at the next Technical Conference. Tony Bruno has accepted chairmanship. The Color Committee will work with him to achieve success in a difficult project.

FRANK P. BRACKETT
Chairman

16mm and 8mm Motion Pictures Committee Report

THERE WERE several items of continuing work requiring minor revisions or redrafts that were dispensed with during the committee meeting at the 109th Conference. These included the rewording of the document describing the nomenclature of 8mm films to be known as super 8 (type S), or regular 8 (type R); combining of the two projector usage documents, PH22.10 and PH22.16; and establishing a preferred, rather than a standard, emulsion orientation, as recommended by Robert Colburn's ad hoc committee. In addition, the chairman presented the Staff Engineer with the specifications for incorporating the end-of-run and perforation notches for super-8 films into PH22.159.1–5. Documents requiring only editorial modifications prior to reballoting include the Proposed SMPTE RP Leader and Trailer for 8mm Preprint Material and the Proposed Recommended Practice for Safe Action and Title Areas for Super 8.

The Staff Engineer reported comments of Engineering Committee balloting and satisfactory disposition of comments for the document on Super-8 Sprocket Design and the proposed SMPTE Recommended Practice for Film Lubrication. Several documents that are in process required referral to their ad hoc committees for additional technical specifications. These included the Proposed Standard for Internal Reflector Lamps and the Proposed Recommended Practice for Projector Spindles for Super 8.

It was necessary to table the revision of RP 1 for 16mm and 8mm Sprocket Design and to table work on the Super-8 Camera Lighting Bracket until disposition is made on parallel work being conducted by the ISO and to be reviewed at the Seventh Plenary Session in London in June.

During the past several meetings of the committee, the question of appropriate test targets for 8mm, super-8 and 16mm registration test films have been discussed. Initially the changed test target represented by RP 32 for super 8 was chosen after an extensive survey. Subsequent sale of this product by the SMPTE has shown a significant number of customers desiring the previous (present 8 and 16mm) test target format. Consequently, the committee concluded that a composite target would probably require extensive work without fulfilling the needs of the users of these films. Therefore, it will be recommended to the ad hoc committee that because the two different test targets offer unique advantages, both should be supplied by the SMPTE in the regular 8, super-8 and 16mm formats.

Currently, the International Organization for Standardization is reviewing and proposing new dimensional specifications for 16mm projection reels. Norman Goldberg has been chairing an ad hoc committee to investigate the compatibility of the ISO proposals in order to assist the USA Committee in its ballot and to consider proposed revisions to the USA document. Mr. Goldberg reported significant changes in flange and diameter departing from the USA document specification and, in some cases, representing significant increases in flange diameter which could cause problems with some existing projection equipment. Although the new specifications are theoretically desirable, based upon the ratio of hub to flange diameter, it is doubtful that these should be standardized because they represent aim specifications without sufficient relationship to existing practice. Comparative specifications were presented to interested members and the ad hoc committee will evaluate other dimensional changes as they may relate to the use of plastics for reels and containers.

The ad hoc committees for Reel-Rewind and Endless-Loop Cartridges met at the 109th Conference and reports of their activities were given by Howard C. Deck and William D. Hedden. The Reel-Rewind Committee reported a lack of progress toward agreement to obtain compatible reels for the nominal 220-ft and 400-ft capacity Bell & Howell and Kodak proposals for projection cassettes. The committee did agree, however, to promulgate standardization of both systems, since it appears that both meet ANSI requirements for standards consideration.

Mr. Hedden indicated that his Endless-Loop ad hoc committee surveyed current manufacturers and found two desiring to standardize their cassettes, while two of the largest manufacturers did not respond. Work will continue in this committee to propose standardization if the criteria are met by the respective manufacturers.

It was noted that both committees responded with recommendations for nomenclature at the October meeting in that the endless-loop variety of devices were to be stipulated "cartridges" and that Reel-to-Reel-rewind devices would be called "cassettes." Glen C. Bull pointed out that these recommendations were not being followed by manufacturers of this equipment and that the Department of Defense was concentrating on the descriptive specification "reel-rewind" and "endless-loop" device.

