a system would substantially simplify the problems of remote control and automation.

Discussions with other interested persons have shown that it may not be necessary to have an individual frame numbering code, nor need the code generally be so technically complex as that required for videotape, where it is required to read the code at high speed and in either direction.[2] The high-speed wind and frame identification are adequately provided for, in film usage, by standard frame counters. We may therefore simplify matters by restricting the code to forward film use at standard speed. At this point, we are well within the range of commercially available equipment. A simple string of tone bursts in the audio range can be arranged to give any desired readout, and also not to respond until two successive readouts agree (necessary to allow for splices, etc.). Such equipment is available for under $1000. Naturally, spare code capacity would be left for future development such as a density or color correction code, or for theatre projection requirements such as screen masking controls.[3]

A typical system operating on a 3-kHz tone frequency requires a bandwidth of less than 200 Hz. While the ideal would be to have the code on a separate track on the film, it is not perhaps absolutely out of the question to consider adding such a narrow band of frequencies – suitably filtered – to the main sound track.

When we consider the amount of information transmitted in TV systems in the time between pictures, corresponding to the film frame line, it seems a pity not to make better use of the film as an information carrier absolutely locked to picture, sound and time, and capable of holding magnetic as well as optical data.

January 23, 1970

Yours very truly,
M. Barlow
5052 Chestnut Ave.
Pierrefonds 920, P.Q., Canada

References

1. M. Barlow, "Coding and packaging film for broadcasting," Letter to Editor, *Jour. SMPTE, 78:* Oct. 1969.
2. R. B. Bonney, Ted J. Kloba and Robert Pargee, "A proposed standard time and control code for video-tape editing," *Jour. SMPTE, 79:* 186–190, Mar. 1970.
3. N. W. Green, "The Cinetronic automatic film presentation system," *Jour. B.K.S.T.S., 51:* 374–378, Nov. 1969.

standards and recommended practices

Approved SMPTE Recommended Practices

On January 29, 1970, the Society's Board of Governors approved the following five SMPTE Recommended Practices, four of which are published here for your information.

SMPTE Recommended Practice RP 7, Density and Contrast Range of Black-and-White Films and Slides for Television, SMPTE Recommended Practice RP 14, Plotting Data from Sensitometric Strips Exposed on Type 1b2 (Intensity Scale) Sensitometers, and proposed SMPTE Recommended Practice RP 15, Calibration of Densitometers Used for Black-and-White Photographic Density Measurement, are substantially reaffirmations of the earlier issues modifed editorially.

SMPTE Recommended Practice RP 39, Specifications for Maintaining an Emulsion-In Orientation on Theatrical Release Prints, is the result of investigation by the Film Projection Practice Committee. The results of the investigation into the cause of focus drift were published as, "Effect of Winding on the Projection Performance of 35-mm Motion Picture Film," in the SMPTE *Journal,* June 1965.

Tests showed that during the normal projection of 2000-foot reels the optimum focus position tended to change continuously. Through accelerated tests, it became evident that some physical action due to winding has a major influence on projection performance. As a result of this factor, the projection properties of a roll of film deteriorate sharply as the winding diameter becomes smaller.

It was obvious from the results of these tests that film wound emulsion-out has poorer projection properties than the same film wound emulsion-in, and that this difference is greatly accentuated as the winding diameter becomes smaller.

The significant advantage of emulsion-in winding is not only that it improves the projection performance of a reel of print film, but that it also minimizes the difference in projection performance between the head and the tail end of the reel.

SMPTE Recommended Practice RP 6, Reference Carrier Frequencies and De-Emphasis Characteristics for 2-In Quadruplex Video Magnetic Tape Recording, now includes an addition to Section 4: Practice LBC is included for reference purposes only. Practice LBC is considered to be obsolescent and is not recommended for new color recordings. RP 6-1967 was published in the July 1967 *Journal.*

Copies of these documents and all SMPTE Recommended Practices may be acquired from Society Headquarters upon request.

Draft American National Standards

Three Draft American National Standards are published here for a trial period and public review. Comments should be addressed to Alex E. Alden, Staff Engineer, at Society Headquarters before June 30, 1970. The proposals have been submitted to the appropriate American National Standards Committees. Consequently, all comments received through *Journal* publication will be reviewed prior to conclusion of action by these committees.

The three proposals specify printed areas on motion-picture stock used in the production of super 8 prints. The proposals are PH22.179, Location of Super 8 Printed Area in Optical Reduction Printing on 35mm Motion-Picture Film Perforated 2R-1664 (1-0), PH22.180, Location of Super 8 Printed Area in Optical Reduction of Contact Printing on 35mm Motion-Picture Film, Perforated 5R-1667 (1-3-5-7-0), and PH22.181, Location of Super 8 Printed Area on 16mm Motion-Picture Film Perforated Super 8 (1-3).

