Sony Corp. of America
Soremec-Eclair U.S.A., Inc.
Stellavox Professional Audio & Data Equipment
Strand Century Inc.
Tektronix, Inc.
Tele-Cine Inc.
TeleMation Div. of Bell & Howell
Telescript, Inc.
Television Equipment Associates
Thomson-CSF Laboratories
Twenty-Fourth Frame
Vital Industries

Among the SMPTE exhibitors will be eight British companies:

Allotrope Ltd.
Elf Audiovisual Ltd.
Lee Filters Ltd.
Neilson Hordell Ltd.
Samcine Sales Ltd.
Racal Zonal Ltd.
Photomec (London) Ltd.
The Association of British Manufacturers of Photographic, Cine and Audio Visual Equipment

September Journal

The September *Journal* will be SMPTE's New York Conference Preview issue. It will contain the Conference Advance Program, the Directory of Exhibitors, full information on hotel reservations and conference registration, plus details on the Get-Together luncheon, the banquet, and the ladies program.

Standards & Recommended Practices

Approved American National Standards

On 2 May 1978 the American National Standards Institute approved two American National Standards which are revisions of existing standards: PH22.40-1978, Position, Dimensions and Reproducing Speed of Photographic Sound Records on 35-mm Motion-Picture Release Prints, and PH22.196-1978, Screen Luminance and Viewing Conditions for Indoor Theater Projection of Motion-Picture Prints.

Inasmuch as compliance with American National Standards is purely voluntary, the standards will become truly effective when broad publicity is given to their existence. The Institute and the Society would appreciate any personal influence to promote their use where such action is appropriate. Copies of the standards may be obtained for a nominal fee from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Approved SMPTE Recommended Practices

The Executive Committee for Standards Approval, acting on behalf of the Board of Governors, approved on 13 June 1978 two SMPTE Recommended Practices: RP 77-1978, Specifications for Azimuth Test Film for 35-mm Three-Track Sound Reproducers, Magnetic Type, and RP 78-1978, Specifications for Azimuth Test Film for 16-mm Sound Reproducers, Magnetic Type. The practices are the result of the transformation of American National Standards PH22.99-1969 and PH22.114-1969, which have been withdrawn. They do not reflect any technical changes in the test films specified.

Approved International Standard

The International Organization for Standardization (ISO) recently approved an International Standard, the technical content of which is published here for your information. ISO 4241-1978, Cinematography — Leaders and Run-Out Trailers for 35-mm and 16-mm Release Prints — Specifications, is in accord with American National Standard PH22.55-1975, Leaders and Cue Marks for 35- and 16-mm Sound Motion-Picture Release Prints.

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Withdrawn American National Standards

A recommendation for withdrawal of approval of two American National Standards was approved by the American National Standards Institute on 26 May 1978. American National Standard PH22.80-1975, Specifications for Scanning-Beam Uniformity Test Film for 16-mm Motion-Picture Sound Reproducers, was withdrawn because all standards specifying test materials are being transformed into SMPTE Recommended Practices. Proposed SMPTE Recommended Practice RP 81 replaces the specifications previously delineated in PH22.80. American National Standard PH22.144-1965, Dimensions and Optical Specifications of Test Slides and Transparencies for Television, is not being followed. A working group of the Television Technology Committee is revising the specifications to reflect current practices. — *Alex E. Alden, Manager of Engineering Services.*

Vertical Interval Time Code Working Group Solicits Information

A working group on Vertical Interval Time Code has been organized to draft an SMPTE Recommended Practice defining information and coding methods to be used when recording VITC (vertical interval time code) on videotape recorders. Two major purposes of the use of VITC are: (1) to reduce the number of channels necessary to carry address information, and (2) to allow the accurate reading of such information during slow-motion and stop-motion playback of video tapes.

In order to maximize the usefulness of the proposed VITC, the working group is soliciting information on the channel capacity of tape recorder formats presently being manufactured or in widespread use.

Information supplied to the working group should include: TV lines available for recording VITC, video bandwidth, transient response, and any limitations due to slow-motion or dubbing operations. Although not specifically defined at this time, the VITC signal is expected to be digital in nature occurring on one or more TV lines within the presently unassigned portions of the vertical interval. Data will be field-oriented and contain essentially the information now included in the Time and Control Code as defined by ANSI C98.12.

Manufacturers of time-base correctors should take note of this proposed use of the vertical interval. Replies, questions, or comments should be directed to the ch hairman of the VITC Working Group: David K. Fibush, Ampex Corporation, Mail Stop 3-59, 401 Broadway, Redwood City, CA 94063. The next working group meeting will be held in early September 1978.

Erratum

Re: Report of the Committee on New Technology
May 1978 Journal, p. 331

Paragraph seven of this report contains an erroneous statement which is corrected as follows: ". . . In general, the test indicated that the NTSC system is not fully utilized. It was evident that a higher line rate is needed for non-broadcast purposes to achieve major quality improvements."

ANSI PH22.40-1978
Revision of PH22.40-1967

American National Standard

position, dimensions and reproducing speed of photographic sound records on 35-mm motion-picture release prints

Approved May 2, 1978 Secretariat: Society of Motion Picture and Television Engineers

1. Scope

1.1 This standard specifies the position, dimensions and reproducing speed of variable-area and variable-density photographic sound records on 35-mm motion-picture release prints.