For new work, an ad hoc committee will be formed under the chairmanship of Herbert E. Farmer to update the SMPTE "Jiffy" test film.

R. J. ZAVADA
Chairman

standards and recommended practices

SMPTE Recommended Practice Approved

On April 25, 1971, the Society's Board of Governors approved SMPTE Recommended Practice RP 40-1971, Specifications for 35mm Projector Alignment and Screen Image Quality Test Film. The test film made in accordance with the practice is an updated version of the SMPTE All-Purpose Projector Alignment Test Film with additional visual data for performance evaluation of a projection system in terms of screen image quality.

ISO Recommendations Approved

Two ISO Recommendations were approved by the International Organization for Standardization (ISO): R 1223 in March and R 1189 in April 1971.

ISO Recommendation R 1189-1971, Recorded Characteristic for Magnetic Sound Records on 35mm Perforated Film, has no comparable American National Standard.

ISO Recommendation R 1223-1971, Picture Areas for Films and Slides for Television, is in agreement with SMPTE Recommended Practice RP 8-1968.

SMPTE RECOMMENDED PRACTICE — RP 40–1971

Specifications for 35mm Projector Alignment and Screen Image Quality Test Film

Introduction

This test film is an updated modification of the SMPTE All-Purpose Projector Alignment Test Film. At the recommendation of the Film Projection Practice Committee, additional visual data were incorporated to evaluate the performance of a projection system in terms of screen image quality. It is intended as an engineering tool to permit quantitative measurements of projector adjustments that affect the visual image.

1. *Scope*

1.1 This recommended practice describes the artwork and dimensions for a test chart to be used as the original subject for the manufacture of a master negative.

1.2 This recommended practice also describes the types of photographic materials and densitometry necessary to manufacture the original negative and to achieve release prints containing the high resolution recorded on the original negative.

2. *Description*

2.1 A reproduction of the test chart is shown in Fig. 1.

2.2 The background checkerboard pattern provides for a 50 percent transmission of the incident radiant energy so as to be more nearly consistent with the projection performance of an average release print. The pattern also provides a quick reference for overall image focus and quality.

2.3 The positive resolution charts are modified NBS Resolution Test Charts which have been trimmed to exclude low-order resolution below 24 lines per millimeter. (See Fig. 3.)

2.4 The negative resolution charts are not modified, but have been trimmed as stated in 2.3. They shall be positioned as shown in Fig. 1 so that the corners coincide.

2.5 The area between the logos *SMPTE* and *RP 40* is to be used to insert a gray patch, if necessary, as a densitometric control in the exposure and processing of the original negative and subsequent prints.

2.6 The test chart shall be photographed as a 35mm camera original negative on a film manufactured in accordance with American National Standard Dimensions for 35mm Motion-Picture Film, BH-1866, PH22.93-1964 (Reaffirmed 1969). The film shall be capable of a modulation transfer of at least 80 percent at 80 lines per millimeter, when properly exposed and processed in the recommended manner to a Ib control gamma of about 2.5. In the preparation of this negative, the film shall be used in such equipment and with such procedures as will maintain optimum resolution and image spread cancellation.

2.7 The chart shall be photographed with a Style B camera aperture, as specified in American National Standard Dimensions of 35mm Motion-Picture Camera Aperture Images, PH22.59-1966.

2.8 The test film shall be produced as a 35mm print in two sections, which shall be spliced together for normal use.

2.8.1 The first section of the test film shall be a print on a black-and-white silver image film in order to provide a high-definition, neutral target at normal contrast. The print is acceptable on film manufactured in accordance with American National Standard Dimensions for 35mm Motion-Picture Film, BH-1866, PH22.93-1964 (Reaffirmed 1969).

