

Specification for

Type C helical video tape recorders —

(Implementation of
CENELEC HD 573 S1)

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Electronic Equipment Standards Committee (EEL/-) to Technical Committee EEL/22, upon which the following bodies were represented:

- Association of Sound and Communications Engineers Limited
- British Broadcasting Corporation
- British Kinematograph, Sound and Television Society
- Council for Educational Technology for the United Kingdom
- Electronic Engineering Association
- Independent Television Companies Association
- Industrial Council for Educational and Training Technology Ltd.
- Training and Educational Systems Testing Bureau

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

- Association of Professional Audio and Radio Consultants
- Association of Professional Recording Studios Limited
- Audio Engineering Society
- British Tape Industry Association
- Royal Photographic Society

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National Foreword

This British Standard has been prepared by Technical Committee EPL/60, Recording, and is identical with IEC 558:1982 *Type C helical video tape recorders* as amended by Amendment No. 1: February 1987 and Amendment No 2: September 1993, published by the International Electrotechnical Commission (IEC). This British Standard is also in agreement with Harmonization Document HD 573 S1:1982 and its amendment A1: June 1995, published by the European Committee for Electrotechnical Standardization (CENELEC).

In Figure 5A the control track frame numbers associated with *U*, i.e. “87” and “288”, were corrected by Amendment No. 1:1987 to read “77” and “278” respectively.

Cross-references

Publication referred to	Corresponding British Standard
	BS EN 60094 (BS 6288) <i>Magnetic tape sound recording and reproducing systems</i>
EN 60094-1:1993 (IEC 94-1:1981)	Part 1:1994 <i>Specification for general conditions and requirements</i>
EN 60094-2:1993 (IEC 94-2:1975)	Part 2:1993 <i>Specification for calibration tapes</i>
	BS 6288 <i>Magnetic tape sound recording and reproducing systems</i>
IEC 94-3:1979	Part 3:1990 <i>Methods of measuring the characteristics of recording and reproducing equipment for sound on magnetic tape</i>
HD 311.6 S1:1987 (IEC 94-6:1985)	Part 6:1987 <i>Specification for reel-to-reel systems</i>
IEC 347:1982	BS 4967:1983 <i>Specification for transverse track video tape recorders</i>
IEC 503:1975	BS 5575:1978 <i>Specification for spools for 1 in (25.4 mm) video magnetic tape</i>
ISO 1860:1986 ^a	BS 3732: <i>Reels for magnetic tape for instrumentation applications</i> Part 1:1988 <i>Specification for precision reels with 76 mm (3 in) centre hole</i>

^a ISO 1860:1978 has been superseded by ISO 1860:1986.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the HD title page, pages 2 to 20, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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ICS 33.160.40

Descriptors: Recording equipment, video recording, video tape recorder, magnetic tape, dimension, recording track, characteristic

English version

Type C helical video tape recorders

(IEC 558:1982/A2:1993)

Magnétoscopes à enregistrement hélicoïdal de
type C
(CEI 558:1982/A2:1993)

Videobandgeräte mit Schrägspuraufzeichnung
Typ C
(IEC 558:1982/A2:1993)

This amendment A1 modifies the Harmonization Document HD 573 S1:1990; it was approved by CENELEC on 1995-05-15. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for implementation of this amendment on a national level.

Up-to-date lists and bibliographical references concerning such national implementation may be obtained on application to the Central Secretariat or to any CENELEC member.

This amendment exists in three official versions (English, French, German).

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of amendment 2:1993 to the International Standard IEC 558:1982, prepared by SC 60B, Video recording, of IEC TC 60, Recording, was submitted to the formal vote and was approved by CENELEC as amendment A1 to HD 573 S1:1990 on 1995-05-15 without any modification.

The following dates were fixed:

- latest date by which the
existence of the
amendment has to be
announced at national
level (doa) 1996-01-01
- latest date by which the
amendment has to be
implemented at national
level by publication of a
harmonized national
standard or by
endorsement (dop) 1996-07-01
- latest date by which the
national standards
conflicting with the
amendment have to be
withdrawn (dow) 1996-07-01

1 Scope

This standard applies to magnetic video recording and/or reproduction using 25.4 mm (1 in) tape on type C helical video tape recorders suitable for broadcast applications.

2 Object

The object of this standard is to define the electrical and mechanical characteristics of equipment which will provide for interchangeability of recordings. The requirements given are related to 525 line-60 field and/or 625 line-50 field systems.

3 Format description

Two video recording heads are used, one for the active period of the field and a part of the vertical interval and one for the remainder of the vertical interval. Use of the latter head is optional.

4 Environment

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

Temperature (drum diameter)	23 ± 0.5 °C
Temperature (all other tests)	23 ± 1 °C
Relative humidity	48 % to 52 %
Barometric pressure	86 kPa to 106 kPa
Conditioning before testing:	24 h

5 Tapes and spools

5.1 Dimensions of magnetic tape for television

The magnetic tape used for television recording shall conform to the following dimensions:

	Millimetres	Inches
Width	$25.350^{+0.025}_{-0.025}$	$0.9980^{+0.001}_{-0.001}$
Maximum overall thickness	0.030	0.0012
Maximum longitudinal curvature	1.3 in 1 m	0.051 in 39.4
NOTE The curvature shall be measured by standard IEC procedures as shown in Figure 1, page 10.		

