

INTERNATIONAL STANDARD

ISO/IEC 17342

First edition
2004-07-15

Information technology — 80 mm (1,46 Gbytes per side) and 120 mm (4,70 Gbytes per side) DVD re-recordable disk (DVD-RW)

*Technologies de l'information — Disque DVD réenregistrable
(DVD-RW) de 80 mm (1,46 Go par face) et 120 mm (4,70 Go par face)*

Reference number
ISO/IEC 17342:2004(E)



PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO/IEC 2004

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 either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	vii
Section 1 - General	1
1 Scope	1
2 Conformance	1
2.1 Optical Disk	1
2.2 Generating system.....	1
2.3 Receiving system	2
3 Normative references	2
4 Terms and definitions	2
5 Conventions and notations	4
5.1 Representation of numbers	4
5.2 Names	5
6 Acronyms	5
7 General description of the disk.....	6
8 General requirement.....	7
8.1 Environments	7
8.1.1 Test environment	7
8.1.2 Operating environment.....	7
8.1.3 Storage environment.....	7
8.1.4 Transportation.....	8
8.2 Safety requirements	8
8.3 Flammability	8
9 Reference measurement devices	8
9.1 Pick-Up Head (PUH).....	8
9.1.1 PUH for measuring recorded disks	8
9.1.2 PUH for measuring unrecorded disks	9
9.2 Measurement conditions	11
9.2.1 Recorded and unrecorded disk.....	11
9.2.2 Recorded disk	11
9.2.3 Unrecorded disk.....	11
9.3 Normalized servo transfer function	11
9.4 Reference servo for axial tracking.....	11
9.5 Reference servo for radial tracking	12
Section 2 - Dimensional, mechanical and physical characteristics of the disk	13
10 Dimensional characteristics (figures 6, 7 and 8).....	13
10.1 Overall dimensions (figure 6)	15
10.2 First transition area (figure 6).....	15
10.3 Second transition area (figure 6)	15
10.4 Clamping Zone (figure 6)	16
10.5 Third transition area (figure 6)	16
10.6 R-Information Zone (figure 6).....	16
10.6.1 Sub-divisions of the R-Information Zone.....	16
10.7 Information Zone (figure 6)	16
10.7.1 Sub-divisions of the Information zone	16
10.8 Track geometry.....	17
10.9 Channel bit length.....	17

10.10	Rim area (figure 7).....	17
10.11	Remark on tolerances.....	18
10.12	Label.....	18
11	Mechanical parameters	18
11.1	Mass.....	18
11.2	Moment of inertia.....	18
11.3	Dynamic imbalance	18
11.4	Sense of rotation.....	19
11.5	Runout	19
11.5.1	Axial runout.....	19
11.5.2	Radial runout.....	19
12	Optical parameters.....	19
12.1	Recorded and unrecorded disk parameters	19
12.1.1	Index of refraction.....	19
12.1.2	Thickness of the transparent substrate	19
12.1.3	Angular deviation.....	20
12.1.4	Birefringence of the transparent substrate.....	20
12.2	Recorded disk reflectivity	20
12.3	Unrecorded disk parameters	21
12.3.1	Polarity of reflectivity modulation	21
12.3.2	Recording power sensitivity variation.....	21
Section 3	- Operational signals.....	21
13	Operational signals for recorded disk	21
13.1	Measurement conditions.....	21
13.2	Read conditions	21
13.3	Recorded disk high frequency (HF) signals.....	21
13.3.1	Modulated amplitude (figure 10).....	21
13.3.2	Signal asymmetry	22
13.3.3	Cross-track signal	22
13.4	Quality of signals.....	22
13.4.1	Jitter	22
13.4.2	Random errors.....	22
13.4.3	Defects	22
13.5	Servo signals.....	23
13.5.1	Differential phase tracking error signal.....	23
13.5.2	Tangential push-pull signal	23
13.6	Groove wobble signal	25
14	Operational signals for the unrecorded disk	26
14.1	Measurement conditions.....	26
14.2	Recording conditions.....	26
14.3	Basic write strategy for media testing	26
14.4	Servo signals.....	27
14.4.1	Radial push-pull tracking error signal.....	27
14.4.2	Defects	28
14.5	Addressing signals.....	28
14.5.1	Land Pre-Pit signal.....	29
14.5.2	Groove wobble signal	30
14.5.3	Relation in phase between wobble and Land Pre-Pit.....	31
15	Operational signals for Embossed Zone.....	32
15.1	Operational signals from the Control data blocks	32
15.1.1	Measurement conditions.....	32
15.1.2	Read conditions	32
15.1.3	High frequency (HF) signals.....	32
15.1.4	Quality of signals.....	32
15.1.5	Servo signals.....	32
15.1.6	Groove wobble signal	33
15.2	Operational signals from the Servo Blocks	33