2.8.1.1 The printing light shall be chosen so that after processing in the recommended manner, there is cancellation of the image spread in the resolution targets specified in 2.3 and 2.4 at 80 lines per millimeter. If used, the gray patch density will provide a convenient densitometric control in the exposure and processing after the characteristics of the system have been established.

2.8.2 The second section of the test film shall be a print on color positive motion-picture film with the image restricted to the top layer for maximum resolution. The print is acceptable on film manufactured in accordance with American National Standard PH22.93-1964.

Approved April 1971

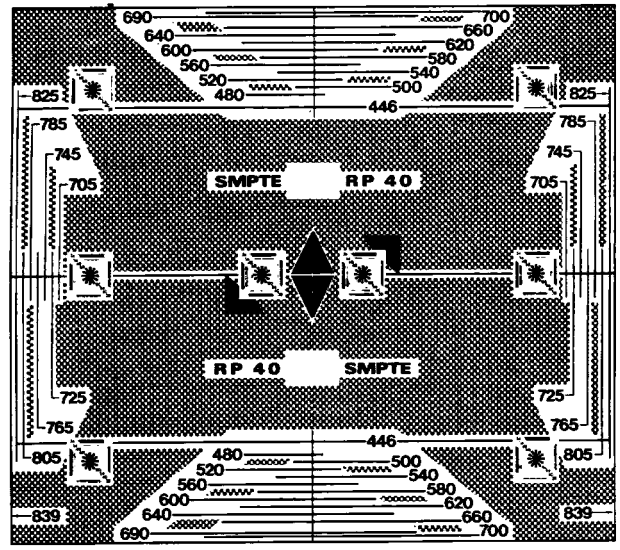


Figure 1

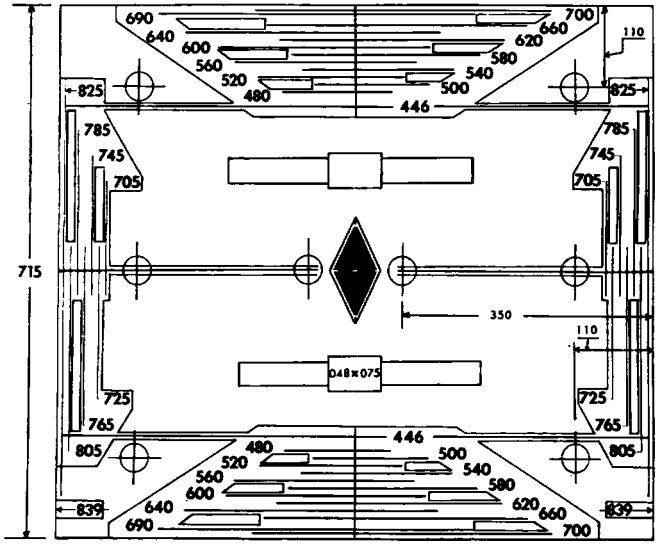


Figure 2

2.8.2.1. *The printing light shall be chosen so that after* processing in the recommended manner, there is cancellation of the image spread in the resolution targets specified in 2.3 and 2.4, at 80 lines per millimeter. If used, the gray patch *density will provide a convenient densitometric* control for the exposure and processing after the characteristics of the system have been established.

2.8.3 The recommended projection print shall be prepared by splicing together 100 ft of the black-and-white film as specified in 2.8.1 followed by 100 ft of the dye image film as specified in 2.8.2. The prints shall be made in accordance with current practices when using step-contact printers. The black-and-white test film shall also be available separately.

3. *Dimensions*

3.1 The dimensions of the original test chart shall be exactly 25X the dimensions listed in Fig. 2. This precise requirement is necessary because the NBS Resolution Test Charts are designed for a 25X reduction.

3.2 The reference figures, adjoining the horizontal and vertical lines, indicate the projector aperture dimensions in units of 0.001 in and shall be multiplied by 25 to provide the dimensions for making the original test chart.

3.3 All vertical lines in the test chart, except in the resolution test charts, shall be one half the thickness (0.0012 in) of the horizontal lines to compensate for the 2:1 image spread in anamorphic systems.