Withdrawal of SMPTE Recommended Practice

On January 29, 1970, the SMPTE Board of Governors approved the recommendation by the Film Dimensions Committee and the SMPTE Standards Committee that the SMPTE Recommended Practice RP 28-1968, Dimensions for 35mm Motion-Picture Film, Perforated 8mm, 5R-1500, be withdrawn. The withdrawal was recommended because the specifications were not being followed. RP 28 was published in the SMPTE *Journal* of March 1968 – *A.E.A.*

SMPTE RECOMMENDED PRACTICE — RP 7-1970

Density and Contrast Range of Black-and-White Films and Slides for Television

1. *Scope*

1.1 This recommendation specifies important density values of black-and-white 16mm and 35mm motion-picture films and slides intended for television transmission.

2. *Density Requirements*

2.1 The minimum diffuse density of highlight areas shall have a normal value of 0.4 to 0.3 but not less than 0.3 for optimum reproduction in the television system. This value is not intended to apply to glint, specular highlights or other small areas where details need not be reproduced.

2.2 The maximum diffuse density of lowlight areas shall have a normal value of 1.9 to 2.0 but not greater than 2.0 for optimum reproduction in the television system. This value is not intended to apply to small areas where details need not be reproduced.

2.3 The density of human faces, usually observed more intently than other picture areas, shall be greater than the measured minimum density as specified in 2.1 above by a value not less than 0.15 or more than 0.5, unless special effects are desired. These density values are important in order to preserve the proper density relationships between face tones and highlights.

2.4 Density values on film intended for television, having a dyed or other base of significant minimum density, must be increased in all cases by the amount that such base density exceeds clear base density.

3. *Measurement*

3.1 The method of density measurement shall be in accordance with American National Standard Method of Determining Transmission Density of Motion-Picture Films, PH22.27-1960 (Reaffirmed 1969).

Revision of RP 7-1962
Approved January 1970

SMPTE RECOMMENDED PRACTICE — RP 15-1970

Calibration of Densitometers Used for Black-and-White Photographic Density Measurement

1. *Scope*

1.1 The purpose of this recommended practice is to specify the means to be employed in the calibration of densitometers utilized in the measurement of diffuse transmission densities.

1.2 This practice applies to densitometers utilized for the measurement of processed black-and-white photographic films and plates or cast colloidal carbon tablets.

2. *Types of Densitometers*

2.1 In general, only those densitometers which conform to the geometric and spectral conditions specified by American National Standard Diffuse Transmission Density, PH2.19-1959, are capable of giving accurate readings of American National Standard diffuse transmission density for all types of black-and-white photographic materials.

2.2 If a nonconforming densitometer is to be used with a given type of photographic material, it may be calibrated from reference samples composed of the same material. In this way, any densitometer may be calibrated to read "American National Standard Diffuse Transmission Density," Type V1-b or Type P2-b, on any single type of photographic material to a degree of accuracy commensurate with the stability and reproducibility of the instrument itself. In general, a new calibration must be made to obtain accurate readings on a different material when a nonconforming densitometer is used.

3. *Reference Specimen*

3.1 A reference specimen shall be a calibrated gray scale which is stored with special care and used at intervals of three months, more or less, as a primary reference against which to control the working specimens. (See 4.1.)

3.2 A densitometer conforming to the geometric and spectral conditions specified in American National Standard PH2.19-1959, for either Type V1-b or Type P2-b, and measuring in American National Standard diffuse transmission density, shall be used to calibrate the reference specimen. (Calibrated reference specimens are sold by manufacturers of densitometers, sensitometers and film.)

3.3 The reference specimen shall have a range of diffuse transmission densities from below 0.06 to 3.0 or greater.

3.4 The density variation within each step or within each specified calibration area shall be 0.01 or less. (Care should be exercised in selecting reference specimens. They should be free from dirt spots and abrasions. The step or calibration area should be large enough to accommodate the largest aperture used for measuring the specimen and to allow for normal specimen-positioning variations. Good optical density stability is essential for reference specimens. In general, this can be accomplished by keeping the processed specimen two months or longer under normal laboratory lighting and temperature conditions before calibrating the specimen.)

3.5 A calibration chart shall accompany each reference specimen, giving the diffuse transmission densities of each step. It shall be noted on the calibration chart whether the diffuse transmission densities listed are American National Standard diffuse visual densities Type V1-b or American National Standard diffuse printing densities Type P2-b (American National Standard PH2.19-1959). Each reference specimen and corresponding calibration chart shall be identified by a code or serial number. The chart shall also show the type of film of which the reference specimen is made.

3.6 Each step of each of three reference specimens shall then be measured carefully on the laboratory densitometer to be controlled. The step-by-step measurements of one specimen shall be compared to the calibration chart values for that specimen, and the deviations* plotted versus the calibration chart values. Measurements of each of the other specimens shall also be compared to corresponding calibration values, and the deviations plotted upon the same chart (Appendix). This procedure establishes the correlation among reference specimens.

* If, during the procedure, deviations in excess of the tolerances shown in 5.2 are obtained, the densitometer first could be recalibrated according to Section 5 and the procedure repeated. However, correlation curves obtained from a densitometer out of calibration (but operating properly) are valid.

