INTERNATIONAL STANDARD

ISO/IEC 30190

Third edition
2021-01

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 Recordable disk

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

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ISO/IEC 30190:2021(E)

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Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 ISO documents 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).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This third edition cancels and replaces the second edition (ISO/IEC 30190:2016), which has been technically revised. It also incorporates the Amendment ISO/IEC 30190:2016/Amd 1:2019.

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The main change compared to the previous edition is the addition of requirements for physical access control (PAC) and reserved area of BD application.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

In March 2002, 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 high-definition video content.

The Blu-ray Disc Association (BDA) issued the first version of the Blu-ray Disc™ Recordable Format Part1 in October 2005, and Version 1.3 of the Blu-ray Disc™ Recordable Format Part1 in April 2008, which enabled the recording velocity up to 6x.

To keep the compatibility of the removable medium in the market, just to make a standard is not enough, and it is necessary to check that the disks and devices can satisfy the specifications. The BDA conducts verification activities for the disks and devices and has established more than 10 testing centers in Asia, Europe and the USA.

Blu-ray™ disks, players, recorders and PC drives/software based on BDA standards became popular all over the world. 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 2011, the BDA was formally requested 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 BDA responded that it had decided to pursue international standardization for the basic physical formats for the Recordable and Rewritable Blu-ray™ Format.

In December 2011, the BDA sent project proposals for international standardization of four formats. 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 a 120 mm triple layer (100,0 Gbytes per disk) BD Rewritable disk.

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 BD application, the file systems or the content protection system, are required for the disk, the generating system and the receiving system[1)].

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 a patent.

ISO and IEC take no position concerning the evidence, validity and scope of this patent right.

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

1) For more information of the BD application, the content-protection system and the additional requirements for the Blu-ray™ Format specifications, see http://www.blu-raydisc.info.

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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 Recordable disk

1 Scope

This document specifies mechanical, physical and optical characteristics of a 120 mm recordable 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 once and read many times using a non-reversible method. This disk is identified as BD recordable disk.

This document specifies the following:

— three 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, 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.

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This document 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 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 9352, *Plastics — Determination of resistance to wear by abrasive wheels*

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

ISO/IEC 30193, *Information technology — Digitally recorded media for information interchange and storage — 120 mm Triple Layer (100,0 Gbytes per disk) BD Rewritable disk*

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*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 30193 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
in-groove
geometry where grooves are farther from the entrance surface of a disk than the lands

4 Symbol and abbreviated terms

ac	alternating current	MM	MSK mark
ADIP	address in pre-groove	MSB	most significant byte
APC	automatic power control	msb	most significant bit
AU	address unit	MSK	minimum shift keying
AUN	address unit number	MW	monotone wobble
BCA	burst-cutting area	NA	numerical aperture
BIS	burst-indicating subcode	NRZ	non-return-to-zero
BPF	band-pass filter	NRZI	non-return-to-zero inverting
CAV	constant angular velocity	NWA	Next writable address
cbs	channel bits	NWL	nominal wobble length
CNR	carrier-to-noise ratio	OPU	optical pick-up unit
dc	direct current	PAA	physical ADIP address
DCZ	drive calibration zone	PIC	permanent information and control data
DDS	disk-definition structure	PLL	phase-lock loop
DFL	defect list	PoA	post-amble
DI	disk information	PP	push-pull
DL	dual layer	pp	peak-to-peak
DMA	disk management area	PrA	pre-amble
DMS	disk management structure	PSN	physical sector number
DSV	digital sum value	R_H	relative humidity
EB	emergency brake	RHWG	ratio HFM-wobbled groove
ECC	error-correction code	RIN	relative intensity noise

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