3.4 The original or 1:1 copy of the NBS Resolution Test Charts shall be cropped as specified in Fig. 3. The modification shall be similar to that illustrated in Fig. 4.

3.5 The modified NBS Resolution Test Charts shall be placed on the original test chart as specified by the dimensions in Fig. 2.

3.6 The gray patches, if used, shall be at least the dimensions specified in Fig. 2 in order to be readable in current 1 mm-aperture densitometers after a 25X reduction.

3.7 The checkerboard background shall contain 200 squares across the width of the test chart (0.839 in).

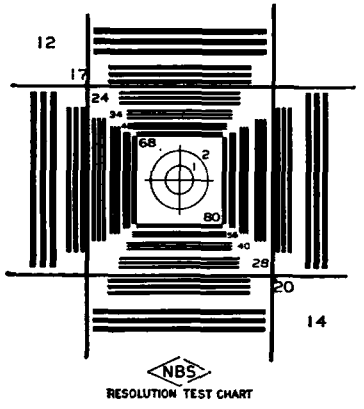


Figure 3

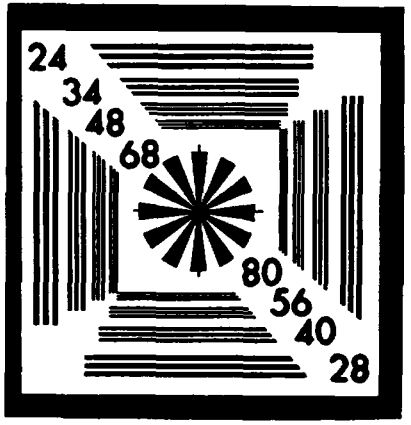


Figure 4

NOTE: A test film made in accordance with this recommended 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 to facilitate its use.)

Control of Resolution and Definition in the Preparation of Test Prints

A1. It has been found that producing test prints with resolution at 80 lines per millimeter requires careful selection of the materials and equipment used, and careful control of the operations. Inasmuch as a measuring tool should be better than the system it is designed to measure, it is desirable that the test film meet the specifications detailed herein, although normal theatrical program release prints will not usually meet these specifications.

A2. The camera used to photograph the test target must have a lens of suitable design and correction to provide a modulation transfer of at least 80 percent at 80 lines per millimeter over the entire field. The camera mechanism must provide steady images, preferably ensured by pin registration.

A3. Image densities referred to in this Appendix are intended for a more precise definition of one system shown to be applicable, and are measured in accordance with American National Standard Method of Determining Transmission Density of Motion-Picture Films, PH22.27-1960 (Reaffirmed 1969). Selection of a film for producing the negative must take into consideration not only the requirements of Section 2.6, but also image spread characteristics such that in conjunction with the print films at image densities that are useful, there is substantial image spread cancellation in the resolution range of interest. Accordingly, the final print will resolve 80 lines per millimeter with the lines and spaces equal in width.

A study of many film products has indicated that a film such as Eastman Type 5460 is applicable when exposed so that the density of the experimental gray patch, with a reflectance of 27 percent, is 0.67 after recommended processing for 7.5 minutes in a developer such as D-97 to a lb control gamma of 2.5.

A4. Selection of a film for producing the black-and-white *print must take into consideration not only the* requirements of Section 2.8.1 but also the image spread characteristics compatible with the negative and projection characteristics suitable for theatrical projection.

A study of many film products has indicated that a film such as Eastman Type 5460 is applicable when exposed so that the density of the experimental gray patch derived from the negative specified in A3 is 0.85 after processing for 3.5 minutes in a developer such as D-97 to a lb control gamma of 2.5.

Satisfactory results have been obtained only with a step-contact printer employing positioning pins.

A5. Selection of a film for producing the dye-image print must take into consideration not only the requirements of Section 2.8.2 but also image spread characteristics compatible with the negative and projection characteristics suitable for theatrical projection.