Revision of RP 15-1964
Approved January 1970

3.7 The procedure in 3.6 shall be repeated on the same densitometer at three-month intervals. If the correlation among reference specimens remains the same, it can be assumed that the specimens have not deteriorated. (Even if used once a week for calibration, seasoned (see 3.4 footnote) reference specimens, when properly handled, might be expected to remain in good condition for about a year.)

3.8 If the trimonthly check reveals that one specimen no longer correlates with the others, it shall be discarded. If the trimonthly check shows that the samples have maintained their original correlation but all three deviation curves have shifted, it may be assumed that the instrument calibration has changed. (However, it is remotely possible that all reference specimens have deteriorated equally.)

4. *Working Specimen*

4.1 A working specimen shall be a calibrated gray scale which is used for the routine calibration of densitometers and measured for correct density against the reference specimens at intervals of three months, more or less.

4.2 For routine checking of the densitometer, it is not advisable to use the reference specimens. For this purpose, working specimens of the same material shall be used once they have been related directly or indirectly to the reference specimens.

4.3 The working specimen can be directly related to the reference specimens by deviating initial average of replicate readings of the working specimen from those of a reference specimen calibration curve (3.6). These deviations, when plotted, shall constitute a working specimen calibration curve. The tolerances shown in 5.2 shall apply to the step values assigned to the working specimen.

4.4 The following alternate technique may be used in place of that outlined in 4.3: a working specimen may be selected and the step densities read on a densitometer which has been newly calibrated by means of the reference specimens. When this working specimen is subsequently used to check densitometer calibration, the instrument shall duplicate the original readings within a tolerance of ± 0.01 from density 0.00 to 2.0 and within ± 0.02 above a density of 2.0 (These tolerances apply to electronic physical densitometers such as the Westrex or Eastman Electronic densitometer. Other densitometers may require wider tolerances. See note after 5.2.) If this tolerance is exceeded in the same direction by three successive steps in one calibration check or by one step on three successive calibration checks, the instrument shall be evaluated with reference specimens. If this evaluation shows the instrument to be in calibration, the new density values shall be assigned to the working specimen, or the working specimen shall be replaced by a new one. If, however, the reference specimen confirms that the instrument is out of calibration, it shall be recalibrated, as in Section 5.

5. *Densitometer Calibration*

5.1 The reference specimen shall be placed in the densitometer to be calibrated in the manner specified in American National Standard PH2.19-1959; i.e., the emulsion side of the reference specimen shall face the receiver, except that if the incident radiation is diffuse, the emulsion side of the specimen shall face the diffuser. (Reference specimens should be handled with care to prevent density changes resulting from abrasions, fingerprints or foreign materials such as grease or film-cleaning compounds.

5.2 The values of diffuse transmission density of the type desired indicated by the densitometer under test shall agree with the values shown on the calibration chart accompanying the reference specimen. For routine sensitometric applications, tolerances may be allowed as follows:

Density	*Tolerance*
0.0 to 1.0	± 0.01
1.0 to 2.0	± 0.015*
2.0 to 3.0	± 0.02
3.0 to 4.0	± 0.03

Each individual densitometer will vary about its bias level. The amount of variation will depend upon the type and condition of the instrument. Precision or repeatability of individual densitometers will determine the need for and degree of replication of measurements. A statistical method for controlling this variability is outlined in the SMPTE book, "Control Techniques in Film Processing."

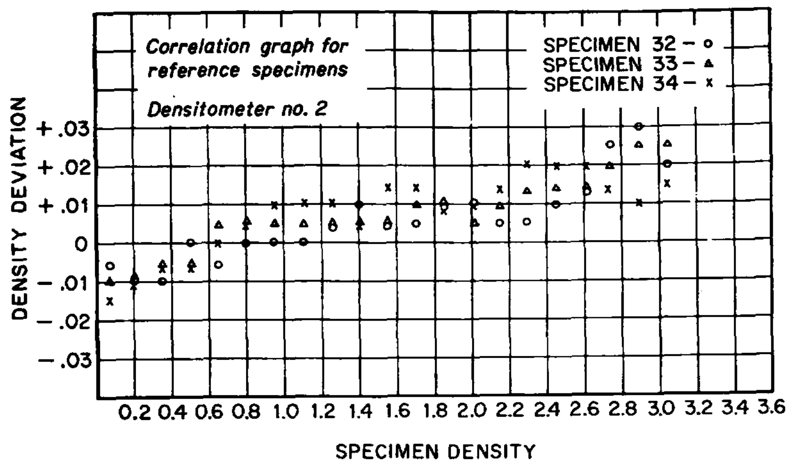
5.3 A densitometer which gives measured values with the reference specimen in excess of the tolerance in 5.2 shall be taken out of service for repair or adjustment. Alternatively, a correction table or chart may be utilized to permit adjustment of the measured values in accordance with the calibration chart.

5.4 If the densitometer under test is of the non-conforming type, its scope may be evaluated by measuring samples which vary in scattering power and spectral selectivity and comparing these results with those obtained by the standard method.

