INTERNATIONAL STANDARD

ISO/IEC 15780

First edition
1998-08-01

Information technology — 8 mm wide magnetic tape cartridge — Helical scan recording — AIT-1 format

Technologies de l'information — Cartouche de bande magnétique de 8 mm *de large — Enregistrement par balayage en spirale — Format AIT-1*

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

Contents

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

© ISO/IEC 1998

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

ISO/IEC Copyright Office • Case postale 56 • CH-1211 Genève 20 • Switzerland

Printed in Switzerland

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

Annexes

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

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.

This International Standard was prepared by ECMA (as ECMA-246) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval of national bodies of ISO and IEC.

iTeh STANDARD PREVIEW

Annexes A to G form an integral part of this International Standard. Annexes H to K are for information only.

(standards.iteh.ai)

ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

iTeh STANDARD PREVIEW
(standards.iteh.ai)

ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

Information technology — 8 mm wide magnetic tape cartridge — Helical scan recording — AIT-1 format

Section 1 - General

1 Scope

This International Standard specifies the physical and magnetic characteristics of an 8 mm wide magnetic tape cartridge to enable physical interchange of such cartridges between drives. It also specifies the quality of the recorded signals, the recording method and the recorded format - called Advanced Intelligent Tape No. 1 (AIT-1) - thereby allowing data interchange between drives by means of such magnetic tape cartridges.

Information interchange between systems also requires, at a minimum, agreement between the interchange parties upon the interchange code(s) and the specifications of the structure and labelling of the information on the interchanged cartridge.

2 Conformance

2.1 Magnetic tape cartridge

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

2.2 Generating drive

iTeh STANDARD PREVIEW

A drive generating a magnetic tape cartridge for interchange shall be in conformance with this International Standard if all recordings on the tape meet the mandatory requirements of this International Standard, and if either or both methods of appending and overwriting are implemented.

(standards.iteh.ai)

A claim of conformance shall state which of the following optional features are implemented and which are not

ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1eb61ca2e57d/iso-iec-15780-1998

- the performing of a Read-After-Write check and the recording of any necessary repeated frames;
- the generation of ECC3 Frames.

In addition a claim of conformance shall state

- whether or not one, or more, registered algorithm(s) are implemented within the system and are able to compress data received from the host prior to collecting the data into Basic Groups, and
- the registered identification number(s) of the implemented compression algorithm(s).

2.3 Receiving drive

A drive receiving a magnetic tape cartridge for interchange shall be in conformance with this International Standard if it is able to handle any recording made on the tape according to this International Standard. In particular it shall

- be able to recognise repeated frames, and to make available to the host, data and Separator Marks from only one of these frames;
- be able to recognise multiple representations of the same Basic Group, and to make available to the host, data and Separator Marks from only one of these representations;
- be able to recognise an ECC3 frame, and ignore it if the system is not capable of using ECC3 check bytes in a process of error correction;
- be able to recognise processed data within an Entity, identify the algorithm used, and make its registered identification number available to the host;
- be able to make processed data available to the host.

In addition a claim of conformance shall state

- whether or not the system is capable of using ECC3 check bytes in a process of error correction;

– whether or not one or more de-compression algorithm(s) are implemented within the system, and are able to be applied to compressed data prior to making such data available to the host;

– the registered identification number(s) of the compression algorithm(s) for which a complementary de-compression algorithm is implemented.

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 (all parts), *Plastics - Determination of tensile properties*.

ISO 1302:1992, *Technical drawings - Method of indicating surface texture.*

ISO/IEC 11576:1994, *Information technology - Procedure for the registration of algorithms for the lossless compression of data.*

4 Definitions

For the purposes of this International Standard the following definitions apply.

4.1 Absolute Frame Number (AFN): A sequence number, encoded in the Frame.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

4.2 a.c. erase: A process of erasure utilizing magnetic fields of decaying intensity.

4.3 Access: A read or write pass over a partition.

4.4 algorithm: A set of rules for transforming the logical representation of data.

ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-fcb0fca2c97d/iso-iec-15780-1998

4.5 Area ID: An identifier defining the area of the tape and specifying the types of Frame written.

4.6 Automatic Track Finding (ATF): The method by which tracking is achieved.

4.7 Average Signal Amplitude: The average peak-to-peak value of the output signal from the read head at the fundamental frequency of the specified physical recording density over a minimum of 20,0 mm of track, exclusive of missing pulses.

4.8 azimuth: The angular deviation made by the mean flux transition line with a line normal to the centreline of the recorded track.

4.9 back surface: The surface of the tape opposite to the magnetic coating which is used to record data.

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

4.11 cartridge: A case containing magnetic tape stored on twin hubs.

4.12 Channel bit: A bit after 8-10 transformation.

4.13 Codeword: A word generated by a compression algorithm. The number of bits in a Codeword is variable, and is not specified by this International Standard.

4.14 Early Warning Point (EWP): A point along the length of the tape at which warning is given of the approach, in the forward direction of tape motion, of the Partition Boundary or of the Physical End of Tape.

4.15 End of Data (EOD): The point on the tape at the end of the group which contains the last user data.

4.16 Entity: A unit of recorded data, comprising an Entity Header and a Record sequence.

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

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

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

4.20 Frame: A pair of adjacent tracks with azimuths of opposite polarity, in which the track with the positive azimuth precedes that with the negative azimuth.

4.21 Housekeeping Frame: A Frame which contains no user data and which is identified as such by the setting of the Data Fields therein.

4.22 Logical Beginning of Tape (LBOT): The point along the length of the tape where a recording of data for interchange commences.

4.23 magnetic tape: A tape which will accept and retain the magnetic signals intended for input, output and storage purposes on computers and associated equipment.

4.24 Master Standard Amplitude Calibration Tape: A pre-recorded tape on which the standard signal amplitudes have been recorded in the tracks of positive and negative azimuth, 35,0 µm wide, recorded at a track pitch of 11,0 µm, on an a.c. erased tape.

Note 1 - The tape includes recording at 1 428,6 ftpmm, 1 904,8 ftpmm, 2 857,1 ftpmm and 3 809,5 ftpmm.

Note 2 - The Master Standard Amplitude Calibration Tape has been established by Sony Corporation of Japan.

4.25 Master Standard Reference Tape: A tape selected as the standard for the Reference Recording Field, Signal Amplitude, Resolution, Overwrite and Signal-to-Noise ratio.

Note - The Master Standard Reference Tape has been established by Sony Corporation of Japan.

4.26 Memory In Cartridge (MIC): A chip within the case containing information on recordings made on the tape.

4.27 Partition Boundary: The point along the length of a magnetic tape at which a Partition ends and the next Partition commences.

4.28 Physical Beginning of Tape (PBOT): The point where the leader tape is joined to the magnetic tape.

4.29 Physical End of Tape (PEOT): The point where the trailer tape is joined to the magnetic tape.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

4.31 pre-recording condition: The recording levels above which a tape intended for interchange shall not previously have been recorded.

ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

4.32 processing: The use of an algorithm to transform host data into Codewords.

4.33 processed data: A sequence of Codewords which results from the application of processing to data.

4.34 Processed Record: A sequence of Codewords which results from the application of processing to an Unprocessed Record.

4.35 record: Related data treated as a unit of information.

4.36 Reference Field: The Typical Field of the Master Standard Reference Tape.

4.37 reprocessing: The use of an algorithm to transform Codewords into data as required by the host.

4.38 Secondary Standard Amplitude Calibration Tape: A tape pre-recorded as specified for the Master Standard Amplitude Calibration Tape the outputs of which are related to those of the Master Standard Amplitude Calibration Tape by calibration factors.

Note - Secondary Standard Amplitude Calibration Tapes can be ordered under Part No. SSCT-AIT-1 from Sony Corporation, RME Company, Data Media Marketing Div. 6-7-35 Kitashinagawa, Shinagawa-ku, Tokyo 141, Japan. In principle such Secondary Standard Amplitude Calibration Tapes will be available until the year 2006. However, by agreement between ISO and Sony Corporation, this period can be shortened or extended to take into account the demand for such Secondary Standard Amplitude Calibration Tapes.

4.39 Secondary Standard Reference Tape: A tape the outputs of which are related to those of the Master Standard Reference Tape by calibration factors.

