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Information technology — 8 mm wide magnetic tape cartridge for information interchange — Helical scan recording

Technologies de l'information — Cartouche pour bande magnétique de 8 mm *de large pour l'échange d'information — Enregistrement par balayage hélicoïdal*

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 11319 was prepared by the European Computer Manufacturers Association (as Standard ECMA-145) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology,* Sub-Committee 11, *Flexible magnetic media for digital data interchange,* in parallel with its approval by national bodies of ISO and IEC.

Annexes A, B and C form an integral part of this International Standard. Annexes D and E are for information only.

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Information technology - 8 mm wide magnetic tape cartridge for information interchange - Helical scan recording

Section 1 : General

1 Scope

This International Standard specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge to enable interchangeability of such cartridges. It also provides a format and recording method, thus allowing, together with ISO 1001 for Magnetic Tape Labelling, full data interchange by means of such magnetic tape cartridges.

2 Conformance

A magnetic tape cartridge shall be in conformance with this International Standard if it satisfies all mandatory requirements specified herein. The tape requirements shall be satisfied throughout the extent of the tape.

3 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/R 527:1966, *Plastics - Determination of tensile properties.*

ISO 1001:1986, *Information processing - File structure and labelling of magnetic tapes for information interchange.*

ISO 1302:1978, *Technical drawings - Method of indicating surface texture on drawings.*

IEC 950:1990, *Safety of Information Technology Equipment, including Electrical Business Equipment.*

4 Definitions

For the purpose of this International Standard, the following definitions apply.

4.1 AC erase: A process of erasure utilizing alternating fields of decaying level.

4.2 Average Signal Amplitude: The average peak-to-peak value of the signal output of the read head measured over a minimum of 1,40 mm, exclusive of missing pulses.

4.3 azimuth: The angular deviation, in degrees of arc, of the recorded flux transitions on a track from the line normal to the track centreline.

4.4 back surface: The surface of the tape opposite to the magnetic coating used to record data.

4.5 bit cell: A distance along the track allocated for the recording of a Channel bit.

4.6 byte: An ordered set of bits acted upon as a unit.

4.7 cartridge: A case containing magnetic tape stored on twin reels.

4.8 Cyclic Redundancy Check (CRC) Character: A character used for error detection.

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4.9 Error Correcting Code (ECC): A mathematical procedure yielding bytes used for the detection and correction of errors.

4.10 flux transition position: That point which exhibits the maximum free-space flux density normal to the tape surface.

4.11 flux transition spacing: The distance along a track between successive flux transitions.

4.12 magnetic tape: A tape that accepts and retains magnetic signals intended for input, output, and storage of data for information processing.

4.13 Master Standard Reference Tape: A tape selected as the standard for amplitude, Typical Field and Resolution.

NOTE 1 The Master Standard Reference Tape has been established by the SONY Corporation.

4.14 Physical Beginning of Tape (PBOT): The transition from the tape leader to the opaque area of the splice by which the translucent leader tape is joined to the magnetic tape.

4.15 Physical End of Tape (PEOT): The transition from the opaque area of the splice to the translucent trailer tape.

4.16 physical recording density: The number of recorded flux transitions per unit length of track, expressed in flux transitions per millimetre (ftpmm).

4.17 Secondary Reference Amplitude: The Average Signal Amplitude from the Secondary Standard Reference Tape when it is recorded with the Test Recording Current at 2126 ftpmm.

4.18 Secondary Reference Field: The Typical Field of the Secondary Standard Reference Tape.

4.19 Secondary Standard Reference Tape: A tape the performance of which is known and stated in relation to that of the Master Standard Reference Tape.

NOTE 2 Secondary Standard Reference Tapes can be ordered under the Part Number RSE-5001, until the year 2001, from the Sony Corporation, Magnetic Product Group, Data Media Sales Division, 6-7-35 Kitashinagawa, Shinagawa-ku, TOKYO 141, Japan.

It is intended that these be used for calibrating tertiary reference tapes for use in routine calibration.