* It is impossible to read thousandths of a density point on all but the most precise instruments. This figure is given as a tolerance based on the statistical average of several readings.

Appendix

(The Appendix is not a part of this SMPTE Recommended Practice, but is included to facilitate its use.)



American National Standard diffuse visual density value (from reference specimen calibration chart).

SMPTE RECOMMENDED PRACTICE — RP 14-1970

Plotting Data from Sensitometric Strips Exposed on Type Ib2 (Intensity Scale) Sensitometers*

1. *Scope*

1.1 The purpose of this recommended practice is to specify the relationship of the spacings of the exposure scale (horizontal co-ordinate) of graph paper on which sensitometric data are plotted and the corresponding increments of the logarithm of exposure in the sensitometer when the exposure modulator is a step tablet.

2. *Exposure Method*

2.1 In a Type I b (intensity scale) sensitometer, the most common method of modulating the illumination falling upon the sample employs a step tablet. The exposure is made with the emulsion of the sample in contact with the modulator except for a thin, transparent acetate cover which protects the modulator against abrasion and foreign matter. The opening and closing of a shutter admits light for the required period of time. Step tablets may be cast with gelatin containing dyes or colloidal carbon or, alternatively, may be produced photographically by suitable exposure and development of film or plates.

2.2 With a step tablet as the exposure modulator, the illumination reaching the sample is dependent upon the transmittance of the various steps of the modulator. This assumes uniformity of illumination. Density, being the common logarithm of the reciprocal of the transmittance, is a more convenient method for specifying the light-stopping power of the segments of the modulator. Density may be measured with a densitometer calibrated in reference to American National Standard Diffuse Transmission Density, PH2.19-1959.

2.3 The 1 b (intensity scale) sensitometer exposure modulator shall have step-to-step increments of 0.15 diffuse transmission density, Type V1-b. As modulators vary somewhat from this 0.15 increment, it may be necessary to adjust the step reference points on the exposure axis (horizontal co-ordinate) of the sensitometric graph paper to represent the actual densities of each step in the tablet. (Single step departures of the order of 0.015, or less, from the ideal 0.15 density increment, when known, would not be considered significant. However, cumulative errors, especially those which occur in the same direction, are significant and can lead to erroneous results. See Appendix.)

3. *Method of Correction*

3.1 The steps of the exposure modulator shall be measured with a densitometer reading in diffuse transmission density, Type V1-b, specified in American National Standard PH2.19-1959. Such densities are normally shown on the calibration chart accompanying each new step tablet.

3.2 If such a calibration chart is not available, the step tablet should be removed carefully from the sensitometer and from its removable protective cover, if any, and each step read on a densitometer. (See 3.1 above.)

3.3 Unless the step tablet modulator conforms to the following specifications, the sensitometric density data shall be plotted against the actual rather than the nominal densities of the step tablet:

(1) The density increment between any two adjacent steps shall be 0.150 ± 0.015 density.

(2) The departure of any step from its nominal density value shall not exceed 0.02 density or 2 percent of its density value, whichever is greater. The nominal value is defined as the density of the lowest density step plus 0.15 times the number of steps above the lowest density step.

(3) Linearity. No individual step shall depart from the best linear fit through all the steps by more than a density of 0.02.

4. *Method for Plotting Actual Densities of the Step Tablet Modulator*

4.1 For laboratories using graph paper where the scale of the horizontal co-ordinate is as long or longer than the scale of the vertical co-ordinate: most laboratories carry a supply of printed graph sheets for the plotting of sensitometric data. These sheets normally carry a density scale on the vertical co-ordinate and a numbered "step" scale or log exposure reference on the horizontal co-ordinate. It is suggested that the density scale be cut off a graph sheet and placed along the horizontal co-ordinate of a second sheet. The scale of the first sheet should be oriented as shown in the Appendix.

* Loyd A. Jones, "Photographic sensitometry," Part I, *Jour. SMPE, 17:* 491-535, Oct. 1931; Part II, *Jour. SMPE, 17:* 695-742, Nov. 1931; Part III, *Jour. SMPE, 18:* 54-89, Jan. 1932; Part IV, *Jour. SMPE, 18:* 324-355, Mar. 1932.

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4.2 The density readings of the exposed and processed sample may now be plotted against the actual step tablet densities.

4.3 For laboratories using graph paper where the horizontal co-ordinate is shorter than the vertical co-ordinate: on graph sheets where the horizontal co-ordinate carries 7½ equal divisions between each "step" or log exposure reference, each division represents 0.02 density of the sensitometer step tablet and may be used as reference to plot the densities of the step tablet against the densities of the exposed and processed sample.

4.4 Where there is no scale on the horizontal co-ordinate between each "step" or log exposure reference, a scale may be drawn to divide the space between each reference into 7½ equal parts. Each part will represent 0.02 density of the sensitometer step tablet. This scale may be moved up the sheet opposite the various density readings of the exposed and processed sample so as to locate the step tablet densities versus the processed sample densities.

