

SMPTE RECOMMENDED PRACTICE

RP 27.3-1989

Specifications for Safe Action and Safe Title Areas Test Pattern for Television Systems



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1. Scope

This practice specifies the format, dimensions, and optical densities for a test pattern for safe action and safe title areas for television systems.

2. Purpose

This practice specifies a test pattern which indicates the safe action image area within which all significant action must take place and the safe title image area within which the more important information must be confined to ensure visibility of the information on the majority of home television receivers.

3. Format

- 3.1 Pattern. A reproduction of the test pattern is shown in Fig. 1.
- 3.2 Area Limit Markings. Dashed lines having the shape and dimensions shown in the figures and table shall be provided to indicate the boundaries of the safe action and title areas.
- 3.3 Arrows and Border. The eight boundary arrows and border define the edge of the test pattern area and the scanned area.
- 3.4 Pattern Identification. The identification number of this document shall appear on the pattern as specified in the figures.

4. Dimensions

- 4.1 Test Pattern. The dimensions of the test pattern shall be as shown in Fig. 2 and the table in percentages of frame height and reproduced with a tolerance of ± 2 percent of the frame height.
 - 4.1.1 The area identification marks shall be positioned symmetrically on the centerlines of the image area as specified in 4.1 within ± 2 percent of the respective dimension.
 - 4.1.2 Image Size. The size of the scanned area, as indicated by the eight boundary arrows, shall be as follows:
 - 4.1.2.1 2x2 in test slides shall have image dimensions in accordance with American National Standard for Television—Image Areas and Mounts for Slides and Optiques, ANSI SMPTE 94-1985.
 - 4.1.2.2 35-mm test films shall have image dimensions in accordance with American National Standard for Motion-Picture Film (35-mm)—Television Image Area, ANSI PH22.95-1984.
 - 4.1.2.3 16-mm test films shall have image dimensions in accordance with American National Standard Dimensions for Television Image Area on 16-mm Motion-Picture Film, ANSI PH22.96-1982.

