

# American National Standard for video recording— 1-in type C recorders and reproducers— frequency response and reference level

Approved April 10, 1985

Sponsor: Society of Motion Picture and Television Engineers

Page 1 of 2 pages

## 1. Scope

This standard specifies the frequency response and reference level of recorders and reproducers for audio records for 1-in Type C helical-scan video tape recording.

## 2. Reference Standards

The following American National Standards are intended to be used in conjunction with this standard:

ANSI/V98.18M-1983, Video Recording—1-in Type C Helical-Scan—Basic System and Transport Geometry Parameters

ANSI/IEEE 152-1953 (R1976), Volume Measurements of Electrical Speech and Program Waves

## 3. Reference Levels

**3.1 Recording Method.** All recordings shall be made using the anhysteresis (bias) method.

**3.2 Recording and Reproducing Level Indicator.** The audio recording and reproducing levels of a video tape recorder shall be adjusted with a standard volume indicator, as specified in ANSI/IEEE 152-1953.

**3.3 Recorder Reference Level.** When a recording is made from a sinusoidal signal having a frequency of 1000 Hz such that the rms short circuit

tape flux per unit track width on the record is  $100 \pm 3$  nWb/m of track width, the recording volume indicator shall be adjusted to deflect to its reference level (0 vu) scale mark. The reference level is intended to be nominally 8 dB below the recorded level that would produce 3% third harmonic distortion.

**3.4 Reproducer Reference Level.** When a tape record having an rms short circuit tape flux per unit track width of 100 nWb/m and a frequency of 1000 Hz is reproduced, the reproducing volume indicator shall deflect to its reference level (0 vu) scale mark.

## 4. Frequency Response

**4.1 Recorder Flux/Frequency Response.** When a tape record is recorded from a constant voltage level applied to the input terminals of the recording system, the short circuit tape flux level on the record versus frequency,  $L_{\phi}(f)$ , shall be as given by the following equation:

$$L_{\phi}(f) = 10 \log_{10} \frac{1 + \left(\frac{f_1}{f}\right)^2}{1 + \left(\frac{f}{f_2}\right)^2} \quad [\text{dB}]$$

where  $L_{\phi}$  is the relative tape flux level;  $f$  is the frequency at which the response is being computed;  $f_1$  is the low-frequency transition fre-

Page 2 of 2 pages

quency, 50 Hz; and  $f_2$  is the high-frequency transition frequency, 10610 Hz.

**4.2 Reproducer Flux/Frequency Response.** When a tape record having a short circuit tape flux level versus frequency given in 4.1 is reproduced, the output voltage level of the reproducer versus frequency shall be constant.

## 5. Track Usage

**5.1 Nonstereo Audio.** The primary program audio channel shall be recorded on the audio 1 track.

**5.2 Stereo Audio.** When separate channels are used for stereo audio, the left channel shall be recorded on the audio 1 track and the right chan-

nel on the audio 2 track. When sum and difference channels are used for stereo audio, the left plus right channel shall be recorded on the audio 1 track and the left minus right channel on the audio 2 track.

**5.3 Time and Control Code.** When used, a time and control code shall be recorded on the audio 3 track.

## 6. Program Audio Head Phasing

When the same signal is recorded on the audio 1 and audio 2 tracks, the tracks shall be so phased that, when reproduced with a head wide enough to sense the recorded flux on both records, they will be additive.

## Appendix

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

Equivalent time constants would be:

$$T_1 = 3180 \mu\text{s}$$

$$T_2 = 15 \mu\text{s}$$

The record flux level versus frequency method given in 4.1 is equivalent to the more familiar reproduce time-constant method. Transition frequencies may be calculated with the following equation:

$$f = \frac{1}{2\pi T}$$

CAUTION: NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute. Printed in USA

Copyright © 1985 by the Society of Motion Picture and Television Engineers. Reprinted by permission.