1.2 This standard also specifies the longitudinal picture-sound displacement.

2. Sound Record

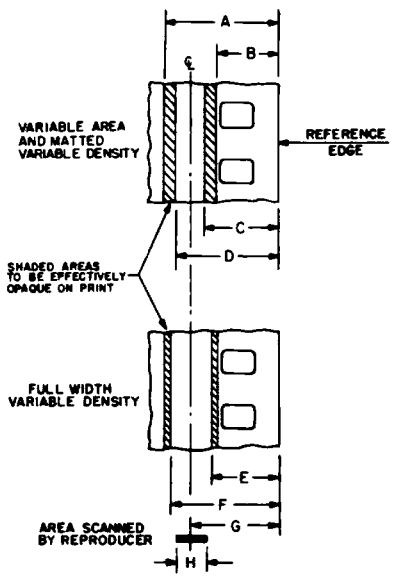
The dimensions and location of the sound records shall be as specified in the figure and table.

3. Longitudinal Picture-Sound Displacement

The sound record on the film shall be displaced longitudinally from the center of the corresponding picture by a distance of 21 frames ± ½ frame in the direction of film travel during normal projection.

4. Reproducing Speed

The recordings shall be made so that the sound records will reproduce properly at 96 perforations per second (approximately 90 feet [27.4 meters] per minute or 18 inches [45.7 centimeters] per second) which is 24 frames per second.



Dimensions	Inches	Millimeters
A	0.308 nom	7.82 nom
B	0.192 nom	4.88 nom
C	0.205 ± 0.001	5.21 ± 0.03
D	0.281 ± 0.001	7.14 ± 0.03
E	0.193 $^{+\ 0.004}_{-\ 0.000}$	4.90 $^{+\ 0.10}_{-\ 0.00}$
F	0.293 $^{+\ 0.000}_{-\ 0.004}$	7.44 $^{+\ 0.00}_{-\ 0.10}$
G	0.244 ± 0.001	6.20 ± 0.03
H	0.084 ± 0.001	2.13 ± 0.03

NOTE 1: Motion-picture prints conforming to this standard are usually projected in accordance with American National Standard Specifications for Projector Usage of 35-mm Release Prints Having Four Perforations Per Picture Frame, PH22.194-1977.

NOTE 2: Motion-picture prints conforming to this standard are usually made on film made in accordance with long-pitch dimensions specified in American National Standard Dimensions for 35-mm Motion-Picture Film Perforated KS, PH22.139-1974.

NOTE 3: Dimensions A and B, describing the printed area of the sound record, are established by American National Standard Dimensions of Exposed Areas for Picture and Photographic Sound on 35-mm Motion-Picture Prints Made on Continuous Contact Printers, PH22.111-1965 (R1975), and are shown in the table as nominal values for reference only.

Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes only.)

In the average theater, it is necessary to emit the sound pulses before the corresponding picture frame is positioned in the aperture. Since sound travels approximately 1100 ft per second or about 50 ft per frame during the normal projection rate of 24 frames per second, the projectionist can place the sound and picture in synchronization in the theater where he wishes by varying the length of the threading path in the projector.

For example, if the positioning of frame 21 at the scanning point brings the corresponding picture and sound to the screen and the speaker at the same instant, then positioning frame 20 at the scanning point would give synchronism at about 50 ft from the screen.

ANSI PH22.196-1978
Revision and Consolidation of
PH22.100-1975, PH22.124-1970 and PH22.133-1963

American National Standard
screen luminance and viewing conditions for indoor theater projection of motion-picture prints

Approved May 2, 1978

Secretariat: Society of Motion Picture and Television Engineers

1. Scope

This standard specifies the screen luminance (brightness) level, color quality and viewing conditions for theatrical, review-room and non-theatrical presentation of 16-, 35- and 70-mm motion-picture prints intended for projection at 24 frames per second. (For review-room viewing of motion-picture prints intended for television, refer to SMPTE Recommended Practice RP 41-1974, Evaluation of Color Films Intended for Television.)

2. Purpose

The purpose of this standard is to specify screen luminance levels at which tone scale, contrast and pictorial quality of the projected image from release prints will be of the quality anticipated during their production.

3. Projector Operating Conditions

Measurement of screen luminance and color of projection light is usually made with the projector in complete operation with its lens set at focus position, but with no film in the aperture.

4. Photometer Type

Screen luminance shall be measured with a photometer having the spectral luminance response of the standard observer (photopic vision), as defined in American National Standard Nomenclature and Definitions for Illuminating Engineering, ANSI/IES RP16-1967. (See Appendix A3.) The acceptance angle of the photometer shall be 2° or less.

5. Luminance Level and Distribution

5.1 The distribution of projection illumination shall be symmetrical about the geometric center of the screen, and the luminance at the center of the screen shall be 16 ± 2 fL (55 ± 7 cd/m²) for review rooms and primary theaters, and 16 ± 4 fL (55 ± 14 cd/m²) for other theatrical projection. Luminance shall be measured from a position on the centerline of the seating area.

5.2 The luminance measured on the horizontal centerline of the screen at a distance from the screen edges equal to 5 percent of the width of the screen shall be the same at each edge and not less than 10 fL (34 cd/m²) and not more than 85 percent of that at the center with a recommended value of 75 percent.

6. Spectral Distribution

6.1 For 35- and 70-mm prints, the light reflected from the screen shall have a spectral distribution approximating that of a black-body at a color temperature of 5400 K ± 400 K, the use of short-arc xenon or carbon-arc light sources being assumed.

6.2 16-mm prints are made for projection with two different colors of projector illuminant. When the intended illuminant cannot be specified uniquely, it is permissible, as a compromise, to group the sources into a color temperature band centered at 5400 K.

7. Multiple Projector Adjustment

7.1 Same Format. The resultant luminance from all projectors intended for use in the continuous viewing of material of the same format shall not vary by more than 2 fL (7 cd/m²), as measured in 5.1 above.

