SMPTE STABLE DOCUMENT

The attached SMPTE Engineering Document has been declared "Stable" by the controlling Technology Committee.

The SMPTE Operations Manual for Standards states:

> *A document should be stabilized if it is believed to be substantially correct, does not contain harmful or misleading recommendations, may still be relevant to equipment or practices in use, is stable, but does not represent current technology, and need not be subject to future reviews.*
>
> *A Stable document shall still be made available and offered for sale by the Society, but it shall be prefaced by a cover page explaining its current status.*
>
> *At any time, a Technology Committee may revise, amend, or otherwise initiate a new Project on a Stable document.*

A Stable document is "In Force", and not deprecated or withdrawn.

* * * * * * * * * * *

Note:

SMPTE "Stable" documents were previously described as "Archived" and the attached document may be marked as "Archived". The status of a SMPTE document described as "Archived" is exactly as described above for a "Stable" document.

Stable documents may not adhere to the latest style and format of SMPTE documents, or to current usage of normative language. Suitable care should be taken in interpretation.

RP 185-2004
Revision of RP 185-1995

SMPTE RECOMMENDED PRACTICE

Classification of Projection Depth of Focus

1 Scope

This practice specifies a test procedure for classification of the depth of focus of a projection system.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this practice. At the time of publication, the edition indicated was 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 standard indicated below.

SMPTE 196M-2003, Motion-Picture Film — Indoor Theater and Review Room Projection — Screen Luminance and Viewing Conditions

3 Test materials

The test films used in this procedure shall contain resolution targets of at least 80, 68, 56, 48, 40, and 34 line pairs per millimeter. One test film shall contain these targets on black-and-white silver image film and the other shall contain these targets exposed in the magenta layer only of color positive release print film.

NOTE – The test film described in SMPTE RP 40 and available from the SMPTE as 35-IQ test film consists of 100 ft of black-and-white image and 100 ft of magenta image and is suitable for this test.

4 Test procedure

4.1 Test film

Assemble a test film of a minimum of 60 s (90 ft) or more, made from the test films described in clause 3. Half of the test film shall consist of the black-and-white film and half of the magenta image film. The test film shall be assembled from new or nearly new test materials. Any residual deformation or other heat damage to the test films will render the test results invalid. (For a quick recheck, a 10-ft to 12-ft dual loop may be used.)

4.2 Screen luminance

Before installing the test film, set the projector for use with 1.85:1 aspect ratio and adjust the screen luminance as used for normal customer operation. The standard value for screen luminance is 16 fL with the testing details and tolerances described in SMPTE 196M.

Approved
November 8, 2004

4.3 Resolution readings

Install the test film and run the projector. Adjust focus critically on the black-and-white section of the film. Note the maximum resolution obtained in the center resolution targets of the black-and-white section of the film, and then, without readjusting focus, the maximum resolution obtained in the same targets on the magenta layer section of the film.

5 Evaluation of results

Results shall be evaluated against the following classifications:

Black-and-white section line pairs/millimeter	Magenta layer section line pairs/millimeters	Classification
80	68 or 80	Excellent
80	56	Very good
80	48	Good
80	40	Poor
80	34	Unacceptable

Annex A (informative)
Additional information

A.1 Significance of test

The silver particles forming the image on the black-and-white film will absorb significantly more of the infrared heat from the light beam than does the dye image forming the magenta layer image, causing greater heating of the black-and-white film and therefore greater curvature in the projection gate and consequent shift in focus. Similarly, an image of greater density will absorb more heat than an image of lesser density. The two test images specified represent a wide difference in densities and, thus, relative heat absorption affecting focus. Thus, the difference in resolution between the two films is an indication of the amount of heat in the light beam passing through the image and the densities of the two images, and the objective of this test is to determine whether the projection system has sufficient depth-of-field to retain adequate focus in both conditions.

A.2 Changes to control focus shift

The addition of infrared filtration between the light source and the film will reduce heat effects. A reduction in f/number of the projection lenses (e.g., *f* /2.0 to *f* /2.4) will increase the projection depth of focus.

A.3 Other dual film testing

Similar tests may be run using other film combinations such as triacetate- and polyester-based films of similar densities or of very high density compared to very low-density images. It should be ensured, however, that each test film in such a combination is capable of being individually focused to the same maximum resolution.

Annex B (informative)
Bibliography

SMPTE RP 40-2003, Specifications for 35-mm Projector Alignment and Screen Image Quality Test Film