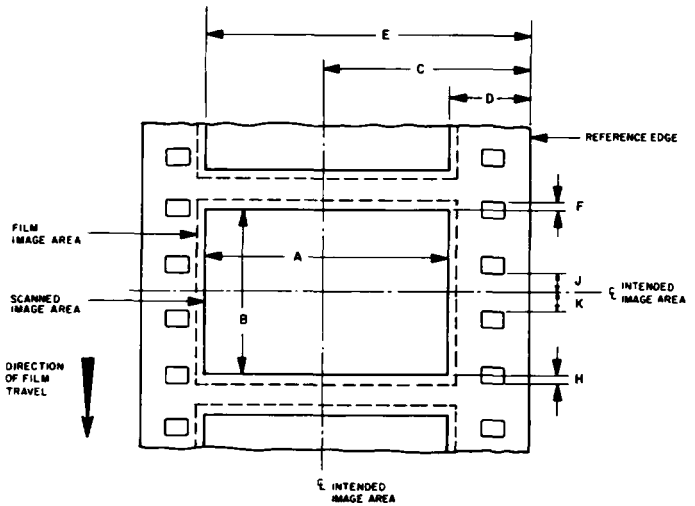

Fig. 2
Scanned Area on Film as Seen Looking Through the Film Toward the Lens

Table 2

Dimensions	Inches	Millimeters
A	0.792 ± 0.002	20.12 ± 0.05
B	0.594 ± 0.002	15.09 ± 0.05
C*	0.738 ref	18.75 ref
D	0.342 nom	8.69 nom
E	1.134 nom	28.80 nom
F = H	nominally equal	
J = K	within 0.004	within 0.10

*Used for 35-mm cameras as specified in ANSI PH22.59-1974.

Appendix

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

It is recognized that 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 27.3-1983. Although some portion of the audience will see the entire transmitted area, for certainty in presentation of critical information over broadcast television, such information should be confined to a smaller, central area.

SMPTE RECOMMENDED PRACTICE — RP 27.3–1983

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

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.

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

4.2.1 2x2 in test slides shall have image dimensions in accordance with American National Standard Dimensions of Image Areas and Mounts for Slides and Opaques for Television, ANSI PH22.-91-1973 (R1979).

4.2.2 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.

4.2.3 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.

