RP 91-2002
Revision of RP 91-1997

SMPTE RECOMMENDED PRACTICE

Specifications for 70-mm Projector Alignment and Screen Image Quality Test Film

1 Scope

1.1 This practice specifies a test film for quantitative measurements of 70-mm projector alignment and screen image quality.

1.2 This practice also describes the artwork and dimensions for a test chart to be used as the original subject for the manufacture of a master negative.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions in 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 standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

ANSI/SMPTE 185-1993, Motion-Picture Film (70-mm) — Six Magnetic Records on Release Prints — Position, Dimensions, Reproducing Speed and Identity

SMPTE 119-1999, Motion-Picture Film (70-mm) — Perforated 65-mm, KS-1870

3 Test film prints

3.1 A reproduction of the test chart is shown in figure 1.

3.2 The positive resolution charts are modified NBS resolution test charts with a luminance ratio of 100:1 (see figure 2).

3.3 The area between the logos (SMPTE and 70-PA) is to be used to insert a gray patch, if necessary, as a densitometric control in the exposure and processing of the original negative and subsequent prints.

3.4 The test film shall be produced as a 70-mm print with a neutral image on color positive film manufactured in accordance with SMPTE 119.

3.4.1 The printing shall be chosen so that, after processing, there is cancellation of the image spread in the resolution targets specified in 3.2 at 80 lines per millimeter. If used, the gray patch density will provide a convenient densitometric control in the exposure and processing after the characteristics of the system have been established.

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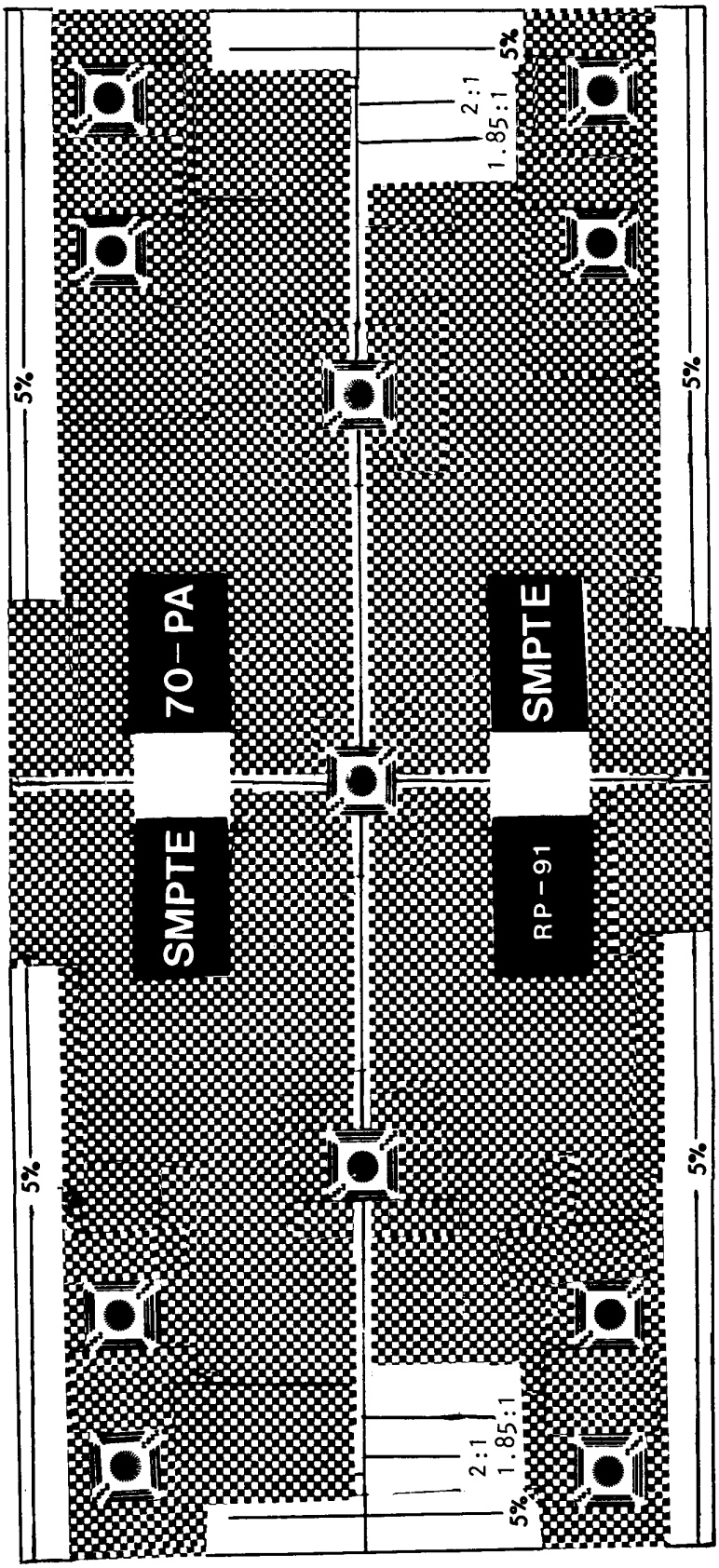

