standards and recommended practices

Proposed American Standards

Three Proposed American 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 September 7. The proposals have also been submitted to ASA Sectional Committee C98. Consequently, all comments received through *Journal* publication will be reviewed prior to the conclusion of action by the C98 Committee.

These Proposed American Standards reflect the long felt need for standardization of sound records associated with video magnetic tape recordings in terms of audio frequency response and recording level. The Video Tape Recording Committee discussed these problems for over two years, and the resulting proposals are felt to reflect the best consensus of current practices in the television broadcasting industry. The choice of recording level, in particular, represents the result of data acquired through a survey of recorder users in both the U.S.A. and Canada, operating a total of 139 machines.

C98.7, Proposed American Standard Specifications for a Primary Audio Reference Level Recording for Quadruplex Video Magnetic Tape Recorders Operating at 15 IPS, specifies a primary reference level recording for laboratory use in calibrating a secondary reference recording for standardization of operating audio level. C98.8, Proposed American Standard Specifications for an Audio Level and Multifrequency Test Tape for Quadruplex Video Magnetic Tape Recorders Operating at 15 IPS, specifies the audio multifrequency test tape for operational use. C98.9, Proposed American Standard Specifications for Color Video Magnetic Tape Leader, specifies the minimal leader requirement for color video tape recording operation to permit adjustment of equipment for optimum performance during reproduction of program material.—*A.E.A.*

International Standardization

The International Organization for Standardization (ISO), whose activities in the field of cinematography were described in the December 1965 *Journal* (pp. 1112–1116), adopted the recommendation published here.

Recommendation R-466, Image Produced by Camera Aperture for 16mm Films, was approved in December 1965 by the total membership of the Technical Committee ISO/TC 36, Cinematography. This Recommendation conforms with American Standard Dimensions of 16mm Motion-Picture Camera Aperture Image, PH22.7–1964.

The members' attention is directed to the fact that only the technical content of the recommendation is published here. Copies of the complete document are available from the American Standards Association, 10 East 40th Street, New York, N.Y. 10016.—*A.E.A.*

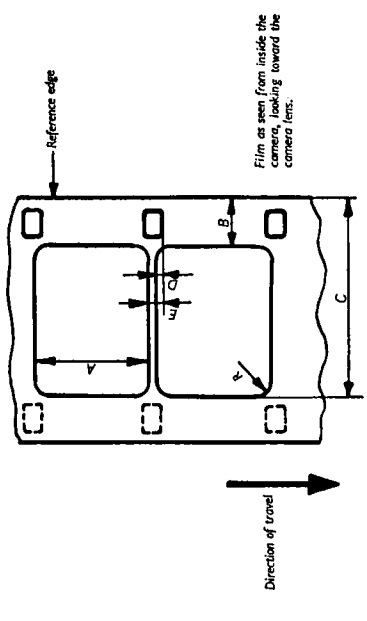
ISO Recommendation R 466 December 1965

CINEMATOGRAPHY

IMAGE PRODUCED BY CAMERA APERTURE FOR 16 mm FILMS

The image produced on the film should be in accordance with the dimensions given in the figure and in the table.

The dimensions are shown relative to unshrunk film.



Dimensions	millimetres	inches
A	$7.42^{+0.15}_{0}$	$0.292^{+0.006}_{0}$
B	2.95 max.	0.116 max.
C	$13.00^{+0.15}_{0}$	$0.512^{+0.006}_{0}$
D	0.46 min.	0.018 min.
R	0.5 max.	0.02 max.
E	0.80 max.	0.032 max.

Proposed American Standard Specifications for a

Primary Audio Reference Level Recording for Quadruplex Video Magnetic Tape Recorders Operating at 15 IPS

C98.7

1. Scope

This standard specifies a primary audio reference level recording for laboratory use in calibrating secondary reference level recordings for standardization of the operating audio level in quadruplex video magnetic tape recorders.

2. General Specifications

2.1 Dimensions of Records. The dimensions of pertinent records constituting this recording shall conform to American Standard Dimensions of Video, Audio and Control Track Records on 2-In. Video Magnetic Tape, C98.6-1965.

2.2 Tape Speed. The nominal linear speed of this recording shall be 15 ips in accordance with American Standard Speed of 2-In. Video Magnetic Tape, C98.4-1963.

