

SMPTE Working Groups Formed

The SMPTE Engineering Committees have formed a number of new working groups to review or develop standards. Anyone having an interest in these subjects, or wishing to participate or comment on them, should contact Alex E. Alden at SMPTE Headquarters.

Under the Committee on Laboratory Services Technology and Applications:

- (a) a recommendation for the storage of magnetic tapes and motion-picture films;
- (b) a definition test film for laboratory printers;
- (c) a five-year review of: PH22.83-1972, Specifications for Location and Spacing of Edge Numbers on 16-mm Motion-Picture Film; PH22.148-1967 (R1972), Specifications for Film Image Area Used for Review Room Viewing of 35-mm and 16-mm Motion-Picture Prints Intended for Television Transmission; RP 23-1967 (R1972), Reinforcement of 70-mm Positive Splices; and RP 25-1968 (R1972), Sound and Picture Synchronization on Motion-Picture Film Relative to the Universal Leader for Magnetic and Photographic Tracks.

Under the Committee on Television Technology:

- (a) a five-year review of: RP 27.3-1972, Specifications for Safe Action and Safe Title Areas Test Pattern for Television Systems; RP 27.4-1972, Specifications for Operational Test Patterns for Checking Jitter, Weave and Travel Ghost in Television Projectors; RP 27.7-1972, Specifications for Gray-Scale Operational Alignment Test Pattern for Telecine Cameras; and RP 46-1972, Density of Color Films and Slides for Television
- (b) to develop a common standard interface between television camera lenses and the camera itself.

Under Committee on Theatrical Projection Technology:

- (a) a five-year review of: RP 12-1972, Screen Luminance for Drive-In Theaters; and RP 33-1968 (R1972), Specifications for 35-mm Subjective Picture Test Film for Theaters and Review Rooms
- (b) to develop a standard for amount of color temperature shift caused by projection lenses.

Standards & Recommended Practices

Approved American National Standards

On 3 February 1976, the American National Standards Institute approved four standards which are primarily editorial revisions of the earlier issues, modified for clarity and to conform in format with other similar standards: PH22.7-1976, Dimensions of 16-mm Motion-Picture Camera Aperture Image (Revision of PH22.7-1964); PH22.19-1976, Dimensions of Camera Aperture Image on 8-mm Type R (Regular 8) Motion-Picture Film (Revision of PH22.19-1964); PH22.48-1976, Location of Printed Areas for 16-mm Picture and Sound Contact Printing (Revision of PH22.48-1965); and PH22.154-1976, Dimensions of Projectable Image Area on 8-mm Type S (Super 8) Motion-Picture Film (Revision of PH22.154-1969).

Inasmuch as compliance with American National Standards is purely voluntary, these standards will become truly effective when broad publicity is given to their existence. ANSI and SMPTE would appreciate any personal influence to promote the use of these standards where such action is appropriate. Copies of the standards may be obtained for a nominal fee from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Proposed SMPTE Recommended Practices

Two Proposed SMPTE Recommended Practices are published here for a trial period and public review: RP 27.1, Specifications for Operational Alignment Test Pattern for Television (Revision of RP 27.1-1968); and RP 27.5, Specifications for Mid-Frequency Response Test Pattern for Television (Revision of RP 27.5-1972).

Comments should be addressed to Alex E. Alden, Manager of Engineering Services, at Society Headquarters prior to 31 December 1976. If no adverse criticism is received, the practices will be submitted to the Board of Governors for final approval.

Reaffirmation of SMPTE Recommended Practices

On the recommendation of the Society's Engineering and Standards Committees, the Board of Governors approved on 8 July 1976 the reaffirmation of the following SMPTE Recommended Practices: RP 27.2-1971, Specifications for Operational Registration Test Pattern for Multiple-Channel Television Cameras; and RP 38.1-1971, Specifications for Deflection Linearity Test Pattern for Television.

Copies of these and other SMPTE Recommended Practices may be purchased from Society Headquarters at \$1.00 per copy.

Approved International Standards

The International Organization for Standardization (ISO) recently approved two International Standards, the technical content of which is published here for your information: ISO 466-1976, Cinematography—Image Produced by 16-mm Motion-Picture Camera Aperture—Position and Dimensions, which is in complete agreement with American National Standard PH22.7-1976; and ISO 2966-1976, Cinematography—Motion-Picture Film 16/8S (1-3) and (1-4)—Cutting and Perforating Dimensions, which is in complete agreement with American National Standards PH22.151 and PH22.168.

Complete copies of all International Standards are available from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

The International Standards published here were developed by Technical Committee 36 on Cinematography. The work of this committee is administered by the Engineering Department of the SMPTE which functions as the secretariat in ANSI's name. A report of the last meeting of the committee was published in the June 1976 SMPTE Journal.—Alex E. Alden, *Manager of Engineering Services*.

American National Standard dimensions of 16-mm motion-picture camera aperture image

Approved February 3, 1976
Secretariat: Society of Motion Picture and Television Engineers

Page 1 of 2 pages

1. Scope

This standard specifies the dimensions of the camera aperture image and its relative position to the reference edge and the perforations of 16-mm motion-picture film. The location of the perforations is based on dimensions given in American National Standards Dimensions for 16-mm Motion-Picture Film Perforated 1R, PH22.109-1974, and Dimensions for 16-mm Motion-Picture Film Perforated 2R, PH22.110-1974.

