

INTERNATIONAL STANDARD

ISO/IEC
10089

First edition
1991-05-01

Information technology — 130 mm rewritable optical disk cartridge for information interchange

*Technologies de l'information — Cartouches de disques optiques réutilisables à
diamètre 130 mm pour l'échange d'information*



Reference number
ISO/IEC 10089 : 1991 (E)

Contents

	Page
1 Scope	1
2 Conformance	1
3 Normative references	1
4 Conventions and notations	1
5 List of acronyms	2
6 Definitions	2
6.1 case	2
6.2 Clamping Zone	2
6.3 Control Track	2
6.4 cyclic redundancy check (CRC)	2
6.5 defect management	2
6.6 disk reference plane	2
6.7 entrance surface	2
6.8 error correction code (ECC)	2
6.9 format	2
6.10 hub	3
6.11 interleaving	3
6.12 Kerr rotation	3
6.13 land and groove	3
6.14 mark	3
6.15 optical disk	3
6.16 optical disk cartridge (ODC)	3
6.17 polarization	3
6.18 pre-recorded mark	3
6.19 read power	3
6.20 recording layer	3

6.21	Reed-Solomon code	3
6.22	rewritable optical disk	3
6.23	spindle	3
6.24	substrate	3
6.25	track	3
6.26	track pitch	3
6.27	write-inhibit hole	3
7	General description	4
8	Environments	4
8.1	Testing environment	4
8.2	Operating environment	4
8.3	Storage environment	4
8.3.1	Short-term storage	5
8.3.2	Long-term storage	5
8.4	Transportation	5
9	Safety requirements	5
10	Dimensional and mechanical characteristics of the case	5
10.1	General	5
10.2	Case drawings	5
10.3	Sides, reference axes and reference planes	6
10.3.1	Relationship of Sides A and B	6
10.3.2	Reference axes and case reference planes	6
10.4	Materials	6
10.5	Mass	6
10.6	Overall dimensions (see figure 3)	6
10.7	Location hole (see figure 3)	7
10.8	Alignment hole (see figure 3)	7
10.9	Surfaces on reference planes P (see figures 4 and 4a)	8
10.10	Insertion slots and detent features (see figure 5)	9
10.11	Gripper slots (see figure 6)	9
10.12	Write-inhibit holes (see figure 7)	10
10.13	Media sensor holes (see figure 8)	10
10.14	Head and motor window (see figure 10)	11
10.15	Shutter (see figure 11)	11
10.16	Slot for shutter opener (see figure 11)	11
10.17	Shutter sensor notch (see figure 9)	12
10.18	User label areas (see figure 13)	12
11	Dimensional and physical characteristics of the disk	13
11.1	Dimensions of the disk	13
11.1.1	Outer diameter	13
11.1.2	Thickness	13

	11.1.3	Clamping zone (see figure 1)	13
	11.1.4	Clearance zone	13
	11.2	Mass	13
	11.3	Moment of inertia	13
	11.4	Imbalance	13
	11.5	Axial deflection	13
	11.6	Axial acceleration	13
	11.7	Dynamic radial runout	13
	11.8	Radial acceleration	14
	11.9	Tilt	14
12		Drop test	14
13		Interface between disk and drive	14
	13.1	Clamping technique	14
	13.2	Dimensions of the hub (see figure 1)	14
	13.2.1	Outer diameter of the hub	14
	13.2.2	Height of the hub	14
	13.2.3	Diameter of the centre hole	14
	13.2.4	Height of the top of the centre hole at diameter D9	14
	13.2.5	Centring length at diameter D9	15
	13.2.6	Chamfer at diameter D9	15
	13.2.7	Chamfer at diameter D8	15
	13.2.8	Outer diameter of the magnetizable ring	15
	13.2.9	Inner diameter of the magnetizable ring	15
	13.2.10	Thickness of the magnetizable material	15
	13.2.11	Position of the top of the magnetizable ring relative to the disk reference plane	15
	13.3	Magnetizable material	15
	13.4	Clamping force	15
	13.5	Capture cylinder for the hub (see figure 12)	15
	13.6	Disk position in the operating condition (see figure 12)	16
14		Characteristics of the substrate	31
	14.1	Index of refraction	31
	14.2	Thickness	31
15		Characteristics of the recording layer	31
	15.1	Test conditions	31
	15.1.1	General	31
	15.1.2	Read conditions	31
	15.1.3	Write conditions	32
	15.1.4	Erase conditions	32
	15.2	Baseline reflectance	33
	15.2.1	General	33
	15.2.2	Actual value	33