15.2.1	Measurement conditions	33
15.2.2	Read conditions.....	33
15.2.3	Servo signals	34
15.2.4	Addressing signals	34
Section 4 - Data format.....		35
16	General.....	35
17	Data Frames (figure 23)	35
17.1	Identification Data (ID).....	36
17.2	ID Error Detection Code.....	36
17.3	RSV	37
17.4	Error Detection Code.....	37
18	Scrambled Frames	37
19	ECC Block configuration	38
20	Recording Frames.....	40
21	Modulation	41
22	Physical Sectors	41
23	Suppress control of the d.c. component	43
24	Linking scheme.....	44
24.1	Structure of linking.....	44
24.2	2K-Link and 32K-Link	44
24.3	Lossless-Link	45
Section 5 - Format of the Information Zone.....		47
25	General description of the Information Zone	47
25.1	Layout of the Information Zone	47
25.2	Physical Sector numbering.....	47
26	Lead-in and Lead-out Zone.....	48
26.1	Lead-in Zone.....	48
26.1.1	Initial Zone	49
26.1.2	Buffer Zone 0	49
26.1.3	RW-Physical Format Information Zone.....	49
26.1.4	Reference Code Zone	52
26.1.5	Buffer Zone 1	52
26.1.6	Control Data Zone	52
26.1.7	Extra Border Zone.....	56
26.2	Lead-out Zone.....	57
Section 6 - Format of the Unrecorded Zone		57
27	General description of the Unrecorded Zone.....	57
27.1	Layout of the Unrecorded Zone	57
27.2	ECC Block address	57
27.3	ECC Block numbering	58
28	Pre-pit Data format.....	58
28.1	General description.....	58
28.2	Pre-pit block structure.....	60
28.3	Pre-pit data block configuration.....	62
28.3.1	Relative address	63
28.3.2	ECC Block address data configuration.....	64
28.3.3	Parity A and Parity B.....	64
28.3.4	Field ID0	65
28.3.5	Field ID1	65
28.3.6	Field ID2 and ID5	67
28.3.7	Field ID3 and Field ID4.....	74

29	Data structure of R-Information Zone	75
29.1	Layout of Power Calibration Area and Recording Management Area	75
29.2	Structure of the Power Calibration Area	75
29.3	Data configuration of the Recording Management Area (RMA)	76
29.3.1	Sector format of the Recording Management Area (figure 62)	76
29.3.2	The data structure of RMA	78
29.3.3	Recording Management Data (RMD)	79
Annex A (normative)	Measurement of the angular deviation α	96
Annex B (normative)	Measurement of birefringence	98
Annex C (normative)	Measurement of the differential phase tracking error	101
Annex D (normative)	Measurement of light reflectance	105
Annex E (normative)	Tapered cone for disk clamping	107
Annex F (normative)	Measurement of jitter	108
Annex G (normative)	8-to-16 Modulation with RLL (2,10) requirements	111
Annex H (normative)	Optimum Power Control	121
Annex J (normative)	Measurement of the groove wobble amplitude	124
Annex K (normative)	Measurement methods for the operational signals for an unrecorded disk	126
Annex L (normative)	NBCA Code	127
Annex M (normative)	Border Zone	133
Annex N (normative)	Write Strategy Options	143
Annex P (normative)	Measurement method of the Land Pre-Pit signal	145
Annex Q (informative)	Transportation	146
Annex R (informative)	Erase operation and Format operation	147

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 17342 was prepared by Ecma International (as ECMA-338) 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.

Information technology — 80 mm (1,46 Gbytes per side) and 120 mm (4,70 Gbytes per side) DVD re-recordable disk (DVD-RW)

Section 1 - General

1 Scope

This International Standard specifies the mechanical, physical and optical characteristics of an 80 mm and a 120 mm DVD Re-recordable disk to enable the interchange of such disks. It specifies the quality of the pre-recorded, unrecorded and the recorded signals, the format of the data, the format of the information zone, the format of the unrecorded zone, and the recording method, thereby allowing for information interchange by means of such disks. This disk is identified as a DVD Re-recordable (DVD-RW) disk.

This International Standard specifies

- 80 mm and 120 mm nominal diameter disks that may be either single or double sided,
- the conditions for conformance,
- the environments in which the disk is to be operated and stored,
- the mechanical and physical characteristics of the disk, so as to provide mechanical interchange between data processing systems,
- the format of the pre-recorded information on an unrecorded disk, including the physical disposition of the tracks and sectors, the error correcting codes and the coding method used,
- the format of the data and the recorded information on the disk, including the physical disposition of the tracks and sectors, the error correcting codes and the coding method used,
- the characteristics of the signals from pre-recorded and unrecorded areas on the disk, enabling data processing systems to read the pre-recorded information and to write to the disks,
- the characteristics of the signals recorded on the disk, enabling data processing systems to read the data from the disk.

This International Standard provides for interchange of disks between disk drives. Together with a standard for volume and file structure, it provides for full data interchange between data processing systems.

2 Conformance

2.1 Optical Disk

A claim of conformance shall specify the type of the disk, i.e. its size and whether it is single-sided or double sided. An optical disk shall be in conformance with this International Standard if it meets the mandatory requirements specified for this type.

2.2 Generating system

A generating system shall be in conformance with this International Standard if the optical disk it generates is in accordance with 2.1.

2.3 Receiving system

A receiving system shall be in conformance with this International Standard if it is able to handle an optical disk according to 2.1.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 10646-1:2000, *Information technology — Universal Multiple-Octet Coded Character Set (UCS) — Part 1: Architecture and Basic Multilingual Plane*

ECMA-287:2002, *Safety of electronic equipment*