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British Standard Specification for

# Transverse track video tape recorders

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Magnétoscopes à pistes transversales — Spécifications

Querspur-Video-Aufzeichnungsgeräte

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## National foreword

This British Standard has been prepared under the direction of the Electronic Equipment Standards Committee and is identical with IEC Publication 347 'Transverse track video recorders', published in 1982 by the International Electrotechnical Commission (IEC). It revises and supersedes BS 4967 : 1973, which is withdrawn.

**Terminology and conventions.** The text of the international standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

The notes to the following clauses and tables contain mandatory material and for the purposes of this British Standard should therefore be regarded as being part of the main text:

- note to table 1
- footnote 4 to table V
- first sentence at foot of table VI

References to page numbers in the text relate to the IEC page numbers given in brackets at the bottom of each page.

## Cross-references

| International standard | Corresponding British Standard                                                                                                                      |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| IEC 94-1 : 1981        | BS 6288 Magnetic tape sound recording and reproducing systems<br>Part 1 : 1982 Specification for general conditions and requirements<br>(Identical) |

British Standards corresponding to IEC 735 'Measuring methods for video tape properties' which is referred to in the note to 3.1 and IEC 752 'Audio-frequency calibration tape for transverse track recorders' which is referred to in A.3, both published in 1982, are currently in course of preparation and are expected to become available shortly.

The Technical Committee has reviewed the provisions of IEC 461 referred to in 4.5, and has decided that they are acceptable for use with this standard. References to the European Broadcasting Union (EBU) standards and to those of the Society of Motion Picture and Television Engineers (USA) (SMPTE) made in the 'Notes' to Table VI are for information only.

Copies of the International Radio Consultative Committee (CCIR) specifications, referred to in clause 2, may be obtained from CCIR, 1211 Geneva 20, 2 rue de Varembe, Switzerland.

*Textual error.* The title of figure 4 was omitted in error, and should read 'Configuration of the tape at the head wheel'.

**Compliance with a British Standard does not of itself confer immunity from legal obligations.**



**Amendment No. 1**  
**published and effective from 31 May 1990**  
**to BS 4967 : 1983**

**Specification for transverse**  
**track video tape recorders**

NOTE. This amendment is being published to effect the implementation of CENELEC HD 451 S1.

### Revised text

AMD 6231  
May 1990

#### Front cover

Underneath the title insert '(Implementation of CENELEC HD 451 S1)'.

AMD 6231  
May 1990

#### National foreword

Delete the existing text and substitute the following.

'This British Standard has been prepared under the direction of the Electronic Equipment Standards Policy Committee and is identical with IEC 347 : 1982 'Transverse track video recorders', published by the International Electrotechnical Commission (IEC). It revises and supersedes BS 4967 : 1973 which is withdrawn. This British Standard is also in agreement with Harmonization Document HD 451 S1, published by the European Committee for Electrotechnical Standardization (CENELEC).

The notes to the following tables contain mandatory material and for the purposes of this British Standard should therefore be regarded as being part of the main text:

note to table 1;

footnote 4 to table V;

first sentence at the foot of table VI.

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#### Cross-references

| International standard | Corresponding British Standard                                                                                                                      |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| IEC 94-1 : 1981        | BS 6288 Magnetic tape sound recording and reproducing systems<br>Part 1 : 1982 Specification for general conditions and requirements<br>(Identical) |
| IEC 461 : 1986         | BS 6865 : 1987 Specification for time and control codes for video tape recorders<br>(Identical)                                                     |
| IEC 735 : 1982         | BS 6412 : 1983 Methods for measurement of video tape properties<br>(Identical)                                                                      |
| IEC 752 : 1982         | BS 6415 : 1983 Specification for audio-frequency calibration tape for transverse track video<br>recorders<br>(Identical)                            |

References to European Broadcasting Union (EBU) standards and those of the Society of Motion Picture and Television Engineers (USA) (SMPTE) made in the 'Notes' to table VI are for information only.

Copies of EBU documents may be purchased from Technical Centre of the European Broadcasting Union, Avenue Albert Lancaster 32, B-1180 Bruxelles (Belgium).

*Textual error.* The title of figure 4 was omitted in error and should read 'Configuration of the tape at the head wheel'.