4.20 Standard Reference Current (Ir): The current that produces the Secondary Reference Field.

4.21 Tape Reference Edge: The lower edge of the tape when the magnetic coating is facing the observer and the supply reel is to the observer's right.

4.22 Test Recording Current: The current that is 1,5 times the Standard Reference Current.

4.23 tone: A signal recorded at 98 ftpmm.

4.24 track: A diagonally positioned area on the tape along which a series of magnetic transitions may be recorded.

4.25 Typical Field: In the plot of the Average Signal Amplitude against the recording field at the physical recording density of 2 126 ftpmm, the minimum field that causes an Average Signal Amplitude equal to 90% of the maximum Average Signal Amplitude.

5 Environment and safety

The conditions specified below refer to ambient conditions immediately surrounding the cartridge. Cartridges exposed to environments outside these limits may still be able to function usefully; however, such exposure may cause permanent damage.

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5.1 Testing environment

Unless otherwise specified, tests and measurements made on the cartridge to check the requirements of this International Standard shall be carried out under the following conditions

temperature:	23 °C ± 2 °C
relative Humidity:	40 % to 60 %
conditioning period before testing:	24 h

5.2 Operating environment

Cartridges used for data interchange shall be capable of operating under the following conditions

temperature:	5 °C to 45 °C
relative Humidity:	20 % to 80 %
wet Bulb Temperature:	26 °C max.

There shall be no deposit of moisture on or in the cartridge.

Conditioning before operating:

If a cartridge has been exposed during storage and/or transportation to a condition outside the above values, before use the cartridge shall be conditioned in the operating environment for a time at least equal to the period during which it has been out of the operating environment, up to a maximum of 24 h.

NOTE 3 Rapid variations of temperature should be avoided.

5.3 Storage environment

For long-term or archival storage of cartridges the following conditions shall be observed

temperature:	5 °C to 32 °C
relative Humidity:	20 % to 60 %
wet Bulb Temperature:	26 °C max.

The stray magnetic field at any point on the tape shall not exceed 4 000 A/m. There shall be no deposit of moisture on or in the cartridge.

5.4 Transportation

Recommended limits for the environment to which a cartridge may be subjected during transportation, and the precautions to be taken to minimize the possibility of damage, are provided in annex D.

5.5 Safety

The cartridge and its components shall satisfy the requirements of IEC 950.

5.6 Flammability

The cartridge and its components shall be made from materials which, if ignited from a match flame, do not continue to burn in a still carbon dioxide atmosphere.

Section 2 : Requirements for the case

6 Dimensional and mechanical characteristics of the case

6.1 General

The case of the cartridge shall consist of

- an upper half,
- a lower half,
- a lid pivotally mounted on the upper half.

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In the drawings, an embodiment of the cartridge is shown as an example.

Figure 1 is a perspective view of the cartridge seen from the top.

Figure 2 is a perspective view of the cartridge seen from the bottom.

Figure 3 shows the top side with the lid closed using third angle projection.

Figure 4 shows the bottom side, datum and support areas.

Figure 5 shows the bottom side with the lid removed.

Figure 6 shows the enlarged view of the datum and recognition holes.

Figure 7 shows the cross-sections through the light path holes, the recognition holes and the write-inhibit hole.

Figure 8 shows details of the lid when closed, rotating and open.

Figure 9 shows the details of the lid release insertion channel.

Figure 10 shows the lid lock release requirements.

Figure 11 shows the reel lock release requirements.

Figure 12 shows the reel unlock force direction.

Figure 13 shows the lid release force direction.

Figure 14 shows the lid opening force direction.

Figure 15 shows the light path and light window.

Figure 16 shows the internal tape path and light path.

Figure 17 shows the cartridge reel and a cross-section view of the cartridge reel.

Figure 18 shows the cross-section view of the cartridge reel interface with the drive spindle.

Figure 19 shows the tape access cavity clearance requirements.

The dimensions are referred to three orthogonal Reference Planes X, Y and Z.

