RP 38.1-1989
Revision of RP 38.1-1983

SMPTE RECOMMENDED PRACTICE

Specifications for Deflection Linearity Test Pattern for Television

1 Scope

Format, dimensions, and optical densities are specified for a test pattern transparency 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 eiectronically-generated grating signal is specified in IEEE Std 202-1954 (RI978), Television: Methods of Measurement of Aspect Ratio and Geometric Distortion.

3 Format

3.1 Pattern

A reproduction of the test pattern is shown in figure 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

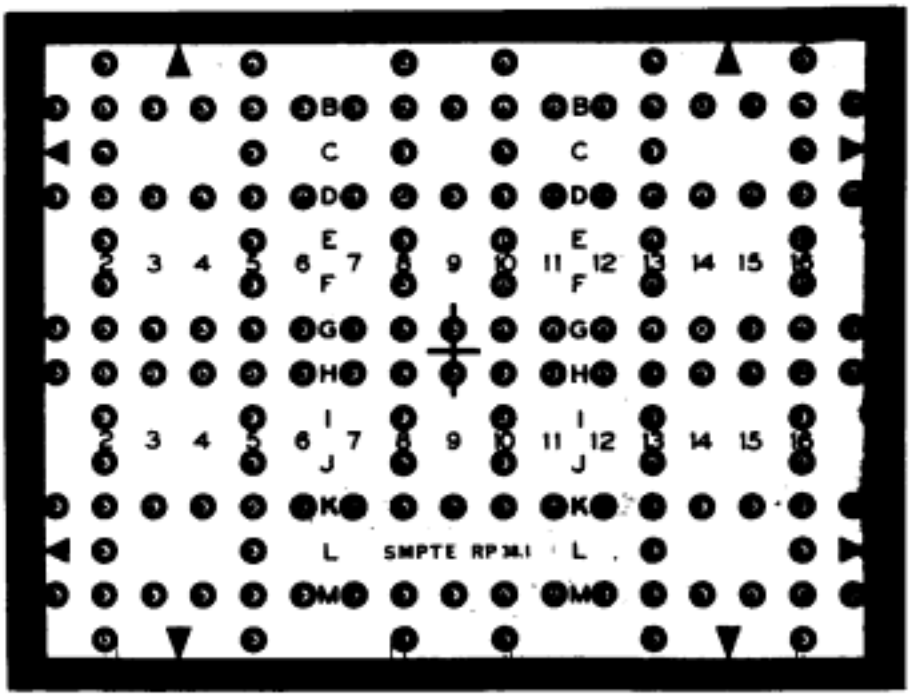

Figure 1 – Reproduction of test pattern

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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 figures 2 through 5, in percentages of frame height (AA).

4.1.1 Circular targets (figures 3 and 4)

The tolerance on the dimensions for the location of these targets is to be ± 0.02 percent of picture height (AA) . The tolerance on the radii of the circles is ± 0.1 percent of picture height.

4.1.2 Central cross (figure 2)

The tolerance on the dimensions locating the central cross is ± 0.02 percent of picture height. The tolerance on the dimensions of the cross is ± 0.1 percent of picture height.

4.1.3 Boundary arrows (figure 2)

The tolerance on the dimensions for the location of the boundary arrows is ± 1 percent of picture height (AA). The tolerances of the dimensioning of the arrows are ± 1 percent and ± 1 degree.

4.1.4 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.

4.1.5 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.

4.2 Image size

The size of the scanned area as indicated by the boundary arrows shall be as follows:

4.2.1 2×2-in test slides shall have dimensions as specified in American National Standard for Television — Image Areas and Mounts for Slides and Opaques, ANSI/SMPTE 94-1985.

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/SMPTE 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 border

The dimensions of the black border shall be as follows:

4.3.1 The dimensions (AA and BA) of the black border for 2×2 in slides are specified as the transmitted image in ANSI/SMPTE 94-1985.