7.2 Different Formats. The resultant luminance from projectors intended for use in a sequential system of viewing material of different formats shall not vary by more than 4 fL (14 cd/m²), as measured in 5.1 above (see Appendix A5).

7.3 The apparent color temperature of the projection light from projectors intended for interchangeably sequential operation shall be consistent within a total range of 400 K. For 16-mm projection with sources with a color temperature of less than 3500 K, the range shall be limited to 7 percent or 200 K.

8. Viewing Conditions

8.1 All observers in a review room shall be located within a standard observing area which is

(a) within the limits of a 15° angle on either side of a perpendicular to the mid-point of the screen as a center, in both the horizontal and vertical planes and

(b) at a distance of 5 ± 1 picture heights from the screen.

8.2 No stray light or illuminated area with a luminance in excess of 1 fL (3.4 cd/m²) shall be visible from the standard observing area of a review room.

8.3 Luminance from stray light, as described in Appendix A4, shall be no more than 0.4 percent of the screen luminance at the center of the screen in review rooms and under 1 percent in semi-permanent theatrical projection facilities.

Appendix

(The Appendix is not a part of this American National Standard, but is included for information purposes only.)

A1. Luminance Level Limits

Possible luminance levels are limited by a minimum value below which the visual process becomes less efficient and by a maximum value above which (assumes a shutter frequency of 48 flashes/s) flicker becomes objectionable. Permissible luminance range is limited by the criterion that a good release print must provide acceptable quality when projected at any luminance within the range.

A2. Normal Print

To provide interchangeability in motion-picture projection, it is desirable that print quality conform to that of a normal print so that theaters can operate at known projection conditions and will, thereby, be able to exhibit projected pictures of good pictorial quality. It has not been possible to specify this normal print in terms of its optical density and other objective measurements because of the difficulties of specifying artistic quality in scientific terms. Accordingly, the normal print is defined as that print which conveys the desired artistic impression when projected under review room conditions as described by this standard.

A3. Meter Acceptance Angle and Response

A photometer with a photopic spectral response allows use of a well known standard response for all photometer manufacturers. A mesopic (partially dark adapted) response might be better but no standard has been set for the mesopic observer under typical screen viewing conditions. When entering a theater from daylight, we find it difficult to see others in the audience although they see us because they are partially dark adapted. The degree of adaption varies with the film subject matter. A typical film reduces the average screen luminance from 16 to 1.6 fL (55 to 5.5 cd/m²). The rest of the theater is much darker. Because of increased blue sensitivity of the eyes (Purkinje Effect) as one becomes somewhat dark adapted, a photometer with a photopic response may give readings on a xenon illuminated screen and a carbon arc illuminated screen that are the same. However, many observers see the xenon illuminated screen as the brighter. The xenon-arc spectrum has a peak in the blue region where, because of the Purkinje shift, there is increased sensitivity. A representative mesopic curve may be developed and adopted in the future.

A4. Stray Light

Stray light shall be measured by comparing the screen luminance with the luminance of the image of an opaque test object placed in the center of the projector aperture. The test object preferably should have a diameter of 5 percent of frame width, and should not exceed 10 percent. The balance of the projected beam is attenuated by any suitable neutral density film that produces through the normal projection system an average screen luminance equal to 10 percent of the luminance of the screen as defined in Sec. 5.1. All sources of illumination in the auditorium, such as exit and aisle lights, shall be used in their normal manner while stray light is being measured.

A5. Other Applications

Specifications for drive-in theater screen luminance are covered in SMPTE Recommended Practice RP 12-1972, Screen Luminance for Drive-In Theaters. Related International Standards are ISO 2895-1974, Cinematography—Screen Luminance for Review Room Projection of Motion-Picture Film Intended for Indoor Theatres, and ISO 2910-1974, Cinematography—Screen Luminance for the Projection of Motion-Picture Films in Indoor Theatres.

Much higher screen luminance levels are acceptable for some 70-mm prints which are used at 30 frames per second. Although this standard is applicable to 35-mm anamorphic prints, the current practice of using a 1.85:1 ratio for nonanamorphic prints will usually result in a 25 percent lower light level; the 1.75:1 ratio, approximately 20 percent lower and the 2:1 ratio, 33 percent lower. It may be necessary to raise the 35-mm nonanamorphic light level to ensure that the nonanamorphic ratio is still within the standard, or change the light output to compensate for the different magnification when changing lens focal length.

SMPTE RECOMMENDED PRACTICE — RP 77–1978

Specifications for Azimuth Test Film for 35-mm Three-Track Sound Reproducers, Magnetic Type

1. *Scope*

This practice specifies a test film for use in aligning the azimuth of magnetic head gaps in 35-mm motion-picture sound reproducers operating at 90 ft (27.4 m) per minute and designed for three 200-mil (5.08 mm) sound records.

2. *Test Film Signal*

2.1 Frequency. The sound record on each of the three tracks shall be an original recording which will reproduce at a frequency of 8000 ± 100 Hz when the linear speed of the film is 96 perforations per second or approximately 90 ft per minute (18 in or 45.7 cm per second).

2.2 Distortion. The total harmonic distortion of the recorded signals shall not exceed 1 percent.

2.3 Sound Record. The location and dimensions of the recorded sound records shall be in accordance with American National Standard Position, Dimensions and Reproducing Speed of Three 200-Mil Magnetic Sound Records on 35-mm and One Record on 17½-mm Motion-Picture Film, PH-22.86-1975. The sound record may also be recorded so that it extends from one edge of the film to the other.