2.3 Stock. This recording shall be made on transversely-oriented television magnetic recording tape, the dimensions of which are specified in American Standard Dimensions of 2-In. Video Magnetic Tape, C98.1-1963. The magnetic properties of this tape shall be carefully evaluated to assure average values of output, sensitivity, and distortion.

2.4 Video Signal. No video signal of any kind shall be recorded.

2.5 Tracking Control Signal. A tracking control signal, conforming to that specified in SMPTE Recommended Practice RP 16-1964, Specifications of Tracking Control Record for 2-In. Video Magnetic Tape Recordings, as applicable, shall be recorded throughout each test section.

2.6 Audio Records. The recording shall be made on both Audio Record No. 1 and Audio Record No. 2.

2.7 Voice announcement at the beginning of this recording shall provide identification information as follows: (1) American Standard, (2) tape issue, (3) serial number, and (4) date of recording.

3. Test Section

3.1 Signal. A sine wave shall be used having a frequency of 1,000 Hz ± 1 percent and containing less than 0.1 percent total harmonic distortion.

3.2 Primary Reference Level. The level used for recording shall be that level which is 8 ± ¼ dB below the recording level which produces 3 percent third harmonic distortion on a recorder with its bias adjusted for maximum 1,000 Hz tape output.

3.3 Recorded Level Fluctuation. The recorded level fluctuation during this test section shall not exceed ± ¼ dB.

3.4 Wow and Flutter. Total wow and flutter of this test section shall not exceed 0.2 percent RMS in the bandwidth of 0.5 to 200 Hz.

3.5 Duration. The duration of this test section shall be a minimum of 1 minute.

3.6 Azimuth. The recorded azimuth accuracy of the test segment shall be within ± 3 minutes of arc from the perpendicular to the reference edge of the tape.

NOT APPROVED

4. Calibration

4.1 Level Measurements. All level measurements shall be made by means of a vu meter, as specified in American Standard Volume Measurements of Electrical Speech and Program Waves, C16.5-1954 (Reaffirmed 1961).

4.2 Wow and Flutter Measurement. Wow and flutter shall be measured in accordance with American Standard Method for Determining Flutter Content of Sound Recorders and Reproducers, Z57.1-1954.

Appendix

(This Appendix is not a part of Proposed American Standard Specifications for a Primary Audio Reference Level Recording for Quadruplex Video Magnetic Tape Recorders Operating at 15 IPS, C98.7, but is included to facilitate its use.)

The Primary Audio Reference Level Recording is designed solely to be used in the calibration of audio level and multifrequency test tapes for use with quadruplex video magnetic tape recorders. Since neither the selected tape sample specified in 2.3 above nor the measurement conditions for the specified distortion can be readily duplicated in the field, no attempt should be made to generate a Primary Audio Reference Level Recording for field use. Rather, use should be made of a suitable secondary reference level recording, as specified in Proposed American Standard Specifications for an Audio Level and Multifrequency Test Tape for Quadruplex Video Magnetic Tape Recorders Operating at 15 IPS, C98.8.

C98.7—NOT APPROVED

Proposed American Standard Specifications for an

Audio Level and Multifrequency Test Tape for Quadruplex Video Magnetic Tape Recorders Operating at 15 IPS

C98.8

1. Scope

This standard specifies an audio frequency test tape to be used for standardization of the operating level and frequency response characteristics of the audio reproducing systems of quadruplex television video tape recorders operating at a tape speed of 15 ips.

2. General Specifications

2.1 Dimensions of Records. The dimensions of pertinent records making up this test tape shall conform to American Standard Dimensions of Video, Audio and Control Track Records on 2-In. Video Magnetic Tape, C98.6-1965.

2.2 Tape Speed. The nominal linear speed of this test tape shall be 15 ips in accordance with American Standard Speed of 2-In. Video Magnetic Tape, C98.4-1963.

2.3 Stock. The test sections shall be recorded on transversely-oriented television magnetic recording tape, the dimensions of which are specified in American Standard Dimensions of 2-In. Video Magnetic Tape, C98.1-1963.

2.4 Video Signal. No video signal of any kind shall be recorded.

2.5 Tracking Control Signal. A tracking control signal, conforming to that specified in SMPTE Recommended Practice RP 16-1964, Specifications of Tracking Control Record for 2-In. Video Magnetic Tape Recordings, as applicable, shall be recorded throughout each test section.

