

## Proposed Revisions, PH22.2 and PH22.3 35mm Film Usage in Camera and Projector

TWO REVISED American Standards are published on the following pages for 3-month trial and criticism. All comments should be sent to Henry Kogel, Staff Engineer, prior to August 15, 1953. If no adverse comments are received, the two proposals will then be submitted to ASA Sectional Committee PH22 for further processing as American Standards.

The Sound Committee's proposed revisions are primarily a simplification of the titles and an addition of a tolerance to the specification of distance between sound and picture.—*H.K.*

## Standards PH22.39, - .53, - .86 and - .87 35mm Screen Brightness; Resolving Power of 16mm Projector Lenses; Dimensions for Magnetic Sound Tracks

THE FOLLOWING proposed standards were approved as American Standards on April 16, 1953, and are published on the following pages as approved:

PH22.39-1953 (Revision of Z22.39-1944), Screen Brightness for 35mm Motion Pictures.

PH22.53-1953 (Revision of Z22.53-1946), Method of Determining Resolving Power of 16mm Motion-Picture Projector Lenses.

PH22.86-1953, Dimensions for 200-Mil Magnetic Sound Tracks on 35mm and 17½mm Motion-Picture Film.

PH22.87-1953, Dimensions for 100-Mil Magnetic Coating on Single-Perforated 16mm Motion-Picture Film.

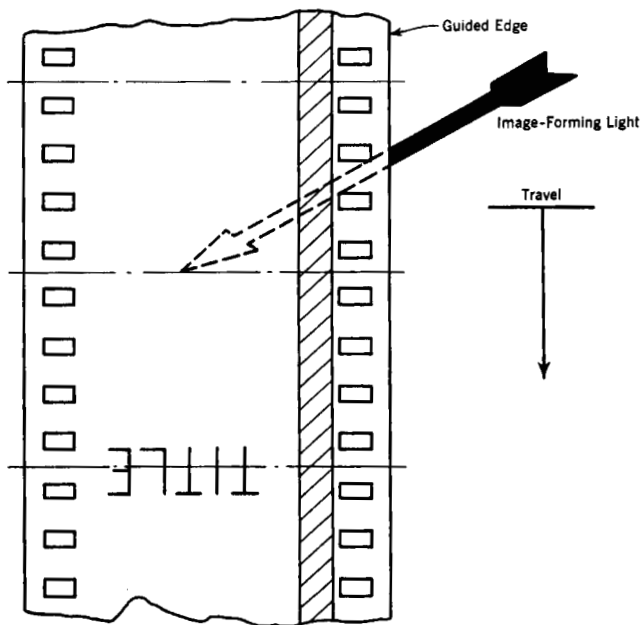
PH22.39 was published for comment in the May 1952 *Journal*. Addition of the note on outdoor theaters was and is the only change in the 1944 standard.

The revisions of PH22.53 were not of major proportions and so were not published. Slight changes were made in paragraphs 2.2 and 3.1 and a new section, 3.1.1, was added to amplify a provision previously stated in paragraph 3.1.

The two new proposals, PH22.86 and PH22.87 were published for trial and comment in the July 1951 *Journal*. One serious objection was made to the 35mm-17½mm proposal which formed the basis of a paper which was delivered before the 70th Convention at Hollywood in October 1951 and published in the February 1952 *Journal*. After full discussions, the objection (an alternate proposal for four tracks instead of three) was voted down. There was also one objection to the 16mm proposal based on a fear that the magnetic coating might produce excessive wear in the guide rails. This was viewed, however, as a problem in design and manufacture, not standardization, and the objection was withdrawn. Editorial changes were made in both standards and therefore the approved standards published here differ slightly from the drafts as first published.—*H.K.*

PROPOSED AMERICAN STANDARD  
35mm Sound Motion-Picture Film—  
Usage in Camera  
(Second Draft)