Figure 1 – Reproduction of test chart

3.4.2 The method of printing shall produce less than 0.20% (arbitrary) vertical image unsteadiness on the test print.

3.4.3 The print shall contain magnetic stripes in accordance with ANSI/SMPTE 185.

4 Dimensions

4.1 The dimensions of the original test chart shall be 25X the dimensions given in table 1. This precise requirement is necessary because the NBS resolution test charts are designed for a 25X reduction. For practical purposes, a smaller original chart can be prepared provided that the NBS resolution charts can be accurately reduced in size by a known ratio which shall then apply to all the other dimensions on the test chart.

4.2 The modified NBS resolution test chart shall be placed on the original test chart as specified by the dimensions in figure 3.

4.3 The densitometric control area specified in 3.3 shall be not less than 5.0 mm × 5.0 mm on the 70-mm film.

4.4 The gray patches, along with the SMPTE logo, should be placed midway between the horizontal centerline and the top and bottom of the test chart.

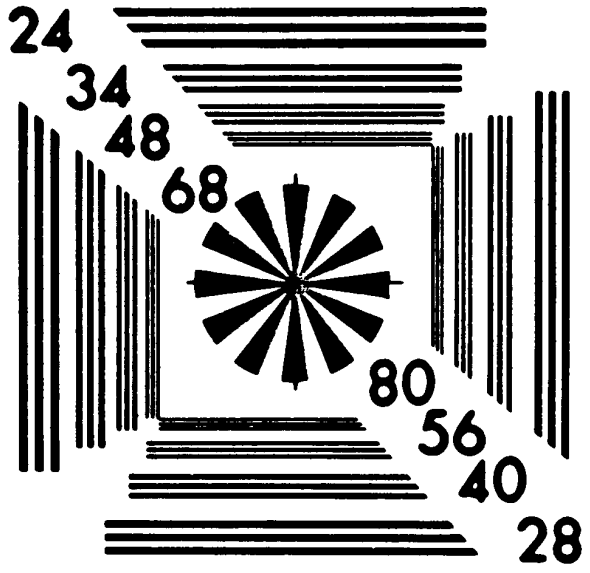

Figure 2 – Resolution chart

Table 1 – Dimensions

Dimensions	Inches	Millimeters
A*	1.912	48.56
B*	0.870	22.10
C*	0.956	24.28
D	0.946	24.03
E	0.600	15.24
F	0.478	12.14
G	0.300	7.62
H	0.125	3.18
J*	0.435	11.05
K	0.425	10.80
L	0.275	6.98
M	0.130	3.30
N	0.045	1.14
O*	0.022	0.56
P	0.096	2.44
Q*	0.048	1.22
R*	0.086	2.18
S*	0.151	3.84
T	0.215	5.46
U	0.125	3.18
V	0.560	14.22
W	0.155	3.94

*See 4.6 for tolerances.

