

motion-picture standards

Revision of American Standard—PH-22.35, 16-Tooth 35mm Motion-Picture Projector Sprockets

A proposed revision of American Standard Z22.35-1947 is published on this page for a three-month period of trial and criticism. All comments should be sent to Henry Kogel, SMPTE Staff Engineer, prior to December 15, 1955. If no adverse comments are received, this proposal will then be submitted to ASA Sectional Committee PH22 for further processing as an American Standard.

The 1947 standard was first reviewed by the Film Projection Practice Committee in 1952 in accord with ASA rules requiring review of all American Standards every five years. This review indicated the existence of a wide divergence in commercial practice in regard to dimension B, the base diameter of the sprocket. Surveys were conducted as to the magnitude of this divergence and several efforts were made to reach agreement on one or another specific value for this dimension. When it became apparent that agreement could not be reached, it was decided to process this standard without specifying this value. Instead, it was agreed to indicate the range of this dimension in commercial practice as well as the factors affecting the choice of an optimum value.

While this is the basic change, two additional modifications have been made to further improve the standard: 1) A paragraph has been added which limits the scope of the standard to sprockets employed in the picture projection mechanism prior to the advent of CinemaScope; 2) The various types of sprockets are defined with respect to their function.

This draft has been approved by the Film Projection Practice and Standards Committees.—H.K.

Two American Standards—PH22.15, .16—1955

Published on the following page are two American Standards approved by the American Standards Association on July 8, 1955: PH22.15-1955, 16mm Film Perforated One Edge, Usage in Camera (Revision of Z22.15-1946); PH22.16-1955, 16mm Film Perforated One Edge, Usage in Projector (Revision of Z22.16-1947).

These standards were published for trial and comment in the September 1954 Journal. The sole change since then has been an editorial modification in the diagrams to make them consistent with developing international standards.—H.K.

Proposed American Standard 16-Tooth 35mm Motion Picture Projector Sprockets (Second Draft)

PH22.35
Rev. Z22.35-1947

1. Scope

1.1 This standard is applicable to sprockets used in conjunction with 35mm motion picture film perforated in accordance with either American Standard PH22.1-1953, Dimensions for 35mm Motion Picture Film, Alternate Standards for Either Positive or Negative Raw Stock or PH22.36-1954, Dimensions for 35mm Motion-Picture Positive Raw Stock.

1.2 This standard is limited to sprockets employed in the picture projection mechanism.

2. Definitions

2.1 Feed Sprocket—A sprocket which pulls the film against tension. Originally applied to the upper sprocket in the projector.

2.2 Hold-Back Sprocket—A sprocket which

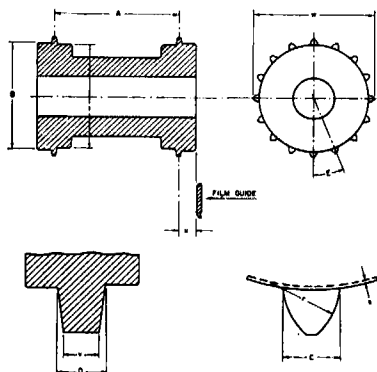
holds back the film against tension. Originally applied to the lower sprocket in the film take-up section of the projector. In many present day projectors the sprocket occupying this lower position no longer has the hold-back function and is, instead, an idler sprocket.

2.3 Idler Sprocket—A sprocket which neither pulls nor holds back film against tension. Normally used to maintain a film loop.

2.4 Intermittent Sprocket—A feed sprocket employed to advance the film one frame at a time before the picture aperture at the designated frame rate.

3. Dimensions

3.1 The sprocket dimensions shall be as given in the diagram and table provided:



	Feed Sprocket		Intermittent Sprocket		Hold-Back Sprocket	
	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
A	1.097 ± 0.001	27.86 ± 0.02	1.097 ± 0.001	27.86 ± 0.02	1.097 ± 0.001	27.86 ± 0.02
B	0.038 ± 0.002	1.40 ± 0.05	0.038 ± 0.002	1.40 ± 0.05	0.038 ± 0.002	1.40 ± 0.05
C	0.038 ± 0.002	1.40 ± 0.05	0.038 ± 0.002	1.40 ± 0.05	0.038 ± 0.002	1.40 ± 0.05
D	0.038 ± 0.002	1.40 ± 0.05	0.038 ± 0.002	1.40 ± 0.05	0.038 ± 0.002	1.40 ± 0.05
E	22 Degrees 30 Min ± 1.5 Min		22 Degrees 30 Min ± 0.75 Min†		22 Degrees 30 Min ± 1.5 Min	
Suggested Dimensions						
f	0.077	1.96	0.077	1.96	0.077	1.96
g	0.004	0.10	0.004	0.10	0.004	0.10
h	0.935	23.75	0.925	23.75	0.922	23.42
i	0.139	3.53	0.139	3.53	0.139	3.53
j	0.040	1.02	0.040	1.02	0.040	1.02
k	1.045	26.54	1.045	26.54	1.032	26.21

† The accumulated error between any 2 teeth not to exceed 4 minutes.