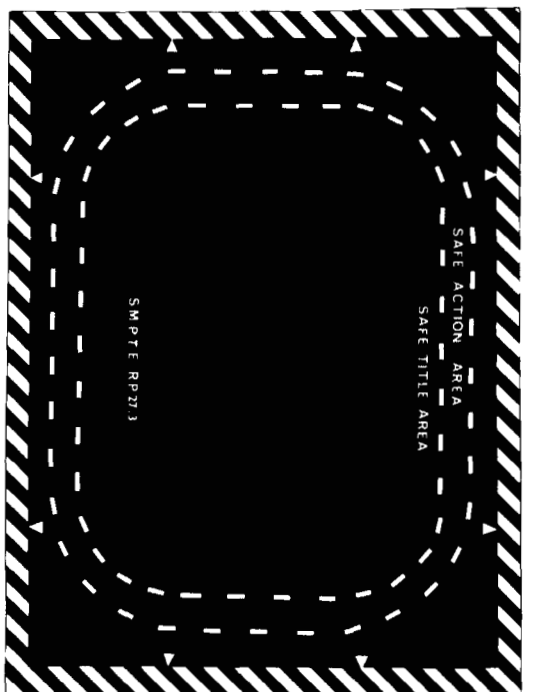


Fig. 1
Reproduction of Test Pattern

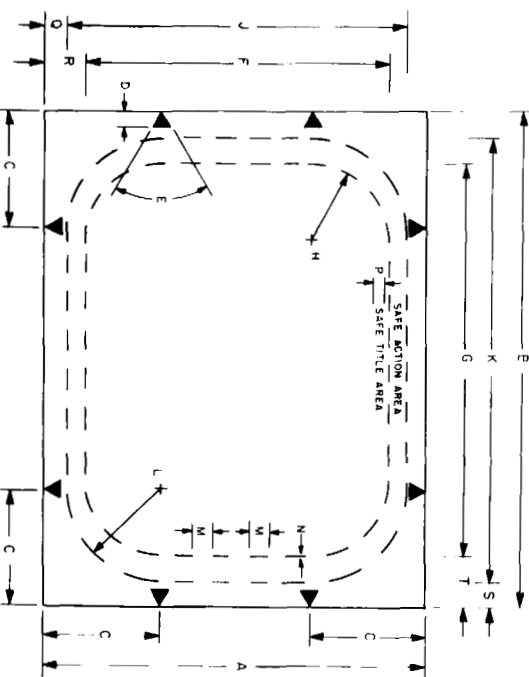


Fig. 2
Dimensional Drawing of Test Pattern

SMPTE RECOMMENDED PRACTICE

Specifications for Mid-Frequency Response Test Pattern for Television

4.3 Black-and-White Border. The dimensions of the black-and-white border shall be as follows:

	Inches		
	Percent	2x2	16-mm
A Scanned image height	100.0	0.843	0.594
B Scanned image width	133.3333	1.124	0.792
C Position of arrow	30.0	0.253	0.178
D Arrow length	4.0	0.033	0.024
E Arrow shape in degrees	40.0	40.0	40.0
F Height of safe title area	80.0	0.673	0.475
G Width of safe title area	105.0	0.894	0.630
H Corner radius, safe title area	21.0	0.177	0.125
J Height of safe action area	90.0	0.759	0.535
K Width of safe action area	120.0	1.012	0.713
L Corner radius, safe action area	24.0	0.202	0.143
M Length and spacing of lines	5.0	0.042	0.030
N Width of line	0.5	0.004	0.003
P Height of letters	2.5	0.021	0.015
Q Vertical position of action area	5.0	0.042	0.030
R Vertical position of title area	10.0	0.084	0.059
S Horizontal position of action area	6.67	0.056	0.040
T Horizontal position of title area	13.33	0.112	0.079

4.3.1 Height and width dimensions of the black-and-white border for 2x2 in slides shall extend to the minimum dimensions specified in ANSI/SMPTE 91-1985.

4.3.2 For 35-mm motion-picture films, the black-and-white border shall extend to the dimensions specified by style A in American National Standard for Motion-Picture Film (35-mm)—Camera Aperture Images, ANSI SMPTE 39-1989.

4.3.3 For 16-mm motion-picture films, the black-and-white border shall extend to the dimensions specified in American National Standard for Motion-Picture Film (16-mm)—Camera Aperture Image and Usage, ANSI SMPTE 7-1988.

4.4 Line Width. The line width of the area limit marks shall be 0.50 ± 0.05 percent of picture height.

4.5 Lettering. The lettering shall be bold and of a style and size shown in the figures.

4.6 Safe Title. Dimensions F, G, H, R, and T shall not limit moving titles. Horizontally moving titles

(crawls) and vertically moving titles (rolls) are allowed to move to and between the extreme edges of the scanned image.

3. Optical Densities

3.1 Optical Densities. All optical densities shall be measured in accordance with American National Standard for Photography—Density Measurements—Geometric Conditions for Transmission Density, ANSI PH2.19-1986.

3.2 Background. The black background shall have a density greater than 1.9.

3.3 The density of the dashes, arrows, and lettering shall be nominally clear.

NOTE 1: The emulsion position shall correspond to the one normally used for the specific format.

NOTE 2: Test material conforming to this practice is available from the Society of Motion Picture and Television Engineers.

1. Scope

This practice specifies the format, dimensions, and optical densities for a test pattern to be used as an operational check of the mid-frequency response of a television system.

2. Purpose

2.1 This practice specifies a test pattern which is suitable for the following operational checks of a television system:

- (a) Performance of video amplifier circuitry under conditions that can occur at average signal levels corresponding to predominantly light and predominantly dark scenes.
 - (b) Operational setup and adjustment of video amplifier mid-frequency amplitude and/or delay distortion (phase response) controls.
- 2.2 The test pattern will show mid-frequency response defects of amplitude and/or phase as either black or white horizontal streaks following transition from white to black or black to white.
- 2.3 The test pattern will detect amplifier or clamp circuit faults, as indicated by streaks of black or white polarity extending across the entire television picture at points corresponding to the mid-frequency bars of the test pattern.