Note - Secondary Standard Reference Tapes can be ordered under Part No. SSRT-AIT-1 from Sony Corporation, RME Company, Data Media Marketing Div., 6-7-35 Kitashinagawa, Shinagawa-ku, Tokyo 141, Japan. In principle such Secondary Standard Reference Tapes will be available until the year 2006. However, by agreement between ISO and Sony Corporation, this period can be shortened or extended to take into account the demand for such Secondary Standard Reference Tapes.

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

4.40 Separator Mark: A record containing no user data, which is used to separate data.

4.41 Standard Reference Amplitude (SRA): The Average Signal Amplitude from the tracks of positive azimuth of the Master Standard Amplitude Calibration Tape at a specified physical recording density.

4.42 Tape Reference Edge: The bottom edge of the tape when viewing the recording side of the tape, with the PEOT to the observer's right.

4.43 Typical Field: In the plot of Average Signal Amplitude against the recording field at the physical recording density of 2 857,1 ftpmm, the field that causes an Average Signal Amplitude equal to 90% of the maximum Average Signal Amplitude.

4.44 Standard Reference Current: The current that produces the Reference Field.

4.45 Test Recording Current: The current used to record an SRA. It is 1,5 times the Standard Reference Current.

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

4.47 unprocessed data: Data which has not been subjected to processing.

4.48 Unprocessed Record: A record of unprocessed data, comprising an integral number of bytes.

5 Conventions and Notations

5.1 Representation of numbers

A measured value is rounded off to the least significant digit of the corresponding specified value. This implies that, for example, a specified value of 1,26 with a positive tolerance of +0,01 and a negative tolerance of -0,02 allows a range of measured values from 1,235 to 1,275.

The setting of a bit is denoted by ZERO or ONE.

Bit patterns and numbers in binary notation are represented by strings of digits 0 and 1. Within such strings, X may be used to indicate that the setting of a bit is not specified within the string.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Bit patterns and numbers in binary notation are shown with the most significant bit to the left and the least significant bit to the right.

The most significant bit of an 8-bit byte is denoted by b8 and the least significant by b1.

ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1eb6dae2e57d/iso-iec-15780-1998

5.2 Names

The names of basic elements, e.g. specific fields, are given with a capital initial letter.

6 Acronyms

AEWP	After Early Warning Point
AFN	Absolute Frame Number
ATF	Automatic Tracking Finding
BAT	Block Access Table
ECC	Error Correcting Code
EOD	End of Data
EWP	Early Warning Point
GIT	Group Information Table
LBOT	Logical Beginning of Tape
LSB	Least Significant Byte
LF-ID	Logical Frame Identifier
MIC	Memory in Cartridge
MSB	Most Significant Byte
MSRT	Master Standard Reference Tape
PBOT	Physical Beginning of Tape
PEOT	Physical End of Tape
RAW	Read-After-Write
SNR	Signal-to-Noise Ratio
msb	Most significant bit

7 Environment and safety

7.1 Test environment

Tests and measurements made on the tape cartridge to check the requirements of this International Standard shall be carried out in the following ambient conditions of the air immediately surrounding the drive.

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

7.2 Operating environment

Cartridges used for data interchange shall be capable of operating under the following conditions, as measured within 10 mm of the tape exit from the drum of the generating or receiving drive:

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.

The above conditions include any temperature rise that may occur while operating the drive.

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.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Note - Rapid variations of temperature should be avoided.

7.3 Storage environment

The following conditions shall be observed during storage.

ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

temperature	: 5°C to 32°C
relative humidity	: 20 % to 60 %

The stray magnetic field at any point on the tape shall not exceed 4000 A/m. There shall be no deposit of moisture on or in the cartridge.

7.4 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 H.

7.5 Safety

The cartridge and its components shall satisfy the requirements of Standard IEC 950. The cartridge and its components shall not constitute any safety or health hazard when used in the intended manner, or through any foreseeable misuse in an information processing system.

7.6 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

8 Dimensional and mechanical characteristics of the case

8.1 General

Dimensional characteristics are specified for those parameters deemed to be mandatory for interchange and compatible use of the cartridge. Where there is freedom of design, only the functional characteristics of the elements described are indicated. In the figures a typical implementation is represented in third angle projection.

