Proposed American National Standard

Specifications and Conditioning of Raw Tape Stock Used to Record Reference Tapes for 1-in Helical-Scan Video Tape Recorders

V98.26M

1. Scope

This standard specifies dimensions for the width, thickness, and width deviation of raw tape stock used to record reference tapes for 1-in helical-scan video tape recorders. Conditions before testing and testing environment are also specified.

2. Conditioning for Testing and Recording

2.1 Tests, measurements, and recordings made on the raw tape stock to check the requirements of this standard shall be made under the following conditions:

Temperature	23 ± 1°C
Relative humidity	50 ± 2 percent
Barometric pressure	86 to 106 kPa

2.2 The raw tape stock shall be stabilized at the above conditions for 24 hours, rewound on a reel at a tape tension of 2.0 ± 0.5 newtons, and kept at the same conditions for another 24 hours.

3. Dimensions

3.1 Tape Stock. The dimensions of the tape stock for recording reference tapes shall be as specified below:

Dimensions	Millimeters
Width	25.360 ± 0.010
Thickness	0.027 to 0.030
Maximum rate of width change	less than 0.015 over a length of 250

3.2 Longitudinal Dimensional Change. The longitudinal dimensional change of the raw tape stock kept under the following conditions for 48 hours shall be less than 0.03 percent:

Temperature	45°C ± 1°C
Relative humidity	85 ± 2 percent
Tape tension	2.0 ± 0.5 newtons

The longitudinal dimensional change shall then be measured after storage for 24 hours under the conditions specified in Sec. 2.1.

NOTE: In addition to the parameters specified in this standard, there are other parameters such as coating and frictional characteristics that affect the operation of the tape. Manufacturers of reference tapes should take these parameters into consideration.

Proposed American National Standard

Basic System and Transport Geometry Parameters for 1-in Type C Helical-Scan Video Tape Reference Recorders for Video and Audio Reference Tapes

V98.27M

1. Scope

This standard specifies test conditions, general video record system, video pole-tip locations, scanner parameters, scanner guide locations, and the tape tension for 1-in Type C helical-scan video tape reference recorders operating on the 525/60 monochrome or NTSC color systems.

2. General Specifications

2.1 Dimensions in the metric system are primary.

2.2 Tests and measurements made on the recorder to check the requirements of this standard shall be made under the following atmospheric conditions:

Temperature of drum diameter	23 ± 0.5°C
Temperature for all other tests	23 ± 1°C
Relative humidity	50 ± 2 percent
Barometric pressure	86 to 106 kPa (860 to 1060 mbar)
Conditioning before testing	24 h

3. Video Record System

3.1 Exactly one field of video shall be recorded during each scanner revolution. The record shall be divided into two parts, video and sync.

3.2 The video record shall contain all active picture lines and sufficient vertical sync information for playback VTR synchronizing. Information not contained in the video record is defined as the vertical interval dropout. (See American National Standard Dimensions and Location of Records for 1-in Type C Helical-Scan Video Tape Recording, ANSI C98.19M-1979.)

3.3 The sync record shall contain a number of horizontal TV lines during the vertical interval, including those of the vertical interval dropout, and sufficient overlap of information for playback switching. (See ANSI C98.19M-1979.)

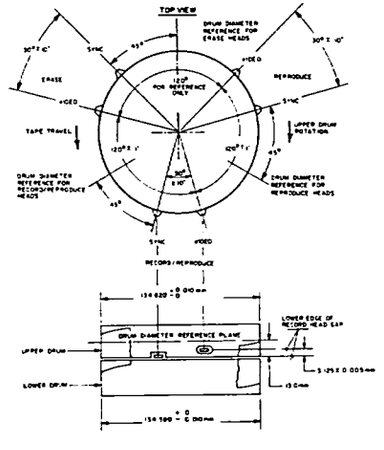

Fig. 1
Pole Tip Locations and Drum Dimensions

3.4 Provision shall be made for recording with and without the sync record. During those times when no sync recording is performed, no other information shall be recorded in the alloted tape area.

4. Scanner Pole Tips

4.1 There shall be six circumferential pole tip locations. The angular relationship shall be as follows:

Video/sync	30° ± 10″
Video/video erase	120° ± 1′
Video/video check	120° ± 1′
Video erase/sync erase	30° ± 30″
Video check/sync check	30° ± 10″

In the event that an operational pole tip is not required, a suitable nonfunctional tip shall be placed in the same location.

4.2 The tip projection of all six heads shall be 0.06 ± 0.01 mm, measured from the outer surface of the upper drum to the end of the pole tip. The outer drum reference shall be located midway between each of the three head groupings 13 mm above the lower edge of the sync record head gap. (See Fig. 1.)