6.2 Overall dimension (figure 3)

The overall dimensions of the case with the lid in the closed position shall be

L_1 = 62,5 mm ± 0,3 mm

L_2 = 95,0 mm ± 0,2 mm

L_3 = 15,0 mm ± 0,2 mm

The distance from the rear side to plane X shall be

L_4 = 47,35 mm ± 0,15 mm

The distance from the right side to plane Y shall be

L_5 = 13,0 mm ± 0,1 mm

6.3 Holding areas

The holding areas, shown hatched in figure 3, shall be the areas along which the cartridge shall be held down when inserted in the drive. Their position and dimensions shall be

L_6 = 12,0 mm max.

L_7 = 3,0 mm min.

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6.4 Cartridge insertion

The cartridge shall have asymmetrical features to prevent insertion in the drive in other than the correct orientation. These consist of a channel, a recess and an incline.

The channel (figures 3 and 9) shall provide for an unobstructed path, when the lid is closed and locked, to unlock the lid. The dimensions shall be

L_8 = 79,7 mm ± 0,2 mm

L_9 = 1,0 mm ± 0,1 mm

L_{10} = 0,7 mm ± 0,1 mm

L_{11} = 1,0 mm min.

L_{12} = 1,2 mm ± 0,1 mm

L_{13} = 0,8 mm ± 0,1 mm

L_{14} = 1,2 mm ± 0,1 mm

L_{15} = 0,5 mm ± 0,1 mm

L_{16} = 1,5 mm ± 0,1 mm

L_{17} = 1,0 mm ± 0,1 mm

L_{18} = 3,8 mm ± 0,1 mm

L_{19} = 0,2 mm ± 0,2 mm

L_{20} = 2,3 mm min.

L_{21} = 2,5 mm ± 0,2 mm

The recess dimensions (figures 3 and 5) shall be

L_{22} = 7,5 mm max.

L_{23} = 11,0 mm ± 0,2 mm

L_{24} = 1,5 mm ± 0,1 mm

L_{25} = 1,5 mm ± 0,1 mm

The incline (figure 8) is part of the lid structure and the dimensions shall be

$$L_{26} = 7{,}7\ \text{mm}\ {}^{+\,0{,}0}_{-\,2{,}5}\ \text{mm}$$

$$L_{27} = 0{,}55\ \text{mm}\ {}^{+\,0{,}05}_{-\,0{,}10}\ \text{mm}$$

A_1 = 17,5° ± 4,0°

6.5 Window (figure 1)

A window may be provided on the top side so that a part of the reel is visible. The window, if provided, shall not extend beyond the height of the cartridge.

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6.6 Loading grips (figure 3)

The cartridge shall have loading grips for automatic loading into a drive.

The dimensions and positions of the loading grips shall be

L_{28} = 39,35 mm ± 0,20 mm

L_{29} = 1,5 mm ± 0,1 mm

L_{30} = 5,0 mm ± 0,3 mm

L_{31} = 2,0 mm ± 0,2 mm

A_2 = 90° ± 5°

6.7 Label areas (figure 3)

A portion of the rear side of the cartridge and a portion of the top side of the cartridge may be used for labels. The rear side area provides for readability of the label when it is stacked or inserted into the drive. The position and the size of the labels shall not interfere with the operation or clearance requirements of the cartridge component parts.

The area used for labels on the top side shall not extend beyond the inner edge of the holding areas defined by L_6 and L_7.

The position and dimensions of the rear side label area shall be

L_{32} = 0,5 mm min.

L_{33} = 1,5 mm min.

L_{34} = 80,0 mm max.

The depth of the label depression shall be 0,3 mm max.

6.8 Datum areas and datum holes (figures 4, 5 and 6)

The annular datum areas A, B and C shall lie in plane Z. They determine the vertical position of the cartridge in the drive. Each shall have a diameter D_1 equal to 6,0 mm ± 0,1 mm and be concentric with the respective datum hole.

The centres of datum holes A and B lie in plane X.

The centre of the circular datum hole A shall be at the intersection of planes X and Y (see figure 5).