A study of many film products has indicated that a film such as Eastman Type 5385 is applicable when exposed through a filter pack that limits the image to the magenta layer, to a red, green, and blue density such that the experimental gray patch derived from the negative specified in A3 is R = 0.17, G = 1.00, and B = 0.34, when read in the densitometer after processing of the film in accordance with the manufacturer's recommendations.

A6. Preparation of the test prints with a resolution and steadiness adequate for the film's purpose requires great care in the selection and operation of the printer. Satisfactory results to date have been obtained only with a step-contact printer employing registration pins. This operation is facilitated by the use of print films perforated to the same standards as the negative (See 2.8.1 and 2.8.2).

If the test film can be made to the same image accuracy on raw stock manufactured in accordance with American National Standard Dimensions for 35mm Motion-Picture Film, DH-1870, PH22.1-1964 (Reaffirmed 1969), or American National Standard Dimensions for 35mm Motion-Picture Film, KS-1870, PH22.36-1964 (Reaffirmed 1969), these results would also be acceptable.

ISO Recommendation R 1189 April 1971

CINEMATOGRAPHY

RECORDED CHARACTERISTIC FOR MAGNETIC SOUND RECORDS ON 35 mm PERFORATED FILM

1. SCOPE

This ISO Recommendation specifies the recorded characteristic for magnetic sound records on 35 mm magnetic film and 35 mm motion-picture film with magnetic striping when used at the nominal speed of 24 frames (18 in or 45.6 cm) per second or 25 frames (18.7 in or 47.5 cm) per second.

NOTE. – This ISO Recommendation and relevant portions of Recommendation No. 265-2 of the CCIR have substantially the same technical content.

2. RECORDED CHARACTERISTIC

2.1 With constant electromotive force applied to the input of the recording chain, the curve of recorded surface induction versus frequency should rise with increasing frequency in conformity with the admittance of a series combination of a capacitance and resistance having a time constant of 35 μs.

2.2 The corresponding reproducing characteristic is that which gives a flat response when reproducing a sound track recorded with the relative surface induction levels stated in clause 2.1.

3. TOLERANCES

Magnetic sound records on 35 mm films should be recorded to the characteristic specified in clause 2.1 within the tolerances given in the Figure on the next page.

TABLE

Frequency	dB	Frequency	dB
40	−41.11	3 000	−5.18
50	−39.18	4 000	−3.60
60	−37.59	4 547.3	−3.01
100	−33.16	5 000	−2.62
200	−27.14	6 000	−1.97
300	−23.63	7 000	−1.53
400	−21.15	8 000	−1.22
500	−19.23	9 000	−0.99
700	−16.35	10 000	−0.82
1 000	−13.36	12 000	−0.58
2 000	− 7.90	15 000	−0.38

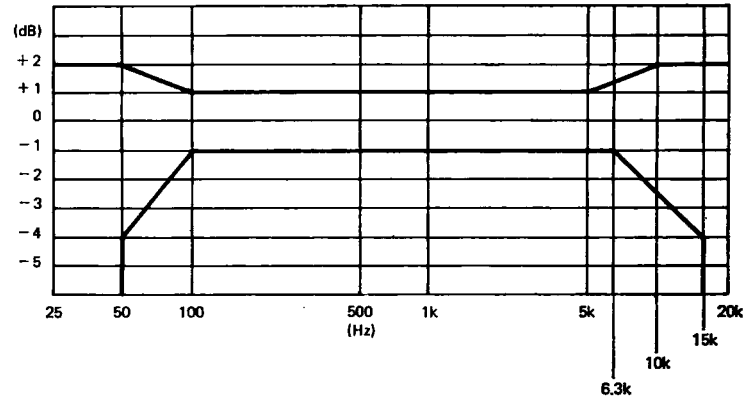


FIGURE – Tolerance on recorded levels

ISO Recommendation R 1223 March 1971

CINEMATOGRAPHY

PICTURE AREAS FOR FILMS AND SLIDES FOR TELEVISION

1. SCOPE

This ISO Recommendation defines those areas of the images on 35 mm and 16 mm motion-picture films and on 5 cm × 5 cm (2 in × 2 in) slides which are transmitted by television, together with the safe areas within which any pictorial or written matter may be expected to be received on a domestic television receiver. It applies to non-anamorphotic film images of 4 : 3 ratio.