5.2 Spools

5.2.1 Spools shall conform to the requirements of ISO Standard 1860. The preferred spool diameters are listed in IEC Publication 503: Spools for 1 in (25.4 mm) Video Magnetic Tape. If a friction ring is used, dimension C shall be:

$$115^{+2}_{-1} \text{ mm } (4.528^{+0.079}_{-0.039} \text{ in})$$

The friction ring shall not impair spool performance or long-term storage of tape. (See Table I and Table II and Figure 2, page 11.)

Table I — Spool dimensions

Dimensions	Millimetres	Inches	Degrees
A	$76.2^{+0.1}_{-0.0}$	$3.000^{+0.004}_{-0.000}$	
C	$114.0^{+0.5}_{-0.0}$	4.500 ± 0.010	
D	$82.5^{+0.1}_{-0.0}$	3.250 ± 0.002	
E	$5.60^{+0.15}_{-0.00}$	$0.219^{+0.006}_{-0.000}$	
G			120.0 ± 0.1
H	0.65 max.	0.025 max.	
J	2.5 max.	0.098 max.	
K	91.5 min.	3.600 min.	
L	153 min.	6.000 min.	
M	30.8 ± 0.1	1.212 ± 0.003	

Table II — Dimension B

Millimetres	Inches
$203.0^{+0.5}_{-0.0}$	8.000 ± 0.010
$229.0^{+0.5}_{-0.0}$	9.000 ± 0.010
$248.0^{+0.5}_{-0.0}$	9.750 ± 0.010
$267.0^{+0.5}_{-0.0}$	10.500 ± 0.010

Table III — Approximate spool capacities

Diameter of spool		Approximate capacity based upon nominal thickness of 0.030 mm		Approximate maximum playing time (min)	
Millimetres	Inches	Metres	Feet	625 line-50 field system	525 line-60 field system
203	8	650	2 100	45	44
229	9	900	3 000	62	61
248	9.75	1 125	3 700	78	77
267	10.5	1 400	4 600	97	95

5.2.2 A minimum distance of 3 mm (0.12 in) from the tape to the spool periphery shall be allowed. Approximate spool capacities are given in Table III.

5.3 Magnetic tape properties

5.3.1 The magnetic coating shall be longitudinally oriented.

5.3.2 The coercivity shall be more than 30×10^3 A/m.

6 Transport geometry parameters and description of the basic system

6.1 Definitions of terms

The following definitions of terms are given to assist in the correct understanding of this part of the standard.

6.1.1 Scanner

The mechanical assembly comprising a drum, rotating pole tips and tape-guiding elements. It is used to record and reproduce video tape recordings.

6.1.2 Drum

The circular cylinder around which tape is at least partially wrapped in order to form the head-to-tape interface of a video tape recording system.

6.1.3 Upper drum

That part of the drum in a helical-scan video recording system which does not contact the reference edge of the tape in this format.

6.1.4 Lower drum

That part of the drum in a helical-scan video recording system which contacts the reference edge of the tape and usually contains tape-guiding elements.

6.1.5 Effective drum diameter

The 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.

6.1.6 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.

6.1.7 Track angle

The angle of the recorded video track with respect to the reference edge of the tape in a helical video tape recording.

6.1.8 Centre span tension

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

6.2 Video and sync record system

6.2.1 Exactly one field of video shall be recorded during each scanner revolution. The video record shall contain all active picture lines and sufficient vertical-sync information for playback synchronization. Information not contained in the video record is defined as the vertical-interval drop-out.

6.2.2 Recording of the missing vertical interval information shall be optional. However, no other information shall be recorded in the allotted tape area for 525-60 systems. A longitudinal audio track (audio 4) may be recorded in the area in lieu of the missing vertical information for 625-50 systems.

6.2.3 The optional record of the vertical interval information shall, contain a number of horizontal TV lines during the vertical interval, those of the vertical interval including drop-out and sufficient overlap of information for playback switching.

6.3 Scanner pole tips

6.3.1 There shall be six circumferential pole tip locations as shown in Figure 3, page 12 (top view). When an operational pole tip is not required, a suitable inoperative tip shall be placed in the same location.

NOTE The inoperative tips have mechanical characteristics similar to those of the pole tips but without any electrical function. Their main function is to cause the tape to assume the same deformation as that produced when a pole tip is used in the same place.

6.3.2 Each tip projection shall be 0.06 ± 0.03 mm (0.0024 ± 0.0012 in) measured from the outer surface of the upper drum to the end of the pole tip.

6.3.3 The axial distance between each video-head pole tip and its associated sync-head pole tip shall be as shown in Figure 3 (side view).

6.4 Scanner guides

6.4.1 Location of the tape entrance and exit guides shall provide a tape-wrap angle such that the video record vertical-interval drop-out is 10.00 ± 0.25 horizontal lines for 525-60 systems or 11.90 ± 0.30 lines in 625-50 systems due to loss of head-to-tape contact, with no electronic switching of the recording signal. Start and end of the vertical-interval drop-out shall be measured at the half-amplitude points of the r.f. signal envelope produced by the video head. The measurements shall be made with a tip projection of 0.06 mm (0.0024 in).

6.4.2 The helix angle formed by the scanner and the associated tape guides shall be $2^\circ 35' 29'' \pm 2''$.

6.5 Drum diameter and tape tension

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 shall produce equivalent recordings for interchange purposes. Values and operating conditions specified in this sub-clause will produce the reference value of track angle.

6.5.1 The actual upper drum diameter shall

be $134.620^{+0.018}_{-0.000}$ mm ($5.300\ 00^{+0.000\ 71}_{-0.000\ 00}$ in)