The distance from the centre of datum hole B to plane Y (see figure 4) shall be

L_{35} = 68,0 mm ± 0,1 mm

The distance from the centre of the circular datum hole C to plane Y (see figure 6) shall be

L_{36} = 10,20 mm ± 0,05 mm

The distance from the centre of datum hole D to plane Y (see figure 6) shall be

L_{37} = 79,2 mm ± 0,1 mm

The distance from the centres of datum holes C and D to plane X (see figure 5) shall be

L_{38} = 36,35 mm ± 0,08 mm

The diameter of datum hole A and datum hole C shall be $3{,}00\ ^{+\,0{,}05}_{-\,0{,}00}$ mm. The dimensions of datum hole A and datum hole C shall be

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$L_{39} = 1{,}2\ \text{mm}\ ^{+\ 1{,}0}_{-\ 0{,}0}\ \text{mm}$

$L_{40} = 2{,}6$ mm min.

$L_{41} = 1{,}5$ mm min.

$L_{42} = 4{,}0$ mm min.

$L_{43} = 0{,}3$ mm max.

$A_3 = 45° \pm 1°$

The dimensions of datum hole B and datum hole D shall be

$L_{39} = 1{,}2\ \text{mm}\ ^{+\ 1{,}0}_{-\ 0{,}0}\ \text{mm}$

$L_{40} = 2{,}6$ mm min.

$L_{41} = 1{,}5$ mm min.

$L_{42} = 4{,}0$ mm min.

$L_{43} = 0{,}3$ mm max.

$L_{44} = 3{,}00\ \text{mm}\ ^{+\ 0{,}05}_{-\ 0{,}00}\ \text{mm}$

$L_{45} = 3{,}5\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{46} = 3{,}00\ \text{mm} \pm 0{,}05\ \text{mm}$

$A_3 = 45° \pm 1°$

$R_1 = 1{,}7$ mm min.

6.9 Support areas

The cartridge support areas are shown shaded in figure 4. Support areas A, B and C shall be coplanar with datum areas A, B and C, respectively, within ± 0,1 mm. Support area D shall be coplanar with datum plane Z within ± 0,15 mm.

The areas within L_{49} of the edge of the cartridge shall be recessed from the support areas.

The dimensions and positions of the support areas shall be

$L_{35} = 68{,}0\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{47} = 10{,}0\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{48} = 11{,}0\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{49} = 0{,}5\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{50} = 7{,}0\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{51} = 30{,}0\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{52} = 5{,}5\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{53} = 64{,}5\ \text{mm} \pm 0{,}2\ \text{mm}$

6.10 Recognition holes (figures 5, 6 and 7)

There shall be 5 recognition holes numbered 1 to 5 as shown in figure 6.

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Their positions shall be defined by

L_{54} = 43,35 mm ± 0,15 mm

L_{55} = 3,7 mm ± 0,1 mm

L_{56} = 2,3 mm ± 0,1 mm

L_{57} = 6,4 mm ± 0,1 mm

L_{58} = 3,7 mm ± 0,1 mm

L_{59} = 2,3 mm ± 0,1 mm

L_{60} = 6,4 mm ± 0,1 mm

L_{61} = 79,0 mm ± 0,2 mm

All recognition holes shall have the cross-section F-F shown in figure 7 and shall have a diameter of 3,0 mm ± 0,1 mm

$L_{62} = 1{,}2\ \text{mm}\ ^{+\ 0{,}3}_{-\ 0{,}1}\ \text{mm}$

L_{63} = 5,0 mm min.

One of the cross-sections shows a recognition hole closed by a plug, the other shows the plug punched out. These plugs shall withstand an applied force of 0,5 N max without being punched out.

This International Standard prescribes the following states of these holes.

- Recognition hole 1 shall be closed.
- Recognition hole 2 shall be closed for tape of 13 µm nominal thickness.
- Recognition hole 2 shall be open for tape of 10 µm nominal thickness.
- Recognition holes 3, 4 and 5 shall be closed.

6.11 Write-inhibit Hole (figures 6 and 7)

The position and dimension of the Write-inhibit Hole shall be defined by

L_{55} = 3,7 mm ± 0,1 mm

$L_{62} = 1{,}2\ \text{mm}\ ^{+\ 0{,}3}_{-\ 0{,}1}\ \text{mm}$

L_{63} = 5,0 mm min.

