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**Information technology — Digitally  
recorded media for information  
interchange and storage — 120 mm  
Triple Layer (100,0 Gbytes single  
sided disk and 200,0 Gbytes double  
sided disk) and Quadruple Layer  
(128,0 Gbytes single sided disk) BD  
Recordable disk**

*Technologies de l'information — Supports enregistrés  
numériquement pour échange et stockage d'information — 120 mm  
de couche triple (100,0 Go disque unique face et 200,0 Go disque  
double face) et quadruple couche (128,0 Go disque unique face) sur  
disque enregistrable BD*



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[ISO/IEC 30191:2021](https://standards.iteh.ai/catalog/standards/sist/e4fdd207-054c-4cd0-a4a8-91169aa4e23b/iso-iec-30191-2021)

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Published in Switzerland

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## Foreword

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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 30191:2015), which has been technically revised. It also incorporates the Amendment ISO/IEC 30191:2015/Amd.1 :2019.

The main change compared to the previous edition is the addition of requirements for physical access control 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](http://www.iso.org/members.html).

## 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 Part 1 in October 2005, and Version 1.3 of the Blu-ray Disc™ Recordable Format Part 1 in April 2008, which enabled the recording velocity up to 6x. In June 2010, the BDA issued Blu-ray Disc™ Recordable Format Part 1 Version 2.0, which specifies the TL and QL of BD recordable disk.

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 also 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 January and February 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 of 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. ISO/IEC 30190, ISO/IEC 30191, ISO/IEC 30192 and ISO/IEC 30193 were published in 2013.

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 system or the content protection system, are required for the disk, the generating system and the receiving system<sup>1)</sup>.

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.

The holder of this patent right has assured ISO and IEC that he/she is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of this patent right is registered with ISO and IEC. Information may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents).

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

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

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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>.

# Information technology — Digitally recorded media for information interchange and storage — 120 mm Triple Layer (100,0 Gbytes single sided disk and 200,0 Gbytes double sided disk) and Quadruple Layer (128,0 Gbytes single sided disk) BD Recordable disk

## 1 Scope

This document specifies the mechanical, physical and optical characteristics of a 120 mm recordable optical disk with a capacity of 100,0 Gbytes, 128,0 Gbytes or 200,0 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; [ISO/IEC 30191:2021](https://standards.iteh.ai/catalog/standards/sist/e4fdd207-054c-4cd0-a4a8-91169aa4e256/iso-iec-30191-2021)
- 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 the data from the disk.

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

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

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*

### 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

##### case

housing for an optical disk, that protects the disk and facilitates disk interchange

#### 3.2

##### mark polarity

polarity of reflectivity change when marks are recorded

### 4 Symbol and abbreviated terms

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

EB	emergency brake	RIN	relative intensity noise
ECC	error correction code	RMTR	repeated minimum transition run length
EDC	error detection code	RS	Reed-Solomon (code)
EQ	equalizer	$R_T$	relative thickness
FAA	first ADIP address (of data zone)	RUB	recording unit block
FS	frame sync	SER	symbol error rate
FWHM	full width at half maximum	SL	single layer
HF	high frequency	$S/N$	signal-to-noise ratio
HFM	high frequency modulated	SRM	sequential recording mode
HMW	harmonic modulated wave	SRR	sequential recording range
HPF	high-pass filter	SRRI	sequential recording range information
HTL	high-to-low	STW	saw-tooth wobble
$I_{NHWS}$	normalized HFM wobble signal amplitude	Sync	synchronization
$I_{NWS}$	normalized wobble signal amplitude	TDDS	temporary disk definition structure
GLAA	last ADIP address (of data zone)	TDFL	temporary defect list
LDC	long-distance code	TDMA	temporary disk management area
LPF	low-pass filter	TDMS	temporary disk management structure
LRA	Last recorded address	TL	triple layer
LSB	least significant byte	TL/D	triple layer double-sided
lsb	least significant bit	TP	track pitch
$L_{SHD}$	second harmonic distortion level	TS	transmission stack
$L_{SHL}$	second harmonic level	$V_{ref}$	reference velocity
LSN	logical sector number	wbs	wobbles
MM	MSK mark		

## 5 Conformance

### 5.1 Optical disk

A claim of conformance with this document shall specify the type implemented. An optical disk shall be in conformance with this document if it meets all mandatory requirements specified for its type.