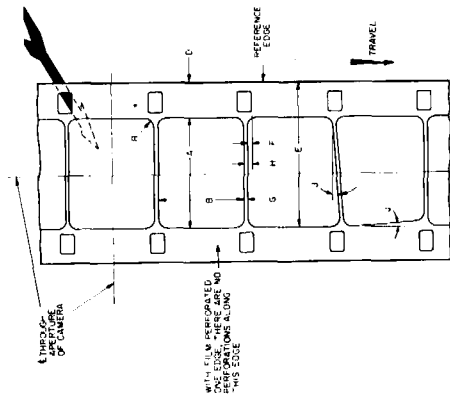
2. Dimensions

2.1 The dimensions shall be as given in the figure and table and shall apply to measurements of the aperture image as formed on freshly exposed and processed film.

2.2 The angle between the vertical edges of the aperture image and the edges of normally positioned film shall be $0^\circ \pm 1/2^\circ$.

2.3 The angle between the horizontal edges of the aperture image and the edges of normally positioned film shall be $90^\circ \pm 1/2^\circ$.

NOTE 1: Dimension B, vertical height of aperture, must be maintained in order to ensure a real (unexposed) frameline in the projector. Close control of the tolerances given for Dimension B is necessary to enable Dimensions F and H to be held within satisfactory limits. These are the distances from the lower edge of the perforation and the horizontal edges of the framelines. Dimensions F and H represent the maximum conditions which can be tolerated due to misalignment of the horizontal centerline of the aperture opening and the optical centerline of the photographic lens. Dimensions B, F, G and H shall be measured to lines that are at right angles to the reference edge of the film and through a point



Film as Seen from Inside Camera Looking toward Camera Lens; Emulsion Away from Observer

Dimensions*	Inches	Millimeters
A	0.404 nom ± 0.004	10.26 nom ± 0.10
B	0.295 max -0.003	7.49 max -0.07
D	0.116 max	2.95 max
E	0.512 min	13.00 min
F	0.018 min	0.46 min
G	0.001 min	0.03 min
H	0.008 max	0.20 max
J	0.032 max $\pm 1/2^\circ$	0.81 max $\pm 1/2^\circ$
R	0.015 max	0.38 max

*See Notes.

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where the radius (Dimension R) is tangent to the horizontal framelines (see figure).

NOTE 2: The centerlines of the aperture image are normally on the optical center of the camera. The optical axis of the camera is defined as the mechanical axis or centerline of the sleeve or other device for holding the camera lens. Except for manufacturing tolerances, it coincides with the optical axis of the lens.

NOTE 3: Dimension J shows the limits by which the frameline may be out of square with the reference edge of the film but, at all times, this should be confined within the area designated by Dimension G.

Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes only.)

A1. If the aperture plate is not in the plane of the emulsion, the physical dimensions of the aperture in the camera will be slightly different from the dimensions given in the figure. The exact amount of this difference will depend upon the f-number and focal length of the camera lenses used and upon the distance between the emulsion and the physical aperture. This separation should be no greater than is necessary to prevent scratching of the film.

A2. It is the intent of this standard to provide a camera image such that the exposed area will always be larger than the area of the projector aperture. This standard meets this objective without causing double exposure of the area between frames.

A3. Dimension G, the distance between adjacent framelines, has been limited carefully so as to make it possible to keep both framelines masked simultaneously by the projector aperture. In addition, Dimensions F and H have been established to limit the distance that any part of the frameline can depart from the bottom edge of the perforations. This is to minimize the necessity for frequent adjustment of the framing device on the projector.

American National Standard dimensions of camera aperture image on 8-mm type R (regular 8) motion- picture film

Approved February 3, 1976
Secretariat: Society of Motion Picture and Television Engineers

1. Scope

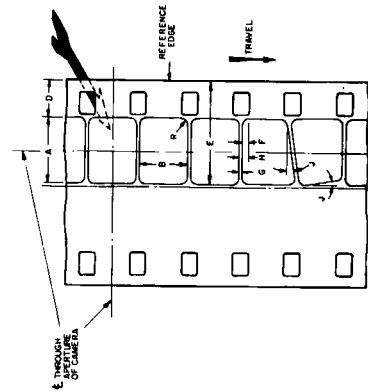
This standard specifies the dimensions of the camera aperture image and its relative position to the reference edge and the perforations of 8-mm Type R (regular 8) motion-picture film. The location of the perforations is based on dimensions given in American National Standard Dimensions for 16-mm Motion-Picture Film Perforated 8-mm Type R (Regular 8), 2R-1500, PH22.17-1974.

2. Dimensions

- 2.1** The dimensions shall be as given in the figure and table and shall apply to measurements of the aperture image as formed on freshly exposed and processed film.
- 2.2** The angle between the vertical edges of the aperture image and the edges of normally positioned film shall be $0^\circ \pm 1/2^\circ$.
- 2.3** The angle between the horizontal edges of the aperture image and the edges of normally positioned film shall be $90^\circ \pm 1/2^\circ$.

3. Camera Usage

The position of the emulsion, the rate of exposure and the orientation of the area being exposed shall be as specified in American National Standard Specifications for Camera Usage of Double-Width 8-mm Type R (Regular 8) Motion-Picture Film Perforated Two Edges, PH22.21-1975.