2.4 Recorded Level. The recorded signal shall have a recorded level of 6.0 ± 1.5 dB below the reference level of a frequency of 1000 Hz having an rms short circuit flux per unit track width of 200 nanowebers per meter (0 dB). The signal level shall not fluctuate more than ± 0.5 dB within the test film length.

2.5 Flutter. The weighted peak flutter of the sound record shall not exceed ± 0.04 percent when measured in accordance with American National Standard Method for Measurement of Weighted Peak Flutter of Sound Recording and Reproducing Equipment, ANSI IEEE Std 193-1971.

2.6 Azimuth. The azimuth of the sound record shall be 90° ± 5′ to the reference edge of the film.

2.7 Signal Phase. The recorded signal in each of the three records shall be in an in-phase relationship to the other two. A recording made as described in the Appendix is considered to be in phase.

3. *Film Stock*

3.1 The film stock shall be full-coat, splice-free and of the low-shrinkage, safety type in compliance with American National Standard Specifications for Motion-Picture Safety Film, PH22.31-1967 (R1973).

3.2 The difference in compliance between triacetate and polyester bases will establish different head wear patterns. A change from one base to the other may cause a temporary loss of high-frequency response until a new wear pattern is established. Therefore, it is recommended that users employ test films having the same film base as used in production recording for any given recorder/reproducer.

3.2.1 Test films made on triacetate base shall be cut and perforated in accordance with long-pitch dimensions specified in American National Standard Dimensions for 35-mm Motion-Picture Film Perforated KS, PH22.139-1974.

3.2.2 Test films made on polyester base shall be perforated in accordance with short-pitch dimensions specified in ANSI PH22.139-1974.

3.3 The film stock shall be conditioned for 10 days at 20°C ± 3° (68°F ± 5.4°) at a relative humidity of 50 ± 10 percent prior to recording.

3.4 The film shall be recorded and packaged within the temperature and humidity limits specified in Sec. 3.3. The recorded film shall be packaged in a metal can and sealed either with a low-moisture permeability plastic tape or a fabric tape having a moisture barrier.

4. *Identification*

Each test film shall be identified by a suitable identification marking.

5. *Calibration*

5.1 Flux. The short circuit flux on the test film shall be determined by means of the calibrated short-gap ferromagnetic core reproducer technique. This technique is described in American National Standard Method of Measuring Recorded Flux of Magnetic Sound Records at Medium Wavelengths, ANSI IEEE Std 347-1972.

Approved 13 June 1978

5.2 Level. The signal level measurements specified in Sec. 2.4 shall be measured with a standard volume indicator conforming to American National Standard Volume Measurements of Electrical Speech and Program Waves. ANSI IEEE Std 152-1953 (R1976).

NOTE: A test film made in accordance with this practice is available from the Society of Motion Picture and Television Engineers.

Appendix

(The Appendix is not a part of this SMPTE Recommended Practice, but is included for information purposes only.)

In-phase relationship of the sound records, as printed by a multiple-head recorder, can be assured if the individual coils of the recording head are similar and are assembled in the same manner.

The relationship is accomplished by connecting the winding in series so that the end of each coil is connected to the beginning of the next coil maintaining a consistent direction of winding.

The relationship is also accomplished in a parallel-type connection if the corresponding beginning leads are connected together and the corresponding ending leads are connected together and the direction of winding of each coil is kept consistent with other coils.

SMPTE RECOMMENDED PRACTICE — RP 78–1978

Specifications for Azimuth Test Film for 16-mm Sound Reproducers, Magnetic Type

1. *Scope*

This practice specifies a test film for use in aligning the azimuth of magnetic head gaps in 16-mm motion-picture sound reproducers operating at 36 ft (11 m) per minute.

2. *Test Film Signal*

2.1 Frequency. The sound record on the film shall be an original recording which will reproduce at a frequency of 7000 ± 100 Hz when the linear speed of the film is 24 perforations per second or approximately 36 ft per minute (7.2 in or 18.3 cm per second).

2.2 Distortion. The total harmonic distortion of the recorded signal shall not exceed 1 percent.

2.3 Sound Record. The location and dimensions of the recorded sound record shall be in accordance with American National Standard Position, Dimensions and Reproducing Speed of 200-Mil Magnetic Sound Records on 16-mm Motion-Picture Film, PH22.97-1975. The sound record may also be recorded so that it extends from one edge of the film to the other.

2.4 Recorded Level. The recorded signal shall have a recorded level of 6.0 ± 1.5 dB below the reference level of a frequency of 1000 Hz having an rms short circuit flux per unit track width of 200 nanowebers per meter (0 dB). The signal level shall not fluctuate more than ± 0.5 dB within the test film length.

2.5 Flutter. The weighted peak flutter of the sound record shall not exceed ± 0.07 percent when measured in accordance with American National Standard Method for Measurement of Weighted Peak Flutter of Sound Recording and Reproducing Equipment, ANSI IEEE Std 193-1971.

2.6 Azimuth. The azimuth of the sound record shall be 90° ± 5′ to the reference edge of the film.

3. *Film Stock*

3.1 The film stock shall be full-coat, splice-free and of the low-shrinkage, safety type in compliance with American National Standard Specifications for Motion-Picture Safety Film, PH22.31-1967 (R1973).

3.2 Test films made on triacetate base shall be cut and perforated in accordance with long-pitch dimensions specified in American National Standard Dimensions for 16-mm Motion-Picture Film Perforated 1R, PH22.109-1971.

3.3 Test films made on polyester base shall be perforated in accordance with short-pitch dimensions specified in ANSI PH22.109-1971.

