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INTERNATIONAL STANDARD

colour inside

Audio archive system –
Part 1-2: BD disk and data migration for long-term audio data storage

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FOREWORD

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International Standard IEC 62702-1-2 has been prepared by technical area 6: Storage media, storage data structures, storage systems and equipment, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this International Standard is based on the following documents:

CDV	Report on voting
100/2894/CDV	100/2970/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

Sound recordings such as music, speech, and storytelling are an important human heritage and should be preserved for a long term as much as possible. However, we were not able to record sounds in order to preserve them in the past. The first recoding was achieved by Edison in 1877.

Although various technologies were invented later, most of them have limitations for audio archives because storage lifetime is limited and the sound quality deteriorates when it is transferred to the next generation storage device.

The progress of LSI (Large-Scale Integrated Circuit) technology made digital recording of recorded sound possible. The digital recording is very suitable for audio archiving because the migration is performed by copying digital data.

For this purpose various recording materials exist, such as optical disks, magnetic disks, magnetic tape and nonvolatile memory such as a phase-change memory.

This document specifies physical and logical aspects for a standard of audio archives of various storage types which are typically used for audio archives in markets.

The IEC 62702 series currently consists of:

– IEC 62702-1, which specifies the minimum requirements on physical aspects of optical disks for digital sound recordings; IEC 62702-1-1 specifies requirements for DVD optical disks, IEC 62702-1-2 specifies requirements for BD optical disks.
– IEC 62702-2, which specifies the minimum requirements for digitization of content, format of digitized content, content information and media inspection.

AUDIO ARCHIVE SYSTEM –

Part 1-2: BD disk and data migration for long-term audio data storage

1 Scope

This part of IEC 62702-1 specifies a method of data-quality assurance for writable disks (hereinafter "disks") which are specified for long-term data storage, and a data migration method, which can sustain the recorded data on disks for long-term audio data preservation. The writable disks include BD Recordable disk and BD Rewritable disk.

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 16963:2017, *Information technology – Digitally recorded media for information interchange and storage – Test method for the estimation of lifetime of optical disks for long-term data storage*

ISO/IEC 29121:2017, *Information technology – Digitally recorded media for information interchange and storage – Data migration method for optical disks for long-term data storage*

ISO/IEC 30190:2016, *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*

ISO/IEC 30191, *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*

ISO/IEC 30192, *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*

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*

3 Terms, definitions and abbreviated terms

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

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

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms and definitions

3.1.1
B_{mig} Life
lifetime for use of data migration and identical to $B_{0,000\,1}$ Life which is 0,000 001 quantile of the lifetime distribution (i.e. 0,000 1 % failure time) or 99,999 9 % survival lifetime distribution (i.e. 0,000 1 % failure time) or 99,999 9 % survival lifetime

[SOURCE: ISO/IEC 29121:2017, 3.1, modified – Note 1 to entry deleted.]

3.1.2
B_5 Life
5 percentile of the lifetime distribution (i.e. 5 % failure time) or 95 % survival lifetime

[SOURCE: ISO/IEC 16963:2017, 3.4]

3.1.3
$(B_5$ Life$)_L$
95 % lower confidence bound of B_5 Life

[SOURCE: ISO/IEC 16963:2017, 3.5]

3.1.4
B_{50} Life
50 percentile of the lifetime distribution (i.e. 50 % failure time) or 50 % survival lifetime

[SOURCE: ISO/IEC 16963:2017, 3.6]

3.1.5
Controlled storage-condition
well-controlled storage conditions with full-time air conditioning (*Temp*=25 °C and *RH*= 50 %) which can extend the lifetime of data stored on optical disks

[SOURCE: ISO/IEC 16963:2017, 3.7]

3.1.6
data migration
process to copy data from one storage device or medium to another

[SOURCE: ISO/IEC 29121:2017, 3.5]

3.1.7
error rate
rate of errors on the recorded disk measured before error correction is applied

[SOURCE: ISO/IEC 29121:2017, 3.7]

3.1.8
initial performance test
test of the recording performance of data recorded on a disk before storing

[SOURCE: ISO/IEC 29121:2017, 3.8]

3.1.9
lifetime
time that information is retrievable in a system

[SOURCE: ISO/IEC 29121:2017, 3.9]

3.1.10
periodic performance test
periodic test of the recording performance of data recorded on a disk during the storage

[SOURCE: ISO/IEC 29121:2017, 3.15]

3.1.11
retrievability
ability to recover physical information as recorded

[SOURCE: ISO/IEC 29121:2017, 3.16]

3.1.12
system
combination of hardware, software, storage medium and documentation used to record, retrieve and reproduce information

[SOURCE: ISO/IEC 16963:2017, 3.20]

3.1.13
uncorrectable error
error in the playback data that could not be corrected by the error correcting decoders

[SOURCE: ISO/IEC 29121:2017, 3.19]

3.1.14
X_{mig} Life
X_{mig}
migration interval (year) that is determined by user

[SOURCE: ISO/IEC 29121:2017, 3.20, modified – Note 1 to entry deleted.]

3.2 Abbreviated terms

Max RSER	Max Random Symbol Error Rate

4 Disk and lifetime for long term audio data storage

4.1 Disk for long term audio data storage

A disk with a specified lifetime should be used for long-term audio data storage. A disk with an unspecified lifetime should not be used.

4.2 Lifetime estimation

For the purposes of this part, the lifetime of a disk shall be derived from the measurements specified in ISO/IEC 16963. The Eyring method is used for lifetime estimation under controlled storage conditions (temperature = 25 °C and RH = 50 %).

In A.1.4 of ISO/IEC 16963:2017, the estimated lifetime can be defined variously as B_{50} Life, B_5 Life and the 95 % lower confidence bound of B_5 Life (= $(B_5 \text{ Life})_L$) and is described as follows.