Film as Seen from Inside Camera Looking toward Camera Lens; Emulsion Away from Observer

Dimensions*	Inches	Millimeters
A	0.192 nom	4.88 nom
B	0.145 +0.003 -0.002	3.68 +0.08 -0.05
D	0.113 max	2.87 max
E	0.297 min	7.54 min
F	0.018 min	0.46 min
G	0.002 min	0.05 min
H	0.007 max	0.18 max
J	0.032 max	0.81 max
R	$\pm 1/2^\circ$	$\pm 1/2^\circ$
	0.010 max	0.25 max

*See Notes.

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NOTE 1: Dimension B, vertical height of aperture, must be maintained in order to ensure a real (unexposed) frame in the projector. Close control of the tolerances given for Dimension B is necessary to enable Dimensions F and H to be held within satisfactory limits. These are the distances from the lower edge of the perforation and the horizontal edges of the frames. Dimensions F and H represent the maximum conditions which can be tolerated due to misalignment of the horizontal centerline of the aperture opening and the optical centerline of the photographic lens. Dimensions B, F, G and H shall be measured to lines that are at right angles to the reference edge of the film and through a point

where the radius (Dimension R) is tangent to the horizontal framelines (see figure).

NOTE 2: The centerlines of the aperture image are normally on the optical center of the camera. The optical axis of the camera is defined as the mechanical axis or centerline of the sleeve or other device for holding the camera lens. Except for manufacturing tolerances, it coincides with the optical axis of the lens.

NOTE 3: Dimension J shows the limits by which the frameline may be out of square with the reference edge of the film but, at all times, this should be confined within the area designated by Dimension G.

Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes only.)

A1. If the aperture plate is not in the plane of the emulsion, the physical dimensions of the aperture in the camera will be slightly different from the dimensions given in the figure. The exact amount of this difference will depend upon the f-number and focal length of the camera lenses used and upon the distance between the emulsion and the physical aperture. This separation should be no greater than is necessary to prevent scratching of the film.

than the area of the projector aperture. This standard meets this objective without causing double exposure of the area between frames.

A3. Dimension G, the distance between adjacent framelines, has been limited carefully so as to make it possible to keep both framelines masked simultaneously by the projector aperture. In addition, Dimensions F and H have been established to limit the distance that any part of the frameline can depart from the bottom edge of the perforations. This is to minimize the necessity for frequent adjustment of the framing device on the projector.

A2. It is the intent of this standard to provide a camera image such that the exposed area will always be larger

American National Standard Location of printed areas for 16-mm picture and sound contact printing

Approved February 3, 1976 Secretariat: Society of Motion Picture and Television Engineers

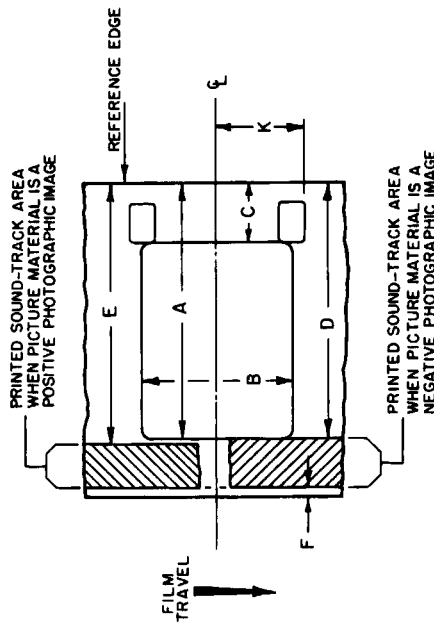
1. Scope

This standard specifies the location and size of the printed picture and photographic sound track areas for both negative/positive and reversal contact printing operations. An opaque line should appear between picture and sound in the finished print. The dimensions given for picture-printed area and for the two widths of sound-printed area provide for an overlap of

picture- and sound-printed areas, or for a gap between them. The specific aperture to be used for printing sound will be chosen to provide the desired black line, as dictated by the printing materials and processing conditions in use.

2. Dimensions

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



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Dimensions	Inches	Millimeters
A*	0.513 ± 0.002	13.03 ± 0.05
B† for Negative/Positive	0.306 ± 0.002	7.77 ± 0.05
B† for Reversal	0.292 ± 0.002	7.42 ± 0.05
C	0.108 ± 0.002	2.74 ± 0.05
D for Negative/Positive	0.513 ± 0.002	13.03 ± 0.05
E* for Reversal	0.517 ± 0.002	13.13 ± 0.05
F	0.018 max	0.46 max
K†	0.175 ± 0.002	4.44 ± 0.05

*The processing technique may make it impossible to avoid a clear sepium between picture and sound areas. The presence of such a clear sepium shall not be cause for rejection of prints, so long as it remains between the minimum A dimension and the maximum E dimension. †Dimensions B and K are applicable only to contact printing by the step process.

Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes only.)

Although this standard applies to release prints for wider format original photography utilizes portions of distribution and international exchange, it recognizes the 16-mm film area generally used for sound track, that dailies or special prints may be made to accommodate special experimental formats, i.e., those wherein

American National Standard dimensions of projectable image area on 8-mm type S (super 8) motion-picture film

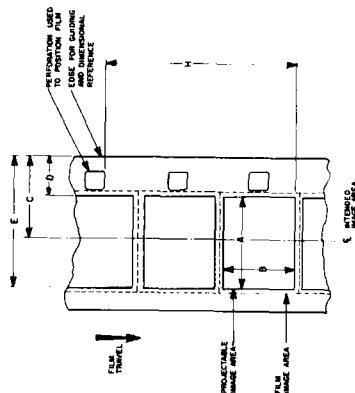
Approved February 3, 1976 Secretariat: Society of Motion Picture and Television Engineers

1. Scope

This standard specifies the maximum dimensions of the film image area intended for projection from 8-mm Type S (super 8) motion-picture film, and the placement of this area relative to the perforations and the reference edge of the film.

