EG 20-1997
Revision of EG 20-1993

SMPTE ENGINEERING GUIDELINE

Tape Transport Geometry Parameters for 19-mm Type D-2 Composite Format for Television Digital Recording

1 Scope

This guideline describes two feasible examples of mechanical design and test conditions for achieving the record dimensions specified in ANSI/SMPTE 245M. The parameters are for reference purposes only.

2 General specifications

2.1 Dimensions are in the metric system.

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

Temperature	20°C ± 1°C
Relative humidity	(50 ± 2)%
Barometric pressure	96 kPa ± 10 kPa
Conditioning of the recorder before testing	Not less than 24 hours

3 Scanner specifications

3.1 The effective drum diameter, tape tension, helix angle, and tape speed taken together determine the track angle. Different methods of design and/or variations in drum diameter and tape tension can produce equivalent recordings for interchange purposes.

3.2 Two possible design examples are shown in table 1 and table 2, and figure 1 and figure 2.

3.3 The longitudinal head locations and tape wrap for design 1 are shown in figure 3.

3.4 The longitudinal head locations and tape wrap for design 2 are shown in figure 4.

Approved September 18, 1997

Table 1 – Pole tip relationships

Parameters		Design 1	Design 2
Relevant figures		Figure 1	Figure 2
Minimum number of pole tips		4	4
Angular relationship (degrees)	H1 -- H2	4.22	3.56
	H3 -- H4	4.22	3.56
	H1 -- H3	180.00	180.00
Vertical displacement (mm)	H1 -- H2	0.0373	0.0376
	H3 -- H4	0.0373	0.0376
Maximum tip projection (μm)		50	50

Table 2 – Scanner design parameters

Parameters	Design 1	Design 2
Scanner rotation speed (rps)	90/1.001[1)]	90/1.001[1)]
Number of tracks per rotation	4	4
Actual drum diameter		
Upper (mm)	96.444 ± 0.005	96.444 ± 0.005
Lower (mm)	96.434 ± 0.005	96.434 ± 0.005
Center span tension (N)	0.7 ± 0.1	0.7 ± 0.1
Helix angle (degrees)	6.1592	6.1592
Effective wrap angle (degrees)	178.2	178.2
Scanner circumferential speed (m/s)	27.3	27.3
Overwrap leading (degrees)	5	5
trailing (degrees)	4.8	4.8
Record head track width	41-45 μm	42 μm typ