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 is a perspective view of Reference Planes X, Y and Z.
Figure 4 shows the front side with the lid closed.
Figure 5 shows the left side with the lid closed.
Figure 6 shows the top side with the lid closed.
Figure 7 shows the right side with the lid closed.
Figure 8 shows the rear side with the lid closed.
Figure 9 shows the bottom side, Datum and Support areas.
Figure 10 shows the bottom side with the lid removed.
Figure 11 shows an enlarged view of the Datum and Recognition holes.
Figure 12 shows the cross-sections through the light path holes, the Recognition holes and the Write-inhibit hole.
Figure 13 shows details of the lid when closed, rotating and open.
Figure 14 shows the details of the lid release insertion channel.
Figure 15 shows the lid lock release requirements.
Figure 16 shows the reel lock release requirements.
Figure 17 shows the reel unlock force direction.
Figure 18 shows the lid release force direction.
Figure 19 shows the lid opening force direction.
Figure 20 shows the light path and light window.
Figure 21 shows the internal tape path and light path.
Figure 22 shows the cartridge reel and a cross-section of the cartridge reel.
Figure 23 shows a cross-section of the interface of the cartridge reel with the drive spindle.
Figure 24 shows the tape access cavity clearance requirements.
Figure 25 shows the MIC requirements on an enlarged view of the rear side.
Figure 26 shows the MIC requirements on an enlarged view of the bottom side.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-[illegible]57d/iso-iec-15780-1998

The dimensions are referred to three orthogonal Reference Planes X, Y and Z (see figure 3).

Plane X is perpendicular to Plane Z and passes through the centres of the Datum holes A and B.

Plane Y is perpendicular to Plane X and Plane Z and passes through the centre of Datum hole A.

Datum areas A, B and C lie in Plane Z.

8.2 Overall dimension (figures 5 and 6)

The length of the case shall be

l_1 = 62,5 mm ± 0,3 mm

The width of the case shall be

l_2 = 95,0 mm ± 0,2 mm

The distance from the top side of the case to Reference Plane Z shall be

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

8.3 Holding areas

The holding areas shown shaded in figure 6 shall be the areas along which the cartridge shall be held down when inserted into the drive. The distance of the holding areas from Plane X shall be

l_6 = 12,0 mm max.

The width when measured from the edges of the case shall be

l_7 = 3,0 mm min.

8.4 Cartridge insertion

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

The channel (figures 4 and 14) shall provide for an unobstructed path, when the lid is closed and locked, to unlock the lid. The distance of the channel from Plane Y shall be

l_8 = 79,6 mm ± 0,2 mm

There shall be a chamfer at the beginning of the channel defined by

l_9 = 1,0 mm ± 0,1 mm
l_{16} = 1,5 mm ± 0,1 mm

An additional chamfer further into the channel shall be defined by

iTeh STANDARD PREVIEW
(standards.iteh.ai)

l_{10} = 0,7 mm ± 0,1 mm
l_{17} = 1,9 mm ± 0,1 mm
l_{18} = 3,65 mm ± 0,10 mm

ISO/IEC 15780:1998
https://standards.iteh.ai/catalog/standards/sist/a11041ba-d8e0-4ba9-8616-1cb61ea2c57d/iso-iec-15780-1998

The innermost width of the channel shall be

l_{11} = 1,0 mm min.

There shall be a chamfer on the lid defined by

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

The distance from the left side of the case to the release pin shall be

l_{19} = 0,2 mm ± 0,2 mm

The height of the insertion area shall be

l_{20} = 2,3 mm min.

$l_{21} = 2{,}5\ \text{mm}\ {}^{+\,0{,}2\ \text{mm}}_{-\,0{,}0\ \text{mm}}$

The recess is located on the right side of the cartridge. The position and dimensions (figures 7 and 10) shall be defined by

l_{22} = 7,5 mm max.
l_{23} = 11,0 mm ± 0,2 mm
l_{24} = 1,5 mm ± 0,1 mm

The depth of the recess shall be

l_{25} = 1,5 mm ± 0,1 mm

The incline (figure 13) is part of the lid structure. The distance of the incline from Plane X shall be