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RP 216-2002

SMPTE RECOMMENDED PRACTICE

Specifications for 3-Perforation Test and Alignment Film for 35-mm Motion Pictures

1 Scope

This practice specifies the format, dimensions, and optical densities of a test and alignment chart for 3-perforation 35-mm motion-picture film. The image is designed for use as an operational alignment tool for telecine.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE 59-1998, Motion-Picture Film (35-mm) — Camera Aperture Images and Usage

SMPTE 96M-1999, Television — 35- and 16-mm Motion-Picture Film — Scanned Image Area

ISO 5-2:1991, Photography — Density Measurements — Part 2: Geometric Conditions for Transmission Density

3 Purpose

This practice specifies a film image pattern designed to provide a television picture for aligning, adjusting, and checking basic setup parameters for transfer of 35-mm 3-perforation motion-picture film on a telecine or film scanner.

4 Description

A reproduction of the test pattern is shown in figure 1. Figure 2 shows various attributes of the test chart. These are described below. All dimensions of the test chart are given as a percentage of picture height (see figure 3).

4.1 Film stock

The pattern shall be produced on 35-mm camera original black-and-white film stock, utilizing short-pitch B&H perforations. The images shown in this practice are positive images.

4.2 Film optical properties

4.2.1 Density

All densities shall be measured in accordance with ISO 5-2.

4.2.2 Black density

All black items and alphanumeric labels shall have a minimum density of at least 1.9 nominal.

4.2.3 White density

All white items shall have a density no greater than 0.2 (nominally clear).

4.3 Pattern and background

The dimensions of the test chart are given as a percentage of picture height and shall be reproduced with a tolerance of ± 0.1% of the frame height. The specific dimensions are given on the chart in figure 3.

The background density of the image shall be fixed to 0.8 nominal.

