standards and recommended practices

Draft American National Standards

Two 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 January 15, 1971. The proposals have been submitted to American National Standards Committee PH22. Consequently, all comments received through Journal publication will be reviewed prior to conclusion of action by the Committee.

PH22.83, Specifications for Location and Spacing of Edge Numbers on 16mm Motion-Picture Film, is substantially a reaffirmation of the earlier issue except that a 20-frame internal is now also permitted.

PH22.94, Dimensions of Television Image Area on Slides and Opaques, also substantially reaffirms the technical data in the earlier issue but was editorially modified to conform to newer formats. Inasmuch as the data are presented differently, all those concerned with slides for television use should study the proposed standard.

Proposed SMPTE Recommended Practices

Two Proposed SMPTE Recommended Practices are published here for a trial period and public review. Proposed SMPTE Recommended Practice RP 43, Video Test Tape for Quadruplex Video Frequency Magnetic Tape Recorders Operating at 15 In/s and Practice HB of SMPTE Recommended Practice RP 6, and Proposed SMPTE Recommended Practice RP 44, Video Test Tape for Quadruplex Video Frequency Magnetic Tape Recorders Operating at 7.5 In/s and Practice HB of SMPTE Recommended Practice RP 6, specifying test tapes for the 2-in quadruplex systems.

Comments are invited and should be addressed to Alex E. Alden, Staff Engineer, at Society Headquarters prior to January 15, 1971. If no adverse criticism is received by that date, the Proposed SMPTE Recommended Practices will be submitted to the Board of Governors for final approval. – A.E.A.

Draft American National Standard Specifications for

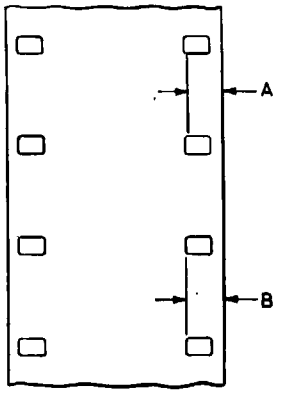
Location and Spacing of Edge Numbers on 16mm Motion-Picture Film

PH22.83

Revision of PH22.83-1965

1. Scope

1.1 Specifications. This standard defines the location within which edge numbers will appear on 16mm motion-picture film. The maximum interval between successive numbers is also specified.



Dimensions	Inches	Millimeters
A	0.093 max	2.36 max
B	0.108 max	2.74 max

1.2 Application. This standard applies to latent-image printing of edge numbers as well as to any other method of printing such as inking.

2. Dimensions

2.1 Latent-Image Numbers. The width dimension of the area on the edge of the film within which latent-image printed numbers shall appear is as shown by Dimension A in the figure and table.

2.2 Inked Edge Numbers. The width dimension of the area on the edge of the film within which inked edge numbers shall appear is as shown by Dimension B in the figure and table.

3. Interval Between Numbers

3.1 Latent-Image Numbers. The interval between consecutive latent-image numbers shall not exceed 40 frames. Where a 40-frame interval is used, the numbers will then indicate film footage, subject to a small correction for shrinkage of the film. A 20-frame interval is frequently used for latent numbering. Where a 20-frame interval is used, the numbers will indicate double the film footage.

3.2 Inked Edge Numbers. The interval between inked edge numbers shall not exceed 40 frames. Where a 40-frame interval is used, the numbers will then indicate film footage, subject to a small correction for the shrinkage of the film. Where a 16-frame interval is used, the edge numbers will then indicate corresponding footage on 35mm materials.

THIS PROPOSAL IS PUBLISHED FOR COMMENT ONLY

Draft American National Standard Dimensions of

Television Image Area on Slides and Opaques

PH22.94

Revision of PH22.94-1954

1. Scope

1.1 This standard specifies the size and location of that portion of the image area of slides and opaques to be reproduced by a television camera chain.

1.2 The three nominal sizes for which dimensions are given in the table shall be considered standard for use in television camera chains.