15.2.3	Requirement	33
15.3	Magneto-optical recording in the User Zone	33
15.3.1	Resolution	33
15.3.2	Imbalance of magneto-optical signal	34
15.3.3	Figure of merit for magneto-optical signal	34
15.3.4	Narrow-band signal-to-noise ratio	34
15.3.5	Cross-talk ratio	35
15.3.6	Ease of erasure	35
16.	Features common to both formats	36
16.1	Track geometry	36
16.1.1	Track shape	36
16.1.2	Direction of rotation	36
16.1.3	Track pitch	36
16.1.4	Track number	36
16.2	Formatted Zone	36
16.3	Control tracks	37
16.4	Control Track PEP Zone	37
16.4.1	Recording in the PEP Zone	37
16.4.2	Cross-track loss	38
16.4.3	Format of the tracks of the PEP Zone	39
16.5	Control Track SFP Zones	42
16.5.1	Duplicate of the PEP information	43
16.5.2	Media information	43
16.5.3	System Information	51
16.5.4	Unspecified content	51
16.6	Requirements for interchange of a user-recorded cartridge	51
16.6.1	Requirements for reading	51
16.6.2	Requirements for writing and erasing	51
17	Format A	51
17.1	Track layout	51
17.1.1	Tracking	51
17.1.2	Characteristics of pre-recorded information	52
17.2	Sector format	54
17.2.1	Sector Mark (SM)	56
17.2.2	VFO areas	56
17.2.3	Address Mark (AM)	56
17.2.4	ID and CRC	56
17.2.5	Postamble (PA)	57
17.2.6	Offset Detection Flag (ODF)	57
17.2.7	Gap	57
17.2.8	Flag	57
17.2.9	Auto Laser Power Control (ALPC)	57

	17.2.12	Buffer	58
17.3		Recording Code	58
17.4		Defect management	59
	17.4.1	Media initialization	59
	17.4.2	Write and read procedure	60
	17.4.3	Layout of the User Zone	60
	17.4.4	Summary of the location of the zones on the disk	64
18		Format B	66
	18.1	Track layout	66
	18.1.1	Servo format	66
	18.1.2	Properties of pre-recorded signals	67
	18.2	Data structure	67
	18.2.1	Track format	67
	18.2.2	Sector format	67
	18.2.3	Error detection and correction	69
	18.2.4	Recording method	70
	18.2.5	Defect management	73
Annexes			
A	Optical systems for measuring write, read and erase characteristics		79
B	Definition of write and erase pulse width		81
C	Measurement of figure of merit		82
D	Values to be implemented in future standards		83
E	Pointer fields		84
F	CRC for ID fields		85
G	Interleave, CRC, ECC, Resync for the Data field		86
H	Sector retirement guidelines		93
I	Office environment		93
J	Transportation		94
K	Requirements for interchange		95

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 JTC1. 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 10089 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

Annexes A, B, C, E, F, G and K form an integral part of this International Standard. Annexes D, H, I and J are for information only.

INTRODUCTION

This International Standard specifies the characteristics of 130 mm optical disk cartridges (ODC) of the type providing for information to be written, read and erased many times using the magneto-optical effect.

This International Standard together with a standard for volume and file structure provides for full data interchange between data processing systems.

Information technology — 130 mm rewritable optical disk cartridge for information interchange

1 Scope

This International Standard specifies

- definitions of the essential concepts;
- the environment in which the characteristics are to be tested;
- the environments in which the cartridge are to be operated and stored;
- the mechanical, physical and dimensional characteristics of the case and of the optical disk;
- the magneto-optical characteristics and the recording characteristics for recording the information, for reading the information and for erasing it many times, so as to provide physical interchangeability between data processing systems;
- two formats for the physical disposition of the tracks and sectors, the error correction codes, the modulation methods used for recording and the quality of the recorded signals.

2 Conformance

A 130 mm rewritable optical disk cartridge is in conformance with this International Standard if it meets all the mandatory requirements of clauses 8 to 16 and either those of clause 17 or those of clause 18.

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 listed below. Members of IEC and ISO maintain registers of currently valid international standards.

ISO 683-13:1986, *Heat treatable steels, alloy steels and free-cutting steels - Wrought stainless steels*.

IEC 950:1986, *Safety of information technology equipment including electrical business equipment*

4 Conventions and notations

The following conventions and notations apply in this International Standard.

- a) In each field the information is recorded so that the most significant byte (byte 0) is recorded first. Within each byte the least significant bit is numbered bit 0, the most significant bit (i.e. bit 7 in an 8-bit byte) is recorded first. This order of recording applies also to the data input of the error-correcting codes, to the cyclic redundancy code, and to their code output.
- b) Unless otherwise stated, numbers are expressed in binary notation. Where hexadecimal notation is used, the hexadecimal digits are shown between parentheses.
- c) bit combinations are shown with the most significant bit to the left.
- d) Negative values are expressed in TWO's complement notation.
- e) The setting of bits is denoted by ZERO and ONE.