L_{64} = 10,0 mm ± 0,1 mm

The diameter of the hole shall be 3,0 mm ± 0,1 mm

When the Write-inhibit Hole is open, recording on the tape is inhibited. When it is closed, recording is enabled.

The case may have a movable element allowing the Write-inhibit Hole to be opened or closed. If present, this element shall be such that the state of the Write-inhibit Hole shall be visible (see figure 3 as an example). The Write-inhibit hole closure shall be constructed to withstand a force of 0,5 N. The force required to open or close the Write-inhibit Hole shall be between 1 N and 15 N.

6.12 Pre-positioning surfaces (figures 3 and 5)

These surfaces determine the position of the cartridge in the Y direction when inserted into the drive loading slot.

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The dimensions of the pre-positioning surfaces shall be

L_{25} = 1,5 mm ± 0,1 mm

L_{65} = 2,4 mm $^{+\ 0,0}_{-\ 0,1}$ mm

L_{66} = 2,4 mm $^{+\ 0,0}_{-\ 0,1}$ mm

L_{67} = 1,0 mm ± 0,1 mm

L_{68} = 69,0 mm ± 0,2 mm

L_{69} = 14,65 mm ± 0,10 mm

L_{70} = 13,15 mm ± 0,10 mm

A_4 = 45° ± 1°

6.13 Cartridge lid (figures 3 and 8)

The cartridge shall include a lid for protection of the tape during handling, storage and transportation. The lid consists of two parts, the main part and an auxiliary part.

The main part rotates around axis A (see figure 8) which is fixed relative to the case.

The location of axis A shall be defined by L_{27} and

L_{71} = 7,5 mm ± 0,1 mm

The auxiliary part rotates around axis B which is fixed relative to the main part of the lid and moves with it. When the lid is in the closed position, the location of axis B shall be defined by

L_{72} = 7,0 mm ± 0,1 mm

L_{73} = 10,1 mm ± 0,1 mm

The rotation of the auxiliary part is controlled, by a cam at each end, to give the path indicated in figure 8.

When the lid is completely open, neither part shall extend above a plane located L_{77} above and parallel to plane Z.

L_{74} = 14,8 mm min.

L_{75} = 11,5 mm ± 0,2 mm

L_{76} = 1,2 mm ± 0,1 mm

L_{77} = 22,3 mm max.

A_5 = 85° ± 2°

When the lid is in a partially open position, neither part shall extend above a plane located L_{78} above and parallel to plane Z.

L_{78} = 22,5 mm max.

R_2 = 14,9 mm max.

The main part is shown in figures 3 and 8.

L_{71} = 7,5 mm ± 0,1 mm

L_{79} = 8,4 mm max.

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$L_{80} = 15{,}2\ \text{mm}\ ^{+\ 0{,}0}_{-\ 0{,}5}\ \text{mm}$

$L_{81} = 15{,}3\ \text{mm}\ ^{+\ 0{,}0}_{-\ 0{,}3}\ \text{mm}$

$L_{82} = 13{,}15\ \text{mm} \pm 0{,}10\ \text{mm}$

$R_3 = 14{,}7\ \text{mm}\ ^{+\ 0{,}0}_{-\ 0{,}3}\ \text{mm}$

The design of the locking mechanism is not specified by this International Standard except that it shall be operated by a release pin in the drive. In the lid closed and locked position, access to the lid lock release shall be unobstructed in the hatched area (see figure 10) defined by

$L_{83} = 2{,}0\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{84} = 6{,}3\ \text{mm} \pm 0{,}2\ \text{mm}$

$L_{85} = 1{,}2\ \text{mm} \pm 0{,}1\ \text{mm}$

$A_6 = 45° \pm 1°$

$A_7 = 15° \pm 1°$

The lid release mechanism shall be actuated when the drive release pin is in the shaded area (see figure 10) defined by

$L_{83} = 2{,}0\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{86} = 8{,}2\ \text{mm} \pm 0{,}2\ \text{mm}$

$L_{87} = 0{,}7\ \text{mm} \pm 0{,}2\ \text{mm}$

$A_8 = 15° \pm 1°$

The force needed to unlock the lid lock shall not exceed 0,25 N in the direction shown in figure 13.