5. *Care of the Modulator*

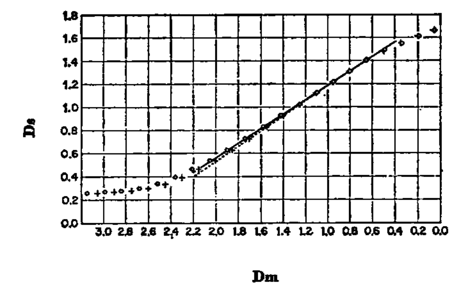
5.1 Step tablets are very delicate. To prevent damage, it is customary to protect the tablet with a thin, transparent acetate cover. The surface of the cover should be inspected from time to time to ensure that it is clean and free from abrasion. The acetate cover should be renewed when necessary to ensure that the diffuse transmission densities of the modulator steps are not affected by dirt or abrasion on the cover.

5.2 While the density of step tablets normally changes little over periods ranging up to two years, it is suggested that they be checked for density from time to time.

Appendix

(The Appendix is not a part of this SMPTE Recommended Practice, but is included to facilitate its use.)

The graph paper described in this recommended practice is in accordance with SMPTE Recommended Practice RP 22-1966, Specifying Graph Paper Used in Inter-Laboratory Exchange of Plotted Sensitometric Data. In plotting sample density against actual step tablet density, the density scale along the horizontal co-ordinate is equivalent to the log E scale; e.g., 0.02 density equals 0.02 log E. Following this procedure, comparisons of plotted sensitometric data can be made with the knowledge that any observed differences cannot be attributed to differences in the plotting method.



Legend

---x---x Curve showing sample densities versus modulator densities assumed to have consecutive ideal increments of 0.15

—o—o— Curve showing same sample densities versus actual modulator densities for a modulator not meeting the criterion of 3.3 (2)

SMPTE RECOMMENDED PRACTICE — RP 39-1970

Specifications for Maintaining an Emulsion-In Orientation on Theatrical Release Prints

Introduction

As the result of investigational work by members of the Society, a paper was published in the June 1965 issue of the SMPTE Journal, Effect of Winding on the Projection Performance of 35mm Motion-Picture Film, documenting the improvement in screen image quality to be gained when theatrical release prints are wound, used, and stored consistently in an emulsion-in orientation. Other advantages include minimal focus drift and a much lower tendency toward flutter and in-and-out of focus.

It is recognized that many details of the projection process can influence screen image quality, and that the print winding procedures are but one part of this process. On the other hand, prints normally circulate through a large number of theaters and maintenance of the film in good condition has always been a responsibility shared among many. Therefore, it is proposed to describe this element of good projection in a recommended practice so that it can be more widely utilized, and its advantages added to the many other beneficial practices that can be independently controlled in each theater.

The specifications mentioned herein are designed to provide a simple and smooth transition from the traditional emulsion-out handling to the recommended emulsion-in orientation and its advantages.

1. *Scope*

1.1 This recommended practice specifies the necessary handling changes in the laboratory, film exchange, and projection room to achieve the emulsion-in orientation of theatrical release prints.

1.2 The practice also describes the advantages to be gained by the change to emulsion-in orientation of theatrical release prints.

1.3 The practice further discusses the consequences of returning to the emulsion-out orientation during the exhibition life of theatrical release prints.

1.4 The practice suggests, in the appendix, the various minor modifications that might be necessary in equipment used for projection, film rewind, and film inspection.

2. *Definitions*

2.1 Emulsion-in. When the film is examined on the reel, the emulsion side of each lap faces toward the hub of the reel.

2.2 Emulsion-out. When the film is examined on the reel, the emulsion side of each lap faces toward the rim of the reel.

2.3 Current procedures. This recommended practice represents a change from the common U.S. practice of having the projector supply reel emulsion-out, the projector take-up reel emulsion-in, and in the rewinding, converting to emulsion-out. This recommended practice specifies that the film be kept emulsion-in throughout its processed life.

3. *Description*

The following procedures are recommended if maximum benefit is to be derived from the proposed change in release print winding orientation:

3.1 The release print must be wound emulsion-in at the first winding after processing, and must be wound emulsion-in every time thereafter. A single winding in the emulsion-out orientation, even briefly, will reduce the benefits very noticeably.

3.2 Specifically, the release print film should be wound emulsion-in on standard cores, as it exits from the processing machine. The emulsion-in orientation should be maintained when the new print is mounted onto shipping reels at the film exchange. Any subsequent handling of the release print in the film exchange, whether for inspection or rewind, should also be in the emulsion-in orientation only.

In the projection room, the film reel should be loaded in the upper projector magazine so that the film will come from the front of the reel in a clockwise rotation. It should be emulsion-in on the take-up reel (as is now common practice). During rewinding, the film should be wound from top to top, or bottom to bottom, to maintain the emulsion-in orientation.

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4. *Objective*

4.1 Data and experimentation have shown that when a reel of print film has been maintained in an emulsion-in orientation from the time it was originally processed, its behavior during projection and the resultant screen image quality are greatly improved. There is a negligible amount of focus drift, and a much lower tendency toward flutter and in-and-out of focus.

