Thomas. This is the parent committee for all standardization matters dealing with videotape recording, and the timely importance of this meeting was attested to by the nearly 30 members and interested parties who attended. Representatives present included the major VTR manufacturers, the television networks, broadcast and industrial users as well as SMPTE staff. The agenda covered standardization items relating to quadruplex, new 1-in helical-scan, 3/4-in and 1/2-in helical-scan, editing matters, etc.

In addition, reports were presented regarding the status of SMPTE videotape test materials and on liaison with other international standards bodies such as the IEC and the EBU.

The first report by D. Fibush reiterated that the Type B and Type C formats had been approved by SMPTE engineering committees and were continuing through customary procedures for official standardization. Even better news from an industry standpoint was that Type C test tapes are about to be interchanged among the major manufacturers and a major user.

The next subject dealt with tape leaders, and K. B. Benson suggested reactivating the working group with new members who are closely associated with this problem. On the matter of reel standards, N. Ritter reported that the one-inch reel standard is basically complete; however, more work is to be done by the working group on tape dimensions and a document relating to tape width and thickness is planned. Mr. Ritter also reviewed the progress toward a publication that would inform users on how videotape should be handled and cared for. L. Hedlund covered the situation on quad transport geometry and the current efforts to obtain sample guides from various manufacturers of quad heads, so as to measure the uniformity of guide curvature. Interchange on quad cassettes and cartridges was reported on by R. Monroe and the consensus was that most users were satisfied with current interchangeability. The problems relating to spooling and inserting tape into the cassette or cartridge seem to be more economic than technical. Mr. Thomas suggested a document instructing users how to do spool-to-cassette loading. Mr. Sprague pointed out that spools for carts and cassettes should all have double mechanical cue markers (foil and holes) for uniformity. Mr. Monroe will initiate a document covering this subject.

Time and control code waveforms were covered by E. Dahlin and only a final draft of an existing standards document (C98.12) is needed to complete this important standard.

With regard to time-code problems, W. Nicholls pointed out that broadcasters are beginning to worry about the proliferation of different digital codes and interfaces for time-code editing.

To attempt some unification, a committee is being formed of representatives from manufacturers who have an interest in standardization. Currently Ampex, CDL, CMX, Datatron and EECO have agreed to assign specialists to the group. Other members are being sought. This committee is charged with standardizing the edit decision list and the data transmission format. C. Kennedy gave the summary on objectives for a one-inch helical-scan test tape, to be distributed under SMPTE auspices. He emphasized that the Society should take an active role in assuring adherence to interchange standards in this new field.

A proposed document, defining the content of a subjective reference video test tape for the U-Matic system, was also circulated and received approval to produce such a tape. Intended mainly as a quick check for U-Matic users (rather than an engineering test), this tape will have such useful signals as basic RGB bars, five-step gray scale, crosshatch, safe title area, flat field and pictorial material. Mr. Remley defined the SMPTE role in the IEC and indicated that there was a dearth of delegates from the U.S. for the upcoming meeting of SC 60B in Budapest in April of this year. He suggested that means should be found to increase American participation in this important international standards committee. Mr. Nicholls reviewed his liaison work with the EBU G2 group and reported on their work toward a Type C format using a combined time-code and control-track signal. This proposal has come about because the European broadcasters consider the third audio track very important for dub-down use and do not want it dedicated to time-code use.

Under "New Business," Mr. Thomas asked for a volunteer to act as liaison between the SMPTE and the AES Digital Audio Committee. In this regard, Mr. Kennedy gave a report on the AES meeting where digital audio was discussed. Users are objecting to various digital audio coding techniques and are looking for some standards in this new field.

The next meeting of the committee was set for 24 May in New York City.

10 March 1978

L. M. THOMAS
Chairman

Standards & Recommended Practices

Approved SMPTE Recommended Practices

The Executive Committee for Standards Approval, acting on behalf of the Board of Governors, approved on 12 April 1977 two SMPTE Recommended Practices: RP 27.1-1977, Specifications for Operational Alignment Test Pattern for Television, and RP 27.5-1977, Specifications for Mid-Frequency Response Test Pattern for Television. Revision of RP 27.1 was undertaken to loosen the density requirements specified in Section 5. RP 27.5 reflects the same modifications and deletion of the alternating Type A and Type B sections.