Approved August 14, 2002

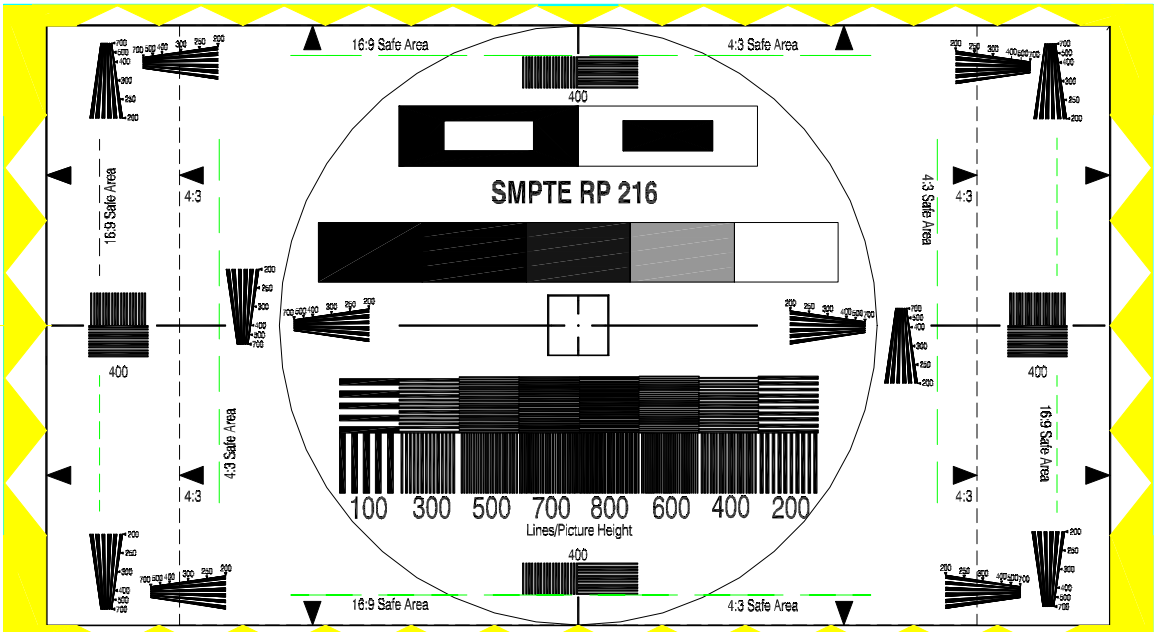
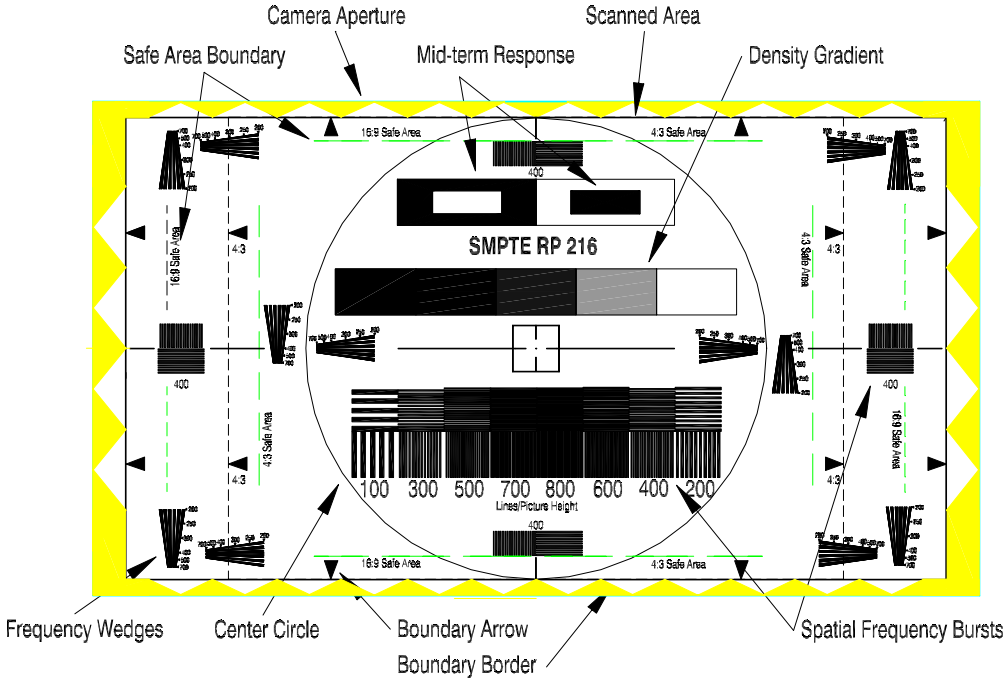
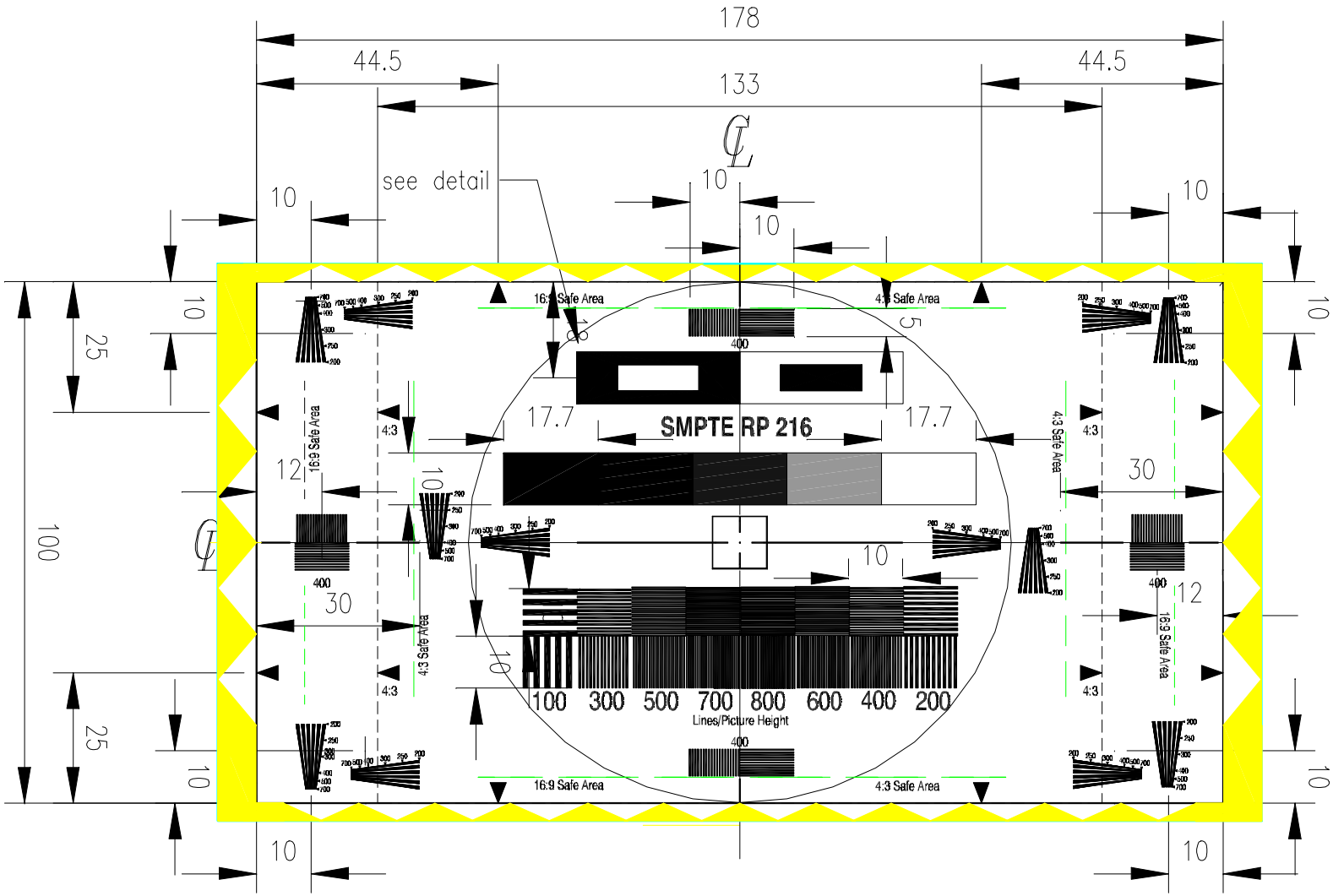