2. Dimensions

2.1 The dimensions and location of the image area reproduced by a television camera chain shall be as specified in the table.

2.2 The overall dimensions of the standard slides and opaques intended for television transmission shall be as specified in the table.

2.3 The portion of the slide or opaque intended for television transmission shall be centrally located to the tolerances specified in the table.

2.4 The background (or pictorial material) shall extend beyond the transmitted area to the dimensions specified in the table.

3. Thumb Mark

To indicate proper orientation, a thumb mark shall be placed in the lower left-hand corner when the slide is viewed as the image was photographed.

	2 X 2 SLIDE*		3¼ X 4 SLIDE & OPAQUE		4 X 5 OPAQUE	
	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
Height	2.00 $^{+0.00}_{-0.03}$	50.8 $^{+0.0}_{-0.8}$	3.25 $^{+0.02}_{-0.03}$	82.5 $^{+0.5}_{-0.8}$	4.00 ± 0.03	101.6 ± 0.8
Width	2.00 $^{+0.00}_{-0.03}$	50.8 $^{+0.0}_{-0.8}$	4.00 $^{+0.02}_{-0.03}$	101.6 $^{+0.5}_{-0.8}$	5.00 ± 0.03	127.0 ± 0.8
Maximum thickness	0.120	3.05	0.156	3.96	0.03	0.8
Minimum overall image height	0.952	24.18	2.25	69.8	3.19	81.0
Minimum overall image width	1.417	35.99	3.00	76.2	4.25	107.9
Maximum transmitted image height	0.844	21.44	2.06	52.3	3.00	76.2
Maximum transmitted image width	1.125	28.57	2.75	69.5	4.00	101.6
Maximum image centering tolerance	0.02	0.5	0.05	1.3	0.02	0.5

*See Note 1.

THIS PROPOSAL IS PUBLISHED FOR COMMENT ONLY

NOTE 1: Dimensions for slide mounts which are recommended for use in television applications are specified in SMPTE Recommended Practice RP 9-1966, Dimensions of Double-Frame 35mm 2x2 Slides for Precise Applications in Television.

NOTE 2: The dimensions shown for the transmitted picture are those which will be scanned by a perfectly-adjusted camera chain. To allow for some misadjustment of the camera chain and an additional misadjustment in the home receiver, it is recommended that all essential information be contained in a centrally located area, as specified in SMPTE Recommended Practice RP 8-1968, Safe Action and Safe Title Areas for TV Transmission.

NOTE 3: Dimensions of slides for non-television usage are specified in American National Standard Dimensions for Projector Slides, PH3.43-1969.

PROPOSED
SMPTE RECOMMENDED PRACTICE — RP 43

Video Test Tape for Quadruplex Video Frequency Magnetic Tape Recorders Operating at 15 In./s and Practice HB of SMPTE Recommended Practice RP 6

1. *Scope*

This recommended practice specifies a video frequency test tape to be used with quadruplex television video tape recorders operating at 15 in./s (38.1 cm/s) and Practice HB of SMPTE Recommended Practice RP 6, Reference Carrier Frequencies and De-Emphasis Characteristics for 2-In. Quadruplex Video Magnetic Tape Recording. It is to be used for:

(a) Positioning of the vacuum guide.

(b) Indication of video frequency response characteristics of the reproducing system.

(c) Adjustment of gain of the video reproducing system.

(d) Comparison of carrier frequencies of the video recording system.

(e) Verification of level and phase of the control track recording system.

(f) Adjustment of the gain of the program audio reproducing system.

2. *General Specifications*

2.1 Dimensions of Records. The dimensions of pertinent records making up this test tape shall conform to American National Standard Dimensions of Video, Audio and Tracking Control 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 in./s in accordance with American National Standard Speed of 2-In. Video Magnetic Tape, C98.4-1963.