4.2 If the print film should inadvertently be wound emulsion-out, its physical properties quickly revert to the current level of performance in evidence now, and its projection properties and screen image quality would become the same as if the film had never been wound emulsion-in.

4.3 Unless the film is wetted and dried, as by reprocessing, the disadvantages of even a single emulsion-out winding are self-correcting only over a long period of many weeks.

4.4 The benefits derived from emulsion-in winding, however, should not be minimized. It should be stressed that the increase in screen image quality is a significant one, particularly in large, first-run theaters.

4.5 A complete changeover to the emulsion-in winding orientation of release prints by the motion-picture industry would be a formidable task. The breaking of deeply ingrained film-handling habits would not be easy to accomplish. It is hoped, however, that the recommended emulsion-in winding orientation will be accepted by leaders in the industry, and that this will become the first step toward the eventual complete changeover.

Appendix

(This Appendix is not part of this SMPTE Recommended Practice, but is included to facilitate its use.)

1. In some projection equipment, it may be necessary to make minor modifications in the upper film magazine to accommodate the new clockwise rotation. Before changes are made in the mechanical parts of projectors, local municipal fire codes must be checked to determine that such changes are not inconsistent with the requirements of applicable law. If the modification of the upper film magazine on the projector has necessarily eliminated the valve rollers, the back wall of that magazine must contain a label or decal specifying the current Underwriters' Laboratories requirements and also a warning against the use of flammable films in the modified equipment. Since there is the possibility of abrasion as the film enters the upper valve rollers from a different angle, some projector manufacturers have made available a simple conversion kit for providing the proper film guidance at that location. It is also feasible to install a small roller just above the valve rollers to accomplish the same objective.

   For those installations which have reel-end alarms, a kit is available for making the proper modifications to clockwise rotation. Reel alarm systems are also available for clockwise use.

2. Projection rooms which are using commercial automatic rewind systems that will not allow top-to-top rewinding without causing film abrasion against the outer case, can modify their equipment by installing a flanged, undercut idler roller just beneath the case obstruction. Another method, which may be more expedient, is to introduce a twist in the film and rewind in the previously accustomed manner.

   Commercial, foot-operated power rewinds, which are employed in some film exchange facilities, can be used without modification if there is no need to wind in both directions. Under present conditions, utilizing the emulsion-out winding orientation, it is possible to wind in both directions under power. Inspection of these units has indicated that the reversal of the motor rotation in the film reel magazine on the left side of the unit would provide the necessary modification to allow power wind in both directions.

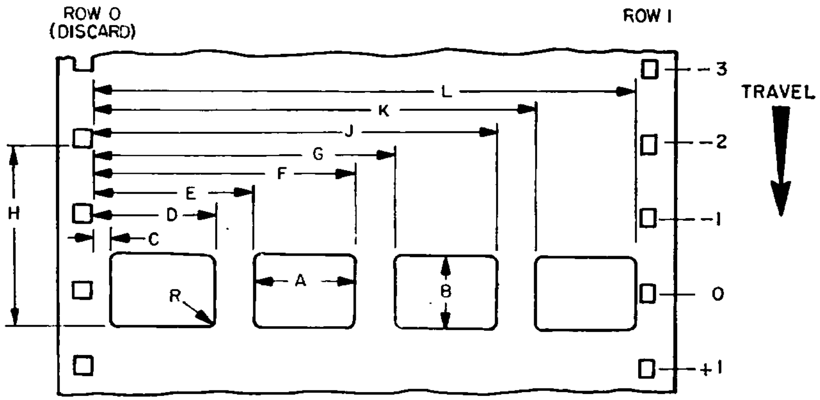
Draft American National Standard

Location of Super 8 Printed Area in Optical Reduction Printing on 35mm Motion-Picture Film, Perforated 2R-1664 (1-0)

PH22.179

1. Scope

This standard specifies the location and size of the super 8 printed picture area for negative and intermediate optical reduction printing on 35mm motion-picture film perforated 2R-1664 in positions 1 and 0.



Dimensions	Inches		Millimeters	
A	0.228	ref	5.79	ref
B	0.162	min	4.11	min
C	0.047	max	1.19	max
D	0.271	min	6.88	min
E	0.361	max	9.17	max
F	0.585	min	14.86	min
G	0.675	max	17.14	max
H*	0.393 ± 0.002		9.98 ± 0.05	
J	0.899	min	22.83	min
K	0.989	max	25.12	max
L	1.213	min	30.81	min
R	0.005	max	0.13	max

* See Note 3 and Appendix A1.

THIS PROPOSAL IS PUBLISHED FOR COMMENT ONLY

2. Dimensions

2.1 The dimensions shall be as given in the figure and table.

2.2 Dimensions A, B, and H apply to all images. The differences in values from the reference perforation, Dimensions C through L, establish the minimum area to be printed. For convenience, and to avoid unnecessary addition and subtraction in applying this standard, a reference dimension has been supplied for a typical width of the image area.