Revision of RP 27.3-1972
Approved 24 October 1983

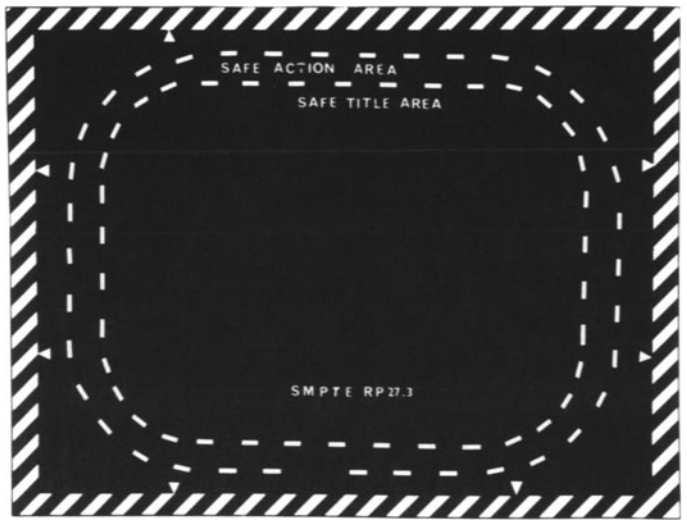

Fig. 1
Reproduction of Test Pattern

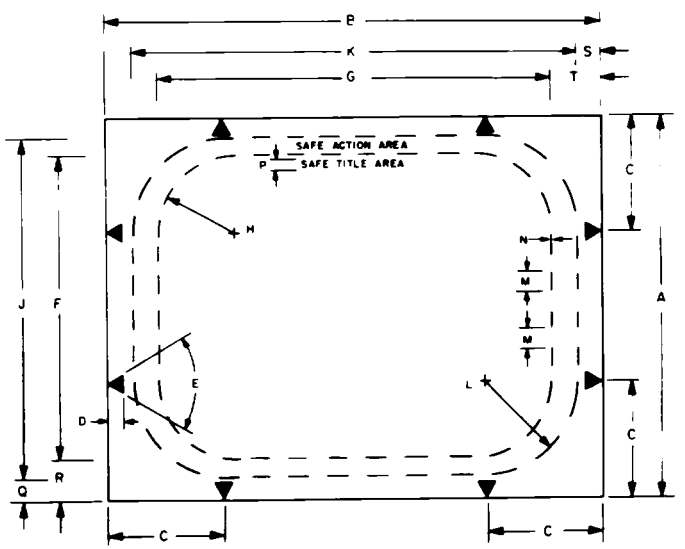

Fig. 2
Dimensional Drawing of Test Pattern

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

	Dimensions	Percent	Inches 2x2	35-mm	16-mm
A	Scanned image height	100.0	0.843	0.594	0.276
B	Scanned image width	133.3333	1.124	0.792	0.368
C	Position of arrow	30.0	0.253	0.178	0.083
D	Arrow length	4.0	0.034	0.024	0.011
E	Arrow shape in degrees		40.0	40.0	40.0
F	Height of safe title area	80.0	0.674	0.475	0.221
G	Width of safe title area	106.0	0.894	0.630	0.293
H	Corner radius, safe title area	21.0	0.177	0.125	0.058
J	Height of safe action area	90.0	0.759	0.535	0.248
K	Width of safe action area	120.0	1.012	0.713	0.331
L	Corner radius, safe action area	24.0	0.202	0.143	0.066
M	Length and spacing of lines	5.0	0.042	0.030	0.014
N	Width of line	0.5	0.004	0.003	0.0014
P	Height of letters	2.5	0.021	0.015	0.007
Q	Vertical position of action area	5.0	0.042	0.030	0.014
R	Vertical position of title area	10.0	0.081	0.059	0.028
S	Horizontal position of action area	6.67	0.056	0.040	0.018
T	Horizontal position of title area	13.33	0.112	0.079	0.037

4.8.1 Height and width dimensions of the black-and-white border for 2x2 in slides shall extend to the minimum dimensions specified in ANSI PH22.94-1973.

4.8.2 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, ANSI PH22.59-1974 (R1981).

4.8.3 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, ANSI PH22.7-1983.

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.

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), ANSI PH2.19-1976 (R1983).

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

5.3 The density of the dashes, arrows, and lettering shall be between 0.3 and 0.4.

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

SMPTE RECOMMENDED PRACTICE — RP 27.1–1983

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 operational 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.

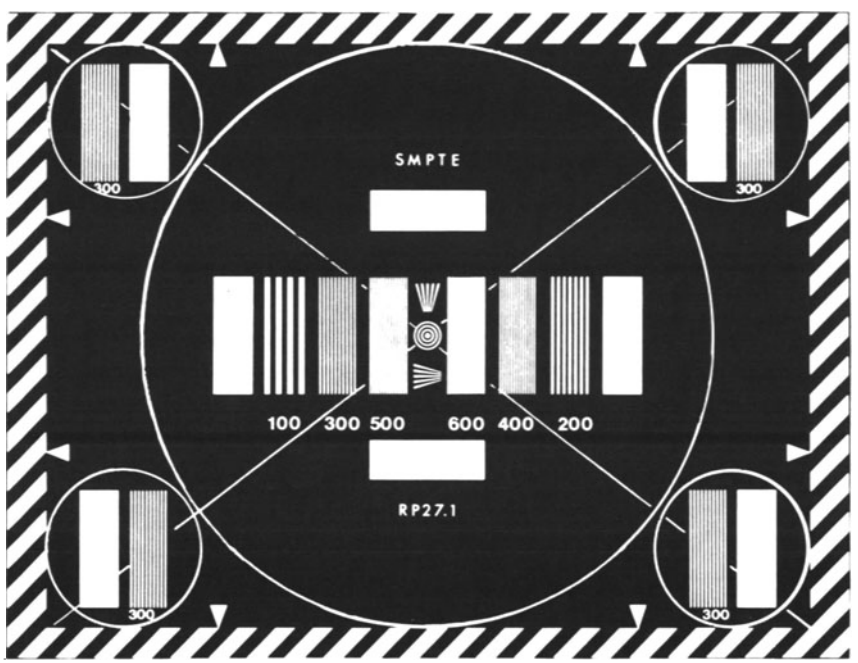

Fig. 1
Reproduction of Test Pattern

Revision of RP 27.1-1977
Approved 24 October 1983

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 have clear density 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 Dimensions. 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 diameter 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:

