
**Information technology — Digitally
recorded media for information
interchange and storage — 120 mm
Single Layer (25,0 Gbytes per disk) and
Dual Layer (50,0 Gbytes per disk) BD
Rewritable disk**

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*Technologies de l'information — Supports pour l'échange d'informations
et le stockage enregistrés numériquement — Disques BD réinscriptibles
de 120 mm simple couche (25,0 Go par disque) et double couche (50,0
Go par disque)*

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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.

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.

ISO/IEC 30192 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 23, *Digitally recorded media for information interchange and storage*.

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Introduction

In March 2002, 9 companies known as the Blu-ray Disc Founders, or BDF, came together to create optical-disk formats with the large capacity and high-speed transfer rates, that would be needed for recording and reproducing of high-definition video content. This joint effort turned out to be fruitful, and the BDF issued the first version of its Blu-ray Disc™ Rewritable Format Part1 Version 1.0, in June of 2002.

Then, in October 2004, more than 100 companies joined and the BDF became an open forum called the Blu-ray Disc Association (BDA). The BDA issued Version 2.1 of the Blu-ray Disc™ Rewritable Format Part1 in October 2005 and Version 3.0 in June of 2010.

By the end of 2010, over 100 million of Blu-ray Disc™ had already been shipped, and the Blu-ray™ devices such as players, recorders, game consoles and PC drives were in use all over the world.

The BDA also conducts verification activities for both disks and devices and has established more than 10 Testing Centres in Asia, Europe and the USA.

The BDA gave consumer applications the highest priority in the first few years. But it was known, of course, that International Standardization would be required before many government entities and their contractors would be allowed to use Blu-ray Disc™. In February and January of 2011, ISO/IEC JTC 1/SC 23 and JIIMA (Japan Image & Information Management Association) formally requested the BDA to consider International Standardization. The reason for this was to enable the inclusion of writable BDs, along with DVDs and CDs, in an International Standard specifying test methods for the estimation of lifetime of optical storage media for long-term data storage. In October 2011, the president of the BDA responded that his organization had decided to pursue International Standards of the basic physical formats for the Recordable and Rewritable Blu-ray Disc™.

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In December 2011 BDA sent project proposals for the International standardization of 4 formats to ISO/IEC JTC 1/SC 23 via the Japan national body. They are 120 mm Single Layer (25,0 Gbytes per disk) and Dual Layer (50,0 Gbytes per disk) BD Recordable disks, 120 mm Single Layer (25,0 Gbytes per disk) and Dual Layer (50,0 Gbytes per disk) BD Rewritable disks, 120 mm Triple Layer (100,0 Gbytes per disk) and Quadruple Layer (128,0 Gbytes per disk) BD Recordable disks and 120 mm Triple Layer (100,0 Gbytes per disk) BD Rewritable disk.

This International Standard specifies the mechanical, physical and optical characteristics of a 120 mm rewritable optical disk with a capacity of 25,0 Gbytes or 50,0 Gbytes.

A few additional specifications are required in order to write and read video recording applications, such as the BDMV and BDAV formats, which have been specified by the BDA for use on BD Recordable disks. These specifications, which are related to the Application, the file system and the Content-protection system, are required for the disk, the generating system and the receiving system. For more information of the Application, the Content-protection system and the additional requirements for the Blu-ray™ Format specifications, see <http://www.blu-raydisc.info>.

The International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of patents.

ISO and IEC take no position concerning the evidence, validity and scope of these patent rights.

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The holders of these patent rights have assured ISO and IEC that they are willing to negotiate licenses under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of holders of these patent rights are registered with ISO and IEC. Information may be obtained from:

Hitachi Consumer Electronics Co., Ltd.
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292 Yoshida-cho, Totsuka-ku, Yokohama 244-0817 Japan

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

ISO (www.iso.org/patents) and IEC (<http://patents.iec.ch>) maintain on-line databases of patents relevant to their standards. Users are encouraged to consult the databases for the most up to date information concerning patents.

NOTE Blu-ray™, Blu-ray Disc™ and the logos are trademarks of the Blu-ray Disc Association.

Information technology — Digitally recorded media for information interchange and storage — 120 mm Single Layer (25,0 Gbytes per disk) and Dual Layer (50,0 Gbytes per disk) BD Rewritable disk

1 Scope

This International Standard specifies the mechanical, physical and optical characteristics of a 120 mm rewritable optical disk with a capacity of 25,0 Gbytes or 50,0 Gbytes. It specifies the quality of the recorded and unrecorded signals, the format of the data and the recording method, thereby allowing for information interchange by means of such disks. User data can be written, read and overwritten many times using a reversible method. A conforming disk is identified as a BD Rewritable disk.

This International Standard specifies

- two related but different Types of this disk,
- the conditions for conformance,
- the environments in which the disk is to be operated and stored,
- the mechanical and physical characteristics of the disk, which allow mechanical interchange between data processing systems,
- the format of the 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 recorded on the disk, which enable data processing systems to read data from the disk.

This International Standard provides for interchange of disks between 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 with this International Standard shall specify the Type implemented. An optical disk shall be in conformance with this International Standard if it meets all mandatory requirements specified for its 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 both Types of optical disks according to 2.1.

2.4 Compatibility statement

A claim of conformance by a Generating or Receiving system with this International Standard shall include a statement listing any other standards supported. This statement shall specify the numbers of the standards, the optical disk Types supported (where appropriate) and whether support includes reading only or both reading and writing.

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3 Normative references

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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 646:1991, *Information technology — ISO 7-bit coded character set for information interchange*

ISO 9352:1995, *Plastics — Determination of resistance to wear by abrasive wheels*

IEC 60068-2-2:1974, *Environment testing — Part 2-2: Tests — Test B: Dry heat*

IEC 60068-2-30:2005, *Environment testing — Part 2-30: Tests — Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60950-1:2005, *Information technology equipment — Safety — Part 1: General requirements*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1

Application

application specified for a BD, for instance a video application, which requires areas for a Content-protection system and for its own Defect-Management system on the disk

4.2

BD

disk having a Cover Layer around 0,1 mm thick and a Substrate around 1,1 mm thick on which data is read or recorded by an OPU using 405 nm laser diode and NA = 0,85 lens

NOTE User Data recorded on the disk is formatted using 17PP modulation and an LDC+BIS code.

4.3

Channel bit

element by which the binary value ZERO or ONE is represented by Pits/Marks and Spaces on the disk

4.4

Cover Layer

transparent layer with precisely-controlled optical properties that covers the Recording Layer closest to the Entrance surface of the disk

4.5

Data Zone n

area between the Inner Zone and the Outer Zone on Layer L_n

4.6

Defective Cluster

Cluster in the User-Data Area that has been registered in the Defect List because it has become unreliable or uncorrectable

4.7

Digital-Sum Value (DSV)

arithmetic sum obtained from a bit stream by assigning the decimal value +1 to Channel bits set to ONE and the decimal value -1 to channel bits set to ZERO

4.8

Disk reference plane

plane defined by the perfect flat annular surface of an ideal spindle onto which the Clamping Area of the disk is clamped that is normal to the axis of rotation

4.9

Embossed HFM Area

area on the disk where information has been stored by means of an HFM Groove during the manufacture of the disk

4.10

Entrance surface

surface of the disk onto which the optical beam first impinges

4.11

Erased Groove

blank Groove on the disk that has been erased by irradiating the Track using only erase power levels P_{E10} and P_{E20} as determined by the OPC algorithm