4.3 The vertical displacement of the video head above its associated sync head on the drum shall be 3.125 ± 0.005 mm.

5. Scanner Guides

5.1 Location of the tape entrance and tape exit guides shall provide a tape wrap angle such that the video record vertical interval dropout is 10.00 ± 0.25 horizontal lines (which reflects the tip projection of 0.060 mm due to loss of head-to-tape contact with no electronic switching of the recording signal. Start and end of the vertical interval dropout shall be measured at 50 percent amplitude points of the RF envelope.

5.2 Location of the tape entrance and exit guides shall produce a helix angle of 2°35′29″ ± 2″.

6. Drum Diameter and Tape Tension

6.1 Effective drum diameter, tape tension, helix angle, and tape speed completely determine the video record track angle. Different methods of design and/or minor variations in drum diameter and tape tension will produce equivalent recording for interchange purposes. Values and operating conditions specified in this standard will produce the reference value of track angle. (See ANSI C98.19M-1979.)

6.2 The upper drum diameter shall be 134.620 +0.010—0.000 mm.

6.3 The lower drum diameter shall be 134.580 +0.000—0.010 mm.

6.4 The upper drum section shall rotate in synchronism with the video tips.

6.5 The center span tape tension shall be 1.7 ± 0.3 N.

7. Gap Azimuth and Alignment

7.1 The azimuth of all head gaps used to produce longitudinal track records shall be 90° ± 2″ to the direction of relative head-to-tape motion.

7.2 The gap of the head for audio channel 2 shall not deviate more than 0.001 mm from a line drawn through the gap of the head for audio channel 1, perpendicular to the edge of the tape (gap scatter).

7.3 The azimuth of the video and sync head gaps shall be perpendicular to the direction of head motion.

8. Relevant Documents

In addition to this standard, the following documents apply:

Proposed American National Standard Dimensions and Location of Records on Video and Audio Reference Tapes for 1-in Type C Helical-Scan Video Tape Recorders, ANSI V98.28M.

Proposed American National Standard Specifications and Conditioning of Raw Tape Stock Used to Record Reference Tapes for 1-in Helical-Scan Video Tape Recorders, ANSI V98.26M.

Proposed SMPTE Recommended Practice on Video and Audio Reference Tape for 1-in Type C Helical-Scan Video Tape Recorders, RP 99.

Proposed SMPTE Recommended Practice on Interchange Reference Tape for 1-in Type C Helical-Scan Video Tape Recorders, RP 100.

SMPTE Recommended Practice on Tracking-Control Record for 1-in Type C Helical-Scan Video Tape Recording, RP 85-1979, except that the tolerance in Sec. 3.1 is tightened to ± 0.1 milliseconds.

SMPTE Recommended Practice on Video Record Parameters for 1-in Type C Helical-Scan Video Tape Recording, RP 86-1979, except that the tolerances in Sec. 5 are tightened to ± 0.02 MHz. Other values shall be held as close as possible.

Appendix

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

The following definitions of terms ensure the correct understanding of this standard:

Center Span Tension. A calculated value of tape tension at a point midway between tape entrance and exit guides of the scanner in a video tape recording system.

Drum. A cylindrical column around which tape is at least partially wrapped in order to form the head-to-tape interface of a video tape recording system.

Lower Drum. That part of the drum in a helical-scan video tape recording system which contacts the reference edge of the tape and usually contains tape guiding elements. (See ANSI C98.19M-1979.)

Upper Drum. That part of the drum in a helical-scan video tape recording system that does not contact the reference edge of the tape. (See ANSI C98.19M-1979.)

Effective Drum Diameter. A value of drum diameter which when used in theoretical calculations will correspond to the actual video record produced in a helical-scan video tape recording system. The effective value is equal to or greater than the actual drum diameter.

Helix Angle. The angle formed between the path of the rotating pole tips and the tape reference edge guiding system on the scanner of a helical-scan video tape recording system.

Scanner. A mechanical assembly containing a drum, rotating pole tips, and tape guiding elements used to record and reproduce video tape recordings.

Track Angle. The angle of the video record with respect to the reference edge of the tape in a helical video tape recording. (See ANSI C98.19M-1979.)

Proposed American National Standard

Dimensions and Location of Records on Video and Audio Reference Tapes for 1-in Type C Helical-Scan Video Tape Recorders

V98.28M

1. Scope

This standard specifies the dimensions and location of video, audio, and tracking control records on reference tapes for 1-in Type C helical-scan video tape recorders operating on the 525/60 monochrome or NTSC color systems.

