RP 27.1-1989
Revision of RP 27.1-1983

SMPTE RECOMMENDED PRACTICE

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 figure 1.

3.2 Background

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

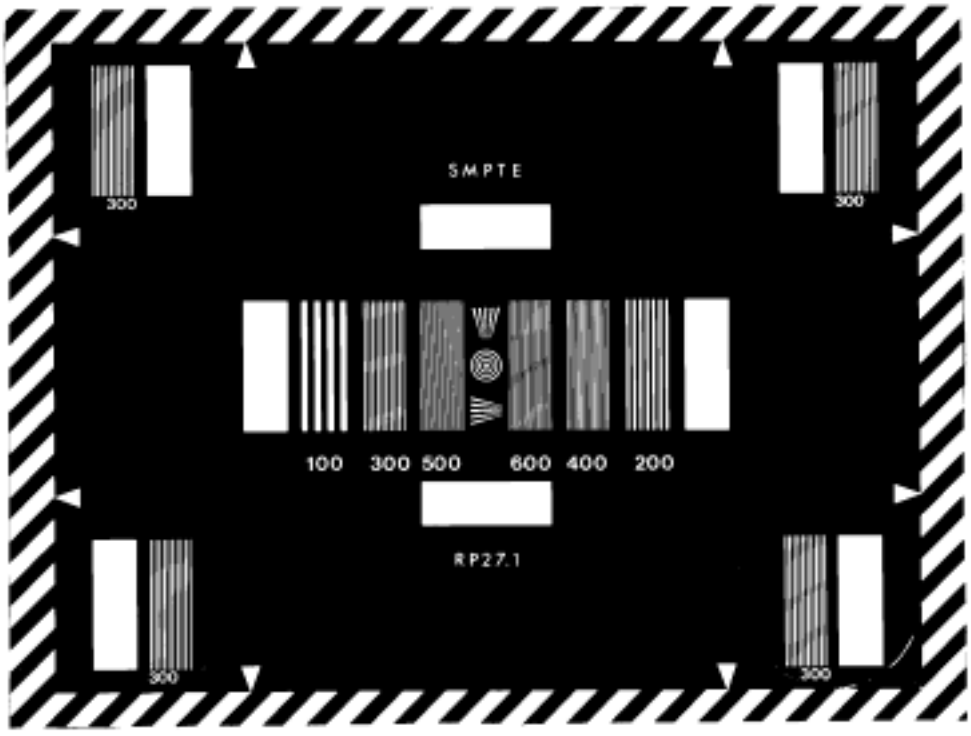

Figure 1 – Reproduction of test pattern

Approved February 28, 1989

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

AII 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 figure 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 figures 2 and 3. All dimensionns 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-mm 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 for Motion-Picture Film (35-mm) — .Camera Aperture Images, ANSI/SMPTE 59-1989; and American National Standand for Motion-Picture Film (16-mm) — Camera Aperture Image and Usage, ANSI/SMPTE 7-1988.

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.