2.3 Tape Stock. The test sections shall be recorded on transversely-oriented television magnetic recording tape optimized for use with Practice HB of SMPTE Recommended Practice RP 6. The dimensions of the tape stock shall be as specified in American National Standard Dimensions of 2-In. Video Magnetic Tape, C98.1-1963.

2.4 Tracking Control Signal. A tracking control signal, conforming to that in SMPTE Recommended Practice RP 16-1968, Specifications of Tracking Control Record for 2-In. Quadruplex Video Magnetic Tape Recordings, shall be recorded throughout the tape.

2.5 Voice announcements at the beginning of this tape shall reference this recommended practice. Voice announcements shall be recorded at a level approximately 5 dB below reference level, as defined in Section 3.1.2 of American National Standard Specifications for an Audio Level and Multifrequency Test Tape for Quadruplex Video Magnetic Tape Recorders Operating at 15 In./s, C98.8-1969. Announcement shall be recorded on Audio Record No. 1 only. A video identification signal may be included during the voice announcement section. If no video identification signal is used, sync, sync and set-up, or test signal shall be recorded on the video channel during the voice announcement.

2.6 Recorded carrier frequencies shall conform to those specified by Practice HB of SMPTE Recommended Practice RP 6; recording pre-emphasis shall be the complement of the de-emphasis characteristic specified by Practice HB of SMPTE Recommended Practice RP 6.

2.7 Tape vacuum guide radius and position shall conform to SMPTE Recommended Practice RP 11-1968, Tape Vacuum Guide Radius and Position for 2-In. Quadruplex Video Magnetic Tape Recording.

2.8 Audio record shall be in accordance with American National Standard Specifications of the Audio Records for 2-In. Video Magnetic Tape Recordings, C98.3-1963.

2.9 Video synchronizing waveforms and signal amplitudes shall conform to the rules and regulations of the Federal Communications Commission for color transmissions. Color subcarrier synchronizing burst shall be included throughout the recording. The timing of the synchronizing waveforms shall be uninterrupted during the transition from the identification signals specified in Section 2.5 to the video test signals specified in Section 3.1 and 3.2, and shall be uninterrupted during the transitions between video test signals specified in Section 3.2.

2.10 Geometric distortion on the test tape caused by lack of exact 90° angular separation (quadrature error) of the transducers on the video head wheel making the recording shall not exceed 0.03 microseconds peak to peak.

2.11 The position of the tape neutral plane shall be in accordance with Proposed SMPTE Recommended Practice RP 36, Specifications for Positioning Tape Neutral Plane and Adjacent Tape Guides for Quadruplex Video Magnetic Tape Recorders Operating at 15 In./s. and 7.5 In./s.

3. *Test Section*

3.1 Video Test Signals. Five types of test signals, as specified in 3.1.1 through 3.1.5, shall be recorded on the tape.

3.1.1 Color Bars. An encoded color-bar signal conforming to EIA Standard RS-189-1957, Encoded Color Bar Signals.

3.1.2 Multiburst. A white pulse followed by a series of six sine wave bursts. The white pulse width and the width of each burst shall be ½ the width of the scan line between the end of H blanking and the start of H blanking. The white bar amplitude shall be at 100 ± 1 IRE units. The axis of the bursts shall be at 50 ± 1 IRE units, and the peak-to-peak amplitude of the bursts shall be 100 ± 1 IRE units. The frequencies of the bursts in time sequence shall be 500 kHz, 1.5 MHz, 2.0 MHz, 3.0 MHz, 3.6 MHz and 4.2 MHz. Harmonic distortion of the sine wave burst signals shall be less than 1 percent.

3.1.3 Ramp. A continuous ramp (or stairstep signal consisting of 10 equal-height steps) extending from 0 to 100 IRE units, and repeating at a line rate. Color subcarrier having a peak-to-peak amplitude of 20 ± 2 IRE units shall be combined additively with the ramp (or stairstep signal).