2. General Specifications

2.1 Tests and measurements made on the tape record to check the requirements of this standard shall be made under the following conditions unless otherwise specified:

Temperature	23 ± 1°C
Relative humidity	50 ± 2 percent
Barometric pressure	86 to 106 kPa (860 to 1060 mbar)
Tape tension	1.7 ± 0.3 N

2.2 Conditioning before recording and testing shall be as follows:

Environmental	Stabilized at the measurement conditions
Tape tension	Wound on a reel at 2.0 ± 0.5 N

2.3 The reference edge of the tape for dimensions in this standard shall be the lower edge as shown in Fig. 1. The magnetic coating is on the side facing the observer in both figures.

3. Tape Speed

The tape speed shall be 244.0 ± 0.2 mm/s.

4. Record Location and Dimensions

4.1 Record location and dimensions shall be as specified in Fig. 1 and Table 1.

4.2 Dimensions P, Q, R, and θ are for reference purposes only. The parameters given in Proposed American National Standard Basic System and Transport Geometry Parameters for 1-in Type C Helical-Scan Video Tape Reference Recorders for Video and Audio Reference Tapes, ANSI V98.27M, and the tape speed completely determine these values and their tolerances. The nominal values given are based on tensioned tape; therefore, direct measurement without tension must take into account the elasticity of the tape.

5. Video Record Curvature

The edge of the video record shall be contained within two parallel straight lines 0.025 mm apart.

6. Relative Position of Recorded Signals

6.1 Video, sync, tracking control, and audio signals with information intended to be time coincident shall be positioned as shown in Fig. 2. Dimensions Y and Z are for reference purposes only.

6.2 The start of the video record is that location on the video record which would be produced by scanner and guide locations with no electronic switching of the recording signal.

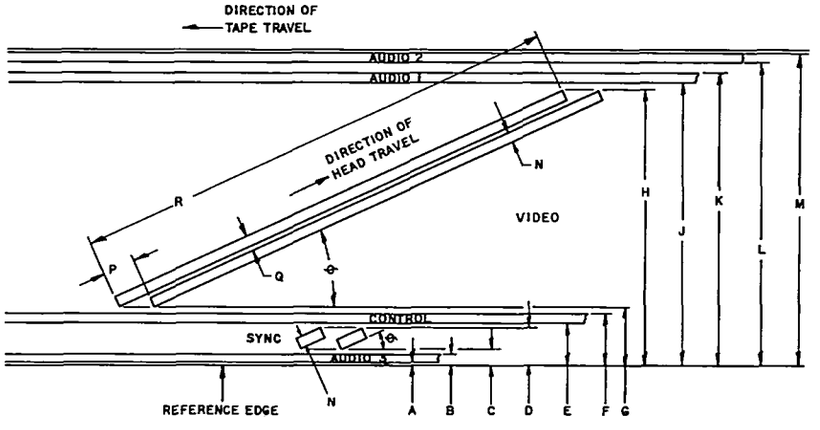

Fig. 1
Record Location and Dimensions

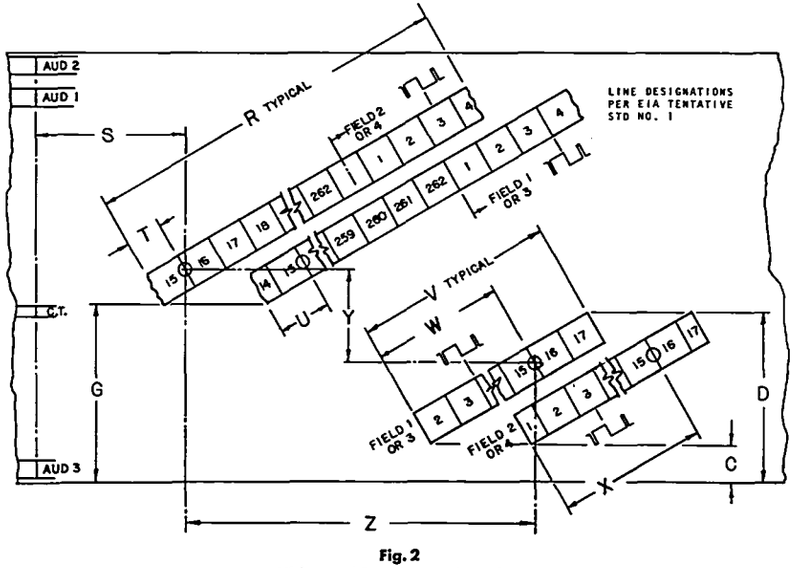

Fig. 2
Video and Sync Record Location