Figure 1 – Test chart



NOTES
1 Outside dimensions of barber pole represent the camera scanned image as defined in SMPTE 59M.
2 Inside dimensions of barber pole represent the scanned image area as defined in SMPTE 96M.

Figure 2 – Test chart attributes



NOTE – Dimensions are shown as a percentage of picture height.

Figure 3 – 3-perforation alignment dimensions

4.4 Spatial frequency bursts

4.4.1 Description

Vertical and horizontal spatial frequency bursts are calibrated in lines per picture height. They are located in the central lower area of the chart as shown in figure 2.

The calibrated bursts are in 100-line increments from 100-line resolution to 800-line resolution, alternating from left to right in a manner that gives the highest resolution in the center of the chart.

The vertical frequency patterns are located directly over the horizontal frequency patterns so that both vertical and horizontal resolution can be evaluated simultaneously with a 15-line horizontal sweep selected on a standard waveform monitor.

Additional vertical and horizontal 400-line spatial frequency bursts are located at the top center, bottom center, left center, and right center of the test chart (see figure 2).

4.4.2 Format

Each central spatial frequency burst width and height is nominally equal to 10% of picture height.

Each left and right spatial frequency burst width and height is nominally equal to 10% of picture height.

The width of the top and bottom 400-line bursts shall be nominally 10% of picture height. The height of the top and bottom 400-line bursts shall be nominally 5% of picture height.

The ratio of the width of the black half-cycle to the width of the white half-cycle shall be 1.00 ± 0.05.

The lines of resolution shall be printed below the bursts as shown in figure 2. The height of the numbers shall be at least 4% of picture height.

NOTE – The burst resolution is accurate only if the chart is sized correctly. Zooming in or out or changing the aspect ratio of the chart will change the spatial relationships and, thus, the specific resolution of the wedge.

4.5 Frequency wedges

4.5.1 Description

Horizontal and vertical frequency wedges are located at the top, center, and bottom left and right edges of the chart. Physical dimensions and location of the wedges shall be as specified in figure 3.

4.5.2 Format

The wedges are calibrated in lines per picture height. The lines of resolution shall be printed on the wedge as shown in figure 3. The height of the numbers shall be at least 1% of picture height.

NOTE – The wedge resolution is accurate only if the chart is sized correctly. Zooming in or out or changing the aspect ratio of the chart will change the spatial relationships and thus the specific resolution of the wedge.

4.6 Density gradient

4.6.1 Description

Five density patches are located in the upper center of the chart as specified in figure 2.

4.6.2 Format

The density of each patch shall be as indicated in table 1. The densities shown in table 1 are nominal and are not intended for quantitative analysis.

Table 1 – Patch density

Patch	1	2	3	4	5
Density	1.9	1.5	0.9	0.3	Clear

4.7 Boundary arrows and borders

4.7.1 Description

Boundary arrows and borders are shown for both 16:9 and 4:3 aspect ratios. The 16:9 borderline is solid and the 4:3 border is broken. The 4:3 boundary arrows are annotated with text as shown in figure 3.

4.7.2 Format

The thickness of both sets of lines is equal to 0.167% $\pm$ 0.011% of picture height.

The boundary borders shall be marked with text as shown in figure 3. The text height shall be at least 2% of picture height.

The boundary arrow dimensions are given in figure 4.

4.8 Center circle

4.8.1 Description

A scribed circle in the center of the frame facilitates verification of optical geometry. The circle does not intersect any other pattern on the chart.