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British Standard Specification for

# Transverse track video tape recorders

## 1. Scope

This standard applies to transverse track video recorders, i.e. recorders making use of four video heads rotating in a plane perpendicular to the direction of tape motion.

## 2. Object

The object of this standard is to define the electrical and mechanical characteristics of equipment which will provide for interchangeability of recordings. For some parameters, the specification is only possible through the description of recorded tapes which implies making reference to the television system or standard in use. In such cases, the reference made for instance to 525 line-60 field or 625 line-50 field systems shall be considered as an example. No restriction to any type of use of transverse track recorders is implied in this standard.

The international exchange of tapes for professional television broadcasting is governed by the C.C.I.R. The clauses of this standard are in accordance with C.C.I.R. specifications, unless otherwise specified.

## 3. Mechanical parameters

### 3.1 *Dimensions of magnetic tape for television*

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

|                                | Millimetres             | Inches                    |
|--------------------------------|-------------------------|---------------------------|
| Width                          | $50.80^{+0.00}_{-0.10}$ | $2.000^{+0.000}_{-0.004}$ |
| Maximum overall thickness      | 0.038                   | 0.0015                    |
| Maximum longitudinal curvature | 1.1 in 1 m              | 0.043 in 39.4             |

*Note.* – The curvature should be measured by standard IEC procedures (see IEC Publication 735: Measuring Methods for Video Tape Properties).

### 3.2 *Spools*

3.2.1 The dimensions of the spools shall be as specified in Figure 1, page 26, and in Tables I and II\*.

\* The dimensions in inches represent the primary standard; the dimensions in millimetres are derived and are rounded off in such a way as not to impair interchangeability.

- 3.2.2 A minimum distance of 5 mm (0.2 in) from the tape stack to the spool periphery shall be allowed. Approximate spool capacities are given in Table III.
- 3.2.3 Flange-fastening members, when necessary, shall not protrude above the outer surface of the flanges.
- 3.2.4 Bosses, ribs, or raised designs are permitted on the outside surface of the flanges provided that they do not extend beyond the cross-hatched envelope when the reel is rotated around its centre axis.
- 3.2.5 The inside cylindrical surface of the centre hole (diameter *A*) shall be coaxial with the outside cylindrical surface of the hub (diameter *C*) within 0.05 mm (0.002 in) TIR; i.e. the deviation of the centre of diameter *A* with respect to the centre of diameter *C* shall not exceed 0.025 mm (0.001 in).
- 3.2.6 The outside diameter of the flanges (diameter *B*) shall be coaxial with the centre hole of the hub (diameter *A*) within 0.4 mm (0.015 in) TIR; i.e. the deviation of the centre of diameter *B* with respect to the centre of diameter *A* shall not exceed 0.2 mm (0.008 in).
- 3.2.7 It is desirable that both flanges be identical and have regularly spaced holes, which extend to the hub periphery and are of such size at this point as to facilitate threading.
- 3.2.8 Reels shall be so constructed that any profile section taken through the centre axis of the reel will fall within the cross-hatched envelope of Figure 1, page 26. This includes lateral run-out of the flanges.
- 3.2.9 Between diameters *K* and *L*, the outside surfaces of the flanges, including any flange fastening device employed, shall not extend beyond the surfaces defined by dimension *M*.
- 3.2.10 The hub surfaces defined by dimension *M* shall be parallel within 0.0004 mm per millimetre (or inches per inch).

TABLE I  
*Spool dimensions*

| Dimension  | Millimetres               | Inches                     | Degrees   |
|------------|---------------------------|----------------------------|-----------|
| <i>A</i>   | 76.20 $^{+0.10}_{-0.00}$  | 3.000 $^{+0.004}_{-0.000}$ | 120 ± 0.1 |
| <i>B</i>   | See Table II              | See Table II               |           |
| <i>C</i> * | 114.00 $^{+0.50}_{-0.00}$ | 4.500 ± 0.010              |           |
| <i>D</i>   | 82.5 $^{+0.1}_{-0.0}$     | 3.250 ± 0.002              |           |
| <i>E</i>   | 5.6 $^{+0.15}_{-0.00}$    | 0.219 $^{+0.006}_{-0.000}$ |           |
| <i>F</i>   | <i>E</i> /2               | <i>E</i> /2                |           |
| <i>G</i>   |                           |                            |           |
| <i>H</i>   | 0.65 max.                 | 0.025 max.                 |           |
| <i>J</i>   | 2.5 max.                  | 0.098 max.                 |           |
| <i>K</i>   | 91.5 min.                 | 3.600 min.                 |           |
| <i>L</i>   | 153 min.                  | 6.000 min.                 |           |
| <i>M</i>   | 56.2 ± 0.1                | 2.212 ± 0.003              |           |

\* Exclusive of friction ring. Friction rings, if provided, shall be such as not to impair spool performance.