4.3.2 For 35-mm motion-picture films, the black 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 59-1989.

4.3.3 For 16-mm motion-picture films, the black 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.

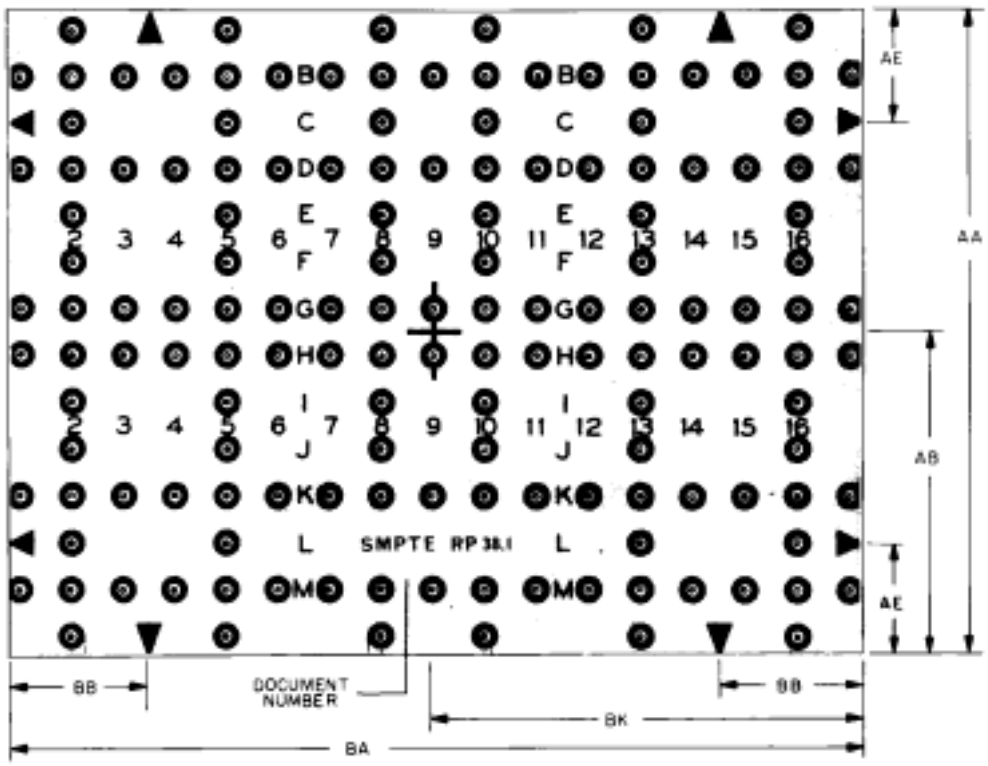

Figure 2 – Location of boundary arrows (figure 5) and center cross (figure 5)

