



Specifications for Deflection Linearity
Test Pattern for Television

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1. **Scope**
Format, dimensions, and optical densities are specified for a test pattern transparent to be used in the measurement of geometric distortion of television systems.
2. **Purpose**
The specified test pattern is to be used with a suitable electronically-generated grating signal to facilitate the adjustment of deflection linearity and the measurement of geometric distortion of television cameras and picture display devices. A suitable electronically-generated grating signal is specified in American National Standard Television: Methods of Measurement of Aspect Ratio and Geometric Distortion. ANS1. IEEE Std 902-1954 (R1978).
3. **Format**
 - 3.1 Pattern. A reproduction of the test pattern is shown in Fig. 1.
 - 3.2 Black Rings. Black rings, having an inner radius of one percent of picture height and an outer radius of two percent of picture height, are uniformly spaced and arranged to overlay an electronically-generated grating pattern. A black ball having a radius of 0.5 percent of picture height is located in the center of each black ring.
 - 3.3 Number of Rings. There are 148 rings arranged in a grid of 17 vertical columns and 14 horizontal rows. Numbers appear from left to right, indicating columns 2 through 16 and letters, from top to bottom, B through M, indicating rows 2 through 13.
 - 3.4 Centering. A black cross is located in the center of the test pattern.
 - 3.5 Arrows and Border. The eight boundary arrows and black border define the edge of the test pattern area and the scanned area.
 - 3.6 Pattern Identification. The identification number of this document appears on the test pattern.

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 (AA).

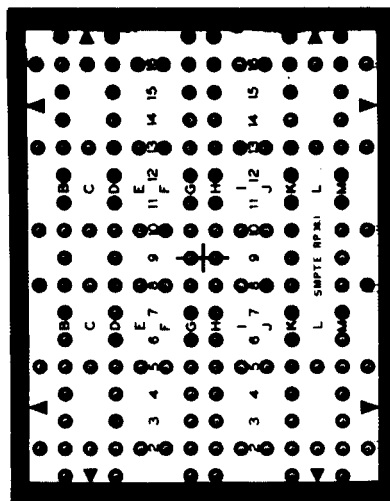


Fig. 1
Reproduction of Test Pattern

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462 Scarsdale Avenue, Scarsdale, NY 10583, (914) 472-6606
Revision of RP 38.1-1971
Approved 24 March 1983

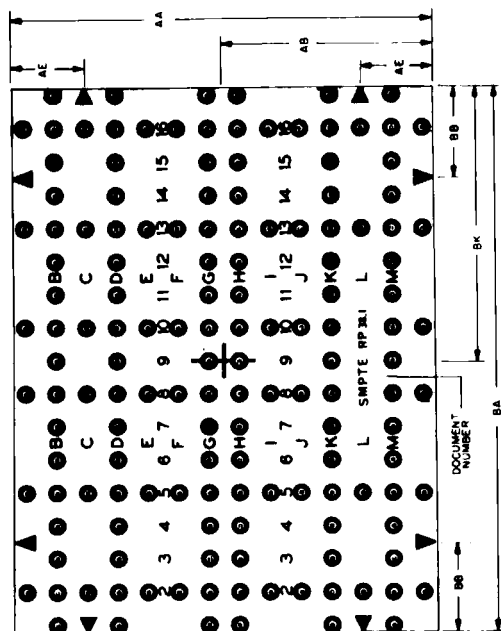


Fig. 2
Location of Boundary Arrows (Fig. 5) and Center Cross (Fig. 5)

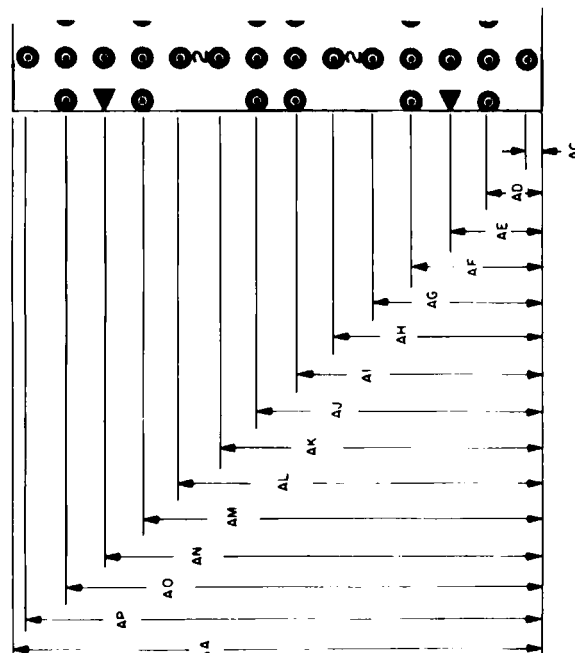


Fig. 3
Location of Horizontal Rows of Circles (Fig. 5)