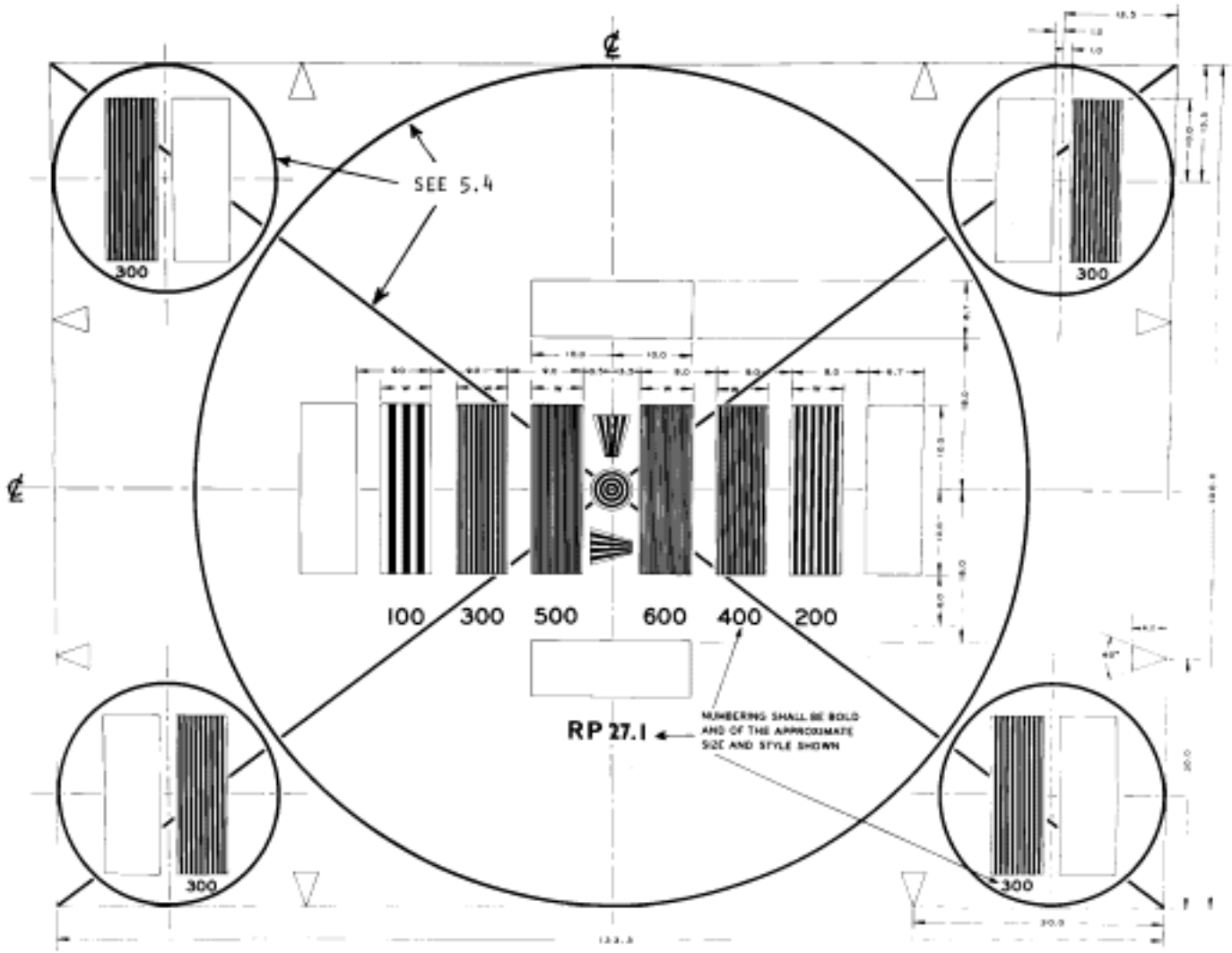

Figure 2 - Dimensional drawing of test pattern

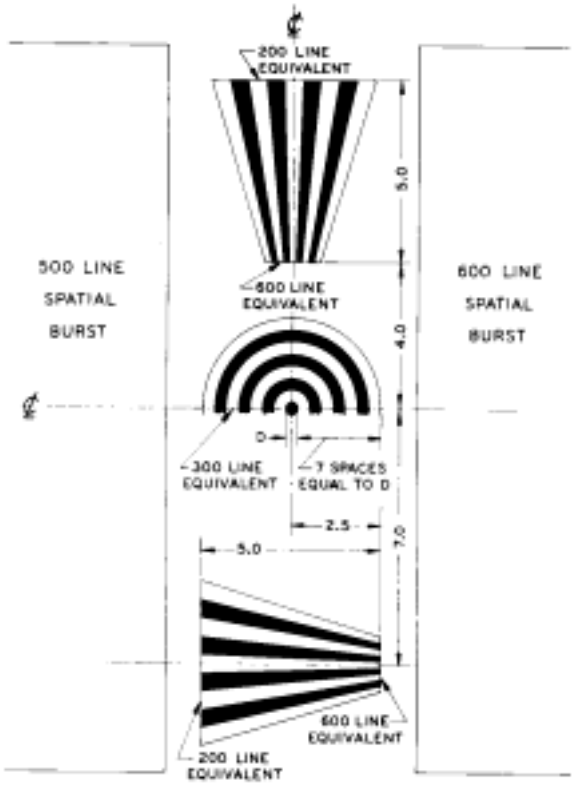

Figure 3 – Enlargement of central portion of figure 2

4.5 Diagonal lines

Diagonal lines shall be drawn between opposing corners as shown in figure 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

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 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 be nominally clear.

5.4 Circles, diagonal lines, and lettering

Circles, diagonal lines, and lettering shall be nominally clear.

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 the white shall be nominally clear.

NOTES

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.

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