Proposed SMPTE Recommended Practice

Proposed SMPTE Recommended Practice RP 82, Specifications for 16-mm Projector Alignment and Screen Image Quality Test Film, is published for public review and comment. Developed by a working group chaired by Paul H. Preo, the test film provides the same degree of performance evaluation for 16-mm projection systems that is presently available for 35-mm systems utilizing SMPTE Recommended Practice RP 40-1971. The film is also an engineering tool permitting quantitative measurements of projector adjustments that affect the visual image.

Comments on the practice should be addressed to Alex E. Alden at Society Headquarters prior to 1 July 1978. If no adverse criticism is received, the proposal will be submitted to the Society's Board of Governors for approval.

Reaffirmed SMPTE Recommended Practices

On 28 November 1977, the Executive Committee for Standards Approval, acting on behalf of the Board of Governors, approved the reaffirmation of two SMPTE Recommended Pratices: RP 35-1969, Specifications for Theater Test Film for Motion-Picture Projection Sound Reproducing Systems, and RP 45-1972, Use and Care of Sound Test Films.

Copies of SMPTE Recommended Practices are available from Society Headquarters for $1.50 each. — Alex E. Alden, *Manager of Engineering Services.*

SMPTE RECOMMENDED PRACTICE

RP 27.1–1977

Revision of RP 27.1-1968

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.

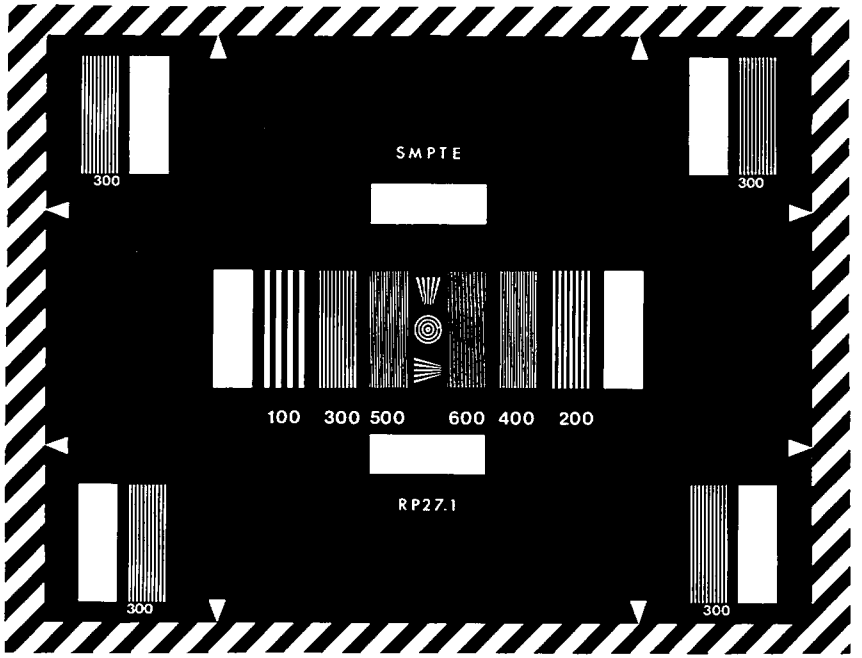


Fig. 1
Reproduction of Test Pattern

Approved 12 April 1977

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 are dark gray 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 Section 3.3 of American National Standard Dimensions for Television Image Area on 35-mm Motion-Picture Film, PH22.95-1963 (R1975). 16-mm test films shall have dimensions in accordance with Section 3.3 of American National Standard Dimensions for Television Image Area on 16-mm Motion-Picture Film, PH22.96-1963 (R1975).

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, PH22.59-1974, and American National Standard Dimensions of 16-mm Motion-Picture Camera Aperture Image, PH22.7-1976.