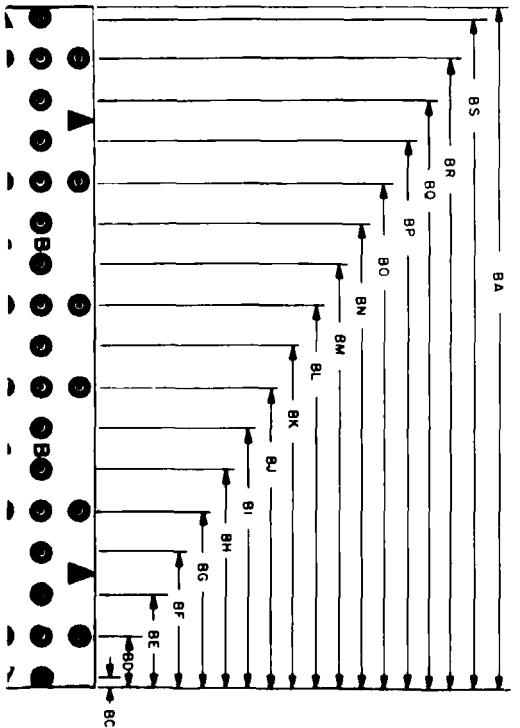


Fig. 4
Location of Vertical Rows of Circles (Fig. 3)

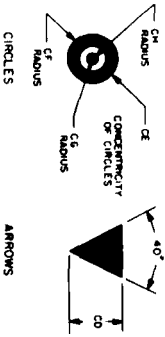
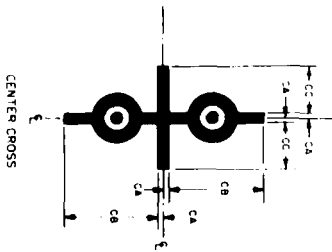


Fig. 5
Details of Figures on Pattern

- 1.1.1 Circular Targets (Figs. 3 and 4): The tolerance on the dimensions for the location of these targets is to be ± 0.02 percent of picture height (AAV). The tolerance on the radii of the circles is ± 0.1 percent of picture height.
- 1.1.2 Center Cross (Fig. 2): The tolerance on the dimensions locating the center cross is ± 0.02 percent of picture height. The tolerance on the dimensions of the cross is ± 0.1 percent of picture height.
- 1.1.3 Boundary Arrows (Fig. 2): The tolerance on the dimensions for the location of the boundary arrows is ± 1 percent of picture height (AA). The tolerance of the dimensioning of the arrows are ± 1 percent and ± 1 degree.

- 1.2.1 Row and Column Identification: The identification numbering and lettering for the rows and columns, respectively, is to be in bold type of approximately the size shown.
- 1.2.2 Pattern Identification: The SMPTE identification number shall be centrally located in the lower portion of the pattern approximately as shown. Bold type shall be used.
- 1.2.3 Image Size: The size of the scanned area as indicated by the boundary arrows shall be as follows:
 - 1.2.3.1 35.2 in test slides shall have dimensions as specified in American National Standard Dimensions of Image Areas and Mounts for Slides and Opticals for Television, ANSI PH22.94-1973 (R1979).
 - 1.2.3.2 35-mm motion-picture films shall have image dimensions in accordance with American National Standard Dimensions for Television Image Area on 35-mm Motion-Picture Film, ANSI PH22.95-1968 (R1973).
 - 1.2.3.3 16-mm test films shall have image dimensions in accordance with American National Standard Dimensions for Television Image Area on 16mm Motion-Picture Film, ANSI PH22.96-1982.
- 1.3 Black Border: The dimensions of the black border shall be as follows:
 - 1.3.1 The dimensions (AV and BV) of the black border for 35.2 in slides are specified as the transmitted image in ANSI PH22.94-1973 (R1979).
 - 1.3.2 For 35-mm motion-picture films, the black border shall extend to the dimensions specified by Scale A in American National Standard Dimensions of 35-mm Motion-Picture Camera Aperture Images, ANSI PH22.94-1974 (R1981).