**SMPTE** American National Standards Institute, 1430 Broadway, New York, N.Y. 10018

ANSI/SMPTE 20M-1985

# American National Standard for video recording— 1-in reel dimensions

Approved April 10, 1985

Sponsor: Society of Motion Picture and Television Engineers

Page of 1 of 4 pages

## 1. Scope

This standard specifies the configuration and dimensions for reels intended for 1-in magnetic tape for television recording on helical-scan video recorders, as specified in ANSI V98.25M-1982.

## 2. Reference Standard

The following American National Standard is intended to be used in conjunction with this standard:

ANSI V98.25M-1982, Dimensions of 1-in Video Magnetic Recording Tape

## 3. Reel Construction

The method of fastening or the fasteners used to hold the flanges to the hub shall not cause protrusions beyond the hub mounting surface. The reel shall be symmetrical about the axis of rotation. Irregularities of configuration, such as flange openings, shall conform to this requirement.

## 4. Dimensions

The dimensions shall be as shown in the figures and tables. The dimensions apply to reels normalized at  $23^{\circ}\text{C} \pm 1^{\circ}\text{C}$  and at  $50 \pm 2$  percent relative humidity.

## 5. Flange Clearance

With the reel mounted in the test apparatus, a width gauge of  $25.500 \pm 0.010 - 0.000$  mm ( $1.0039 \pm 0.0004 - 0.0000$  in) shall be mounted so the gauge centerline is  $15.37$  mm ( $0.605$  in) from the hub mounting surface and at  $90^{\circ}$  relative to the hub winding surface. The reel shall be rotated and the width gauge moved between the flanges from the flange rim to the hub surface. The width gauge shall not touch the flange during this operation. When the reel is turned over so that the other side of the hub is the reel mounting surface, it shall also pass tape path clearance check.

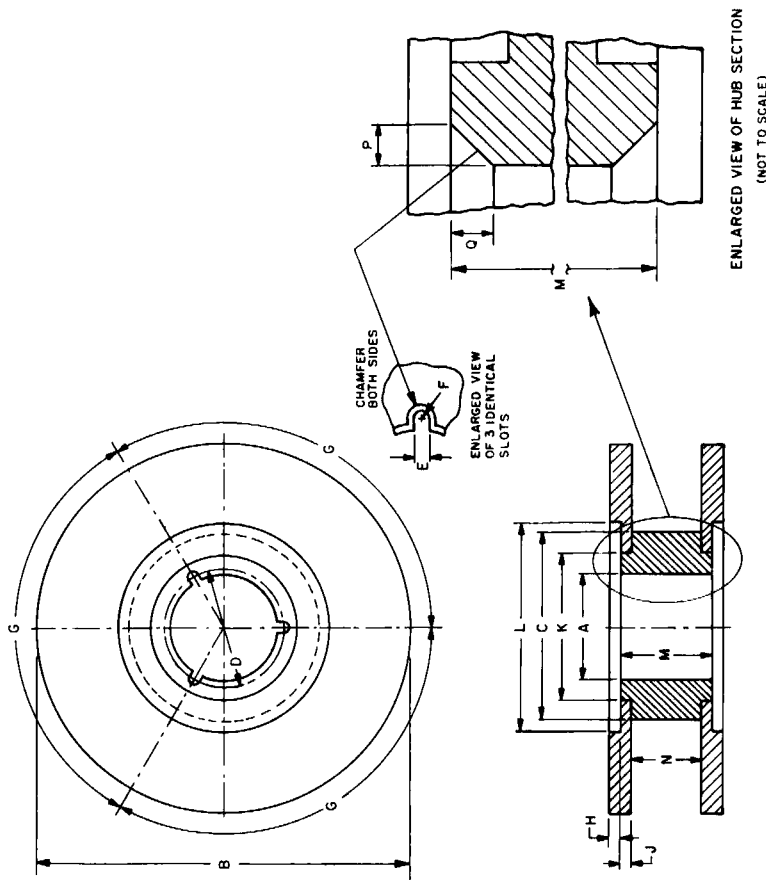


Fig. 1  
Reel for 1-in Magnetic Tape

CAUTION NOTICE: This American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to reaffirm, revise, or withdraw this standard no later than five years from the date of publication. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute. Printed in USA

Copyright © 1985 by the Society of Motion Picture and Television Engineers. Reprinted by permission.