2. Dimensions

2.1 The dimensions shall be as given in the figure and table.



Film as Seen from Projector Light Source
Looking toward Lens; Emission Away from Observer

Dimensions	Inches	Millimeters
A	0.209 ref	5.31 ref
B	0.158 max	4.01 max
C*	0.170 ref	4.32 ref
D	0.063 min	1.60 min
E	0.278 max	7.06 max
H†	0.389 nom	9.88 nom

*See Appendix.
†See Note 6.

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NOTE 2: Projector Aperture. Dimensions B, D and E define the maximum image area on the film that is available for projection. They do not define the opening in the aperture plate of a projector. 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.

NOTE 3: 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.

When the picture outline on the screen is defined by the projector aperture, it is customary to round the corners of the projected film area. A maximum corner radius of 0.010 in (0.25 mm) at the film plane is recommended.

NOTE 4: Film Perforations. Film intended for projection with this image area is normally perforated as specified in American National Standard Dimensions for 8-mm Motion-Picture Film Perforated 8-mm Type S (Super 8), 1R, PH22.149-1975.

NOTE 5: Print Preparation. Prints conforming to this standard are prepared for use as specified in American National Standard Specifications for Projector Usage of Super 8 Motion-Picture Film, PH22.155-1967 (R1973).

NOTE 6: Dimension H. In this format, the positioning of the projectable image with respect to the film perforations has been established by the nominal value H, together with limitations on image positioning given in American National Standards PH22.153-1971 and PH22.157-1971.

Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes only.)

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 0.013 in (0.33 mm) nominal.

SMPTE RECOMMENDED PRACTICE

RP 27.1
Revision of
RP 27.1-1968

Specifications for Operational Alignment Test Pattern for Television

1. Scope

This practice describes the format, dimensions and optical densities for a test pattern transparency to be used as an operational alignment tool for television systems.

2. Purpose

The purpose of this practice is to provide a simplified test pattern to facilitate day-to-day opera-

Page 1 of 4 pages

tional checks and adjustments of focus, resolution response, mid-band streaking, astigmatism, field uniformity, scanning size, linearity, and interlace in live and film television systems.

3. Description

3.1 Pattern. A reproduction of the test pattern is shown in Fig. 1.

3.2 Background. The background of the test pattern is black to minimize interference when evaluating the television waveform display. (See 5.2.)

3.3 White Bars. White bars of equal size are located on each side, above and below the central spatial frequency bursts and in each of the four corners. The bars are provided to establish a white level to evaluate the white signal uniformity of the system. The two bars located above and below the central spatial frequency bursts are also used to evaluate mid-band streaking.

3.4 Spatial Frequency Bursts. All spatial frequency bursts are calibrated in television lines per picture height and are located in the central portion of the test pattern and at each of the four corners. The central bursts are arranged with the highest line numbers nearest the center of the pattern where optical and electrical performance is maximum. The spatial frequency bursts located in each of the four corners are horizontally positioned so that they do not overlap each other when viewed on a waveform monitor triggered at a horizontal rate.

3.5 Electrical Alignment. A bull's-eye pattern is located at the center of the test pattern to facilitate pickup tube beam alignment.

3.6 Horizontal and Vertical Wedges. Horizontal and vertical wedges are located near the center of the test pattern to facilitate beam alignment for minimum astigmatism. The horizontal wedge can also be used to check scanning interlace.

3.7 Circles and Diagonal Lines. Circles and diagonal lines are provided to check system geometry. They are dark gray to minimize interference when evaluating the television waveform display. (See 5.4.)

3.8 Boundary Arrows and Black-and-White Border. The eight boundary arrows and black-and-white border provide a check on system centering, scanning size and equipment clamp performance. (See 5.3.)

3.9 Pattern Identification. The identification number of this document shall appear on the slide in the area specified in Fig. 2.

3.10 Manufacturer's Identification. Identification of the manufacturer shall appear on the slide mount outside the pattern area.

4. Format

4.1 The dimensions of the test pattern shall be as shown in Figs. 2 and 3. All dimensions are in percentage of picture height. One hundred percent picture height is equal to the outside di-

ameter of the largest circle. No dimensions, dimension lines or centerlines are to appear on the final product.

4.2 Image Size. The size of the area inside the black-and-white border, as indicated by the eight boundary arrows, shall be as follows:

4.2.1. 2x2 in (50x50 mm) test slides and 8x10 in (20x25 cm) test transparencies shall have Category 1 dimensions, as specified in American National Standard Dimensions and Optical Specifications of Test Slides and Transparencies for Television, PH22-144-1965 (R1969).

4.2.2. 35-mm test films shall have dimensions in accordance with Section 3.5 of American National Standard Dimensions for Television Image Area on 35-mm Motion-Picture Film, PH22-95-1963 (R1975). 16-mm test films shall have dimensions in accordance with Section 3.3 of American National Standard Dimensions for Television Image Area on 16-mm Motion-Picture Film, PH22-96-1963 (R1975).