35-mm test films shall have dimensions in accordance with American National Standard for Motion-Picture Film (35-mm) — Television Image Area, ANSI PH22.95-1984. 16-mm test films shall have dimensions in accordance with American National Standard Dimensions for Television Image Area on 16-mm Motion-Picture Film, ANSI PH22.96-1982.

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

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, ANSI PH22.59-1971 (R1981); and American National Standard for Motion-Picture Film (16-mm) — Camera Aperture Image, ANSI PH22.7-1983.

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.

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

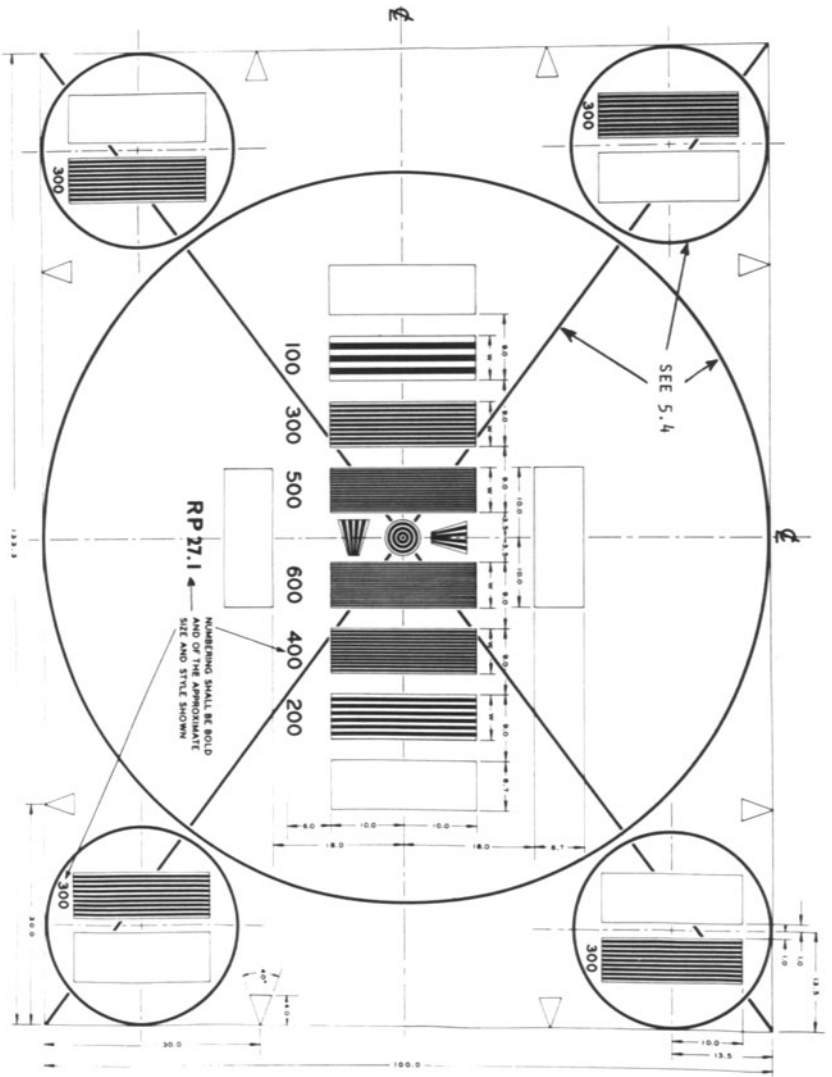

Fig. 2
Dimensional Drawing of Test Pattern

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), ANSI PH2.19-1976 (R1983).

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 clear density between 0.3 and 0.4.

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 clear density between 0.3 and 0.4.

NOTE 1: 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. Inasmuch 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.