3.4 The film stock shall be conditioned for 10 days at 20°C ± 3° (68°F ± 5.4°) at a relative humidity of 50 ± 10 percent prior to recording.

3.5 The film shall be recorded and packaged within the temperature and humidity limits specified in Sec. 3.4. The recorded film shall be packaged in a metal can and sealed either with a low-moisture permeability plastic tape or a fabric tape having a moisture barrier.

4. *Identification*

Each test film shall be identified by a suitable identification marking.

5. *Calibration*

5.1 Flux. The short circuit flux on the test film shall be determined by means of the calibrated short-gap ferromagnetic core reproducer technique. This technique is described in American National Standard Method of Measuring Recorded Flux of Magnetic Sound Records at Medium Wavelengths, ANSI IEEE Std 317-1972.

5.2 Level. The signal level measurements specified in Sec. 2.4 shall be measured with a standard volume indicator conforming to American National Standard Volume Measurements of Electrical Speech and Program Waves, ANSI IEEE Std 152-1953 (R1976).

NOTE: A test film made in accordance with this practice is available from the Society of Motion Picture and Television Engineers.

Approved 13 June 1978

Cinematography — Leaders and run-out trailers for 35 mm and 16 mm release prints — Specifications

1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies the essential features of leaders, change-over cue marks and run-out trailers for 35 mm and 16 mm release prints for cinema use.

It also specifies the essential information to be placed on the leader and run-out trailer, and the specific frame spacing of this information in relation to the beginning and end of the picture section.

2 LEADER (see figure 1)

2.1 Sections of the leader

The leader shall consist of

a) a protective section,

b) an identification section, and

c) a synchronizing section.

2.2 Protective section

The protective section shall consist of any raw stock or film with no image and shall be not less than 2,4 m (8 ft) long for 35 mm film and 1 m (3 ft) long for 16 mm film, but not less than the circumference of the wound roll.

2.3 Identification section

The identification section shall have the following information photographically printed or indelibly marked on it :

a) title of film;

b) identification number of the reel;

c) a word to indicate beginning, boldly printed in one frame;

d) aspect ratio for presentation, and whether non-anamorphic or anamorphic;

e) type of sound ; where non-standard photographic sound tracks are used, any special characteristics of recording shall be indicated;

f) the language of the version of the photographic sound record, printed in the sound track area.

2.4 Synchronizing section

2.4.1 *Length*

The synchronizing section shall be 218 frames in length.

2.4.2 *Sound track area*

The area for the sound track in the synchronizing section shall be opaque except for the sound photographic record which corresponds to the first picture images.

2.4.3 *Picture gate*

Frame 192 shall be transparent and contain in bold black letters the word or mark appropriate to the country of use to indicate "PICTURE GATE".

NOTE — This frame is intended for threading, and the projector must be run down to a later point which is chosen depending on the acceleration characteristics of the projector.

2.4.4 *Time lapse numerals*

Commencing from the "picture gate" (frame 192), there shall be a series of six frames at intervals of 24 frames (frames 168, 144, 120, 96, 72 and 48), containing, respectively, the numerals 7, 6, 5, 4, 3 and 2. The frames shall be neutral grey and the numerals shall be boldly printed in black.

NOTE — The duration of the synchronizing section is specified as 8 s; a longer section as may be required, is acceptable.

2.4.5 *Sound head symbols*

Related to the "picture gate" (frame 192), these shall be included as follows :

16 mm photographic sound :

26 frames in advance of "picture gate" (frame 218);

16 mm magnetic sound :

28 frames in advance of "picture gate" (frame 220);

35 mm photographic sound :

20 frames in advance of "picture gate" (frame 212);

35 mm magnetic sound :

28 frames behind "picture gate" (frame 164).

2.4.5.1 DETAILS OF SOUND HEAD FRAMES

The sound head frames shall be opaque with a central horizontal transparent line. Above the line there shall appear a transparent number "35" or "16", appropriate to the gauge of film, and below the line there shall appear a transparent letter "P" or "M", appropriate to the type of sound track (photographic or magnetic).

2.4.5.2 REPEAT OF SOUND HEAD FRAMES

The sound head frames may be repeated in relation to the time lapse numerals 7, 6 and 5, at the same relative positions as are stated in 2.4.5.

2.4.6 *Black lead picture section*

Following the time lapse numeral 2, there shall be black frames to the commencement of the picture section. An additional frame shall be added to the synchronizing section with an arrow indicating the splice line to ensure correct splicing of picture and leader. The frames marked "SPLICE HERE" are not to be included in the picture of the release print.

2.4.6.1 FRAME 8

A single transparent dot shall be located as specified in 3.2. The dot is used to determine that the last eight frames of the leader have been retained when leaders have been removed and replaced.

3 CHANGE-OVER CUES (see figure 1)

3.1 Cue marks

The picture section shall include a "motor" cue and also a "change-over" cue in the position shown in figure 2. These two marks may differ in shape.

3.2 Location of cue marks

The cue marks shall be placed on the film so as to appear in the top right-hand corner of the screen when the film is projected at any aspect ratio up to 1 : 1,85 for non-anamorphotic images and 1 : 2,35 for anamorphotic images (see figure 2).

3.3 Visual duration of cue marks

The "motor" cue marks and the "change-over" cue marks shall each be of four frames duration.

3.4 Spacing of cue marks

There shall be 168 frames between the last frame of the "motor" cue marks and the first frame of the "change-over" cue marks, and 24 frames between the last frame of the "change-over" cue marks and the end of the picture section.

4 RUN-OUT TRAILER (see figure 1)

4.1 Sections of the run-out trailer

The run-out trailer shall consist of

a) a run-out section,

b) an identification section, and

c) a protective section.