NOTE 1: The reduction ratio of prints made from 16mm negatives or reversal originals shall be approximately 1.8:1.

NOTE 2: The reduced super 8 image of the original camera aperture image should be centered on the perforation centerline, when the original or intermediate contains more vertical height information than is transferred to the reduced image.

NOTE 3: The "travel" shown in the figure is to aid in illustrating the —2 perforation used to position the 8mm print, and the direction of motion in the projector for the resulting 8mm print if the figure is as seen from the light source in a projector used for direct front projection (See A1).

NOTE 4: If photographic sound will be applied to the print, it is necessary to restrict the value for Dimensions C, E, G, and K to avoid intrusion into the sound track area. A suggested value of 0.0015 in. (0.038mm) less than the maximum value may be used until the values are established.

Appendix

(The Appendix is not a part of this American National Standard, but is included to facilitate its use.)

A1. If prints are made with a step printer, the registration device should be in the —2 perforation, or that perforation which corresponds to the —2 perforation when the final print stage is reached, to obtain maximum benefit of cancellation as films are projected in accordance with American National Standard Specifications for Projector Usage of Super 8 Motion-Picture Film, PH22.155-1967, which specifies the —2 position for projected films.

A2. The parenthetical numerals have been added to the title of this standard to specify how the rows of perforations are placed on the film. This designation is necessary only when the film stock is wider than its end use and more than one combination of perforation rows is possible. The perforation rows are numbered starting at the reference edge, which is the edge nearest to that row of perforations which is retained in the slitting operation. The row of perforations which is discarded is given the number 0. Negative or intermediate films which are not slit may contain a 0-numbered row of perforations if that perforated row corresponds to the discard row of perforations on the subsequent print stock.

PH22.179

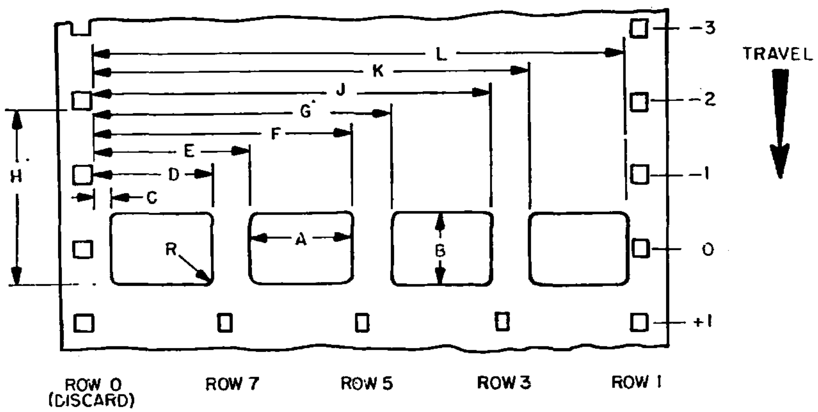
Draft American National Standard

Location of Super 8 Printed Area in Optical Reduction of Contact Printing on 35mm Motion-Picture Film, Perforated 5R-1667 (1-3-5-7-0)

PH22.180

1. Scope

This standard specifies the location and size of the super 8 printed picture areas for print films derived by optical or contact printing on 35mm film perforated 5R-1667 in positions 1, 3, 5, 7 and 0.



Dimensions	Inches		Millimeters	
A	0.228	ref	5.79	ref
B	0.162	min	4.11	min
C	0.047	max	1.19	max
D	0.271	min	6.88	min
E	0.361	max	9.17	max
F	0.585	min	14.86	min
G	0.675	max	17.14	max
H*	0.393 ± 0.002		9.98 ± 0.05	
J	0.899	min	22.83	min
K	0.989	max	25.12	max
L	1.213	min	30.81	min
R	0.005	max	0.13	max

* See Note 3 and Appendix A1.

THIS PROPOSAL IS PUBLISHED FOR COMMENT ONLY

2. Dimensions

2.1 The dimensions shall be as given in the figure and table.

2.2 Dimensions A, B, and H apply to all images. The differences in values from the reference perforation, Dimensions C through L, establish the *minimum area to be printed.* For convenience, and to avoid unnecessary addition and subtraction in applying this standard, a reference dimension has been supplied for a typical width of the image area.

NOTE 1: The reduction ratio of prints made from 16mm negatives or reversal originals shall be approximately 1.8:1.

NOTE 2: The reduced super 8 image of the original camera aperture image should be centered on the perforation centerline, when the original or intermediate contains more vertical height information than is transferred to the reduced image.

NOTE 3: The "travel" shown in the figure is to aid in illustrating the —2 perforation used to position the 8mm print, and the direction of motion in the projector for the resulting 8mm print if the figure is as seen from the light source in a projector used for direct front projection (See A1).

NOTE 4: If photographic sound will be applied to the print, it is necessary to restrict the value for Dimensions C, E, G, and K to avoid intrusion into the sound track area. A suggested value of 0.0015 in. (0.038mm) less than the maximum value may be used until the values are established.