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

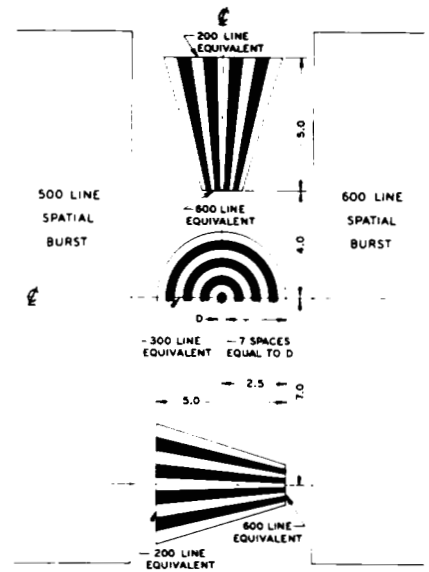

Fig. 3
Enlargement of Central Portion of Fig. 2

SMPTE RECOMMENDED PRACTICE — RP 27.2-1983

Specifications for Operational Registration Test Pattern for Multiple-Channel Television Cameras

1. *Scope*

Format, dimensions, and optical densities are specified for a test pattern transparency to be used as an operational alignment tool for multiple-channel color television cameras.

2. *Purpose*

This practice specifies a test pattern designed to provide a television picture signal suitable for aligning, adjusting, and checking multiple-channel color cameras for combined optical, mechanical, and electrical registration.

3. *Format*

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

3.2 Grid. The horizontal and vertical black lines of the grid produce a uniformly-spaced grid dividing the picture area into 18 squares vertically and 21 squares horizontally. Half dimensions have been added near the edges of the pattern where registration is most difficult to achieve.

3.3 Circles and Diagonals. Circles and diagonal black lines are provided to center the pattern on the camera tubes and check alignment.