The force needed to open the lid shall not exceed 1,0 N in the direction shown in figure 14.

6.14 Cartridge reel lock (figure 11)

The reels shall be locked when the cartridge is removed from the tape drive. The design of the locking mechanism is not specified by this International Standard except that it shall be operated by a release pin in the drive.

The release mechanism shall be accessed through a hole in the case (see figure 5) defined by

$L_{88} = 34{,}5\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{89} = 35{,}85\ \text{mm} \pm 0{,}15\ \text{mm}$

$L_{90} = 4{,}0\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{91} = 6{,}5\ \text{mm min.}$

The reels shall be unlocked when the operating face of the release pin is located L_{95} from plane X. In this position there shall be a clearance of L_{96} between the locking mechanism and the inside of the rear wall of the cartridge.

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The dimensions of the release mechanism (see figure 11) shall be

L_{92} = 3,2 mm $^{+0,3}_{-0,2}$ mm

L_{93} = 4,0 mm ± 0,1 mm

L_{94} = 39,0 mm $^{+2,0}_{-0,0}$ mm

L_{95} = 41,75 mm $^{+0,50}_{-0,00}$ mm

L_{96} = 0,5 mm min.

L_{97} = 7,8 mm max.

L_{98} = 4,0 mm ± 0,1 mm

A_9 = 60,0° ± 1,0°

R_4 = 0,3 mm max.

The force needed to unlock the reel lock in the direction shown in figure 12 shall not exceed 1,0 N.

6.15 Reel access holes (figure 5)

The case shall have two circular reel access holes which shall allow penetration of the drive spindles.

The dimension and positions of the access holes shall be

L_{99} = 23,00 mm ± 0,05 mm

L_{100} = 11,40 mm ± 0,05 mm

L_{101} = 46,2 mm ± 0,1 mm

D_2 = 18,80 mm ± 0,05 mm

6.16 Interface between the reels and the drive spindles (figures 17 and 18)

The drive spindles shall engage the reels in the area defined by

L_{102} = 5,4 mm ± 0,1 mm

L_{103} = 4,4 mm ± 0,1 mm

L_{104} = 0,6 mm max.

L_{105} = 2,4 mm ± 0,1 mm

L_{106} = 0,2 mm max.

L_{107} = 2,4 mm ± 0,2 mm

A_{10} = 45° ± 1°

A_{11} = 15° ± 1°

A_{12} = 60° ± 1°

R_5 = 0,2 mm max.

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$D_3 = 6{,}50\ \text{mm}\ ^{+\ 0{,}08}_{-\ 0{,}00}\ \text{mm}$

$D_4 = 10{,}00\ \text{mm}\ ^{+\ 0{,}08}_{-\ 0{,}00}\ \text{mm}$

$D_5 = 16{,}0\ \text{mm max.}$

$D_6 = 18{,}0\ \text{mm}\ ^{+\ 0{,}0}_{-\ 0{,}1}\ \text{mm}$

Depth L_{108} of reel driving hole shall be effective to the diameter D_3 .

$L_{108} = 9{,}4\ \text{mm min.}$

The reel spring force F shall be 0,6 N ± 0,2 N in the direction shown in figure 18 when the cartridge is mounted in the drive and the support area is L_{110} from datum plane Z.

$L_{109} = 7{,}05\ \text{mm} \pm 0{,}10\ \text{mm}$

$L_{110} = 0{,}6\ \text{mm} \pm 0{,}2\ \text{mm}$

$L_{111} = 7{,}5\ \text{mm max.}$

$L_{112} = 8{,}0\ \text{mm max.}$

$A_{13} = 60° \pm 1°$

6.17 Light path (figures 5, 7, 15 and 16)

A light path shall be provided for sensing the leader and trailer tapes. When the lid is open, an unobstructed light path shall exist from the D_7 diameter light path hole to the outside of the cartridge via square holes of side L_{116} (see cross-section D-D in figure 7) and the light window in the cartridge lid.