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

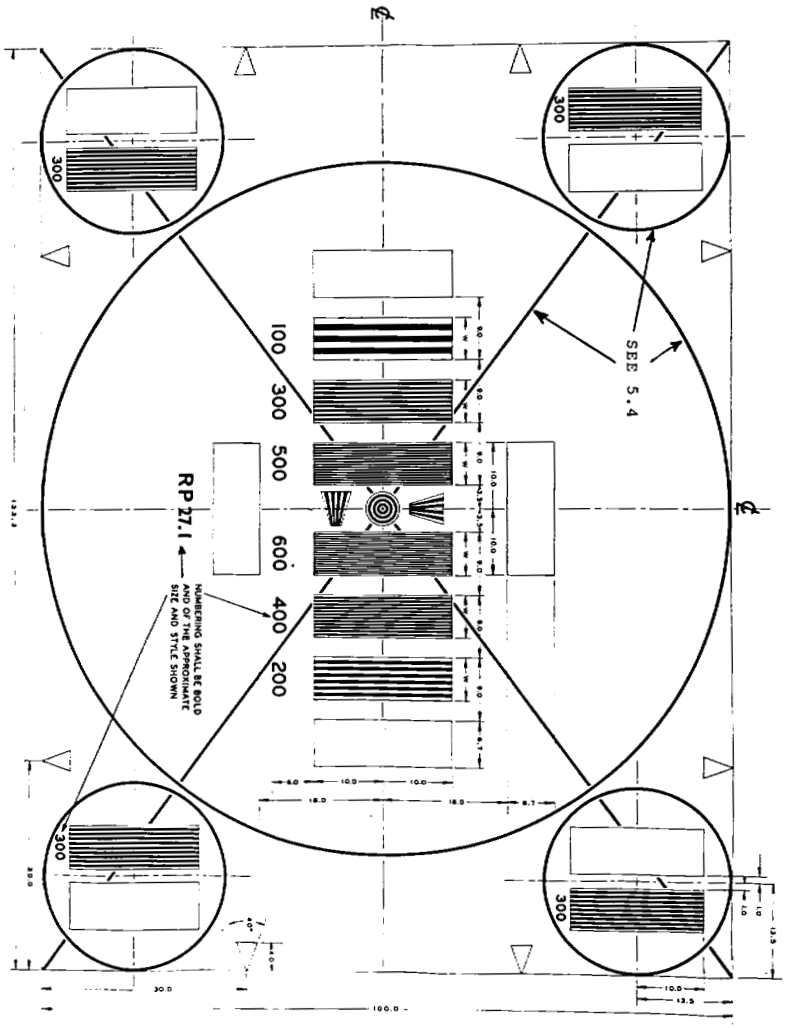


Fig. 2
Dimensional Drawing of Test Pattern

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), PH2.19-1976.

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 density between 0.95 and 1.35.

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 white 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.

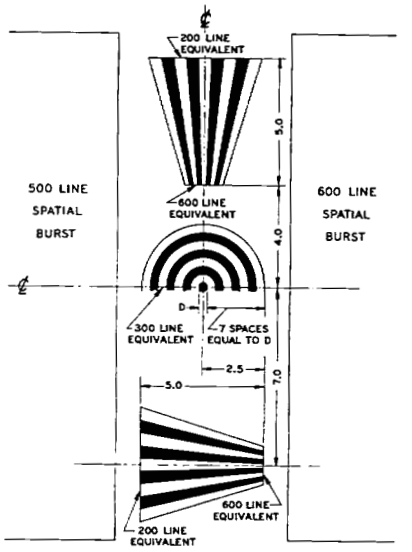


Fig. 3
Enlargement of Central Portion of Fig. 2

SMPTE RECOMMENDED PRACTICE

RP 27.5–1977

Revision of RP 27.5-1972

Specifications for Mid-Frequency Response Test Pattern for Television

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 half-wave 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 Section 3.3 of American National Standard Dimensions for Television Image Area on 35-mm Motion-Picture Film, PH22.95-1963 (R1975).

4.2.2 16-mm test films shall have image dimensions in accordance with Section 3.3 of American National Standard Dimensions for Television Image Area on 16-mm Motion-Picture Film, PH22.96-1963 (R1975).

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, PH22.59-1974.

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, PH22.7-1976.