2. DEFINITIONS

2.1 *Transmitted area.* That area of the image on the film or slide which is transmitted from the television station.

2.2 *Action field.* That area on the film or slide within which pictorial matter may be composed, and which may reasonably be expected to be reproduced on a domestic receiver.

2.3 *Safe title area.* That area on the film or slide which is available to contain all essential information.

3. DIMENSIONS

3.1 Transmitted area

The dimensions of the transmitted areas of the images on 35 mm and 16 mm films and on 5 cm × 5 cm (2 in × 2 in) slides are given in Figures 1, 4 and 7, respectively.

3.2 Action field

The dimensions of the action field on 35 mm and 16 mm films and on 5 cm × 5 cm (2 in × 2 in) slides are given in Figures 2, 5 and 8, respectively.

NOTES

1. The dimensions of the action field were calculated by multiplying the transmitted area width by 0.675, 0.900 and 0.180 for the height, width and corner radius, respectively.
2. In slides, the picture is so composed that the slide is used with the larger dimension of the action field horizontal.

3.3 Safe title area

The dimensions of the safe title area on 35 mm and 16 mm films and on 5 cm × 5 cm (2 in × 2 in) slides are given in Figures 3, 6 and 9, respectively.

NOTES

1. The dimensions of the safe title area were calculated by multiplying the transmitted area width by 0.650, 0.800 and 0.160, for the height, width, and corner radius, respectively. The safe title area does not follow strictly the 4 : 3 ratio of the transmitted area, being proportionately greater in height than in width. This is possible because the average domestic receiver is capable of reproducing height more accurately than width.
2. In slides, the written matter is so composed that the slide is used with the larger dimension of the safe title area horizontal.

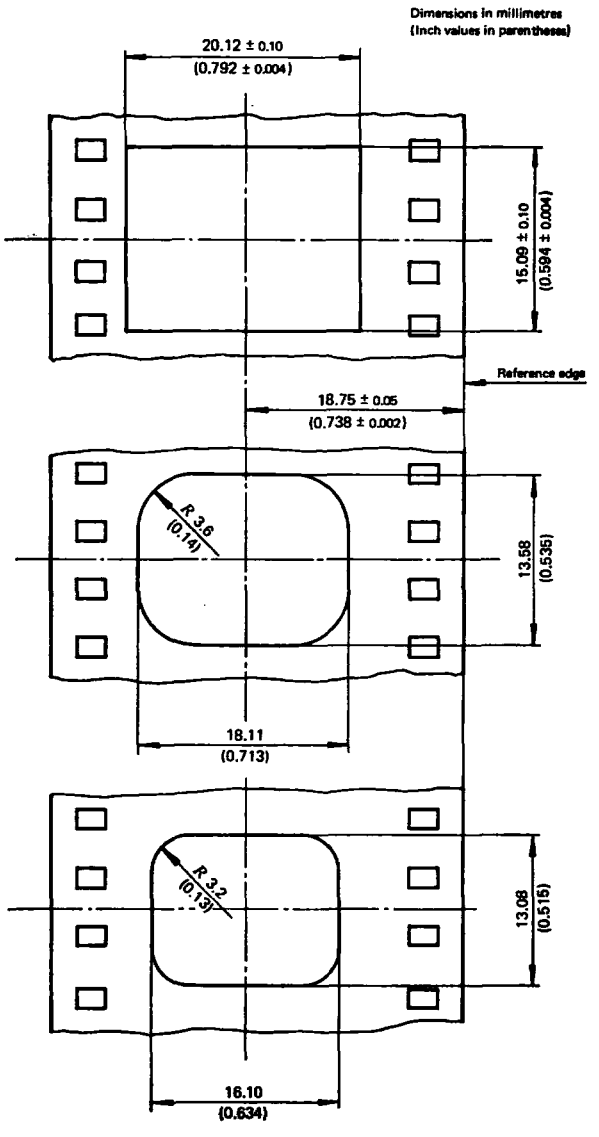


FIG. 1 – Transmitted area

FIG. 2 – Action field

FIG. 3 – Safe title area

35 mm MOTION-PICTURE FILMS FOR TELEVISION

Dimensions in millimetres
(Inch values in parentheses)