3. Format

3.1 Pattern. A reproduction of the test pattern is shown in Figs. 1 and 2.

3.2 Bar Width. The four bars shall have horizontal dimensions corresponding to half-wave pulses at frequencies of 15, 30, 100, and 300 kHz, respectively.

3.3 Types. The test pattern is produced in two types: type A, black bars on a white background and type B, white bars on a black background.

3.4 Arrows and Border. The eight boundary arrows and border define the edge of the test pattern area and the scanned area.

3.5 Pattern Identification. The identification number of this document shall appear on the pattern as specified in the figures.

1. Dimensions

4.1 Test Pattern. The dimensions of the test pattern shall be as shown in Fig. 3 and the table in percentages of frame height and reproduced with a tolerance of ± 2 percent of the frame height.

4.1.1 The bars shall be positioned symmetrically on the vertical centerline of the image area within ± 2 percent of the respective dimension.

4.2 Image Size. The size of the scanned area as indicated by the eight boundary arrows shall be as follows:

4.2.1 35-mm test films shall have image dimensions in accordance with Sec. 5.2 of American National Standard for Motion-Picture Film (35-mm)—Television Image Area, ANSI PH22.95-1984.

4.2.2 16-mm test films shall have image dimensions in accordance with Sec. 3.3 of American National Standard Dimensions for Television Image Area on 16-mm Motion-Picture Film, ANSI PH22.96-1982.

4.3 Black-and-White Border. The dimensions of the black-and-white border shall be as follows:

4.3.1 For 35-mm motion-picture films, the black-and-white border shall extend to the dimensions specified by style A in American National Standard for Motion-Picture Film (35-mm)—Camera Aperture Images, ANSI SMPTE 39-1989.

4.3.2 For 16-mm motion-picture films, the black-and-white border shall extend to the dimensions specified in American National Standard for Motion-Picture Film (16-mm)—Camera Aperture Image and Usage, ANSI SMPTE 7-1988.