Approved 12 April 1977

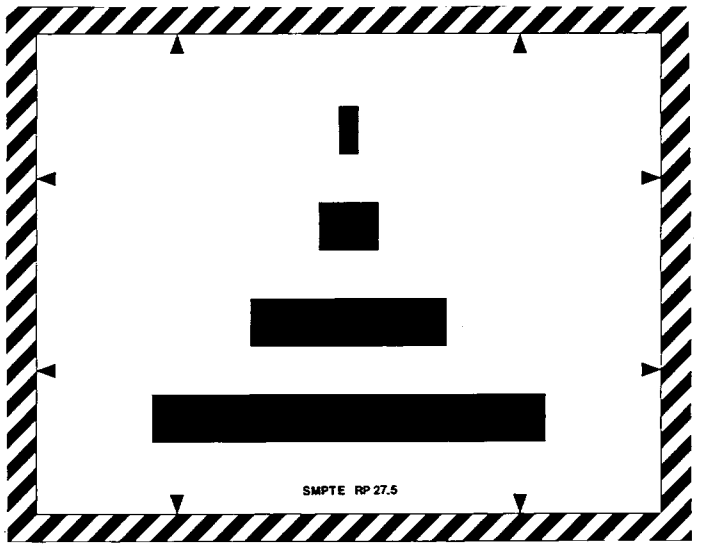


Fig. 1
Reproduction of Test Pattern Type A

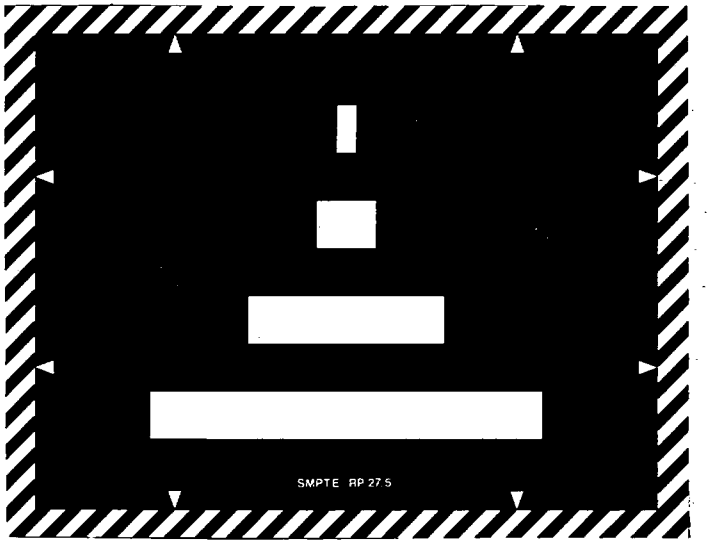


Fig. 2
Reproduction of Test Pattern Type B

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), 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 1.9.

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 0.3 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.

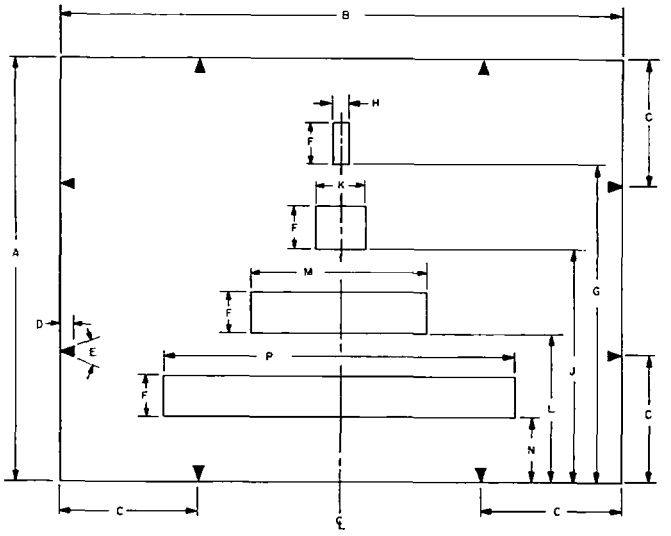


Fig. 3
Dimensional Drawing of Test Pattern

	Dimensions	Percent	Inches 2x2	8x10	35-mm	16-mm
A	Scanned image height	100.0	0.843	6.30	0.594	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	0.034	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
J	Position of 100-kHz bar	55.0	0.464	3.465	0.327	0.152
K	Width of 100-kHz bar	12.7	0.107	0.800	0.075	0.035
L	Position of 30-kHz bar	35.0	0.295	2.205	0.208	0.097
M	Width of 30-kHz bar	42.0	0.354	2.646	0.249	0.116
N	Position of 15-kHz bar	15.0	0.126	0.945	0.089	0.041
P	Width of 15-kHz bar	84.0	0.708	5.292	0.499	0.232

PROPOSED

SMPTE RECOMMENDED PRACTICE — RP 82

Specifications for 16-mm Projector Alignment and Screen Image Quality Test Film

Introduction

This test film is designed to provide the same degree of performance evaluation for 16-mm projection systems that is presently available for 35-mm projection systems utilizing SMPTE Recommended Practice on Specifications for 35-mm Projector Alignment and Screen Image Quality Test Film, RP 40-1971. It is also intended as an engineering tool to permit quantitative measurements of projector adjustments that affect the visual image.