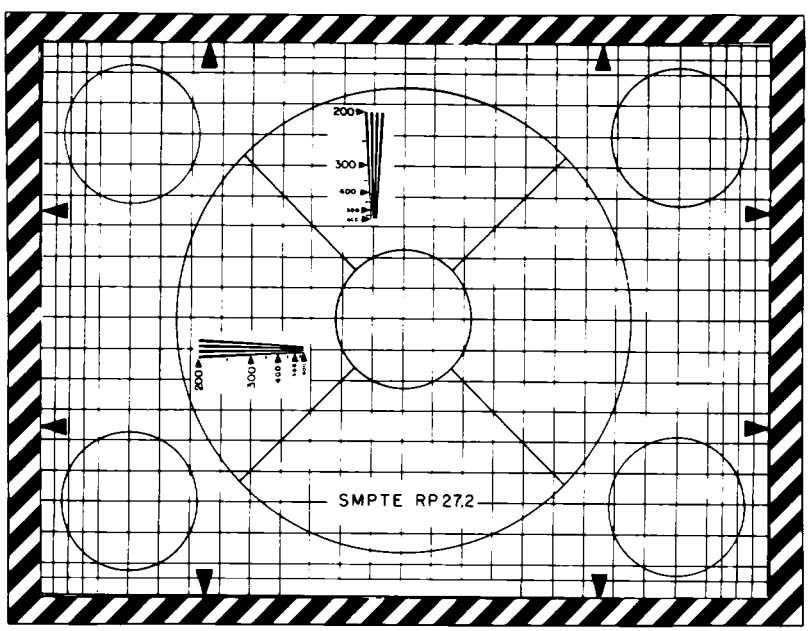

Fig. 1
Reproduction of Test Pattern

Revision of RP 27.2-1971
Approved 23 October 1983

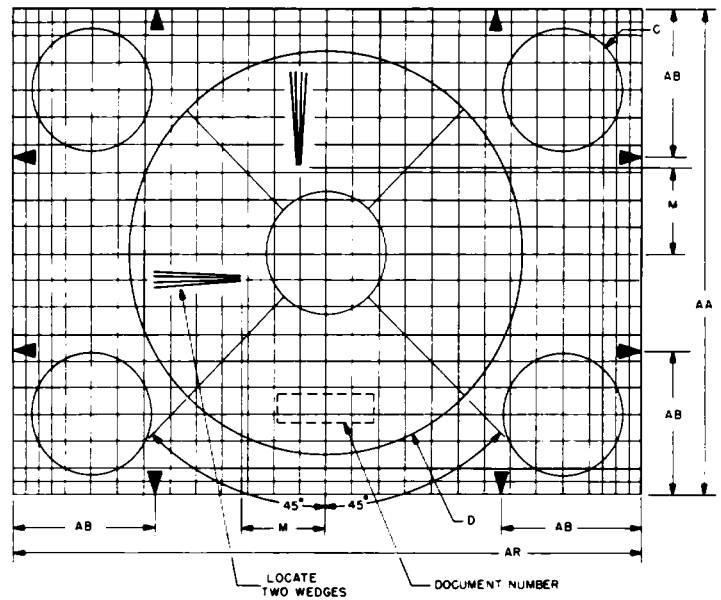

Fig. 2
Location of Boundary Arrows, Circles, Wedges and 45° Lines

3.4 Resolution Wedges. Vertical and horizontal wedges are provided for checking optical and electrical focus and to aid registration.

3.5 Arrows and Border. The eight boundary arrows and black-and-white border define the edge of the test pattern area and the scanned area.

3.6 Pattern Identification. The identification number of this document shall appear on the pattern as specified in Fig. 2.

4. *Dimensions*

4.1 Test Pattern. The dimensions of the test pattern shall be as shown in Figs. 2 through 5, in percentages of frame height and reproduced with a tolerance of ± 0.1 percent of the frame height.

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

4.2.1 2x2 in test slides shall have dimensions as specified in American National Standard Dimensions of Image Areas and Mounts for Slides and Opaques for Television, ANSI PH22.94-1973 (R1979).