2.6 Test sections shall be recorded on both Audio Record No. 1 and Audio Record No. 2.

2.7 Voice announcement at the beginning of this test tape shall provide identification as to the applicable American Standard, tape issue and serial number and manufacturer. Each test section and segment shall be preceded by voice announcements identifying the content. Voice announcements shall be recorded at a level approximately 5 dB below reference level. (See 3.1 below.)

2.8 Wow and Flutter. Total wow and flutter of this test tape shall not exceed 0.2 percent RMS in the bandwidth of 0.5 to 200 Hz.

3. Test Sections

3.1 Reference Level Test. This section is to be used to calibrate the operating level of the audio reproducing systems of a video magnetic tape recorder.

3.1.1 Frequency. A frequency of 1,000 Hz ± 2 percent shall be used.

3.1.2 Reference Level. Recorded level shall be that 1,000 Hz level which reproduces at the same level as the Primary Audio Reference Level Recording, ± ¼ dB. (See 4.1 below.)

3.1.3 Recorded Level Fluctuation. The level fluctuation during playback of this section shall not exceed ± ½ dB.

3.1.4 Distortion. Total harmonic distortion of this section, when reproduced, shall not exceed 2 percent.

3.1.5 Duration. The duration of this section shall be a minimum of 1 minute.

3.2 Frequency Response Test. This section is to be used to calibrate the frequency response of the audio reproducing systems of a video magnetic tape recorder.

3.2.1 Frequencies. The following test segment frequencies (in Hertz) shall be recorded in the order given:

1,000 (reference)	240	2,000	10,000
50	400	4,000	12,000
100	1,000	8,000	15,000

The frequency tolerance on these test segments shall be ± 1 percent of the prescribed frequency.

3.2.2 Recorded Level. The reference recorded level for the frequency response test shall be that 1,000 Hz level which reproduces at the same level as the Reference Level Test Section, ± 1 dB. Other frequencies are to be recorded so that when this test section is reproduced on a standard reproducing system, as defined in 4.2, the test segments will be reproduced at uniform level, as measured at the output of the reproducing system, with a tolerance for relative recorded levels of segments of ± ½ dB referred to the 1,000-Hz segment. The tolerance of ± ½ dB may be extended to ± 2 dB provided that a calibration chart is supplied with the test tape by the manufacturer.

3.2.3 Duration. The duration of frequency response test segments shall be approximately 10 seconds.

3.3 Azimuth. The recorded azimuth accuracy of the test segments shall be within ± 3 minutes of arc from the perpendicular to the reference edge of the tape.

4. Calibration

4.1 Calibration of level on all test tapes for field use shall be accomplished by comparison on a calibrated reproducer to a Primary Audio Reference Level Recording made in accordance with Proposed American Standard Specifications for a Primary Audio Reference Level Recording for Quadruplex Video Magnetic Tape Recorders Operating at 15 IPS, C98.7.

4.2 Calibration of the Frequency Response Test Section (3.2) shall be by means of the reproducing system defined in American Standard Specifications of the Audio Records for 2-In. Video Magnetic Tape Recordings, C98.3-1963.

4.3 Level Measurements. All level measurements shall be made by means of a vu meter, as specified in American Standard Volume Measurement of Electrical Speech and Program Waves, C16.5-1954 (Reaffirmed 1961).

4.4 Wow and Flutter Measurement. Wow and flutter shall be measured in accordance with American Standard Method for Determining Flutter Content of Sound Recorders and Reproducers, Z57.1-1954.

Appendix

(This Appendix is not a part of Proposed American Standard Specifications for an Audio Level and Multifrequency Test Tape for Quadruplex Video Magnetic Tape Recorders Operating at 15 IPS, C98.8, but is included to facilitate its use.)

A1. Primary Audio Reference Level has been chosen to be the recording level 8 decibels below the level producing 3 percent third harmonic distortion. In practice, this level is approximately 10 dB below the point of subjective overload for a typical recording system.

A2. A guide to proper usage and a fuller explanation of the calibration techniques shall be supplied with each test tape.