1. *Scope*

1.1 This practice describes the artwork and dimensions for constructing a test chart to be used as the original subject for the manufacture of the test film.

1.2 The practice also describes the types of photographic materials and densitometry necessary to manufacture the film.

2. *Description*

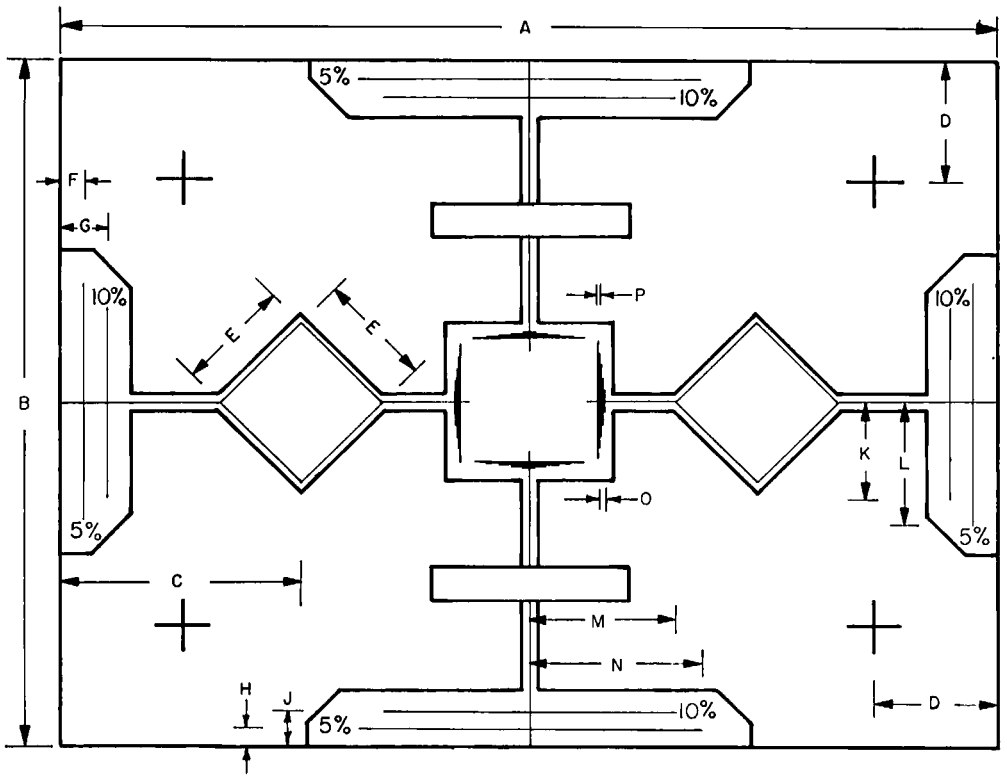
2.1 The test pattern on the film shall be as shown in Figs 1 and 2.

2.2 The background checkerboard pattern provides a 50-percent transmission of the incident radiant energy which is more nearly consistent with the projection performance of an average release print. The pattern also provides a quick reference for overall image focus and quality.

2.3 The resolution charts are modified high-contrast NBS Resolution Charts with a luminance ratio of 100:1 which have been trimmed to exclude low-order resolution below 34 lines per millimeter (see Fig. 3).

2.4 The wedge steps placed on each side and above and below the center resolution chart are designed to measure quantitatively vertical image unsteadiness and horizontal weave. The actual length of the wedges and their placement around the center resolution chart are not critical, but the total width of the wedge shall equal the size of one background square, and each step shall be 0.2 percent of the total width of the wedge. (One square equals 1 percent of the image height.)

2.5 The diamond patches are to be inserted as a densitometric control in the exposure and processing of the original test film.