4.3 Black-and-White Border. Height and width dimensions of the black-and-white border for 2x2 in (50x50 mm) slides and 8x10 in (20x25 cm) transparencies are specified in American National Standard Dimensions and Optical Specifications of Test Slides and Transparencies for Television, PH22-144-1965 (R1969).

For 35- and 16-mm motion-picture films, the black-and-white border shall extend to the dimensions of the negative image as specified by Style A in American National Standard Dimensions of 35-mm Motion-Picture Camera Aperture Images, PH22-59-1974, and American National Standard Dimensions of 16-mm Motion-Picture Camera Aperture Image, PH22.7-1976.

4.4 Corner Circles. Each of the four corner circles shall be located so that its outside diameter is tangent to the perimeter of the pattern in its respective corner.

4.5 Diagonal Lines. Diagonal lines shall be drawn between opposing corners as shown in Fig. 2 and shall not intersect any of the pattern elements.

4.6 Line Widths. Line widths for the circumference of the five circles and the diagonal lines shall be 0.50 ± 0.05 percent.

4.7 Spatial Frequency Burst. Each spatial frequency burst width "W" is nominally equal to 6 percent of picture height plus one additional half cycle of white to provide a burst pattern which starts and ends with a white half cycle. The ratio of the width of the black half cycle to the width of the white half cycle shall be 1.00 ± 0.05. A tabulation of the nominal dimensions in terms of picture height is listed in the table.

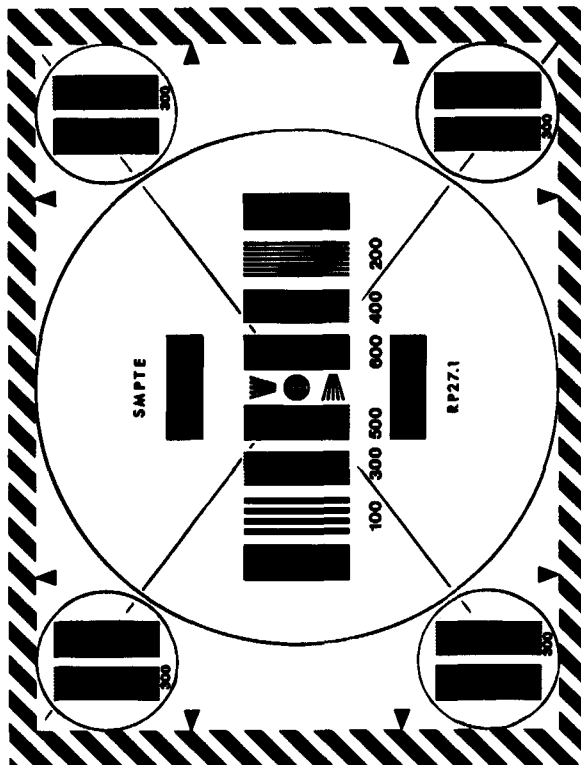


Fig. 1
Reproduction of Test Pattern

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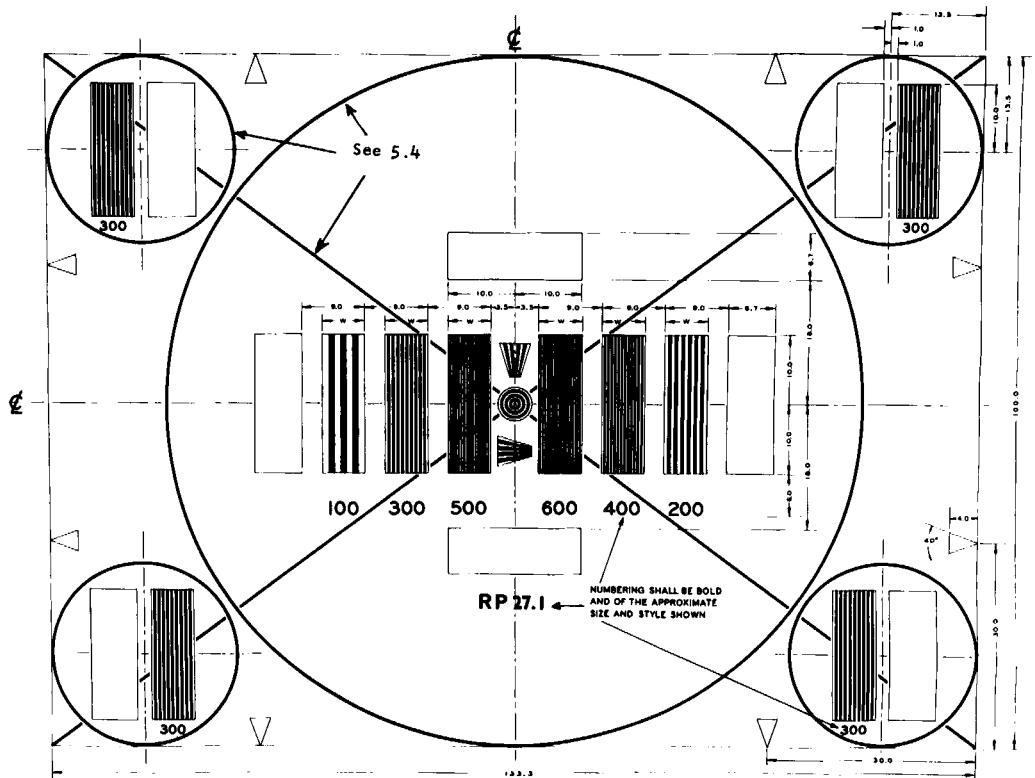