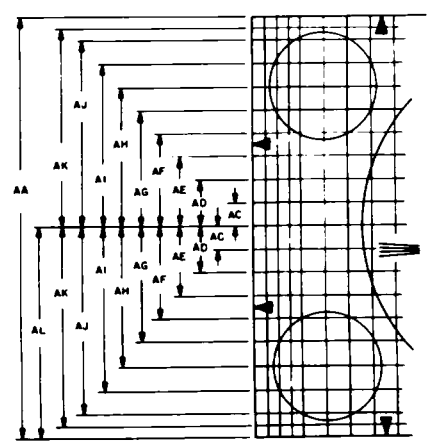

Fig. 3
Location of Horizontal Grating Lines

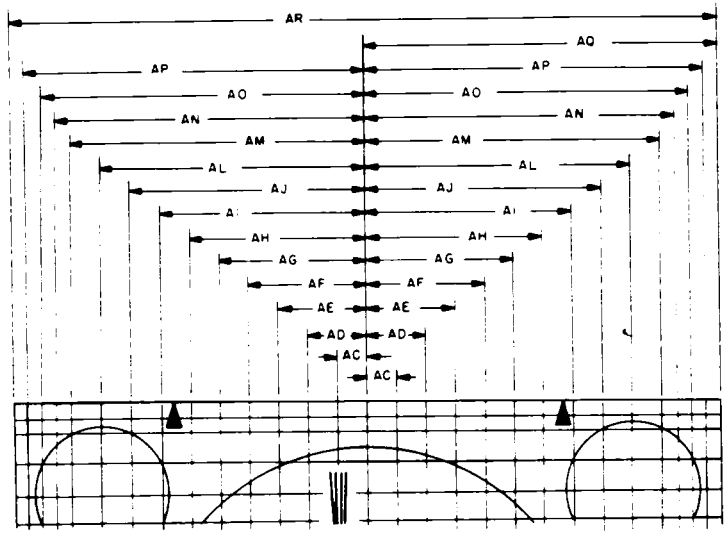

Fig. 4
Location of Vertical Grating Lines

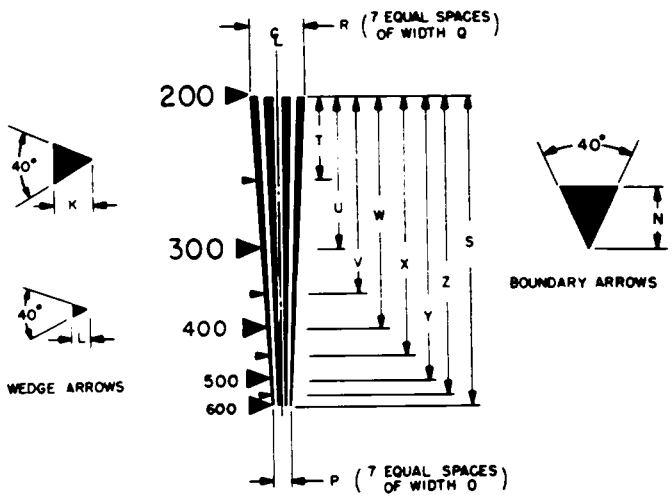

Fig. 5
Wedge Detail and Boundary Arrows

Dimensions	Percentage	Inches 8x10	2x2	35-mm	16-mm
AA	100.00000	6.300	0.8430	0.6000	0.2760
AB	30.00000	1.890	0.2529	0.1782	0.0828
AC	5.55556	0.350	0.0468	0.0330	0.0153
AD	11.11111	0.700	0.0937	0.0660	0.0307
AE	16.66667	1.050	0.1405	0.0990	0.0460
AF	22.22222	1.400	0.1873	0.1320	0.0613
AG	27.77778	1.750	0.2342	0.1650	0.0767
AH	33.33333	2.100	0.2810	0.1980	0.0920
AI	38.88889	2.450	0.3278	0.2310	0.1073
AJ	44.44444	2.800	0.3747	0.2640	0.1227
AK	47.22222	2.975	0.3981	0.2805	0.1303
AL	50.00000	3.150	0.4215	0.2970	0.1380
AM	55.55556	3.500	0.4683	0.3300	0.1533
AN	58.33333	3.675	0.4917	0.3465	0.1610
AO	61.11111	3.850	0.5151	0.3630	0.1687
AP	63.88888	4.025	0.5386	0.3795	0.1763
AQ	66.66667	4.200	0.5620	0.3960	0.1840
AR	133.33333	8.400	1.1240	0.8000	0.3680
C	25.00000	1.575	0.2108	0.1485	0.0690
D	83.33333	5.250	0.7025	0.4950	0.2300
K	1.00000	0.063	0.0084	0.0059	0.0027
L	0.50000	0.032	0.0042	0.0030	0.0014
M	17.7777	1.120	0.1499	0.1056	0.0491
N	4.0000	0.252	0.0337	0.0238	0.0110
O	0.1667	0.011	0.0014	0.0010	0.0005
P	1.1667	0.074	0.0098	0.0069	0.0032
Q	0.5000	0.032	0.0042	0.0030	0.0014
R	3.5000	0.221	0.0295	0.0208	0.0097
S	20.0000	1.260	0.1686	0.1188	0.0552
T	6.0000	0.378	0.0506	0.0356	0.0166
U	10.0000	0.630	0.0843	0.0594	0.0276
V	12.8571	0.810	0.1084	0.0764	0.0355
W	15.0000	0.945	0.1264	0.0891	0.0414
X	16.6667	1.050	0.1405	0.0990	0.0460
Y	18.0000	1.134	0.1517	0.1070	0.0497
Z	19.0909	1.203	0.1610	0.1134	0.0527

4.2.2 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.

4.2.3 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.

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

4.3.1 The dimensions (AA and BA) of the black-and-white border for 2x2 in slides are specified as the transmitted image in ANSI PH22.94-1973.

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, ANSI PH22.59-1974 (R1981)

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, ANSI PH22.7-1983.

4.4 Line Widths. The width of the grid lines, the circles, and the diagonals shall be 0.167 ± 0.011 percent of the scanned image height.

4.5 Resolution Wedges. The resolution portion of the pattern is shown in detail in Fig. 5. The tolerance of the nominal dimensions of the lines of the wedge shall be ± 0.011 percent of the scanned image height.

4.5.1 The nominal dimensions of the wedge shall be as illustrated in Fig. 5.

4.5.2 At any given television line number, the ratio of the width of the black half cycle to the white half cycle shall be 1.00 ± 0.05.

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), ANSI PH2.19-1976 (R1983).

5.2 Background. The white background shall have a density between 0.3 and 0.4.

5.3 Grid lines, circles, diagonals, arrows, and lettering shall have a density greater than 1.9.

5.4 Resolution Wedges and Black-and-White Border. The resolution wedges 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: The emulsion position shall correspond to the one normally used for the specific format.