A
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C
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D

Fig. 2

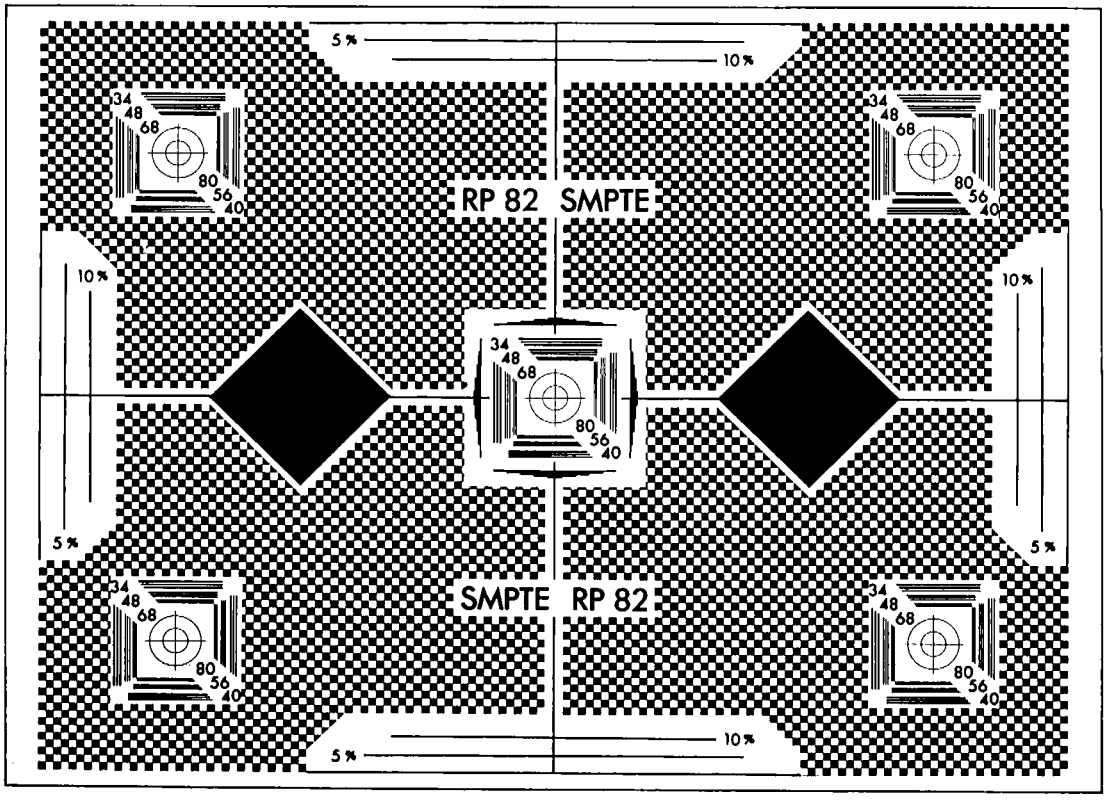
RP 82 SMPTE
SMPTE RP 82
5%
10%
34
48
68
80
56
40

Fig. 1

Dimensions	Inches		Millimeters	
A	0.380	± 0.002	9.65	± 0.05
B	0.284	± 0.002	7.21	± 0.05
C	0.10	nom	2.5	nom
D	0.05	nom	1.3	nom
E	0.0475	nom	1.206	nom
F	0.0095	± 0.0005	0.241	± 0.013
G	0.0190	± 0.0005	0.483	± 0.013
H	0.0071	± 0.0005	0.180	± 0.013
J	0.0142	± 0.0005	0.361	± 0.013
K	0.04	nom	1.0	nom
L	0.05	nom	1.3	nom
M	0.06	nom	1.5	nom
N	0.07	nom	1.8	nom
O*	0.00284		0.0721	
P*	0.00057		0.0145	

*Derived from Sec. 2.4.

2.6 The test chart shall be photographed as a 16-mm camera original on a film manufactured in accordance with American National Standard Dimensions for 16-mm Motion-Picture Film Perforated 1R, PH22.109-1974. The film shall be capable of a modulation transfer of at least 80 percent at 80 lines per millimeter when exposed to a high-contrast resolution chart at a reduction ratio of 25:1 and then properly processed. In preparation, the film shall be used in such equipment and with such procedures as will maintain optimum resolution and steadiness.