4.2 Run-out section

The run-out section shall comprise not less than 48 black frames. An additional frame shall be added ahead of the run-out section with an arrow indicating the splice line to ensure correct splicing of picture and trailer. The frames marked "SPLICE HERE" are not to be included in the picture of the release print

4.3 Identification section

The identification section may be of any convenient length, and shall have the following information photographically printed or indelibly marked on it :

a) title of film;

b) identification number of the reel;

c) in one frame, boldly printed, the word appropriate to the country of use to indicate "END" ("FIN").

4.4 Protective section

The protective section shall consist of any raw stock or film with no image and shall be not less than 2,4 m (8 ft) long for 35 mm film and 1 m (3 ft) long for 16 mm film, but not less than the circumference of the wound roll.

5 OPTICAL DENSITY

The clear (transparent) portions of the leader and trailer shall have a minimum neutral density of 0,35.

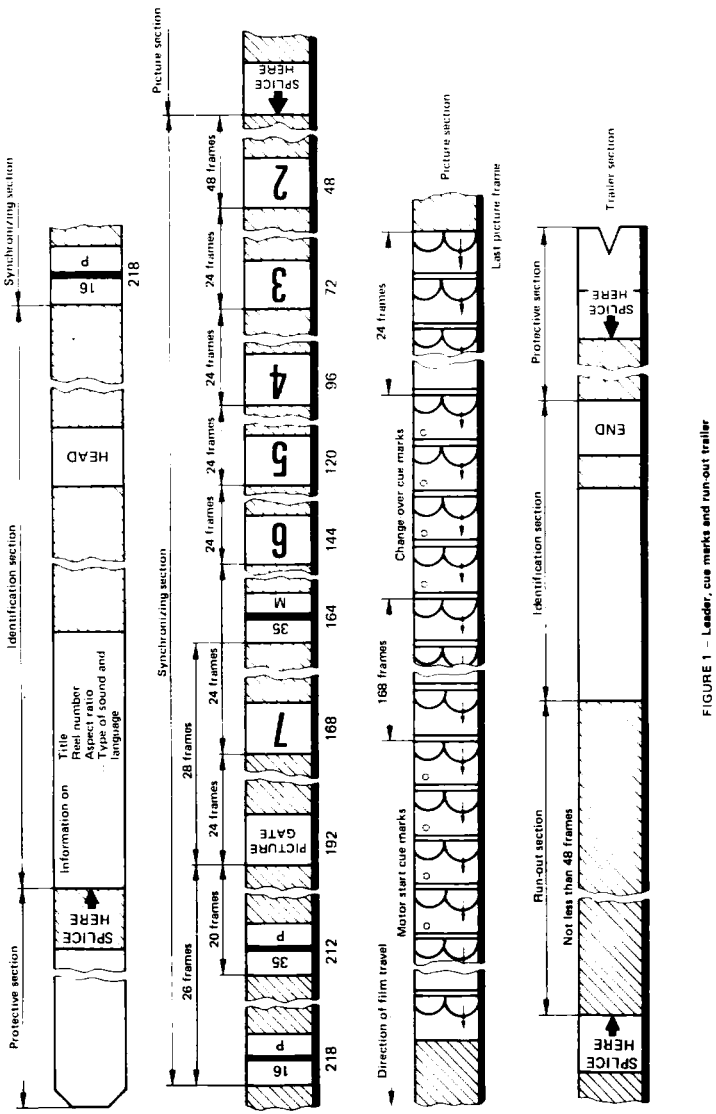


FIGURE 1 – **Leader, cue marks and run-out trailer**

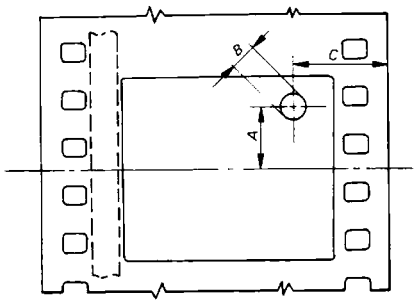


Image as seen on the screen

FIGURE 2 – **Position of cue marks**