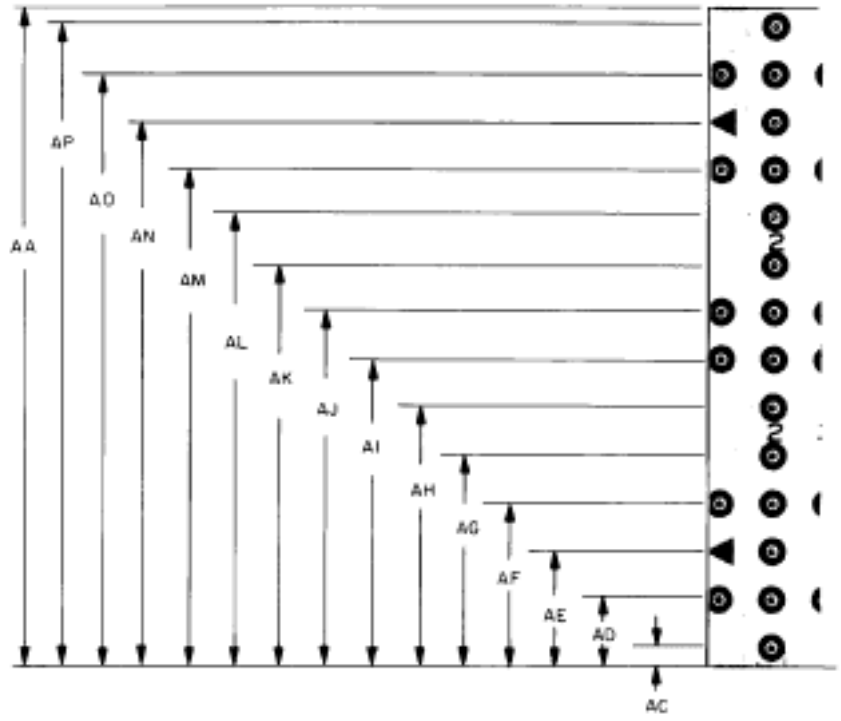

Figure 3 – Location of horizontal rows of circles (figure 5)

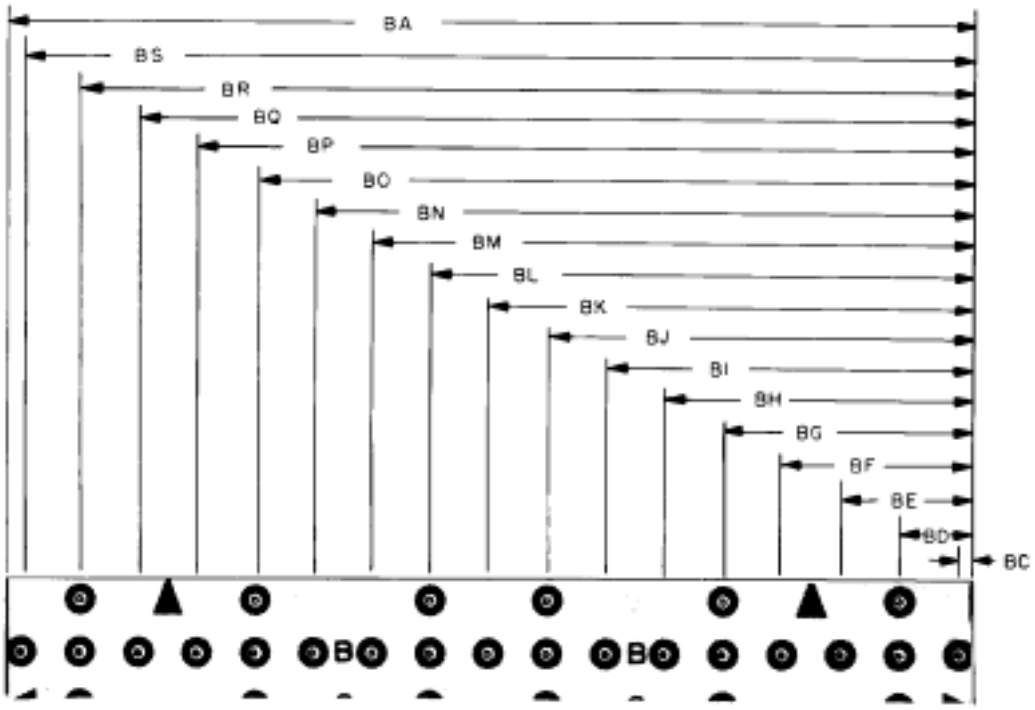

Figure 4 – Location of vertical rows of circles (figure 5)