3.1.4 Window and Pulses. A window signal, a modulated 20T (2.5 μsec) pulse, and a 2T (0.25 μsec) sine-squared pulse. All signals shall extend from 7½ ± 2½ IRE units to 100 ± 1 IRE units. The three signals shall occur on alternate lines with the window signal on one line, and the 2T and 20T pulses on the next line, with the alternation continuing throughout the field. The leading and trailing edges of the window shall correspond in shape and rise time to the leading and trailing edges of the 2T pulse, respectively. The timings of the pulses and window shall be measured at their half-amplitude points, and shall be as specified below:

(i) Leading edge of window: 0.3H after trailing edge of preceding horizontal sync pulse.

(ii) Width of window: 0.4H.

(iii) Leading edge of 20T pulse: 0.4H after trailing edge of preceding horizontal sync pulse.

(iv) Leading edge of 2T pulse: 0.2H after leading edge of 20T pulse.

(v) Tolerances: All dimensions given in (i) through (iv) shall be held within ± 0.03H.

3.1.5 Black. A signal consisting of sync, burst, and 7½ ± 2½ IRE units of set-up.

3.2 Sequence of Video Signals. The video signals shall be recorded in the sequence indicated by Table I.

TABLE I

Signal	*Duration*	*Nominal Time from Start of Test Signals*	
		Begin	*End*
Black	0:20	0:00	0:20
Multiburst	0:30	0:20	0:50
Ramp	0:25	0:50	1:15
Window and Pulses	0:25	1:15	1:40
Color Bars	0:30	1:40	2:10
Black	0:10	2:10	2:20
Multiburst	1:30	2:20	3:50
Black	0:10	3:50	4:00
Ramp	2:20	4:00	6:20
Black	0:10	6:20	6:30
Window and Pulses	1:20	6:30	7:50
Black	0:10	7:50	8:00
Color Bars	2:20	8:00	10:20
Black	0:10	10:20	10:30

The tolerance on all durations shall be ± 2 seconds, with the exception of the black signals, which shall have a tolerance of +4 seconds, —0 seconds.

3.3 Audio Test Signal. A 1 kHz ± 5 percent tone shall be recorded at reference level ± ½ db throughout the test section on Audio Record No. 1 only, except as interrupted for the announcements defined in Section 3.4.

3.4 Voice Announcements. Each time the type of signal recorded on the tape is changed, an appropriate voice announcement identifying the new signal shall be made. Instructional or precautionary information may be included in such announcements. No identifying announcements shall be required during the black signal portions of the tape. All voice announcements shall be made under the same conditions as stated in Section 2.5, except that the video test signal shall not be interrupted.

4. *Calibration*

4.1 Calibration of audio level on all test tapes for field use shall be accomplished by comparison on a calibrated reproducer with a primary audio reference level recording made in accordance with American National Standard Specifications for a Primary Audio Reference Level Recording for Quadruplex Video Magnetic Tape Recorders Operating at 15 In./s, C98.7-1969.

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

4.3 Video Level Measurements. All video measurements of luminance levels shall be made in accordance with American National Standard Method of Measurement of Television Luminance Signal Levels, C16.31-1959.

Note: The frequency response of a recovered video signal is a function of such variables as recording current and type of tape stock used; therefore, the optimum reproducing-equalization setting for this tape will not necessarily be the optimum reproducing-equalization setting for all other recordings.

PROPOSED
SMPTE RECOMMENDED PRACTICE — RP 44

Video Test Tape for Quadruplex Video Frequency Magnetic Tape Recorders Operating at 7.5 In./s and Practice HB of SMPTE Recommended Practice RP 6

1. *Scope*

This recommended practice specifies a video frequency test tape to be used with quadruplex television video tape recorders operating at 7.5 in./s (19.05 cm/s) and Practice HB of SMPTE Recommended Practice RP 6, Reference Carrier Frequencies and De-Emphasis Characteristics for 2-In. Quadruplex Video Magnetic Tape Recording. It is to be used for:

(a) Positioning of the vacuum guide.

