

INTERNATIONAL
STANDARD

ISO/IEC
15307

First edition
1997-12-01

**Information technology — Data interchange
on 12,7 mm 128-track magnetic tape
cartridges — DLT 4 format**

*Technologies de l'information — Échange de données sur cartouches de
bande magnétique de 12,7 mm, 128 pistes — Format DLT 4*



Reference number
ISO/IEC 15307:1997(E)

Contents

	Page
Section 1 - General	1
1 Scope	1
2 Conformance	1
2.1 Magnetic tape cartridges	1
2.2 Generating systems	1
2.3 Receiving systems	1
3 Normative references	1
4 Definitions	1
4.1 Average Signal Amplitude	1
4.2 azimuth	1
4.3 back surface	1
4.4 Beginning-Of-Tape marker (BOT)	1
4.5 byte	1
4.6 cartridge	2
4.7 Cyclic Redundancy Check (CRC) character	2
4.8 Early Warning (EW)	2
4.9 Error-Detecting Code (EDC)	2
4.10 End-Of-Tape marker (EOT)	2
4.11 Entity	2
4.12 Error-Correcting Code (ECC)	2
4.13 flux transition position	2
4.14 flux transition spacing	2
4.15 Logical Block	2
4.16 logical track	2
4.17 magnetic tape	2
4.18 Master Standard Reference Tape	2
4.19 object	2
4.20 page	2
4.21 physical block	2
4.22 physical recording density	2
4.23 physical track	2
4.24 Record	2
4.25 Reference Edge	3
4.26 Reference Field	3
4.27 Secondary Standard Reference Tape	3
4.28 Standard Reference Amplitude (SRA)	3
4.29 Standard Reference Current	3
4.30 Test Recording Current	3
4.31 Typical Field	3

©ISO/IEC 1997

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

5	Conventions and notations	3
5.1	Representation of numbers	3
5.2	Dimensions	3
5.3	Names	3
5.4	Acronyms	3
6	Environment and safety	4
6.1	Cartridge and tape testing environment	4
6.2	Cartridge operating environment	4
6.3	Cartridge storage environment	4
6.4	Safety	4
6.4.1	Safeness	4
6.4.2	Flammability	4
6.5	Transportation	5
Section 2 - Requirements for the unrecorded tape		5
7	Mechanical and electrical requirements	5
7.1	Material	5
7.2	Tape length	5
7.3	Width	5
7.4	Total thickness	5
7.5	Discontinuity	5
7.6	Longitudinal curvature	5
7.6.1	Requirement	5
7.6.2	Procedure	5
7.7	Out-of-Plane distortions	5
7.8	Cupping	5
7.9	Roughness of the coating surfaces	5
7.9.1	Roughness of the back coating surface	5
7.9.2	Roughness of the magnetic coating surface	6
7.10	Coating adhesion	6
7.11	Layer-to-layer adhesion	6
7.11.1	Requirements	6
7.11.2	Procedure	6
7.12	Modulus of elasticity	7
7.12.1	Requirement	7
7.12.2	Procedure	7
7.13	Flexural rigidity	7
7.13.1	Requirement	7
7.13.2	Procedure	8
7.14	Tensile yield force	8
7.14.1	Procedure	8
7.15	Electrical resistance	8
7.15.1	Requirement	8
7.15.2	Procedure	8
7.16	Inhibitor tape	9
7.17	Abrasivity	9