TABLE 1 – **For non-anamorphic prints**

Dimension	mm	in
A	3,8	0.150
B	2,4	0.094
C	7,1	0.280

TABLE 2 – **For anamorphic prints**

Dimension	mm	in
A	6,1	0.240
B	2,4	0.094
C	9,7	0.382

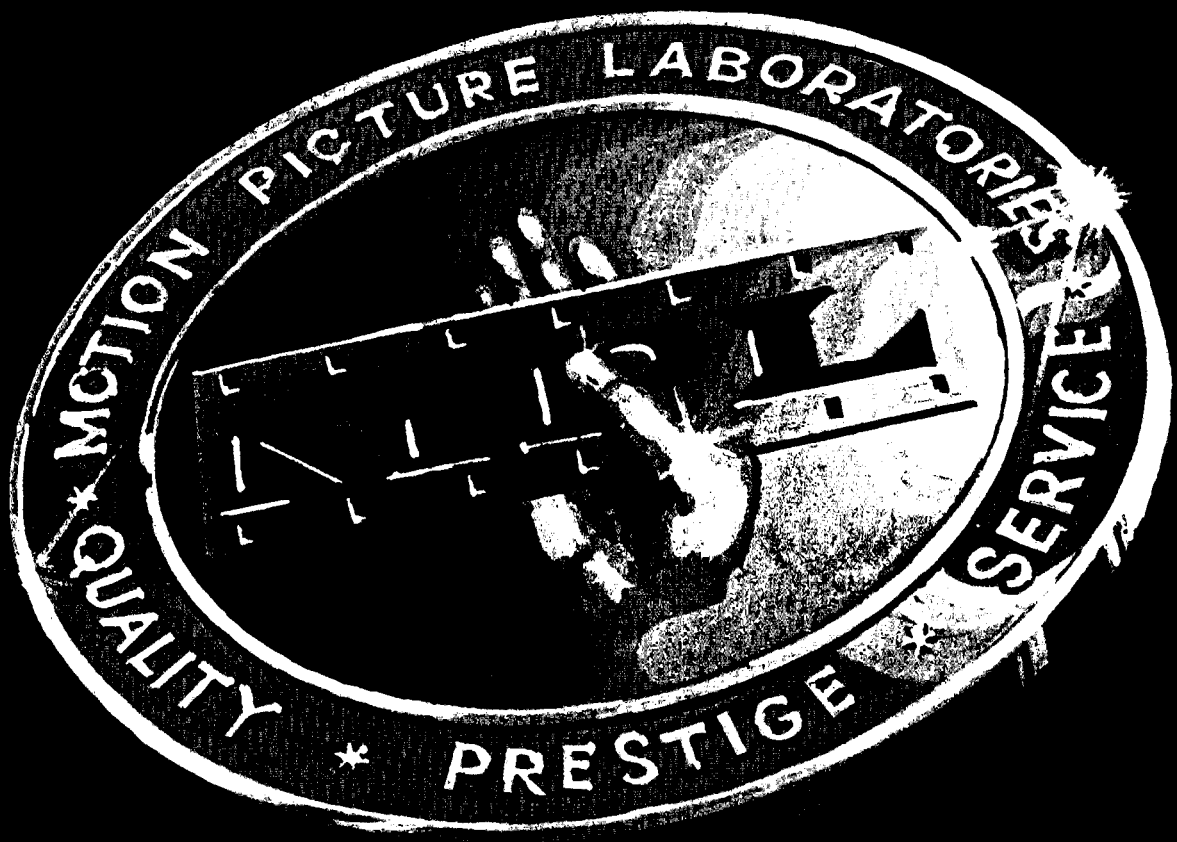
ANNEX

In applying the characteristics and specifications given in this International Standard to the design of a specific leader and trailer, it should be recognized that these features are expressed as minima and without the embellishment sometimes desired in practice.

Therefore, it is recognized that modifications may be made to accommodate national practices or specific applications without damaging the standardized characteristics.

Examples of permissible modifications might be : the incorporation of a sweeping hand, moving wedge or other features to provide for the interpretation of time change; or the inclusion of additional frames which may be needed to accommodate national or other engineering practices, or requirements such as increasing the minimum synchronizing section duration to 10 s.

The user is cautioned, however, that no changes should be made to the standard that will delete any of the features which would affect its intended function.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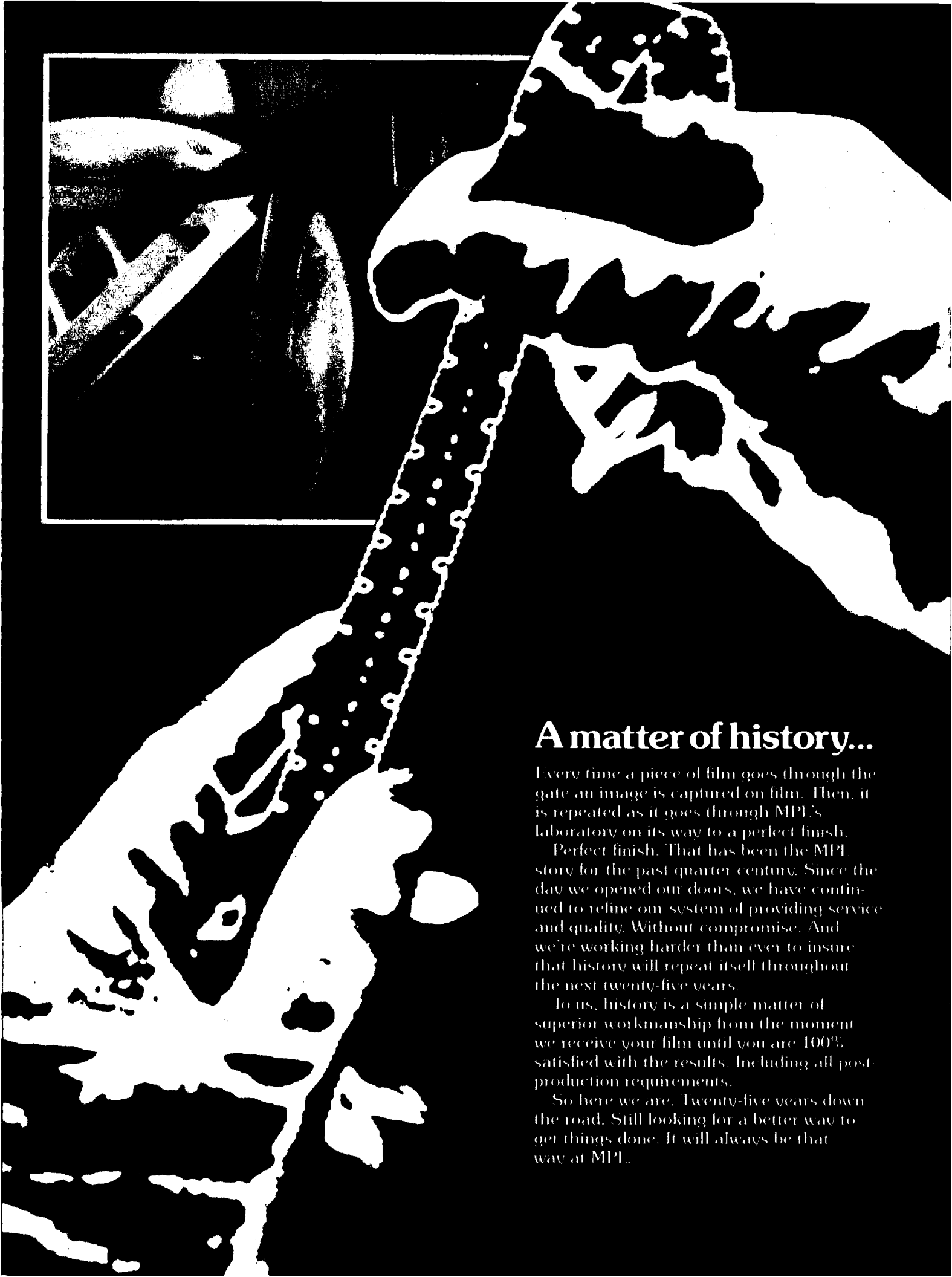