$L_{88} = 34{,}5\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{113} = 8{,}35\ \text{mm} \pm 0{,}10\ \text{mm}$

$L_{114} = 0{,}5\ \text{mm max.}$

$L_{115} = 6{,}05\ \text{mm} \pm 0{,}10\ \text{mm}$

$L_{116} = 2{,}5\ \text{mm} \pm 0{,}4\ \text{mm}$

$L_{117} = 12{,}5\ \text{mm min.}$

$L_{118} = 3{,}8\ \text{mm} \pm 0{,}1\ \text{mm}$

$L_{119} = 2{,}5\ \text{mm} \pm 0{,}4\ \text{mm}$

$L_{120} = 6{,}05\ \text{mm} \pm 0{,}10\ \text{mm}$

$A_{14} = 45° \pm 1°$

$A_{15} = 5{,}50° \pm 0{,}25°$

$D_7 = 6{,}5\ \text{mm}\ ^{+\ 0{,}3}_{-\ 0{,}0}\ \text{mm}$

6.18 Position of the tape in the case (figure 16)

The tape shall run between two guide surfaces in a plane parallel to datum plane X and L_{121} from it.

$L_{121} = 12{,}46\ \text{mm} \pm 0{,}10\ \text{mm}$

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The guide surfaces shall have a radius of R_6 and shall be tangential, as shown in figure 16, to lines tangential to the reel hubs that extend to points outside the case . These points shall be defined by

L_{122} = 76,28 mm ± 0,30 mm

L_{123} = 27,15 mm ± 0,20 mm

L_{124} = 31,15 mm ± 0,20 mm

L_{125} = 9,67 mm ± 0,10 mm

R_6 = 1,5 mm min.

6.19 Tape path zone (figures 16 and 17)

When the cartridge is inserted into the drive, the tape is pulled outside the case by tape guides and is no longer in contact with the guide surfaces. The tape path zone of the case is the zone in which the tape shall be able to move freely. This zone shall be maintained for both sides of the case and shall be defined by

L_{122} = 76,28 mm ± 0,30 mm

L_{123} = 27,15 mm ± 0,20 mm

L_{124} = 31,15 mm ± 0,20 mm

L_{125} = 9,67 mm ± 0,10 mm

L_{126} = 23,0 mm ± 0,1 mm

L_{127} = 0,3 mm min.

L_{128} = 46,2 mm ± 0,2 mm

L_{129} = 11,4 mm ± 0,1 mm

L_{130} = 0,3 mm min.

$D_8 = 16{,}05 \text{ mm}^{+0{,}00}_{-0{,}10} \text{ mm}$

6.20 Tape access cavity (figure 5)

When the cartridge is inserted into the drive, tape guides in the drive pull out the tape into the drive tape path. The shape and dimensions of the access cavity for these tape guides shall be defined as follows. The two radii R_7 are centred on datum holes A and B.

R_7 = 2,3 mm ± 0,1 mm

The two radii R_8 are centred on the centres of the reel access holes.

R_8 = 24,15 mm ± 0,10 mm

L_{67} = 1,0 mm ± 0,1 mm

L_{68} = 69,0 mm ± 0,2 mm

L_{131} = 3,81 mm ± 0,10 mm

6.21 Tape access cavity clearance requirements (figure 19)

The case design shall provide clearance for drive tape threading mechanisms and shall be

L_{132} = 1,2 mm max.