Dimensions	Percentage	8 X 10	2 X 2	Inches	35-mm	16-mm
AV	100.0000	6.300	0.810	0.310	0.2760	0.1380
VB	50.0000	3.150	0.405	0.155	0.1380	0.0690
VC	2.8980	0.183	0.0231	0.0072	0.0080	0.0040
VD	10.1130	0.639	0.0826	0.0310	0.0280	0.0140
VE	17.3913	1.096	0.1466	0.0548	0.0480	0.0240
VF	24.6377	1.552	0.2077	0.0783	0.0680	0.0340
VG	31.8841	2.009	0.2688	0.1044	0.0880	0.0440
VH	39.1304	2.567	0.3299	0.1299	0.1160	0.0580
VI	46.3768	2.922	0.3755	0.1480	0.1280	0.0640
VJ	53.6232	3.478	0.4530	0.1740	0.1560	0.0780
VK	60.8696	3.833	0.5131	0.2010	0.1880	0.0940
VL	68.1159	4.291	0.5712	0.2280	0.2080	0.1040
VM	75.3623	4.748	0.6283	0.2550	0.2280	0.1140
VN	82.6087	5.204	0.6961	0.2820	0.2480	0.1240
VO	89.8551	5.661	0.7575	0.3337	0.2480	0.1240
VP	97.1014	6.117	0.8186	0.3768	0.2680	0.1340
AV	133.333333	8.100	1.1210	0.4790	0.4680	0.2340
BH	21.98018	1.379	0.1815	0.1390	0.0604	0.0302
BD	1.62902	0.102	0.0135	0.0097	0.0019	0.0009
BE	9.73610	0.615	0.0822	0.0580	0.0289	0.0144
BF	17.88618	1.127	0.1508	0.1062	0.0494	0.0247
BF	26.01626	1.639	0.2193	0.1713	0.0718	0.0359
BG	34.14634	2.151	0.2879	0.2098	0.0892	0.0446
BH	42.27642	2.663	0.3564	0.2511	0.1167	0.0583
BI	50.40650	3.176	0.4249	0.2994	0.1391	0.0695
BJ	58.53658	3.688	0.4935	0.3477	0.1616	0.0807
BK	66.66666	4.200	0.5620	0.3960	0.1840	0.0920
BL	74.79674	4.712	0.6305	0.4443	0.2064	0.1032
BM	82.92682	5.224	0.6990	0.4926	0.2288	0.1144
BN	91.05690	5.737	0.7676	0.5409	0.2513	0.1256
BO	99.18698	6.249	0.8361	0.5892	0.2738	0.1368
BP	107.31706	6.761	0.9047	0.6375	0.2962	0.1480
BQ	115.44714	7.273	0.9732	0.6858	0.3186	0.1592
BR	123.57722	7.785	1.0418	0.7340	0.3411	0.1704
BS	131.70730	8.298	1.1103	0.7823	0.3635	0.1816
CA	0.3300	0.022	0.0030	0.0021	0.0010	0.0005
CB	7.6000	0.179	0.0041	0.0121	0.0210	0.0105
CC	1.0000	0.232	0.0238	0.0110	0.0210	0.0105
CD	1.0000	0.272	0.0337	0.0238	0.0110	0.0055
CE	0.0100	0.006	0.0001	0.0001	0.00003	0.00003
CF	2.0000	0.135	0.0189	0.0119	0.0075	0.0038
CG	1.0000	0.063	0.0084	0.0079	0.0028	0.0014
CH	0.50000	0.032	0.0042	0.0030	0.0011	0.0006

- 1.3.3 For 16mm motion-picture films the black border shall extend to the dimensions specified in American National Standard Dimensions of 16mm Motion-Picture Camera Aperture Images, ANSI PH22.7-1983.
2. Optical Densities
- 2.1 Optical Densities: All optical densities shall be measured in accordance with American National Standard Conditions for Densit and Double-Exposure Transmission Measurements (Transmission Density), ANSI PH2 19.1976.
 - 2.2 Background: The density of the background shall be 0.05 ± 0.2 .
 - 2.3 Pattern: The black border, arrows, rings, center cross, and lettering shall have a density greater than 1.9.
- NOTE: The emission position shall correspond to the one normally used for the specific format.

SMPTE RECOMMENDED PRACTICE

RP 27.5-1983

Specifications for Mid-Frequency Response Test Pattern for Television



Page 1 of 3 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 halfwave 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 35-mm test films shall have image dimensions in accordance with Sec. 3.3 of American National Standard Dimensions for Television Image Area on 35-mm Motion-Picture Film, ANSI PH22.95-1963 (R1973).

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 Dimensions of 35-mm Motion-Picture Camera Aperture Images, ANSI PH22.59-1971 (R1981).

4.3.2 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, ANSI PH22.7-1983.