7.17.1 Requirement	9
7.17.2 Procedure	9
7.18 Light transmittance of the tape and the leader	9
7.19 Coefficient of dynamic friction	9
7.19.1 Requirements	10
7.19.2 Procedure for the measurement of the friction between the magnetic surface and the back surface	10
7.19.3 Procedure for the measurement of the friction between the magnetic surface or the back surface and calcium titanate ceramic	10
8 Magnetic recording characteristics	10
8.1 Typical Field	11
8.2 Signal amplitude	11
8.3 Resolution	11
8.4 Overwrite	11
8.4.1 Requirement	11
8.5 Peak shift	11
8.5.1 Requirement	11
8.5.2 Procedure	11
9 Tape quality	12
9.1 Missing pulses	12
9.1.1 Requirement	12
9.2 Missing pulse zone	12
9.2.1 Requirement	12
9.3 Tape durability	12
Section 3 - Mechanical specifications of the tape cartridge	12
10 General	12
10.1 Bottom side and right side	13
10.2 Back side and left side	14
10.3 Tape reel	14
10.4 Tape leader	15
10.5 Front side	16
10.6 Operation of the cartridge	17
10.7 Tape winding	17
10.8 Moment of inertia	17
10.9 Material	18
Section 4 - Requirements for an interchanged tape	27
11 Method of recording	27
11.1 Physical recording density	27
11.2 Channel bit cell length	27
11.2.1 Average Channel bit cell length	27
11.2.2 Long-term average Channel bit cell length	27
11.2.3 Short-term average Channel bit cell length	27
11.3 Flux transition spacing	27
11.4 Read signal amplitude	27
11.5 Azimuth	28
11.6 Channel skew	28
12 Tape format	28

12.1 Reference Edge	28
12.2 Direction of recording	28
12.3 Tape layout	28
12.4 Calibration and Directory Area	28
12.4.1 Scratch Area	29
12.4.2 Guard Area G1	29
12.4.3 Calibration Tracks Area	29
12.4.4 Guard Area G2	30
12.4.5 Directory Area	30
12.4.6 Guard Area G3	30
12.5 Data Area	30
12.5.1 Physical tracks	31
12.5.2 Width of the physical tracks	31
12.5.3 Logical tracks	31
12.5.4 Locations of the physical tracks	31
12.5.5 Layout of tracks in the Data Area	32
13 Data format	32
13.1 Data Bytes	33
13.2 Logical Blocks	33
13.3 Data Blocks	33
13.4 Types of Logical Blocks	33
13.5 Entities	33
13.6 Logical Block format	33
13.6.1 Preamble	34
13.6.2 Sync	34
13.6.3 Data Field	34
13.6.4 EDC	36
13.6.5 Control Field 1 (CF1)	36
13.6.6 Control Field 2 (CF2)	37
13.6.7 CRC	38
13.6.8 Postamble	38
14 Use of Logical Blocks	38
14.1 Data Blocks	38
14.2 Filler Blocks	38
14.3 End of Track Blocks (EOTR)	39
14.4 End of Data Blocks (EOD)	39
14.5 ECC Blocks	39
15 Format of Entities	39
16 Error handling	39
Annexes	
A - Measurement of light transmittance	40
B - Generation of the Data Block CRCs	43
C - ECC generation	44
D - Generation of page CRCs	47
E - Format of MAP entries	48
F - Format of Control Field 1	49
G - Format of Control Field 2	50
H - Recommendations for transportation	51

J - Inhibitor tape	52
K - Recommendations on tape durability	53
L - Handling guidelines	54

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 15307 was prepared by ECMA (as ECMA-231) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

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

Introduction

This International Standard constitutes a further development of the family of DLT-formatted magnetic tape cartridges. It allows for a capacity of 20 Gbytes of uncompressed data, or, typically, of 40 Gbytes of compressed user data.

Information technology — Data interchange on 12,7 mm 128-track magnetic tape cartridges — DLT 4 format

Section 1 - General

1 Scope

This International Standard specifies the physical and magnetic characteristics of a 12,7 mm wide, 128-track magnetic tape cartridge, to enable interchangeability of such cartridges. It also specifies the quality of the recorded signals, a format - called Digital Linear Tape 4 (DLT 4) - and a recording method. Together with a labelling standard, for instance ISO 1001 for Magnetic Tape Labelling, it allows full data interchange by means of such magnetic tape cartridges.

2 Conformance

2.1 Magnetic tape cartridges

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

2.2 Generating systems

A system generating a magnetic tape cartridge for interchange shall be entitled to claim conformance with this International Standard if all the recordings that it makes on a tape according to 2.1 meet the mandatory requirements of this International Standard.

2.3 Receiving systems

A system receiving a magnetic tape cartridge for interchange shall be entitled to claim conformance with this International Standard if it is able to handle any recording made on a tape according to 2.1.

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

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