(b) Indication of video frequency response characteristics of the reproducing system.

(c) Adjustment of gain of the video reproducing system.

(d) Comparison of carrier frequencies of the video recording system.

(e) Verification of level and phase of the control track recording system.

(f) Adjustment of the gain of the program audio reproducing system.

2. *General Specifications*

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

2.2 Tape Speed. The nominal linear speed of this test tape shall be 7.5 in./s in accordance with American National Standard Speed of 2-In. Video Magnetic Tape, C98.4-1963.

2.3 Tape Stock. The test sections shall be recorded on transversely-oriented television magnetic recording tape optimized for use with Practice HB of SMPTE Recommended Practice RP 6. The dimensions of the tape stock shall be as specified in American National Standard Dimensions of 2-In. Video Magnetic Tape, C98.1-1963.

2.4 Tracking Control Signal. A tracking control signal, conforming to that in SMPTE Recommended Practice RP 16-1968, Specifications of Tracking Control Record for 2-In. Quadruplex Video Magnetic Tape Recordings, shall be recorded throughout the tape.

2.5 Voice announcements at the beginning of this tape shall reference this recommended practice. Voice announcements shall be recorded at a level approximately 5 dB below reference level, as defined in Section 3.1.2 of American National Standard Specifications for an Audio Level and Multifrequency Test Tape for Quadruplex Video Magnetic Tape Recorders Operating at 7.5 In./s, C98.11-1969. Announcement shall be recorded on Audio Record No. 1 only. A video identification signal may be included during the voice announcement section. If no video identification signal is used, sync, sync and set-up, or test signal shall be recorded on the video channel during the voice announcement.

2.6 Recorded carrier frequencies shall conform to those specified by Practice HB of SMPTE Recommended Practice RP 6; recording pre-emphasis shall be the complement of the de-emphasis characteristic specified by Practice HB of SMPTE Recommended Practice RP 6.

2.7 Tape vacuum guide radius and position shall conform to SMPTE Recommended Practice RP 11-1968, Tape Vacuum Guide Radius and Position for 2-In. Quadruplex Video Magnetic Tape Recording.

2.8 Audio record shall be in accordance with American National Standard Specifications of the Audio Records for 2-In. Video Magnetic Tape Recordings, C98.3-1963.

2.9 Video synchronizing waveforms and signal amplitudes shall conform to the rules and regulations of the Federal Communications Commission for color transmissions. Color subcarrier synchronizing burst shall be included throughout the recording. The timing of the synchronizing waveforms shall be uninterrupted during the transition from the identification signals specified in Section 2.5 to the video test signals specified in Section 3.1 and 3.2, and shall be uninterrupted during the transitions between video test signals specified in Section 3.2.

2.10 Geometric distortion on the test tape caused by lack of exact 90° angular separation (quadrature error) of the transducers on the video head wheel making the recording shall not exceed 0.03 microseconds peak to peak.

2.11 The position of the tape neutral plane shall be in accordance with Proposed SMPTE Recommended Practice RP 36, Specifications for Positioning Tape Neutral Plane and Adjacent Tape Guides for Quadruplex Video Magnetic Tape Recorders Operating at 15 In./s. and 7.5 In./s.

3. *Test Section*

3.1 Video Test Signals. Five types of test signals, as specified in 3.1.1 through 3.1.5, shall be recorded on the tape.

3.1.1 Color Bars. An encoded color-bar signal conforming to EIA Standard RS-189-1957, Encoded Color Bar Signals.

3.1.2 Multiburst. A white pulse followed by a series of six sine wave bursts. The white pulse width and the width of each burst shall be ½ the width of the scan line between the end of H blanking and the start of H blanking. The white bar amplitude shall be at 100 ± 1 IRE units. The axis of the bursts shall be at 50 ± 1 IRE units, and the peak-to-peak amplitude of the bursts shall be 100 ± 1 IRE units. The frequencies of the bursts in time sequence shall be 500 kHz, 1.5 MHz, 2.0 MHz, 3.0 MHz, 3.6 MHz and 4.2 MHz. Harmonic distortion of the sine wave burst signals shall be less than 1 percent.