Fig. 2
Dimensional Drawing of Test Pattern

Line Number	Line Width in Percent of Picture Height	Burst Width "W" in Percent of Picture Height
100	1.00	7.00
200	0.50	6.50
300	0.33	6.33
400	0.25	6.25
500	0.20	6.20
600	0.17	6.17

5. Optical Densities

- 5.1 Optical Densities. All optical densities shall be measured in accordance with American National Standard Conditions for Diffuse and Doubly-Diffuse Transmission Measurements (Transmission Density), PH2.19-1976.
- 5.2 Background. The black background shall have a density greater than 1.9.
- 5.3 White Bars and Boundary Arrows. The eight white bars and boundary arrows shall have a density between 0.3 and 0.4.
- 5.4 Circles, Diagonal Lines and Lettering. Circles, diagonal lines and lettering shall have a density between 0.95 and 1.35.
- 5.5 Bursts, Wedges, Bull's-Eye and Border. Spatial frequency bursts, wedges, bull's-eye, and black-and-white border shall have a black density greater than 1.9 and a white density between 0.3 and 0.4.

NOTE: Silver-image films scatter light such that the effective density in the specular optical system of the television film chain is increased by an average factor of 1.35 over that measured in diffuse light. For dye images, this light-scatter factor (Callier Q) is approximately 1.0. Inas-

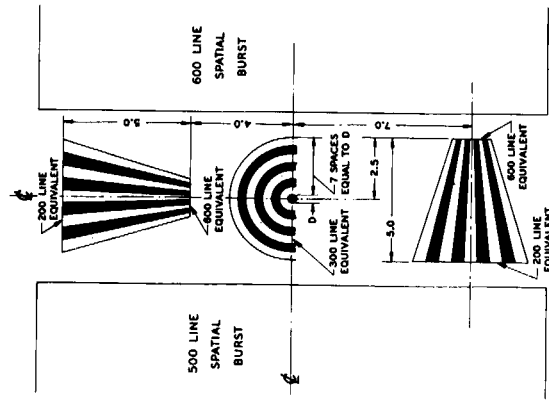


Fig. 3
Enlargement of Central Portion of Fig. 2

much as it is common practice to reproduce this test pattern on photographic silver film, it should not be used for accurate adjustment of color telecine gain and black level.

SMPTE RECOMMENDED PRACTICE

RP 27.5
Revision of
RP 27.5-1972

*Specifications for Mid-Frequency Response
Test Pattern for Television*

Page 1 of 4 pages

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.

4. 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 2×2 in (50x50 mm) test slides and 8×10 in (20x25 cm) transparencies shall have Category 3 dimensions, as specified in American National Standard Dimensions and Optical Specifications of Test Slides and Transparencies for Television, PH22.144-1965 (R1969).

4.2.2 35-mm test films shall have image dimensions in accordance with Section 3.3 of American National Standard Dimensions for Television Image Area on 35-mm Motion-Picture Film, PH22.95-1963 (R1975).

4.2.3 16-mm test films shall have image dimensions in accordance with Section 3.3 of American National Standard Dimensions for Television Image Area on 16-mm Motion-Picture Film, PH22.96-1963 (R1975).

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

4.3.1 Height and width dimensions of the black-and-white border for 2×2 in slides and 8×10 in transparencies are specified in ANSI PH22.144-1965.

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 Dimensions of 35-mm Motion-Picture Camera Aperture Images, PH22.59-1974.