TABLE II

*Dimension B*

| Millimetres          | Inches               |
|----------------------|----------------------|
| $165^{+0.5}_{-0.0}$  | $6.500 \pm 0.010$    |
| $203^{+0.5}_{-0.0}$  | $8.000 \pm 0.010$    |
| $267^{+0.5}_{-0.0}$  | $10.500 \pm 0.010$   |
| $318^{+0.5}_{-0.0}$  | $12.500 \pm 0.010$   |
| $356^{+0.5}_{-0.0}$  | $14.000 \pm 0.010$   |
| $397^{+0.5*}_{-0.0}$ | $15.625 \pm 0.010^*$ |

\* This size reel is for special applications only and may not fit on all machines.

TABLE III

*Approximate spool capacities*

| Diameter of spool |        | Approximate capacity |       | Approximate maximum playing time*<br>min |                                 |
|-------------------|--------|----------------------|-------|------------------------------------------|---------------------------------|
| Millimetres       | Inches | Metres               | Feet  | 625 line-<br>50 field<br>system          | 525 line-<br>60 field<br>system |
| 165               | 6.5    | 225                  | 750   | 9 ( 19)                                  | 10 ( 20)                        |
| 203               | 8      | 500                  | 1 650 | 21 ( 42)                                 | 22 ( 44)                        |
| 267               | 10.5   | 1 110                | 3 600 | 46 ( 92)                                 | 48 ( 96)                        |
| 318               | 12.5   | 1 700                | 5 540 | 71 (142)                                 | 74 (148)                        |
| 356               | 14     | 2 200                | 7 230 | 92 (185)                                 | 96 (193)                        |
| 397               | 15.625 | 2 800                | 9 200 | 118 (235)                                | 122 (245)                       |

\* Figures in brackets apply to half speed.

### 3.3 Vacuum guide radius and position

3.3.1 The relative position of the vacuum guide and the video-head wheel shall be such that a line drawn from the axis of rotation of the wheel through the centre of curvature of the vacuum guide intersects the tape at the mid-point of its width (see Figure 2, page 27).

3.3.2 The radius of the vacuum guide shall be:

$$26.248^{+0.000}_{-0.013} \text{ mm}$$

$$1.0334^{+0.0000}_{-0.0005} \text{ in}$$

- 3.3.3 The distance  $E$  (eccentricity) between the axis of rotation  $O$  of the wheel and the centre of curvature  $C$  of the vacuum guide shall be adjusted to be equal to the amount by which the guide radius departs from its nominal value. The centre of curvature of the vacuum guide shall lie between the axis of rotation of the wheel and the vacuum guide.

*Note.* – The above specification is based on a tape thickness of 0.0356 mm (0.0014 in) and on a radius of rotation of the head-pole tips of 26.236 mm (1.0329 in) min. to 26.304 mm (1.0356 in) max.

### 3.4 *Speeds of the tape and of the video-head wheel*

- 3.4.1 The nominal linear speed of the tape shall conform with Table IV.

- 3.4.2 The nominal rotational speed of the video-head wheel shall conform with Table IV.

TABLE IV

|                                        | 625 line-50 field system   | 525 line-60 field system |
|----------------------------------------|----------------------------|--------------------------|
| Nominal linear tape speeds             | 39.7 cm/s<br>(15.625 in/s) | 38.1 cm/s<br>(15 in/s)   |
|                                        | 19.8 cm/s<br>(7.812 in/s)  | 19.0 cm/s<br>(7.5 in/s)  |
| Nominal rotational speed of head wheel | 250 rev/s                  | 240 rev/s                |

### 3.5 *Position of the recorded tracks*

- 3.5.1 The position and dimensions of the video, audio, control and cue tracks shall be in accordance with Figure 3, page 28, and Table V.
- 3.5.2 Either edge of any video track shall fall between two parallel lines spaced 0.025 mm (0.001 in) apart and inclined at the actual track angle.