Appendix

(The Appendix is not a part of this American National Standard, but is included to facilitate its use.)

A1. If prints are made with a step printer, the registration device should be in the —2 perforation, or that perforation which corresponds to the —2 perforation when the final print stage is reached, to obtain maximum benefit of cancellation as films are projected in accordance with American National Standard Specifications for Projector Usage of Super 8 *Motion-Picture Film, PH22.155-1967*, which specifies the —2 position for projected films.

A2. The parenthetical numerals have been added to the title of this standard to specify how the rows of perforations are placed on the film. This designation is necessary only when the film stock is wider than its end use and more than one combination of perforation rows is possible. The perforation rows are numbered starting at the reference edge, which is the edge nearest to that row of perforations which is retained in the slitting operation. The row of perforations which is discarded is given the number 0. Negative or intermediate films which are not slit may contain a 0-numbered row of perforations if that perforated row corresponds to the discard row of perforations on the subsequent print stock.

PH22.180

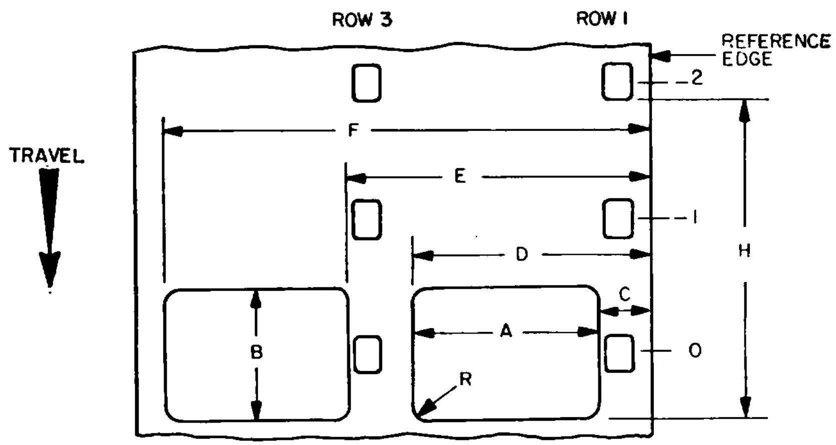
Draft American National Standard

Location of Super 8 Printed Area on 16mm Motion-Picture Film, Perforated Super 8 (1-3)

PH22.181

1. Scope

This standard specifies the location and size of the super 8 printed picture areas for negative/positive and reversal printing on 16mm motion-picture film perforated super 8, 2R-1667 and 2R-1664 in positions 1 and 3.



Dimensions	Inches		Millimeters	
A	0.228	ref	5.79	ref
B	0.162	min	4.11	min
C	0.058	max	1.47	max
D	0.282	min	7.16	min
E	0.372	max.	9.45	max
F	0.596	min	15.14	min
H*	0.393 ± 0.002		9.98 ± 0.05	
R	0.005	max	0.13	max

* See Note 3 and Appendix A1.

THIS PROPOSAL IS PUBLISHED FOR COMMENT ONLY

2. Dimensions

2.1 The dimensions shall be as given in the figure and table.

2.2 Dimensions A, B, and H apply to all images. The differences in values from the reference perforation, Dimensions C through F, establish the minimum area to be printed. For convenience, and to avoid unnecessary addition and subtraction in applying this standard, a reference dimension has been supplied for a typical width of the image area.

NOTE 1: The reduction ratio of prints made from 16mm negatives or reversal originals shall be approximately 1.8:1.

NOTE 2: The reduced super 8 image of the original camera aperture image should be centered on the perforation centerline, when the original or intermediate contains more vertical height information than is transferred to the reduced image.

NOTE 3: The "travel" shown in the figure is to aid in illustrating the —2 perforation used to position the 8mm print, and the direction of motion in the projector for the resulting 8mm print if the figure is as seen from the light source in a projector used for direct front projection (See A1).

NOTE 4: If photographic sound will be applied to the print, it is necessary to restrict the value for Dimensions D and F to avoid intrusion into the sound track area. A suggested value of 0.0015 in. (0.038mm) more than the minimum value may be used until the values are established.

Appendix

(The Appendix is not a part of this American National Standard, but is included to facilitate its use.)

A1. If prints are made with a step printer, the registration device should be in the —2 perforation, or that perforation which corresponds to the —2 perforation when the final print stage is reached, to obtain maximum benefit of cancellation as films are projected in accordance with American National Standard Specifications for Projector Usage of Super 8 Motion-Picture Film, PH22.155-1967, which specifies the —2 position for projected films.

A2. The parenthetical numerals have been added to the title of this standard to specify how the rows of perforations are placed on the film. This designation is necessary only when the film stock is wider than its end use and more than one combination of perforation rows is possible. The perforation rows are numbered starting at the reference edge, which is the edge nearest to that row of perforations which is retained in the slitting operation. The row of perforations which is discarded is given the number 0. Negative or intermediate films which are not slit may contain a 0-numbered row of perforations if that perforated row corresponds to the discard row of perforations on the subsequent print stock.

PH22.181