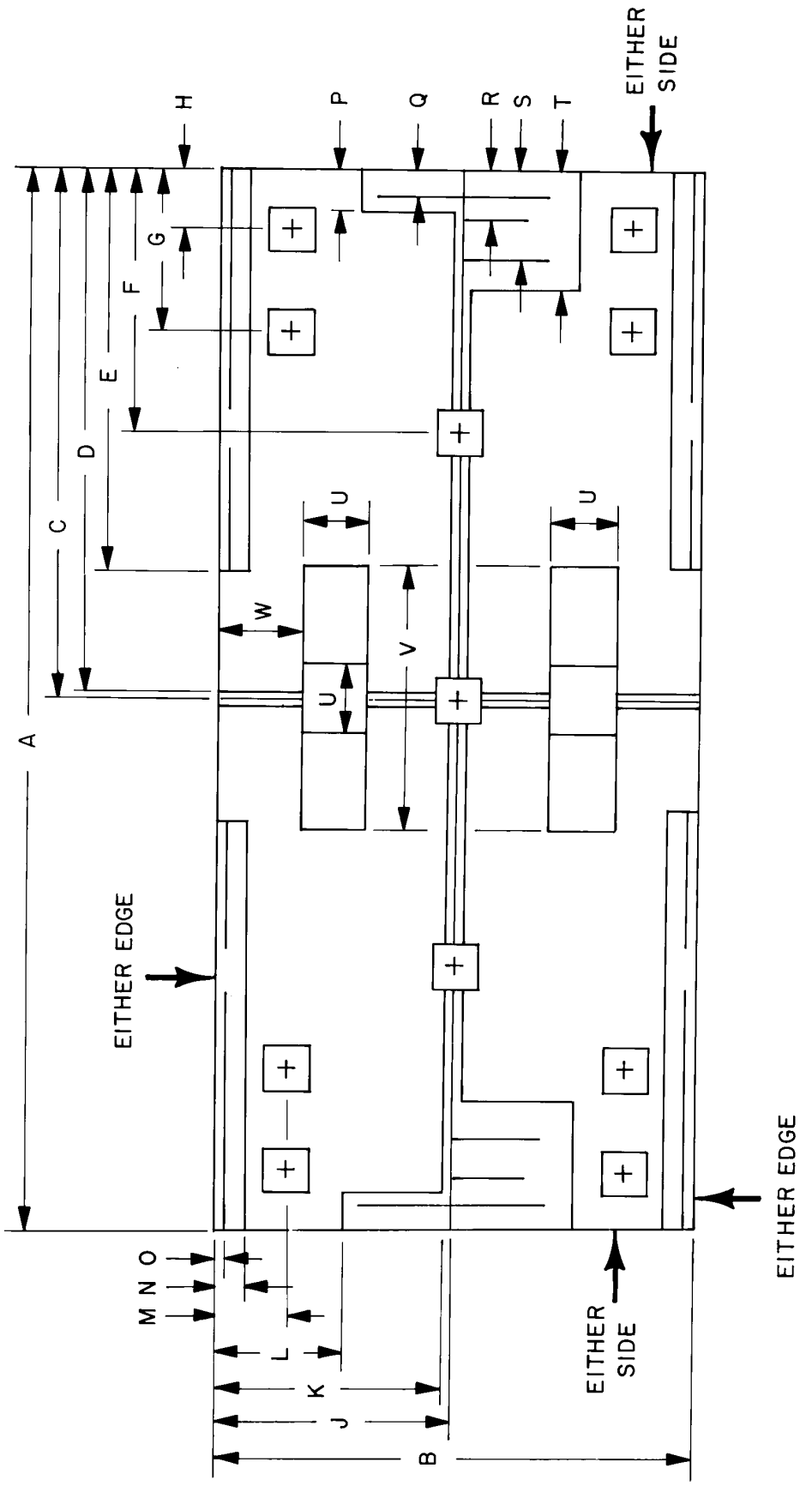

Figure 3 – Test chart dimensions

4.5 The checkerboard background shall contain 100 squares vertically and 220 squares horizontally.

4.6 The dimensions marked with an asterisk in the table shall be within tolerances of 0.002 in (0.05 mm) on the print. All other dimensions are nominal.

Annex A (informative)
Control of resolution and definition in the preparation of test prints

A.1 It has been found that producing test prints 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.

A.2 The background checkerboard pattern provides for a 50% transmission of the incident radiant energy so as to be more nearly consistent with the projection performance of an average release print.

A.3 Image densities referred to in this annex are intended for a more precise definition of one system shown to be applicable, and are measured in accordance with ANSI/NAPM IT2.19. Selection of a film for producing the negative must take into consideration image spread characteristics such that, in conjunction with the print films at image densities that are useful, there is substantial image spread cancellation in the resolution range of interest. Accordingly, the final print will resolve 80 lines per millimeter with the lines and spaces equal in width.

A.4 Selection of a film for producing the dye-image print must take into consideration not only the requirements of 3.4.1, but also image spread characteristics compatible with the negative and projection characteristics suitable for theatrical projection.

A.5 Preparation of the test prints with a resolution and steadiness adequate for the film's purpose requires great care in the selection and operation of the printer. Satisfactory results can be obtained only with a step-contact printer employing registration pins.

Annex B (informative)
Bibliography

ANSI/NAPM IT2.19-1994, Photography — Density Measurements — Part 2: Geometric Conditions for Transmission Density