PH22.2  
Revision of Z22.2-1946



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

**1. Position of the Emulsion**

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

**2. Rate of Exposure**

2.1 The rate of exposure shall be 24 frames per second.

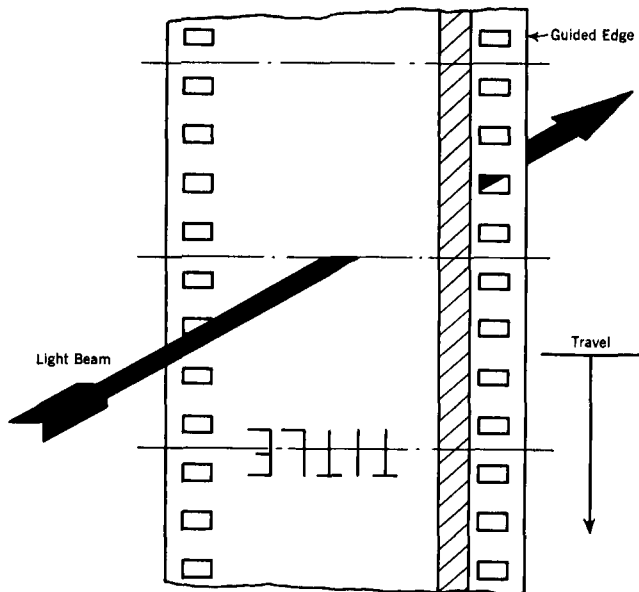
**3. Relationship Between Sound and Picture**

3.1 The apparatus and film shall be so arranged that the sound is placed on the film 20 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 sound head after it has passed the picture aperture.

NOT APPROVED

PROPOSED AMERICAN STANDARD  
35mm Sound Motion-Picture Film—  
Usage in Projector  
(Second Draft)

PH22.3  
Revision of Z22.3-1946



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

**1. Position of the Emulsion**

**1.1** Except for special processes, the emulsion shall be toward the light-source of the projector.

**2. Rate of Projection**

**2.1** The rate of projection shall be 24 frames per second.

**3. Relationship Between Sound and Picture**

**3.1** The apparatus and the film shall be so arranged that when the film is threaded normally, the sound track is scanned for reproduction at a point 20 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 sound head after it has passed the picture aperture.

NOT APPROVED

AMERICAN STANDARD

# Screen Brightness for 35mm Motion Pictures



Reg. U. S. Pat. Off.

**PH22.39-1953**

Revision of Z22.39-1944

\*UDC 778.55

## 1. Screen Brightness

**1.1** The brightness at the center of a screen for viewing 35mm motion pictures in indoor theaters shall be  $10 \frac{1}{1}$  footlambert when the projector is running with no film in the gate.

**Note:** Outdoor theaters have been excluded from this standard because of their inability to meet it. It is recommended that outdoor theaters approach the indoor standards as closely as possible in view of the fact that the same release prints are generally used for both types of theaters.

Approved April 16, 1953, by the American Standards Association, Incorporated  
Sponsor: Society of Motion Picture and Television Engineers

\*Universal Decimal Classification

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ASA/M653

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AMERICAN STANDARD  
Method of Determining  
Resolving Power of 16mm Motion-Picture  
Projector Lenses

ASA  
Reg. U. S. Pat. Off.

PH22.53-1953

Revision of Z22.53-1946

\*UDC 778.55

Page 1 of 2 pages

### 1. Scope

**1.1** This standard describes a method of determining the resolving power of projection lenses used in 16mm motion-picture projectors. The resolving power shall be measured in lines per millimeter.

### 2. Test Method

**2.1** The lens to be tested shall be mounted in a special test projector. A glass plate test object, carrying patterns of lines, shall be then projected upon a white matte grainless screen located at such a distance from the projector that the projected image of the border of the test object measures  $30 \times 40$  inches. The resolving power of the lens is the largest number of lines per millimeter in the test object pattern that an observer standing close to the screen sees definitely resolved in both the radial and tangential directions. Lines shall not be regarded as definitely resolved unless the number of lines in the image is the same as the number of lines in the test object.

**2.1.1** The patterns of lines shall consist of parallel black lines  $2.5/\times$  mm long and  $0.5/\times$  mm wide between the parallel lines, where  $\times$  equals the number of lines per millimeter.

**2.2** Care shall be taken to insure that the screen is perpendicular to the projection axis and that the lens is focused to give the maximum visual contrast in the fine detail of the central image.

### 3. Test Projector

**3.1** The projector design shall be such that the glass plate test object is held in proper relation to the lens axis. It shall not heat the test plate to a temperature which may cause the plate to be fractured or otherwise damaged. The emulsion side of the test plate shall be toward the projection lens.

**3.1.1** The cone of light supplied by the projector shall completely fill the unvignetted aperture of the test lens for all points in the field. This may be verified by lowering the lamp voltage and looking back into the projection lens through holes in the projection screen situated at the stations A, B, C, etc. It can then be easily seen whether the lens aperture is properly filled with light.