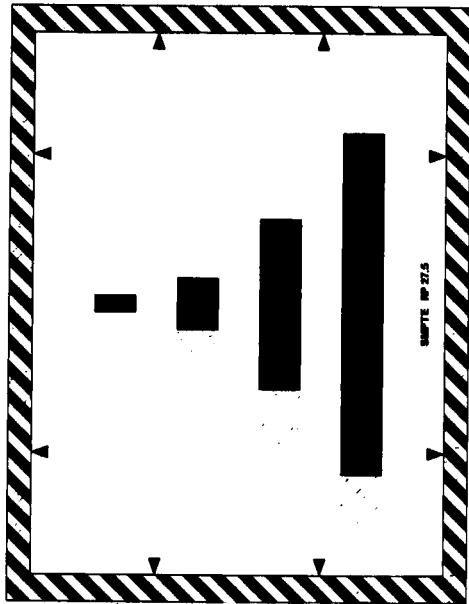


Fig. 1
Reproduction of Test Pattern Type A

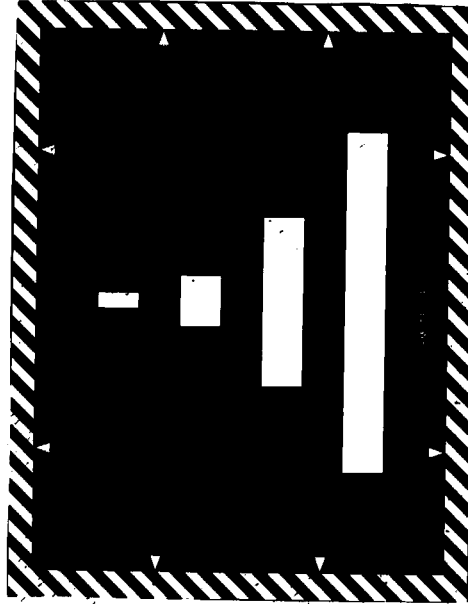


Fig. 2
Reproduction of Test Pattern Type B

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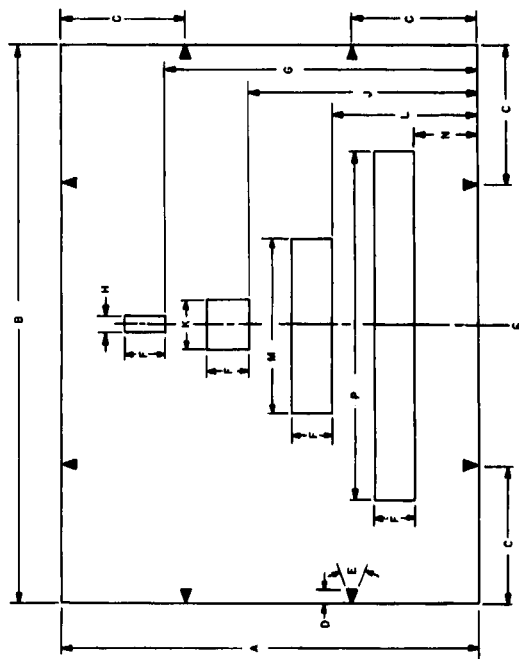


Fig. 3
Dimensional Drawing of Test Pattern

Dimensions	Percent	Inches		
		2x2	8x10	35-mm
A Scanned image height	100.0	0.843	6.30	0.594
B Scanned image width	138.5353	1.124	8.40	0.792
C Position of arrow from corner	30.0	0.253	1.890	0.178
D Arrow length	4.0	0.034	0.252	0.024
E Arrow shape in degrees		40.0	40.0	40.0
F Height of bars	10.0	0.084	0.630	0.059
G Position of 300-kHz bar	75.0	0.632	4.725	0.446
H Width of 300-kHz bar	4.2	0.035	0.26	0.025
J Position of 100-kHz bar	55.0	0.464	3.465	0.327
K Width of 100-kHz bar	12.7	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	42.0	0.354	2.646	0.249
N Position of 15-kHz bar	15.0	0.126	0.945	0.089
P Width of 15-kHz bar	84.0	0.708	5.292	0.499

4.3.3 For 16-mm motion-picture films, the black-and-white border shall extend to the dimensions specified in American National Standard Dimensions of 16-mm Motion-Picture Camera Aperture Image, PH22.7:1976.

5. Optical Densities

5.1 Optical Densities. All optical densities shall be measured in accordance with American National Standard Conditions for Diffuse and Doubly-Diffuse Transmission Measurements (Transmission Density), PH2.19:1976.

5.2 Test Pattern Type A

5.2.1 The background density shall be between 0.3 and 0.4.

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 between 0.3 and 0.4.

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

Cinematography — Image produced by 16 mm motion-picture camera aperture — Position and dimensions

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the position and dimensions of the image area produced by the camera aperture on 16 mm motion-picture film.

2 REFERENCES

ISO 25, *Cinematography — Camera usage of 16 mm motion-picture film — Specifications*.¹⁾

ISO 89, *Cinematography — 16 mm motion-picture film — Cutting and perforating dimensions*.

ISO 359, *Cinematography — Projectable image area on 16 mm motion-picture prints — Dimensions and location*.²⁾

3 DIMENSIONS

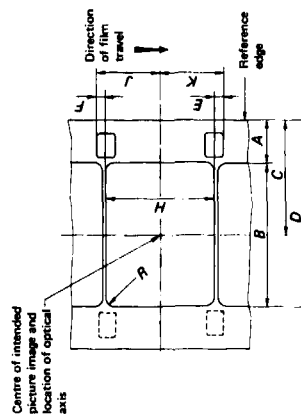
3.1 The dimensions shall be as shown in the figure and given in the table.

3.2 The dimensions specified are relative to unshrunk film.

Dimension	mm	in
A max.	2,95	0.116
B min. (see note 1)	10,05	0.396
C nom.	7,98	0.314
D min. (see note 2)	13,00	0.512
H	7,42 ± 0,15	0.292 ± 0.006
A max.	0,50	0.020
E = F ± 0,20 mm (0.008 in)		
J = K nom.		
(see note 1)		

NOTES

- For reference only.
- For negatives on which a photographic sound track is recorded, dimension D equals 13,00 ± 0,15 mm (0.512 ± 0.006 in).
- The "reference edge" serves as the datum for the specified dimensions; it is not necessarily the edge of the film which is guided.



The film is shown as seen from inside the camera looking toward the lens with the photographic layer away from the observer.

Cinematography — Motion-picture film 16/8S (1-3) and (1-4) — Cutting and perforating dimensions

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the cutting and perforating dimensions for motion-picture film 16/8S in positions 1-3 and 1-4, as well as the width of motion-picture film after processing and slitting.

2 REFERENCES

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

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

3 DIMENSIONS

The dimensions and tolerances shall be as referred to in the figure and given in the table, and apply to raw stock safety films as defined in ISO 543, immediately after cutting and perforating.

If required by usage, the manufacturer shall indicate the atmospheric conditions applied to the dimensional control at the time of cutting and perforating.

1) At present at the stage of draft. (Revision of ISO/R 25.)

2) At present at the stage of draft. (Revision of ISO/R 359.)