4.8.2 Format

The diameter of the center circle shall be the full image height. The width of the line shall be 0.167% ± 0.011% of picture height.

4.9 Electrical alignment

An alignment pattern is located at the center of the test pattern to facilitate optical centering and possibly beam or scanner alignment. (see figure 5).

4.10 Mid-term response

4.10.1 Description

A black-and-white patch is located in the upper center of the frame. These patches are used to verify various scanning characteristics such as afterglow and mid- or long-term smear.

4.10.2 Format

The patch shall have dimensions as shown in figure 3. A detail of the patch is given in figure 6.

4.11 Center box

4.11.1 Description

A square box is located in the geometric center of the test image.

4.11.2 Format

The center box shall have the dimensions shown in figure 5. The center of the box shall be identified with a dot.

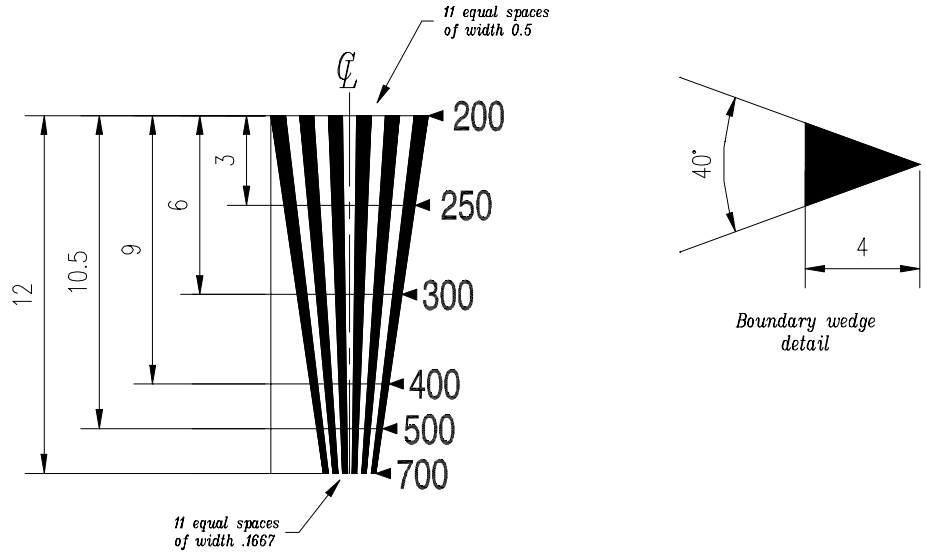
4.12 Label

The name of the practice shall be placed in the upper center of the frame, as shown in figure 3. The letters shall be in bold and shall be nominally 4% of picture height.

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 may be available from the Society of Motion Picture and Television Engineers.



NOTE – All dimensions are as a percentage of picture height.

Figure 4 – Wedge and boundary arrow detail

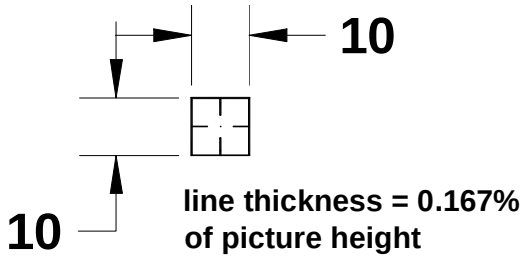


Figure 5 – Center box detail

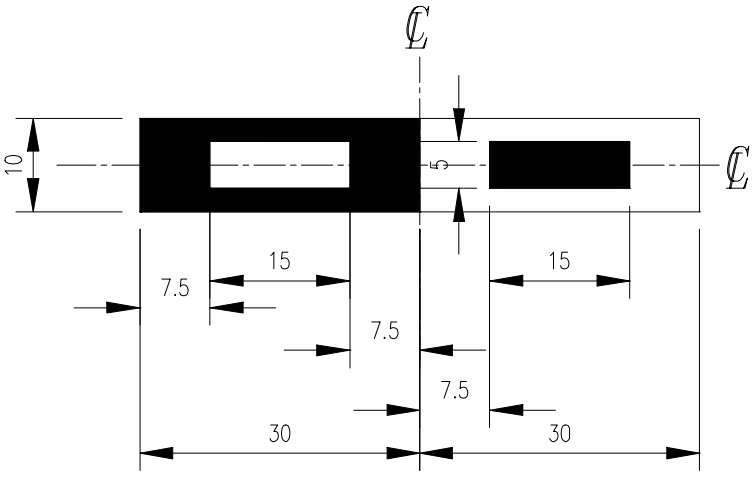


Figure 6 – Mid-term response detail