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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 Rewritable disk

Technologies de l'information — Supports enregistrés numériquement pour échange et stockage d'information — 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.

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

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

This second edition cancels and replaces the first edition (ISO/IEC 30192:2013), of which it constitutes a minor revision. It also incorporates the Technical Corrigendum ISO/IEC 30192:2013/Cor 1:2015.

This corrected version of ISO/IEC 30192:2017 incorporates the following corrections as well as other minor editorial modifications:

— in Annex F, the two Figures previously entitled “F.6.” have been corrected and one figure was re-numbered as Figure F.7.;

— Figure H.2. was replaced.

Introduction

In March 2002, nine 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 a hundred 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 a hundred 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 ten 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 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 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™.

In December 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 25,0 Gbytes or 50,0 Gbytes.

Some technical errors were found during the editorial work for JIS X 6232, which is the Japanese Industrial Standard identical with ISO/IEC 30192:2013. In December of 2014, a Defect 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 30192:2013 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 30192:2013, including the Technical Corrigendum and additional corrections for some minor editorial errors.

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.

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 the following.

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Pioneer Corporation
Intellectual Property Division, Legal and Intellectual Property Division,
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Sony Corporation
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1-7-1, Konan, Minato-ku, Tokyo, 108-0075, Japan

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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 the following:

— two related but different Types of this disk;

— conditions for conformance;

— environments in which the disk is to be operated and stored;

— mechanical and physical characteristics of the disk, which allow mechanical interchange between data processing systems;

— format of the information on the disk, including the physical disposition of the Tracks and Sectors;

— error-correcting codes and coding method used;

— 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.

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

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

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

IEC 60068-2-30, *Environment 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

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 areas for a Content-protection system and for its own Defect-Management system on the disk

4.2
BD
disk having a *Cover Layer* (4.4) around 0,1 mm thick and a *Substrate* (4.37) 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* (4.36) 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 Ln* (4.17)

4.6
Defective Cluster
Cluster in the *User-Data Area* (4.41) 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* (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 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* (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 on the disk that has been erased by irradiating the Track using only erase power levels P_{E1O} and P_{E2O} as determined by the OPC algorithm