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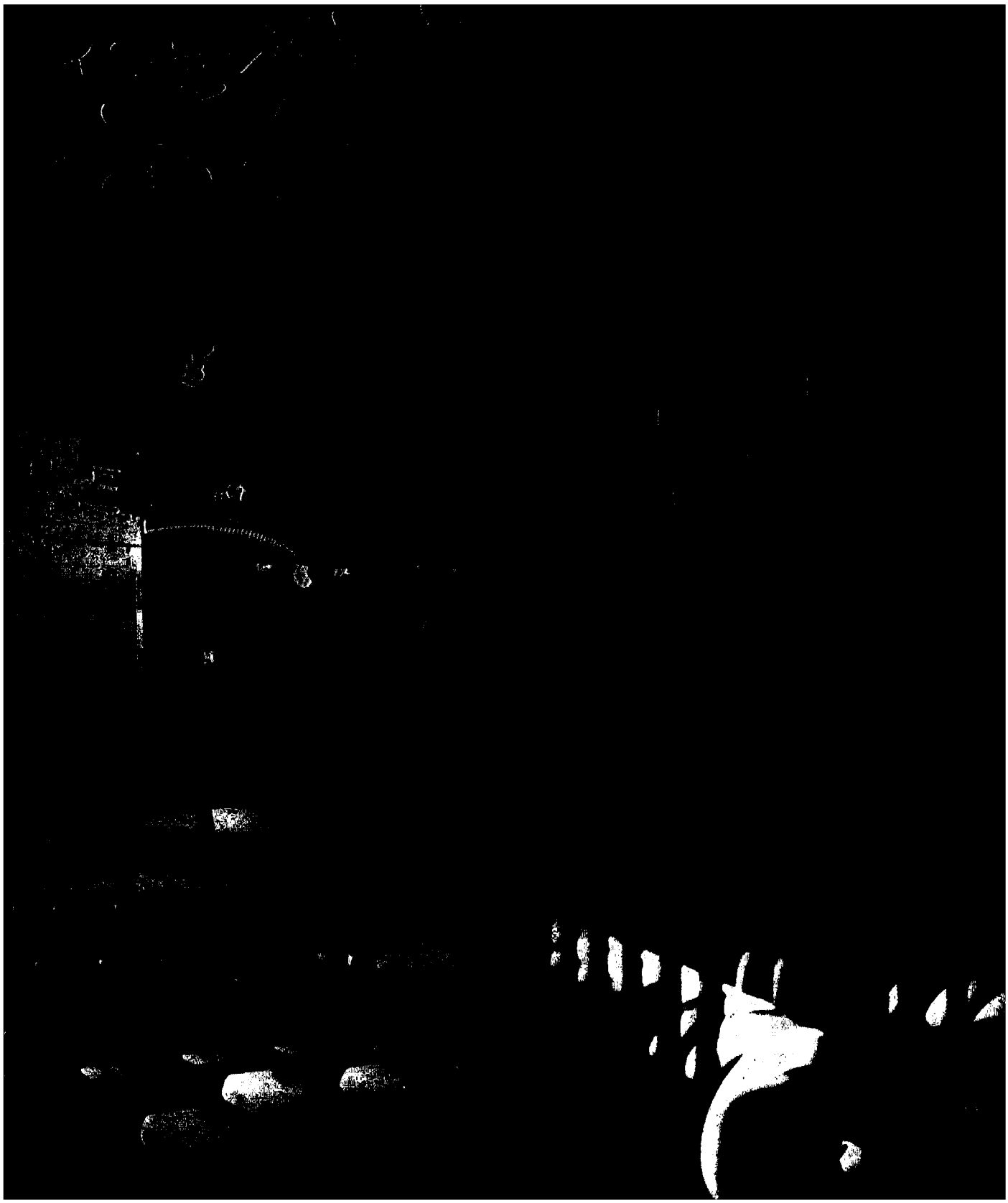

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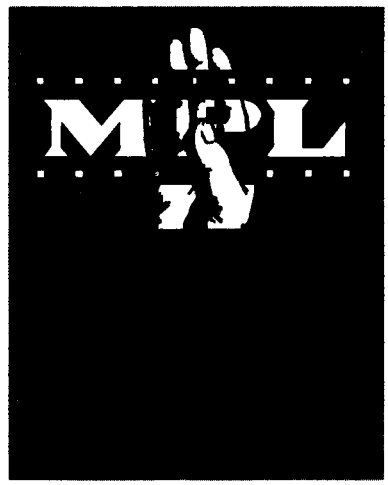

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