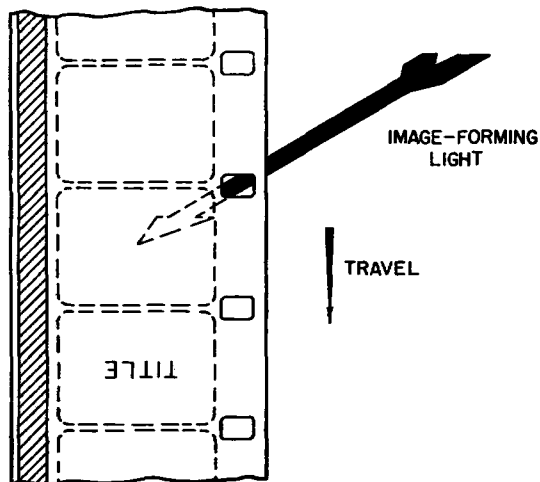
† This dimension varies in commercial practice from 0.935" to 0.950" for the feed and intermittent sprockets. Manufacturers have discovered that this dimension may appreciably affect the projector noise level. The choice of an optimum value is somewhat empirical in nature and appears to be influenced by tooth design, the degree of film wrap and the amount of film tension. When film life is of the greatest importance, dimension 0.950" should be chosen. For hold-back sprockets, this dimension varies in commercial practice from 0.932" to 0.940". Good practice requires that the pitch of a hold-back sprocket be less than the pitch of the film.

NOTE: When a sprocket is acting as an Idler the value of dimension B depends on the particular design of the projector. The range for this dimension in commercial practice is 0.937" to 0.950".

NOT APPROVED

American Standard
16mm Film Perforated One Edge,
Usage in Camera

ASA
Reg. U.S. Pat. Off.
PH22.15-1955
(Revision of Z22.15-1946)
*UDC 778.53



Drawing shows film as seen from inside the camera looking toward the camera lens.

1. Position of the Emulsion

Except for special processes, the emulsion shall be toward the camera lens.

2. Rate of Exposure

The rate of exposure shall be 24 frames/sec.

3. Relationship Between Sound and Picture

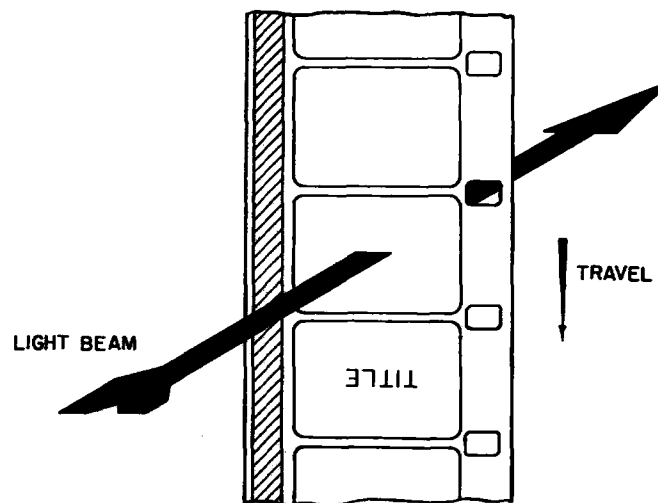
The apparatus and film shall be so arranged that the sound is placed on the film 26 frames, $\pm \frac{1}{2}$ frame, ahead of the horizontal centerline through the corresponding picture. Thus, a given point on the film shall pass the soundhead after it has passed the picture aperture.

Approved July 8, 1955, by the American Standards Association, Incorporated
Sponsor: Society of Motion Picture and Television Engineers

*Universal Decimal Classification

American Standard
16mm Film Perforated One Edge,
Usage in Projector

ASA
Reg. U.S. Pat. Off.
PH22.16-1955
(Revision of Z22.16-1947)
*UDC 778.55



Drawing shows film as seen from the light source in the projector.

1. Position of the Emulsion

Except for special processes, the emulsion shall be toward the projection lens.

2. Rate of Projection

The rate of projection shall be 24 frames/sec.

3. Relationship Between Sound and Picture

The apparatus and the film shall be so arranged that when the film is threaded normally, the soundtrack is scanned for reproduction at a point 26 frames, $\pm \frac{1}{2}$ frame, ahead of the centerline through the picture being projected. Thus a given point on the film shall pass the soundhead after it has passed the picture aperture.

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