### 4. Test Object

**4.1** The glass photographic plate used for making the test object and the lens used in making the reduction of the master test chart shall have sufficiently high resolving power to insure clear definition of all lines in the patterns on the test object.

**4.2** The photographic reduction of the master test chart shall be such that the test object border has a height of 7.21 mm (0.284 inch) and a width of 9.65 mm (0.380 inch) with a radius of 0.5 mm (0.02 inch) in the corners, and such that the sets of lines in the reduced image are spaced 20, 30, 40, 50, 60, 80, and 90 lines per millimeter.

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PH22.53-1953

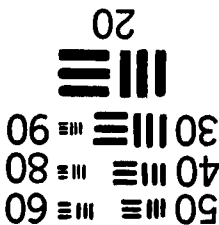


Fig. 1. Resolution Test Patterns (X 100 Diameters).

4.3 The patterns on the test object shall be in accordance with Fig. 1.

4.4 The position of the test patterns on the test object shall be in accordance with Fig. 2.

4.5 Identification of the positions of the test patterns on the test object shall be in accordance with Fig. 3.

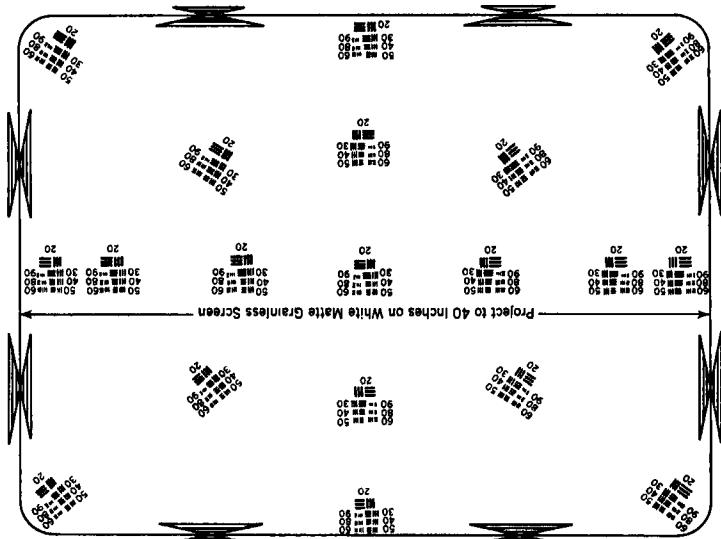


Fig. 2. Resolving Power Test Object (X Approximately 15 Diameters).

Note: The triangular alignment of test plates in the projector.

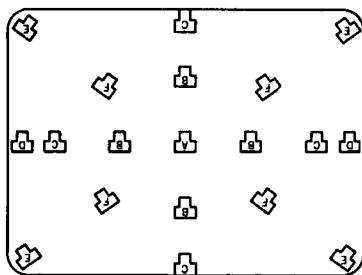


Fig. 3. Identification of Test Patterns in Frame Area.

Note: When not using a 2-inch focal length lens, B corresponds to 2 degrees from the axis, C corresponds to 4 degrees from the axis, D corresponds to 6 degrees from the axis, E corresponds to 8 degrees from the axis, and F corresponds to 3 degrees from the axis.

Note: Glass test plates in accordance with this standard are available from the Society of Motion Picture and Television Engineers, 40 West 40th Street, New York 18, N.Y.

AMERICAN STANDARD  
**Dimensions for  
 200-Mil Magnetic Sound Tracks  
 on 35mm and 17½mm Motion-Picture Film**