$L_{133} = 1{,}15 \text{ mm}^{+0{,}20}_{-0{,}00} \text{ mm}$

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$L_{134} = 14{,}0\ \text{mm}\ ^{+\ 0{,}0}_{-\ 0{,}2}\ \text{mm}$

$L_{135} = 66{,}8\ \text{mm min.}$

$L_{136} = 10{,}0\ \text{mm min.}$

$A_{16} = 49°\ \text{max.}$

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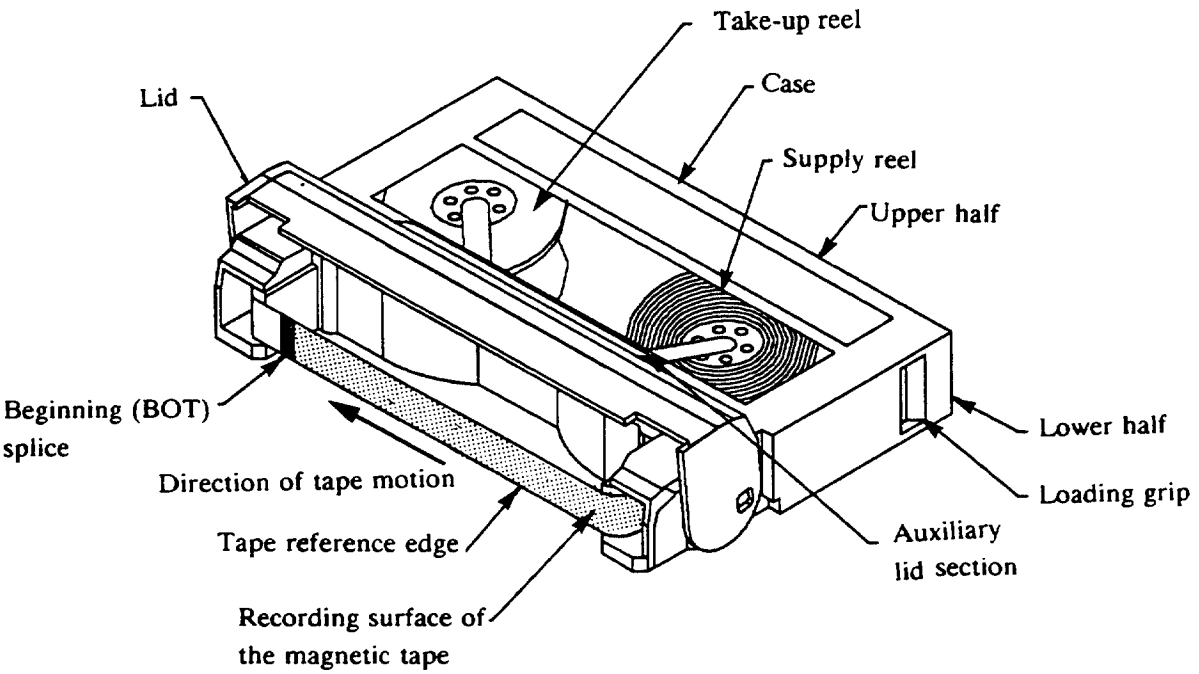

Figure 1 - Tape cartridge assembly bottom view (lid open)

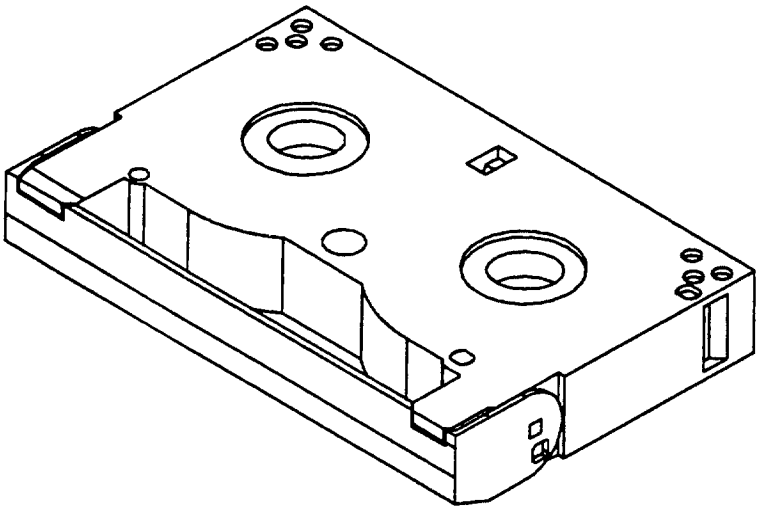

Figure 2 - Tape cartridge assembly bottom view (lid closed)

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