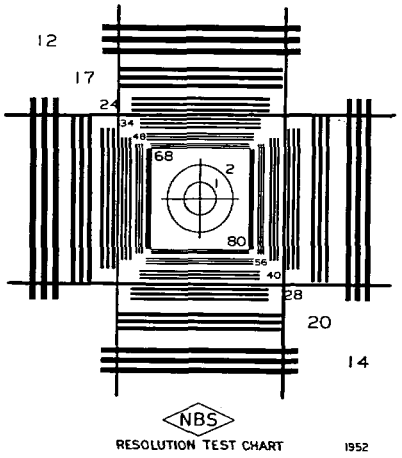

Fig. 3

2.7 The chart shall be photographed with a camera aperture as specified in American National Standard Dimensions of 16-mm Motion-Picture Camera Aperture Image, PH22.7-1976.

2.8 The test film shall be produced as a 16-mm camera original.

3. *Dimensions*

3.1 The dimensions of the original test chart shall be 25X the dimensions listed in Fig. 2. (This requirement is necessary because the NBS Resolution Test Charts are designed for a 25X reduction.)

3.2 The original or 1:1 copy of the NBS Resolution Test Charts shall be cropped as specified in Fig. 3. The modification shall be similar to that illustrated in Fig. 4.

3.3 The modified NBS Resolution Test Charts shall be placed on the original test chart as specified by the dimensions in Fig. 2.

3.4 The gray patches shall be at least the dimensions specified in Fig. 2 in order to be readable in current 1-mm aperture densitometers after a 25X reduction.

3.5 The checkerboard background on the test chart shall contain 100 squares vertically and 134 horizontally.

3.6 The horizontal and vertical lines indicating 5- and 10-percent reductions in image length or height shall be placed on the test target in accordance with the dimensions specified in Fig. 2.

NOTE: A test film conforming to this practice is available from the Society of Motion Picture and Television Engineers.

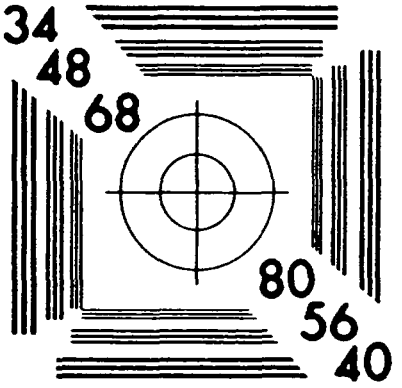

Fig. 4

Appendix

(The Appendix is not a part of this SMPTE Recommended Practice, but is included for information purposes only.)

A1. It has been found that producing test films with resolution at 80 lines per millimeter requires careful selection of the materials and equipment used, and careful control of the operations. Inasmuch as a measuring tool should be better than the system it is designed to measure, it is desirable that the test film meet the specifications detailed herein, although normal theatrical program release prints will not usually meet these specifications.

A2. The camera used to photograph the high-contrast test target must have a lens of suitable design and correction to provide an image of sufficient resolution to allow a modulation transfer of at least 80 percent at 80 lines per millimeter on the processed film image over the entire field. The camera mechanism must provide steady images, preferably ensured by pin registration.

A3. Image densities referred to in this Appendix are intended for a more precise definition of one system shown to be applicable, and are measured in accordance with American National Standard Conditions for Diffuse and Doubly Diffuse Transmission Measurements (Transmission Density), PH2.19-1976. Selection of a film for producing the test film must take into consideration the requirements of Sec. 2.6.

A study of many film products indicates that a high-contrast panchromatic film is applicable but, for adequate control of line widths, resolution, etc., there must be careful control of both exposure and processing. Quality control may be achieved conveniently by inserting a gray patch having a density of about 0.94 on the film when all the conditions have been met. For a reflective target and for film processed as recommended to a Ib control gamma of 3.3, this has been achieved with a gray patch having a reflectance of 32 percent. For a transmission target, a gray area of a different density may be needed to provide the identical test films.

A4. If constructing an original reflecting test chart with a negative image is desirable, it should be pointed out that negative NBS Resolution Test Charts are unavailable. However, they can be manufactured from an original positive by a competent graphic arts studio familiar with the requirements of size and resolution.