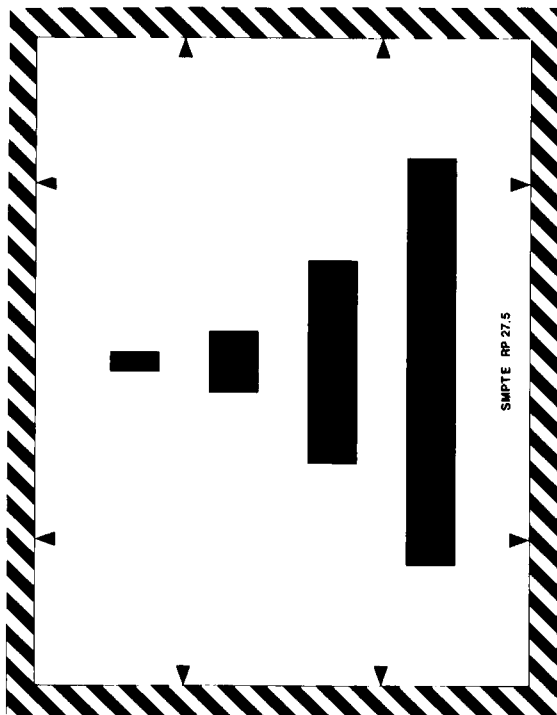


Fig. 1
Reproduction of Test Pattern Type A

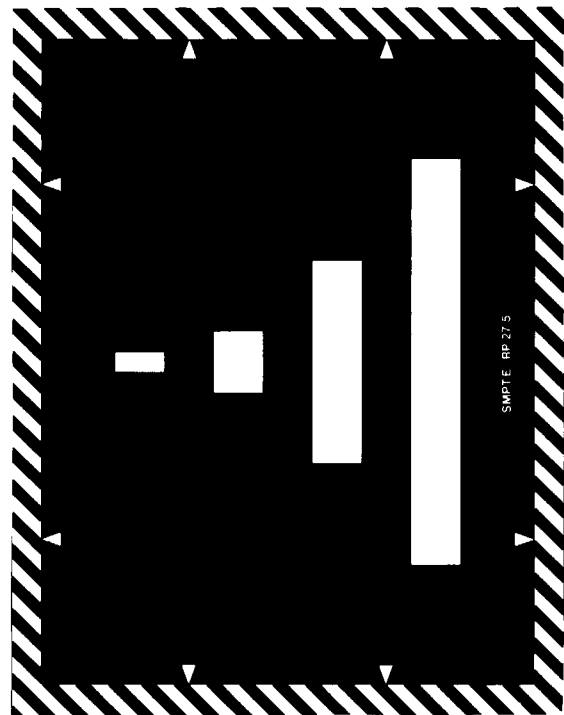


Fig. 2
Reproduction of Test Pattern Type B

3. Optical Densities

5.1 Optical Densities. All optical densities shall be measured in accordance with American National Standard for Photography—Density Measurements—Geometric Conditions for Transmission Density, ANSI PH2.19-1986.

5.2 Test Pattern Type A

5.2.1 The background density shall be nominally clear.

5.2.2 The density of the bars, arrows, and identification shall be greater than 1.9.

5.3 Test Pattern Type B

5.3.1 The background density shall be greater than 1.9.

5.3.2 The density of the bars, arrows, and identification shall be nominally clear.

NOTE 1: The emulsion position shall correspond to the one normally used for the specific format.

NOTE 2: Test material conforming to this practice is available from the Society of Motion Picture and Television Engineers.

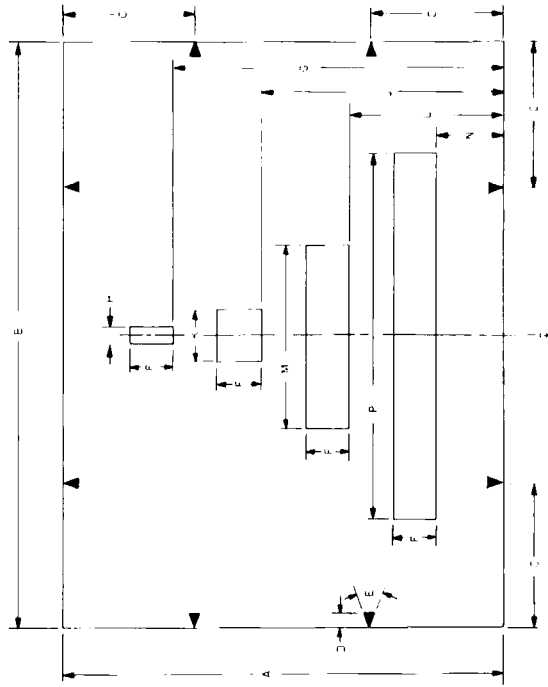


Fig. 3
Dimensional Drawing of Test Pattern

Dimensions	Percent	Inches		
		2N2	8x10	35-mm
A Scanned image height	100.0	0.843	6.30	0.591
B Scanned image width	133.3333	1.124	8.40	0.792
C Position of arrow from corner	30.0	0.253	1.890	0.178
D Arrow length	3.0	0.031	0.232	0.023
E Arrow shape in degrees	10.0	10.0	10.0	10.0
F Height of bars	10.0	0.084	0.630	0.059
G Position of 300-kHz bar	75.0	0.632	4.725	0.416
H Width of 300-kHz bar	3.2	0.035	0.26	0.025
J Position of 1000-kHz bar	55.0	0.461	3.463	0.327
K Width of 1000-kHz bar	32.7	0.107	0.800	0.075
L Position of 30-kHz bar	35.0	0.295	2.205	0.208
M Width of 30-kHz bar	12.0	0.351	2.616	0.219
N Position of 15-kHz bar	15.0	0.126	0.945	0.089
P Width of 15-kHz bar	81.0	0.708	5.292	0.199

PROPOSED SMPTE ENGINEERING GUIDELINE

Projected Image Quality of 70-mm, 35-mm and 16-mm Motion-Picture Projection Systems

EG 5

Revision of
EG 5:1982

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Appendix

(This Appendix is not part of the SMPTE Engineering Guideline, but is included for information only.)

