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>
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>
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RP 106-1994
Revision of RP 106-1982

SMPTE RECOMMENDED PRACTICE

Film Tension in 35-mm Motion-Picture Systems Operating Under 0.9 m/s (180 ft/min)

Introduction

This practice was developed by the Committee on Theatrical Projection Technology to guide equipment manufacturers, projectionists, and service personnel in making designs for and adjustments to new or current equipment for 35-mm motion-picture projectors and film-handling devices. Current film and sprocket tooth combinations have a tension limit of 66.7 N (15 lbf) before rupture occurs. Therefore, all film handling equipment must maintain a film tension that is only a small fraction of this rupture limit. Film tension in excess of 4.4 N (16 ozf) is unnecessary and only increases film wear, while tension as low as 1.7 N (6 ozf) appears to be sufficient to provide a steady screen image.

1 Scope

1.1 This practice specifies the film tension needed to transport 35-mm motion-picture film through a film-handling system operating under 0.9 m/s (180 ft/min) while minimizing conditions that contribute to film damage.

1.2 This practice also recommends methods for testing film tension.

2 Film tension

Film tension under normal operating conditions shall be 1.7 N to 4.4 N (6 ozf to 16 ozf).

3 Measurement methods

3.1 A feed or take-up system shall be measured with the equipment in normal operating mode after placing 0.9 m to 1.8 m (3 ft to 6 ft) of film around the hub of the reel and attaching the other end to a dynamometer. Tension shall be plotted against winding diameter and shall be as specified in clause 2.

3.2 To measure the film tension necessary to move the film through the projector gate, a short length of normal print material shall be placed in the projector gate and the gate closed. The film shall be attached to a dynamometer that pulls it through the gate.

NOTE – Gate tension should be adjusted to avoid picture image jump of more than 0.15% of the image height.

Approved February 8, 1994