35- and 16-mm Audio Release Prints
- ANSI/SMPTE 59-1991, Motion-Picture Film (35-mm) — Camera Aperture Images and Usage
- ANSI/SMPTE 111-1988, Motion-Picture Film (35-mm) — Exposed Areas for Picture and Audio — Prints Made on Continuous Contact Printers
- SMPTE RP 27.3-1989, Specifications for Safe Action and Safe Title Areas Test Pattern for Television Systems

ANSI/SMPTE 59-1991. In all cases, the framelines on the print shall essentially be opaque.

It is recommended that pictures designed to be shown at aspect ratios other than those specified in this standard be so marked in a conspicuous manner. The Universal leader (described in ANSI PH22.55-1983) provides for aspect ratio identification on frames 6-10.

**A.5 Image area on original negative**

Use of camera aperture dimensions other than those stated in ANSI/SMPTE 59-1991 is discouraged. Film users are reminded that many features composed for wide-screen aspect ratio will be shown later on television. Use of a hard matte in the camera will require substantial cropping of the film horizontally when the film is transferred to television, and severely limits the use of a print made from the negative.

Good practice dictates using the 1.37:1 style A camera aperture of ANSI/SMPTE 59-1991, while composing for the desired theatrical projection aspect ratio. Care should be taken to exclude extraneous items or action from the photographed image area which may show in the television scanned area.

## PROPOSED SMPTE RECOMMENDED PRACTICE

### Specifications for Buzz-Track Test Film for 35-mm Motion-Picture Photographic Audio Reproducers

RP 68  
Revision of RP 68-1984

#### 1 Scope

This practice specifies a test film for checking the lateral position of the audio scanning beam in 35-mm motion-picture photographic audio reproducers.

#### 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

ANSI/SMPTE 139-1986 (R1991), Motion-Picture Film (35-mm) — Perforated KS  
ANSI/SMPTE 223M-1991, Motion-Picture Film — Safety Film

#### 3 Test Film

3.1 The test film shall have originally recorded 300- and 1000-Hz signal tracks on opposite sides of the central exposed strip as shown in figure 1.

3.2 The position of the tracks shall be in accordance with the dimensions given in table 1.

3.3 The exposed portions of the signal track shall have a minimum density of 1.4 and the unexposed portions of the signal track shall be nominally clear.

#### 4 Film stock

The film stock, preferably polyester, shall be splice-free, of the low-shrinkage, safety type in accordance

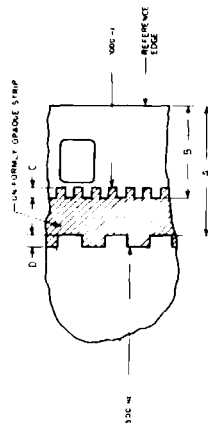


Figure 1 — Signal tracks

Table 1 — Dimensions

Dimensions	Inches	Millimeters
A	+ 0.000 - 0.001	7.25 - 0.03
B	+ 0.001 - 0.000	5.08 - 0.00
C	0.012 min	0.30 min
D	0.012 min	0.30 min

with ANSI/SMPTE 223M-1991, and cut and perforated in accordance with long-pitch dimensions specified in ANSI/SMPTE 139-1986.

#### 5 Identification

Each test film shall be identified by a suitable marking printed lengthwise in the picture area. The spacing between consecutive marks shall be approximately 12 in (30 cm).

NOTE — A test film conforming to this practice is available from the Society of Motion Picture and Television Engineers.

## PROPOSED SMPTE RECOMMENDED PRACTICE

RP 164

### Location of Vertical Interval Time Code

#### 1 Scope

The purpose of this practice is to define the preferred location of the vertical interval time code (VITC) at equipment interfaces, and its location on recorded media.

#### 2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this practice are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

ANSI/SMPTE 12M-1986, Television — Time and Control Code — Video and Audio Tape for 525-Line/60-Field Systems

#### 3 Position of VITC

3.1 VITC should appear on one line in each field.

3.2 The preferred line shall be 14 (277).

3.3 If it is necessary to preserve compatibility with older equipment, VITC should appear on two nonconsecutive lines in each field.

3.3.1 In the above case, the preferred lines are 14 and 16 (277 and 279) except:

— lines 12 and 14 (275 and 277) in type C recorders with sync head;

— lines 16 and 18 (279 and 281) in type C recorders without sync head.

3.4 On component equipment, the VITC shall appear on the luminance channel.

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