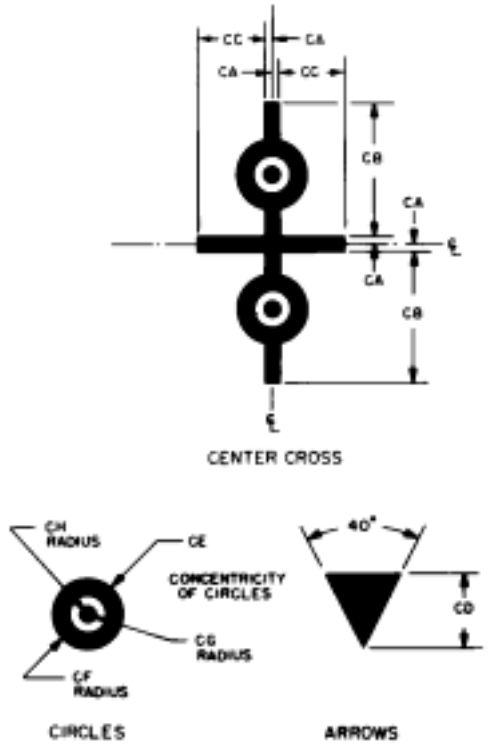

Figure 5 –Details of figures on pattern

		Inches			
Dimensions	Percentage	8×10	2×2	35-mm	16-mm
AA	100.0000	6.300	0.8430	0.5940	0.2760
AB	50.0000	3.150	0.4215	0.2970	0.1380
AC	2.8986	0.183	0.0244	0.0172	0.0080
AD	10.1449	0.639	0.0856	0.0603	0.0280
AE	17.3913	1.096	0.1466	0.1033	0.0480
AF	24.6377	1.552	0.2077	0.1463	0.0680
AG	31.8841	2.009	0.2688	0.1894	0.0880
AH	39.1304	2.465	0.3299	0.2324	0.1080
AI	46.3768	2.922	0.3910	0.2755	0.1280
AJ	53.6232	3.378	0.4520	0.3185	0.1480
AK	60.8696	3.835	0.5131	0.3616	0.1680
AL	68.1159	4.291	0.5742	0.4046	0.1880
AM	75.3623	4.748	0.6353	0.4477	0.2080
AN	82.6087	5.204	0.6964	0.4907	0.2280
AO	89.8551	5.661	0.7575	0.5337	0.2480
AP	97.1014	6.117	0.8186	0.5768	0.2680
BA	133.33333	8.400	1.1240	0.7920	0.3680
BB	21.88618	1.379	0.1845	0.1300	0.0604
BC	1.62602	0.102	0.0137	0.0097	0.0049
BD	9.75610	0.615	0.0822	0.0580	0.0269
BE	17.88618	1.127	0.1508	0.1062	0.0494
BF	26.01626	1.639	0.2193	0.1545	0.0718
BG	34.14634	2.151	0.2879	0.2028	0.0942
BH	42.27642	2.663	0.3564	0.2511	0.1167
BI	50.40650	3.176	0.4249	0.2994	0.1391
BJ	58.53658	3.688	0.4935	0.3477	0.1616
BK	66.66666	4.200	0.5620	0.3960	0.1840
BL	74.79674	4.712	0.6305	0.4443	0.2064
BM	82.92682	5.224	0.6991	0.4926	0.2289
BN	91.05690	5.737	0.7676	0.5409	0.2513
BO	99.18698	6.249	0.8361	0.5892	0.2738
BP	107.31706	6.761	0.9047	0.6375	0.2962
BQ	115.44714	7.273	0.9732	0.6858	0.3186
BR	123.57722	7.785	1.0418	0.7340	0.3411
BS	131.70730	8.298	1.1103	0.7823	0.3635
CA	0.3500	0.022	0.0030	0.0021	0.0010
CB	7.6000	0.479	0.0641	0.0451	0.0210
CC	4.0000	0.252	0.0337	0.0238	0.0110
CD	4.0000	0.252	0.0337	0.0238	0.0110
CE	0.0100	0.006	0.0001	0.0001	0.00003
CF	2.0000	0.126	0.0169	0.0119	0.0055
CG	1.0000	0.063	0.0084	0.0059	0.0028
CH	0.50000	0.032	0.0042	0.0030	0.0014

5 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 Background

The density of the background shall be 0.6 ± 0.2.

5.3 Pattern

The black border, arrows, rings, centering cross, and lettering shall have a density greater than 1.9.

NOTES

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

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