Proposed American Standard Specifications for

Color Video Magnetic Tape Leader

C98.9

1. Scope

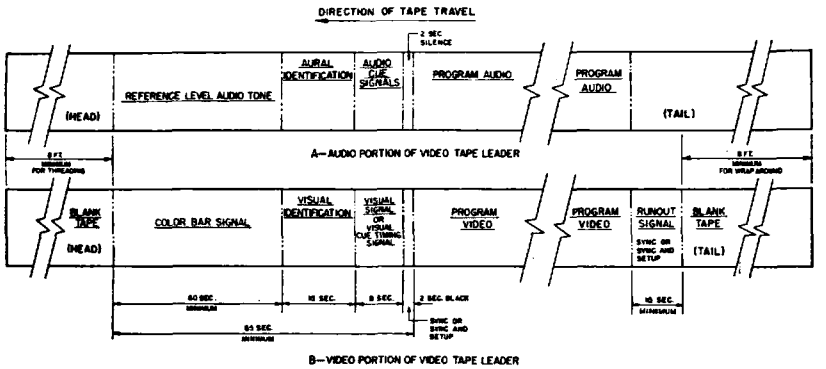
1.1 This standard specifies the minimum leader requirements for color video tape recording operation to permit adjustment of equipment for optimum performance during reproduction prior to the start of recorded program material.

1.2 The standard also specifies the audio and video information that precedes and follows the recorded program material (for purposes of ensuring uniformity of reproduction), and provides the necessary identification cue up and run out information, and the minimum lengths of tape required to ensure proper threading for color video tape recordings.

2. Color Bar Signal

2.1 At the head end of the tape, at least 60 seconds of color bar pattern, as defined by EIA Standard RS-189, Encoded Color Bar Signals, shall be recorded with maximum luminance at 77 IRE units corresponding to 75 percent chroma level, including a reference white bar and reference black bar.

The recording shall be made under the same conditions of equipment adjustment as used for recording the video program material. For original recording, the color bar signal shall originate in and be fed through the same studio and equipment used for the program.



NOTE: The figures of picture and sound sequences are shown related on a time basis. There is separation of the picture and sound records on the recorded tape, as defined in American Standard Specifications of the Audio Records for 2-In. Video Magnetic Tape Recordings, C98.3-1963.

NOT APPROVED

2.2 Simultaneously with the color bar signal, a reference level audio tone of 400 Hz ± 5 percent shall be recorded at the same level and under the same conditions of equipment adjustment used for recording the audio portion of the program material.

2.3 The color bar signal shall be preceded by 8 ft minimum of blank tape for threading purposes.

3. Identification Information

3.1 Visual identification information shall be recorded for at least 15 seconds following the color bar signal specified in Section 2. The identification shall contain:

(1) title
(2) subject
(3) production number
(4) take number
(5) name of recording studio
(6) date of recording
(7) broadcast date (if known)

3.2 Simultaneously, an aural identification of the information specified in Section 3.1 shall be recorded under the same conditions as defined in Section 2.2.

4. Cue Timing Signals

4.1 Audio cue signals, as described below, shall be recorded on the audio program track following the aural identification signals specified in Section 3.

4.1.1 The audio cue tone signals shall consist of a series of 400 Hz ± 5 percent bursts, each of ½-second duration, occurring at one-second intervals over the range from ten or more seconds ahead of the program material to two seconds ahead. The recording level shall be as defined in Section 2.2.

4.1.2 In addition, a steady component of the audio cue tone shall be recorded approximately 20 dB below the level used in Section 4.1.1 above, starting with the first tone burst and ending with the last one, to leave a two-second silent interval before the start of program material.

4.2 A visual signal shall be recorded during the entire period of the steady component of the above-described audio tone signals. Sync (or sync, color burst, and setup) only shall be recorded during the two-second interval from the end of the tone bursts to the start of program. The recording level shall be as described in Section 2.1.

If a visual cue timing signal is used, it shall be coincident with and identify the tone burst in Section 4.1.1.

5. Continuity of Recorded Signals

Continuity of recorded signals, beginning with the color bar signal, shall not be interrupted. This continuity of sync, color burst, and control track shall be achieved by continuous recording or by equivalent splicing, provided that the requirements of Section 2.1 are fulfilled.

6. Run-Out Signal

6.1 There shall be at least 10 seconds of sync (or sync, color burst, and setup) recorded immediately following the conclusion of program material.

6.2 The run-out signal shall be followed by 8 ft minimum of blank tape for wrap around purposes.