[1)] 1.001 = 60/59.94

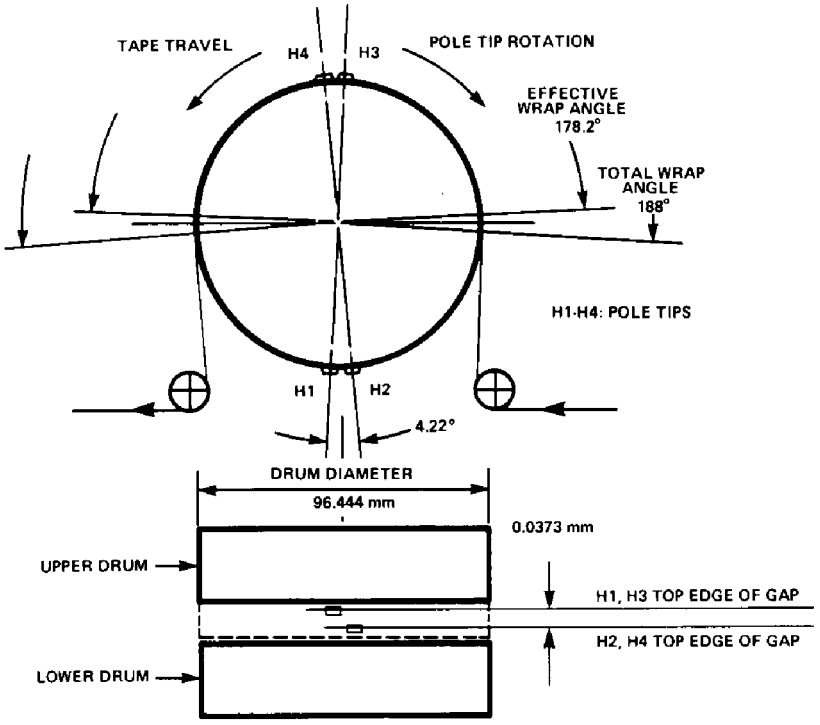

Figure 1 – Scanner configuration for design 1

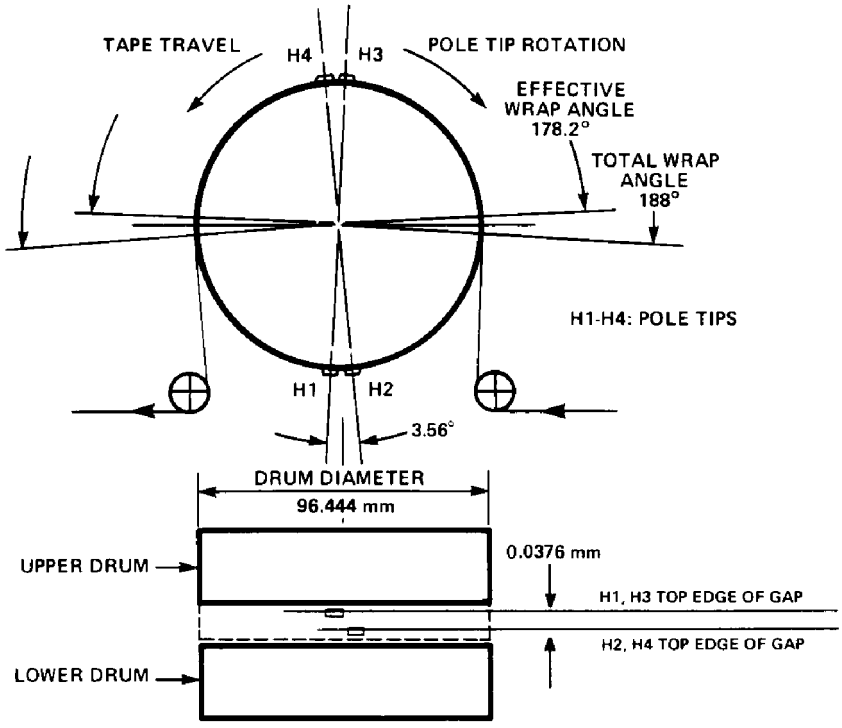

Figure 2 – Scanner configuration for design 2

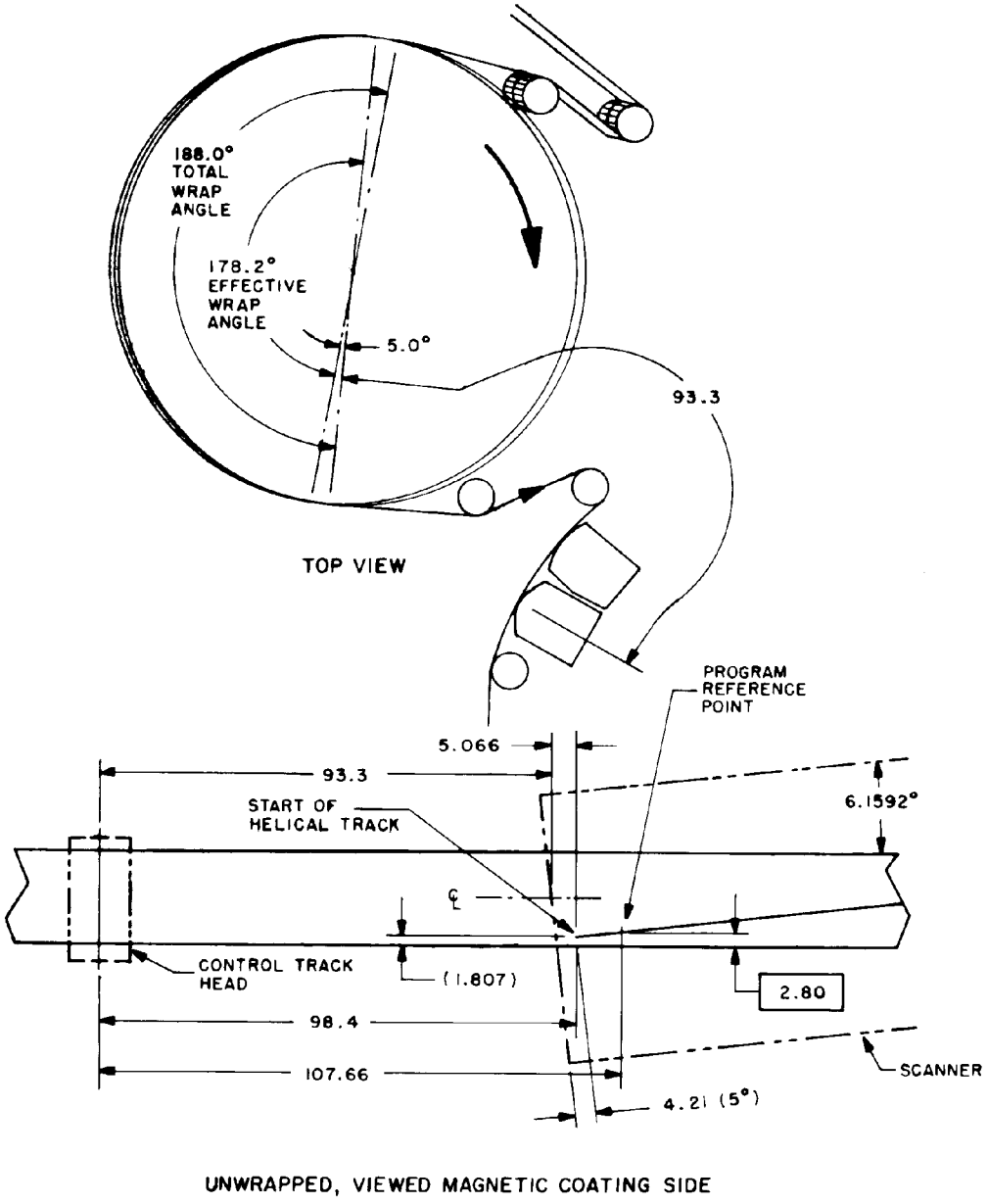

Figure 3 – Longitudinal head locations and tape wrap for design 1

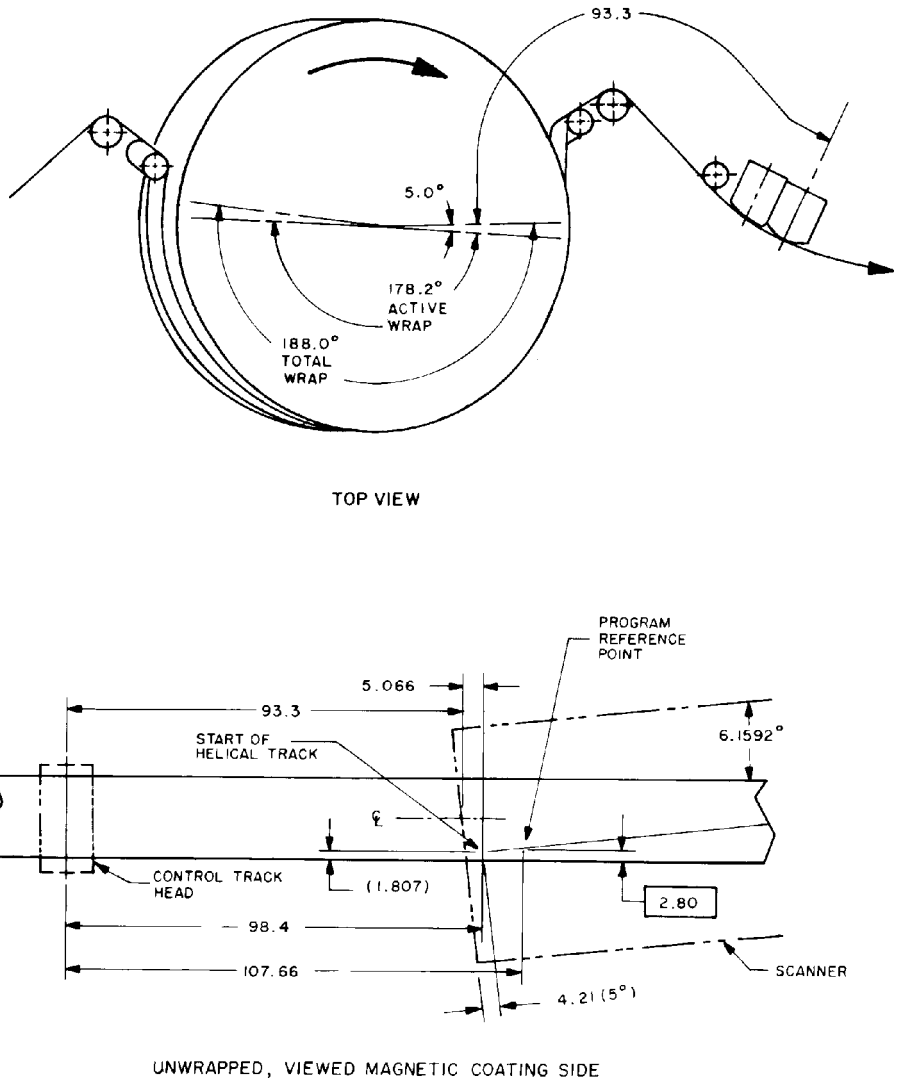

Figure 4 – Longitudinal head locations and tape wrap for design 2

Annex A (informative)
Bibliography

ANSI/SMPTE 226M-1996, Television Digital Recording — 19-mm — Tape Cassettes

ANSI/SMPTE 244M-1995, Television — System M/NTSC Composite Video Signals — Bit-Parallel Digital Interface

ANSI/SMPTE 245M-1993, Television Digital Recording — 19-mm Type D-2 Composite Format — Tape Record

ANSI/SMPTE 246M-1993, Television Digital Recording — 19-mm Type D-2 Composite Format — Magnetic Tape

ANSI/SMPTE 247M-1993, Television Digital Recording — 19-mm Type D-2 Composite Format — Helical Data and Control Records

ANSI/SMPTE 248M-1993, Television Digital Recording — 19-mm Type D-2 Composite Format — Cue Record and Time and Control Code Record

SMPTE EG 21-1997, Nomenclature for Television Digital Recording of 19-mm Type D-1 Component and Type D-2 Composite Formats