- A1. Judgment of screen image resolution must be made from areas closer to the screen than those generally considered the best for viewing and definitely not from the rear of the theater or projection room.
- A2. Appropriate test films are SMPTE 35-PA, as specified in SMPTE Recommended Practice RP 40. Specifications for 35-mm Projector Alignment and Screen Image Quality Test Film.
- A3. Appropriate test films are SMPTE 70-PA, as specified in SMPTE Recommended Practice RP 91. Specifications for 70-mm Projector Alignment and Screen Image Quality Test Film.
- A4. Appropriate test films are SMPTE 16-PA, as specified in SMPTE Recommended Practice RP 82. Specifications for 16-mm Projector Alignment and Screen Image Quality Test Film.

Introduction

The Committee on Theatrical Projection Technology decided that, with the availability of appropriate test films, a guideline should be developed to assist those interested in determining the degree of acceptability of image quality regarding the apparent sharpness of the projected image. Although factors such as image contrast, color fringing, and image steadiness are not covered, their effect on apparent sharpness should be considered.

1. Scope

This guideline specifies the conditions for the determination of image sharpness of 70-mm, 35-mm, and 16-mm motion-picture projection systems. It also classifies the practical limits of acceptability of image sharpness when using projector alignment test films. (See Appendix A2.)

2. Test Conditions

This guideline is based on the assumption that the classifications specified are those to which the projection system has been adjusted as specified in SMPTE Recommended Practice on Method for Determining the Degree of Jump and Weave in 70-mm, 35-mm and 16-mm Motion-Picture Projected Images, RP 105:1981; and that the screen luminance has been adjusted to be in accord with American National Standard for Motion-Picture Film—Screen Luminance and Viewing Conditions—Indoor Theater Projection, ANSI/SMPTE 196M:1986.

3. Definitions

3.1 Resolution is the apparent sharpness determined by the ability of a system to reproduce a specified number of equally spaced black lines and white spaces in groups which are at right angles to each other. (In television terminology, resolution is described by counting line pairs, a black line and a white space as a single unit.)

3.2 The viewer's impression of resolution is related to the apparent size of the screen image. The apparent size of the screen image may be divided into three classifications:

Large: A large appearing screen image is one which is viewed from a distance of 3.7 screen heights or less (vertical field of vision is 15° or greater).

Medium: A medium appearing screen image is one which is viewed from a distance of 3.7 to 5.7 screen heights (vertical field of vision is between 10° and 15°).

Small: A small appearing screen image is one which is viewed from a distance of greater than 5.7 screen heights (vertical field of vision is 10° or less).

4. Method

Project an appropriate test film containing resolution targets calibrated in line pairs per millimeter (see A2), using the projection format with the greatest horizontal magnification (usually anamorphic for 35-mm projection).

Examine the projected image closely (see A1), considering only the vertical line pairs in the resolution target, since the horizontal line pairs are affected by system unsteadiness (jump) to a degree which makes them unreliable for resolution evaluation.

A line pair is considered to be clearly recognizable when the individual lines in the pattern can be clearly distinguished and the number of lines seen in the pattern is the same as the number of lines in the original target.

5. Classification

For each classification of apparent size of the screen image, the practical minimum limit of acceptability in terms of clearly recognizable lines per millimeter shall be as follows:

Center	Lines per Millimeter	
	Sides*	Corners
80	56	48
68	56	40
56	48	40

* Assumes left and right sides equivalent at same focus setting.

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