American National Standards Institute, 1430 Broadway, New York, N.Y. 10018

ANSI/SMPTE 24M-1985

**Table 1**  
Reel Dimensions

Dimensions	Millimeters	Inches
A	76.20 ± 0.10	3.000 ± 0.004
B*	See Table 2	See Table 2
C	114.30 ± 0.25	4.500 ± 0.010
D	82.55 ± 0.05	3.250 ± 0.002
E	5.56 ± 0.15	0.219 ± 0.006
F	2.77 R ref	0.109 R ref
G	120.0° ± 0.1°	120.0° ± 0.1°
H	0.64 max	0.025 max
J	2.39 max	0.094 max
K†	91.44 min	3.600 min
L*†	152.40 min	6.000 min
M	30.78 ± 0.08	1.212 ± 0.003
N	25.91 ± 0.05	1.020 ± 0.002
P	0.76 max	0.030 max
Q	0.76 max	0.030 max

\*Outside surfaces of reel flanges between diameters L and B shall not extend more than 0.64 mm (0.025 in) beyond the surfaces defined by the actual Dimension M.

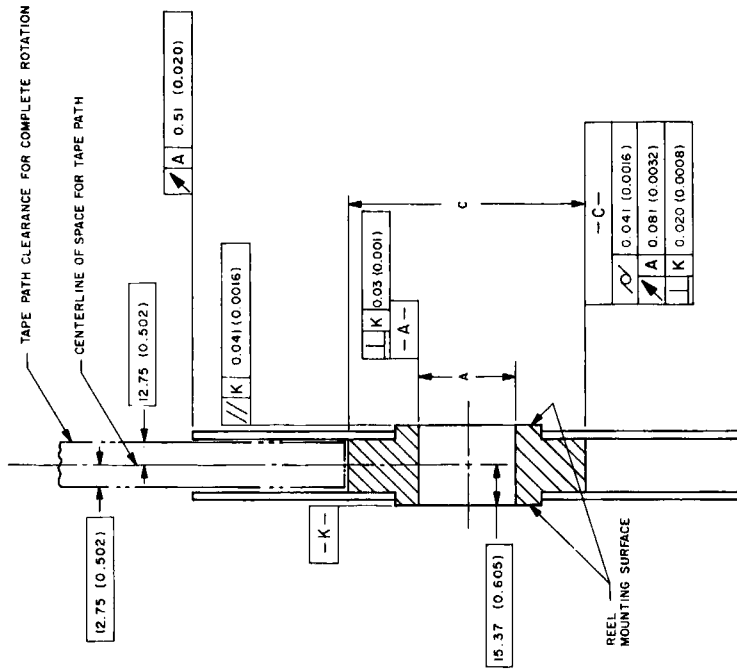
†Outside surfaces of reel flanges between diameters K and L shall not extend beyond the surfaces defined by the actual Dimension M.

**Table 2**  
Dimension B, Flange Diameters

Millimeters	Inches
165.10 ± 0.25	6.500 ± 0.010
203.20 ± 0.25	8.000 ± 0.010
228.60 ± 0.25	9.000 ± 0.010
266.70 ± 0.25	10.500 ± 0.010
292.10 ± 0.25	11.500 ± 0.010
298.50 ± 0.25	11.752 ± 0.010
304.80 ± 0.25	12.000 ± 0.010
317.50 ± 0.25	12.500 ± 0.010
355.60 ± 0.25	14.000 ± 0.010

Note 1: Reel shall meet tape clearance requirements when mounted on either side.

Note 2: Tape path clearance takes precedence over any tolerance build-up. See Sec. 5 for measurement techniques.



**Fig. 2**  
Clearance

**Appendix**

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

It is recommended that reels be identified in a manner making it readily apparent that they contain video tape in order to prevent inadvertent use of other types of tape having a similar appearance.