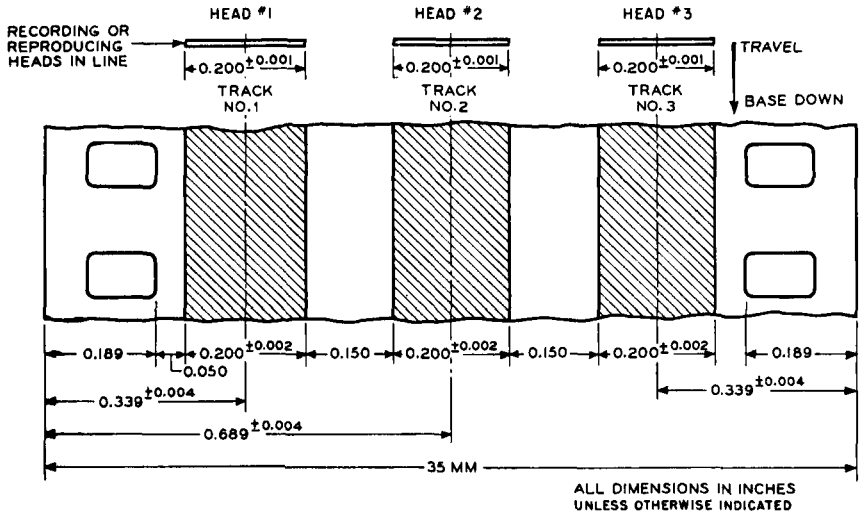
  
 Reg. U. S. Pat. Off.  
**PH22.86-1953**  
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 \*UDC 778.554.4

**1. Scope**

**1.1** This standard pertains to magnetic sound records, both single and multiple tracks, on 35mm perforated film, and single tracks on 17½mm perforated film

**2. Film Base**

**2.1** The film base shall be of the low-shrinkage safety type.  
**2.2** With the direction of travel as shown in Fig. 1, the magnetic material is coated on the upper side of the film base.



**Figure 1.**

**3. Dimensions**

**3.1** All dimensions given are relative to unshrunken film.  
**3.2** Cutting and perforating dimensions and tolerances are identical to those given in the

American Standard Cutting and Perforating Dimensions for 35mm Motion-Picture Positive Raw Stock, Z22.36-1947, or any subsequent revision thereof approved by the American Standards Association, Incorporated.

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Price, 25 Cents

**4. Preferred Track Position**

**4.1** Track No. 1 is the preferred position for 35mm single-track recording and is the standard position for 17½mm recording.

**5. Recording and Reproducing Speed**

**5.1** Recording and reproducing speed shall be 24 frames per second (see American Stand-

ard Emulsion and Sound Record Positions in Camera for 35mm Sound Motion Picture Film, Z22.2-1946, or any subsequent revision thereof approved by the American Standards Association, Incorporated [now being revised as PH22.2, 35mm Sound Motion-Picture Film—Usage in Camera]). This is exactly 96 perforations per second and approximately 18 inches per second.

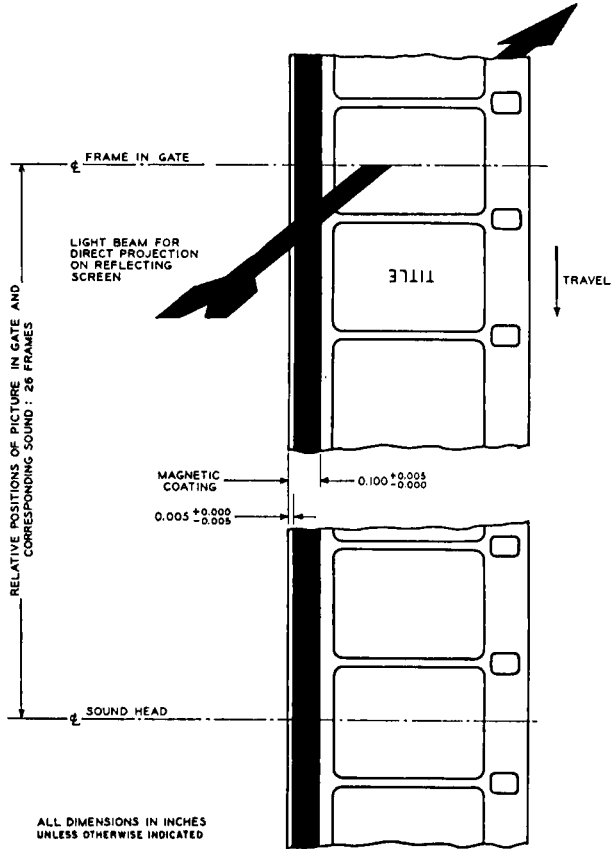
AMERICAN STANDARD

Dimensions for  
100-Mil Magnetic Coating  
on Single-Perforated 16mm Motion-Picture Film

  
Arg. U. S. Pat. Off.

PH22.87-1953

\*UDC 778.554.4



The magnetic coating in the above drawing is on the side of the film toward the lamp on a projector arranged for direct projection on a reflection-type screen.

The projection speed shall be 24 frames per second.

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