ANNEX

A.1 Film can shrink or swell due to loss or gain in moisture content, or can shrink due to loss of solvent. These changes invariably result in changes in the dimensions during the life of the film. The change is generally uniform throughout a roll.

A.2 The uniformity of pitch, hole size and margin (dimensions B, C, D and E) is an important variable affecting steadiness. Variations in these dimensions, from roll to roll, are of little significance compared to variations from one perforation to the next. Actually, it is the maximum variation from one perforation to the next within any small group of consecutive perforations that is important.

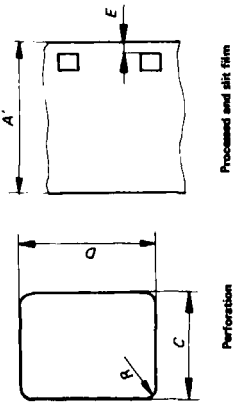
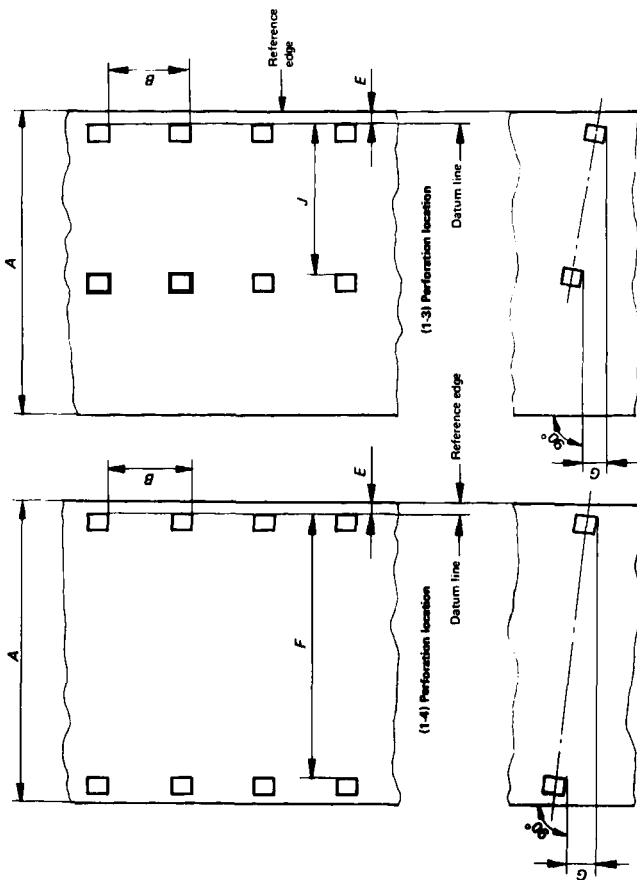
A.3 The width for 16 mm films is controlled by the shrinkage characteristics of the films involved. Thus, there have been standards for the width of 16 mm stock of the "usual" shrinkage and for stock of "low-shrinkage" characteristics. The purpose was to obtain films of approximately the same width regardless of the type of film base during their useful life. This International Standard is based on the values adapted to "low-shrinkage" film base since nearly all films now manufactured meet the definition given below:

- For the purpose of choice of width, low-shrinkage film base is film base which:
- when coated with emulsion and any other normal coating treatment;
 - perforated;
 - kept in the manufacturer's normal commercial packing for 6 months at 18 to 24 °C (64 to 75 °F);
 - exposed;
 - processed;
 - stored exposed to air for a period not to exceed 30 days at 18 to 24 °C (64 to 75 °F) and 50 to 60 % relative humidity;
 - measured under like conditions of temperature and humidity,

shall have shrunk not more than 0.2 % from its original dimensions at the time of perforating.

This definition of low-shrinkage film stock has been found by experience to be useful as a guide to film manufacturers in sitting their stock. Departure from this definition shall not be cause for rejection of the stock. Note that this definition of shrinkage differs from the criterion applying to choice of longitudinal pitch, where greater periods of time are involved and where short-time tests can be deceptive.

Allowance has been made in arriving at these values for the common tendency of film to expand when exposed to high relative humidity. Allowance should be made for this factor in equipment design and in no case should the equipment design fail to accommodate a film of 16.00 mm (0.630 in) width.



Dimension	mm	in
A	15.86 ± 0.025	0.628 ± 0.001 0
A'	7.975 ± 0.050	0.314 0 ± 0.002 0
B	4.234 ± 0.010	0.166 7 ± 0.000 4
B**	4.227 ± 0.010	0.166 4 ± 0.000 4
C	0.914 ± 0.010	0.035 0 ± 0.000 4
D	1.143 ± 0.010	0.045 0 ± 0.000 4
R	0.13 ± 0.03	0.005 ± 0.001
E	0.51 ± 0.05	0.020 ± 0.002
F	14.02 ± 0.03	0.552 ± 0.001
G	0.025 max.	0.001 0 max.
J	7.975 ± 0.025	0.314 0 ± 0.001 0
L**	423.40 ± 0.40	16.670 ± 0.016
L'(***)	422.70 ± 0.40	16.640 ± 0.016

* Dimensions B' and L' (short perforation pitch) are provided to fulfill the requirements of continuous sprocket contact printing.

** Dimensions L and L' represent the length of any 100 consecutive perforation intervals.

NOTE — There are many dimensions in the table for which the tolerances of the parts are limited by other tolerances, and where this occurs, the exclusion provided in sub-clause 1.2.5 of ISO/R 129 shall apply.