
**Information technology — Digitally
recorded media for information
interchange and storage — 120 mm
Triple Layer (100,0 Gbytes per disk)
BD Rewritable disk**

*Technologies de l'information — Supports enregistrés
numériquement pour échange et stockage d'information — Disques
BD réinscriptibles de 120 mm triple couche (100,0 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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](http://www.iso.org/foreword)

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 23, *Digitally recorded media for information interchange and storage*.

This second edition cancels and replaces the first edition (ISO/IEC 30193:2013), of which it constitutes a minor revision. It also incorporates the Technical Corrigendum ISO/IEC 30193:2013/Cor 1:2015.

Introduction

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

Then, in October of 2004, more than a hundred companies joined and 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 a hundred million Blu-ray Disc™ have been shipped and 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 Centers 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, the chairs of ISO/IEC JTC 1/SC 23 and JIIMA (Japan Image and 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 the 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 decided to pursue International Standard of the basic physical formats for the Recordable and Rewritable Blu-ray™ Formats.

In December of 2011, BDA sent project proposals for the International Standardization of four 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 100,0 Gbytes.

Some technical errors were found during the editorial work for JIS X 6233, which is the Japanese Industrial Standard identical with ISO/IEC 30193:2013. In December of 2014, a Defective Report was submitted by the Japan national body of ISO/IEC JTC 1/SC 23. The project editor proposed a Draft Technical Corrigendum for ISO/IEC 30193:2013 and it was approved by ISO/IEC JTC 1/SC 23 in May of 2015. This International Standard is the updated first edition of ISO/IEC 30193:2013, including the Technical Corrigendum and additional corrections for some editorial errors.

A few additional specifications are required in order to write and read video-recording applications, such as BDAV Format which had been specified by the BDA for use on BD Rewritable disks. These specifications, which are related to the Application, the file system or the Content-protection system, are required for the disk, the generating system and the receiving system. For more information about 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 International Standard may involve the use of patents.

ISO/IEC 30193:2016(E)

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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 — 120mm Triple Layer (100,0 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 100,0 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. This disk is identified as a BD Rewritable disk.

This International Standard specifies the following:

- the one disk Type;
- 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 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, enabling data processing systems to read 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 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 the Type of optical disk 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.

3 Normative references

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

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

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

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

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

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

4 Terms and definitions

iTeh STANDARD PREVIEW
(standards.iteh.ai)

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

4.1

Application

application specified for a *BD* (4.2), for instance a video application, which requires area for a Content-protection system and for its own Defect-Management system on the disk

ISO/IEC 30193:2016

<https://standards.iteh.ai/catalog/standards/sist/5a4854c0-8715-4a59-8e0e-3594ac1b9c1e/iso-iec-30193-2016>

4.2

BD

disk having a *Cover Layer* (4.4) around 0,1 mm thick and a *Substrate* (4.38) 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 1 to entry: 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* (4.24)/*Marks* (4.18) and *Spaces* (4.37) on the disk

4.4

Cover Layer

transparent layer with precisely-controlled optical properties that covers the *Recording Layer* (4.29) closest to the Entrance surface of the disk

4.5

Data Zone *n*

area between the Inner Zone and the Outer Zone on *Layer Ln* (4.17)

4.6**Defective Cluster**

cluster in a *User-Data Area* (4.42) that has been registered in a Defect List as unreliable or uncorrectable one

4.7**Digital-Sum Value****DSV**

arithmetic sum obtained from a bit stream by assigning the decimal value +1 to *Channel bits* (4.3) 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 Zone 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* (4.13) 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* (4.12) on the disk that has been erased by irradiating the *Track* (4.39) using only erase power level P_{EO} as determined by the OPC algorithm

4.12**Groove**

trench-like feature of the disk, connected to a *Recording Layer* (4.29)

Note 1 to entry: In case of Triple-Layer disk, one *Groove* can be carried by the *Substrate* (4.38) and other Grooves can be carried by the *Spacer Layer* (4.36) or the *Cover Layer* (4.4) (see Figure 1). Grooves are used to define the *Track* (4.39) locations.

In general, the *Groove* can be depression in the carrier or an elevation on the carrier. If the *Groove* is nearer to the *Entrance surface* (4.10) than the *Land* (4.16) (see Figure 53), the recording method is called "On-Groove recording". If the *Groove* is farther from the *Entrance surface* (4.10) than the *Land* (4.16), the recording method is called "In-Groove recording".

In the BD Rewritable system, there are 3 types of *Groove*:

- Wobbled *Groove* in Rewritable Area containing address information;
- HFM *Groove* in Embossed HFM Area containing Permanent Information and Control data;
- Straight *Groove* without any modulation in the BCA Zone.

4.13**High-Frequency Modulated Groove****HFM Groove**

Groove (4.12) modulated in the radial direction with a rather high bandwidth signal

Note 1 to entry: HFM *Groove* creates a data channel with sufficient capacity and data rate for replicated information.

4.14**Information Area**

area on the disk in which information can be recorded

4.15**Information Zone**

recorded part of the *Information Area* (4.14)