3.1.3 Ramp. A continuous ramp (or stairstep signal consisting of 10 equal-height steps) extending from 0 to 100 IRE units, and repeating at a line rate. Color subcarrier having a peak-to-peak amplitude of 20 ± 2 IRE units shall be combined additively with the ramp (or stairstep signal).

3.1.4 Window and Pulses. A window signal, a modulated 20T (2.5 μsec) pulse, and a 2T (0.25 μsec) sine-squared pulse. All signals shall extend from 7½ ± 2½ IRE units to 100 ± 1 IRE units. The three signals shall occur on alternate lines with the window signal on one line, and the 2T and 20T pulses on the next line, with the alternation continuing throughout the field. The leading and trailing edges of the window shall correspond in shape and rise time to the leading and trailing edges of the 2T pulse, respectively. The timings of the pulses and window shall be measured at their half-amplitude points, and shall be as specified below:

(i) Leading edge of window: 0.3H after trailing edge of preceding horizontal sync pulse.

(ii) Width of window: 0.4H.

(iii) Leading edge of 20T pulse: 0.4H after trailing edge of preceding horizontal sync pulse.

(iv) Leading edge of 2T pulse: 0.2H after leading edge of 20T pulse.

(v) Tolerances: All dimensions given in (i) through (iv) shall be held within ± 0.03H.

3.1.5 Black. A signal consisting of sync, burst, and 7½ ± 2½ IRE units of set-up.

3.2 Sequence of Video Signals. The video signals shall be recorded in the sequence indicated by Table I.

TABLE I

Signal	*Duration*	*Nominal Time from Start of Test Signals*	
		Begin	*End*
Black	0:20	0:00	0:20
Multiburst	0:30	0:20	0:50
Ramp	0:25	0:50	1:15
Window and Pulses	0:25	1:15	1:40
Color Bars	0:30	1:40	2:10
Black	0:10	2:10	2:20
Multiburst	1:30	2:20	3:50
Black	0:10	3:50	4:00
Ramp	2:20	4:00	6:20
Black	0:10	6:20	6:30
Window and Pulses	1:20	6:30	7:50
Black	0:10	7:50	8:00
Color Bars	2:20	8:00	10:20
Black	0:10	10:20	10:30

The tolerance on all durations shall be ± 2 seconds, with the exception of the black signals, which shall have a tolerance of +4 seconds, —0 seconds.

3.3 Audio Test Signal. A 1 kHz ± 5 percent tone shall be recorded at reference level ± ½ db throughout the test section on Audio Record No. 1 only, except as interrupted for the announcements defined in Section 3.4.

3.4 Voice Announcements. Each time the type of signal recorded on the tape is changed, an appropriate voice announcement identifying the new signal shall be made. Instructional or precautionary information may be included in such announcements. No identifying announcements shall be required during the black signal portions of the tape. All voice announcements shall be made under the same conditions as stated in Section 2.5, except that the video test signal shall not be interrupted.

4. *Calibration*

4.1 Calibration of audio level on all test tapes for field use shall be accomplished by comparison on a calibrated reproducer with a primary audio reference level recording made in accordance with American National Standard Specifications for a Primary Audio Reference Level Recording for Quadruplex Video Magnetic Tape Recorders Operating at 7.5 In./s, C98.10-1969.

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

4.3 Video Level Measurements. All video measurements of luminance levels shall be made in accordance with American National Standard Method of Measurement of Television Luminance Signal Levels, C16.31-1959.

Note: The frequency response of a recovered video signal is a function of such variables as recording current and type of tape stock used; therefore, the optimum reproducing-equalization setting for this tape will not necessarily be the optimum reproducing-equalization setting for all other recordings.