FIG. 4 – Transmitted area

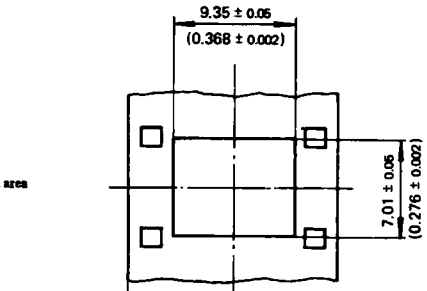


FIG. 5 – Action field

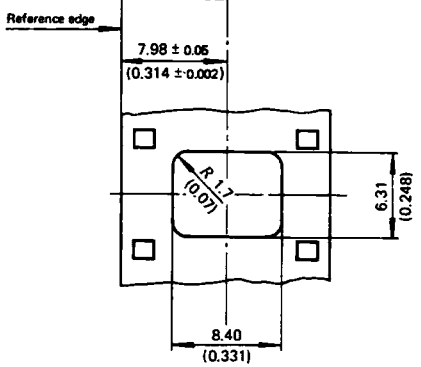
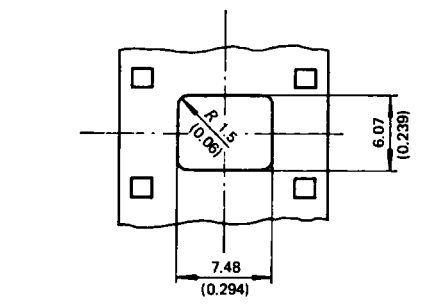


FIG. 6 – Safe title area



16 mm MOTION-PICTURE FILMS FOR TELEVISION

Dimensions in millimetres
(Inch values in parentheses)

FIG. 7 – Transmitted area

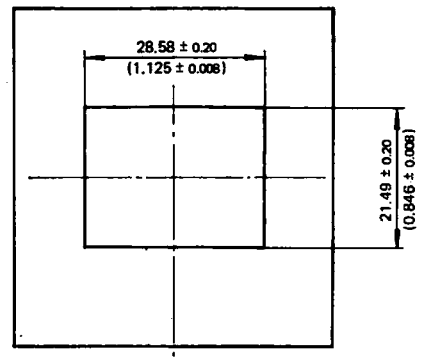


FIG. 8 – Action field

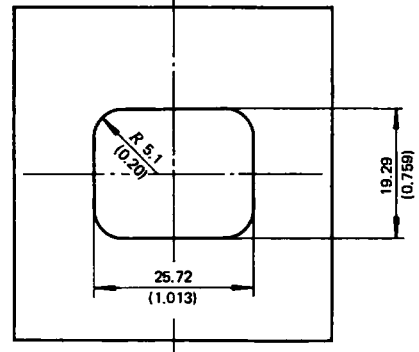
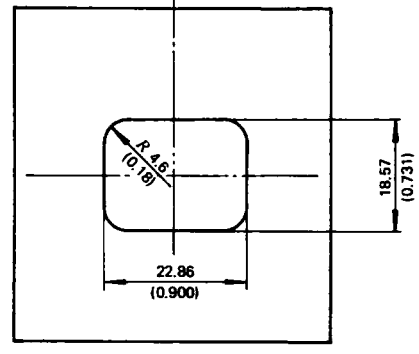


FIG. 9 – Safe title area



5 cm x 5 cm (2 in x 2 in) SLIDES FOR TELEVISION