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RP 153-1999
Revision of RP 153-1994

SMPTE RECOMMENDED PRACTICE

Method for Measuring 35- and 70-mm Shutter Efficiency

1 Scope and purpose

1.1 This practice specifies the method and factors to be considered when measuring and reporting the comparative shutter efficiency (remaining useful light) of 35- and 70-mm projectors.

1.2 The purpose of this practice is to provide guidelines for the evaluation of projector shutter performance, either in an operating movie theater or in a test laboratory.

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.

ANSI/PIMA IT7.231-1998, Projection in Indoor Rooms — Part 1: Screen Illumination Test for Still Projectors

3 General method

The general test method is to arrange test equipment for light measurements and take two readings in each point of the pattern described in 5.2, the first with the shutter in normal operation and the second with the shutter stationary in the full open position.

4 Test instruments

4.1 The meters employed must be linear over the range of the readings to be taken, and not sensitive to shutter frequency.

4.2 In a theater, the usual test equipment is a precision foot-lambert meter which is calibrated.

4.3 In a test laboratory, the usual test equipment is a precision foot-candle meter which is calibrated.

5 Test set-up and pattern

5.1 The test instrument described above is to be mounted in a fixed manner; i.e., the foot-lambert meter should be on a sturdy tripod, or the foot-candle meter mounted in a fixed mount or pole so that the test location of the reading is identical in the two cases specified in clause 3.

5.2 The test pattern should be the nine-point group as specified in ANSI/PIMA IT7.231. This is recommended so that efficiency in different, but important, regions of the screen can be determined.

6 Calculations

6.1 Test readings are to be taken at each of the nine points, first with the shutter fixed open (see annex A.2), and then immediately with the shutter in normal running condition.

6.2 Divide the second reading for each point (shutter running) by the first reading for the same point (shutter fixed open). The result is a percentage of shutter efficiency for that point. The nine points must be considered separately, so that variations can be found. For simplicity, the nine readings can be averaged completely, or into three groups—the left three, the center three, and the right three—and reported as an average percentage of shutter efficiency.

Approved November 5, 1999

Annex A (informative)
Additional data

A.1 With standard and generic projector shutters functioning in the 50% range (two-bladed shutters), it is expected that all results will fall in the range of 40% to 60%. Results over 55% and below 45% should be considered suspect and be double-checked.

A.2 Note that operation of a projector without film in the gate and with the shutter in a stationary open position may allow sufficient heat build-up in the lens system to endanger the lens. Therefore, it is recommended that this condition be allowed for only a few seconds at a time, and that measurements be made very quickly under such conditions.