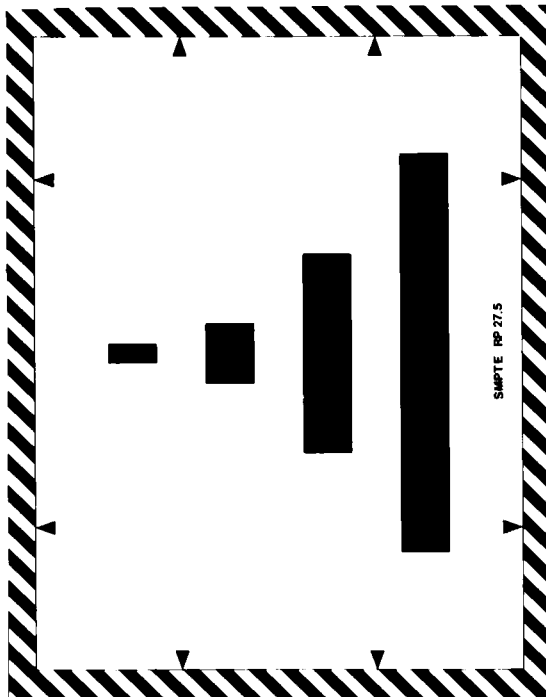


Fig. 1
Reproduction of Test Pattern Type A

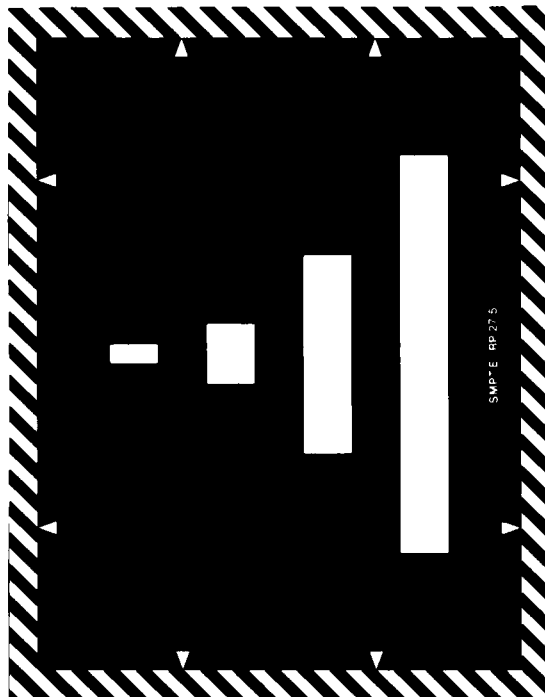


Fig. 2
Reproduction of Test Pattern Type B

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.

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 2.9.

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 0.5 and 0.4.

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.

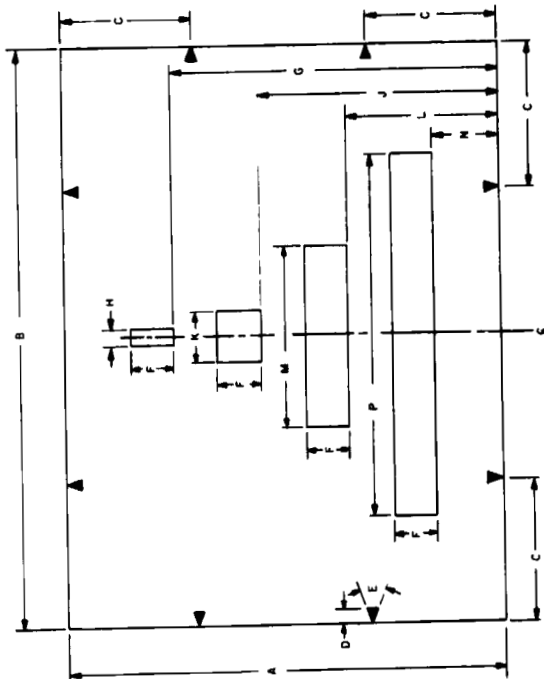


Fig. 3 Dimensional Drawing of Test Pattern

Dimensions	Percent	Inches		
		2x2	8x10	35-mm 16-mm
A Scanned image height	100.0	0.843	6.50	0.591 0.276
B Scanned image width	133.3333	1.124	8.40	0.792 0.368
C Position of arrow from corner	30.0	0.253	1.890	0.178 0.083
D Arrow length	4.0	0.094	0.252	0.024 0.011
E Arrow shape in degrees	40.0	40.0	40.0	40.0
F Height of bars	10.0	0.084	0.630	0.059 0.028
G Position of 300-kHz bar	75.0	0.632	4.725	0.446 0.207
H Width of 300-kHz bar	4.2	0.035	0.26	0.025 0.012
I Position of 100-kHz bar	55.0	0.464	3.465	0.327 0.152
J Width of 100-kHz bar	12.7	0.107	0.800	0.075 0.035
K Position of 50-kHz bar	55.0	0.295	2.205	0.208 0.097
L Width of 50-kHz bar	42.0	0.354	2.646	0.219 0.116
M Position of 15-kHz bar	15.0	0.126	0.945	0.069 0.041
N Width of 15-kHz bar	81.0	0.708	5.292	0.499 0.232