
**Information technology — Digitally
recorded media for information
interchange and storage — Test method
for the estimation of lifetime of optical
media for long-term data storage**

*Technologies de l'information — Supports pour l'échange d'informations
et le stockage enregistrés numériquement — Méthode d'essai pour
l'estimation de la durée de vie de supports optiques pour le stockage à
long terme*

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Published in Switzerland

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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.

ISO/IEC 16963 was prepared by Ecma International (as ECMA-396) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, *information technology*, in parallel with its approval by national bodies of ISO and IEC.

Introduction

Markets and industry have developed a common understanding that the property referred to as the lifetime of data recorded to optical media plays an increasingly important role for the intended applications. Disparate standardized test methodologies exist for Magneto Optical media and recordable compact disk and DVD systems. It was agreed that the project represented by this International Standard be undertaken in order to provide a common methodology, applicable for various purposes, that includes the testing of currently available writable CD and DVD optical media.

ISO/IEC JTC 1/SC 23/JWG 1, which is a Joint working group among ISO/TC 42, ISO/TC 171 and ISO/IEC JTC 1/SC 23, initiated work on this subject and developed the initial drafts with assistance from Ecma International TC31.

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Information technology — Digitally recorded media for information interchange and storage — Test method for the estimation of lifetime of optical media for long-term data storage

1 Scope

This International Standard specifies an accelerated aging test method for estimating the lifetime of the retrievability of information stored on recordable or rewritable optical disks.

This test includes details on the following formats: DVD-R/RW/RAM, +R/+RW and CD-R/RW. It may be applied to additional optical disk formats, with substitution of the appropriate specifications, and may also be updated by committee in the future as required.

This International Standard includes:

- stress conditions
 - Basic stress condition and Rigorous stress condition testing for use with the Eyring Method and testing for use with the Arrhenius Method.
- ambient storage conditions in which the lifetime of data stored on optical media is estimated
 - Controlled storage condition, e.g. 25 °C and 50 % RH, representing well-controlled storage conditions with full-time air conditioning. Eyring Method is used to estimate the lifetime under this storage condition.
 - Harsh storage condition, e.g. 30 °C and 80 % RH, representing the most severe conditions in which users handle and store the optical media. Arrhenius Method is used to estimate the lifetime under this storage condition.
- evaluation system description
- specimen preparation and data-acquisition procedure
- definition of and method for estimating lifetime of stored data on specified media
- data analysis for lifetime of stored data
- reporting format for estimated lifetime of stored data

The methodology includes only the effects of temperature (T) and relative humidity (RH). It does not attempt to model degradation due to complex failure-mechanism kinetics, nor does it test for exposure to light, corrosive gases, contaminants, handling, or variations in playback subsystems. Disks exposed to these additional sources of stress or higher levels of temperature and relative humidity are expected to experience shorter usable lifetimes.

2 Conformance

Media tested by this methodology shall conform to all normative references specific to that media format.

3 Normative references

The following referenced documents are indispensable for the application 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 10149:1995, *Information technology — Data interchange on read-only 120 mm optical data disks (CD-ROM)* (ECMA-130)

ISO/IEC 12862:2009, *Information technology — 120 mm (8,54 Gbytes per side) and 80 mm (2,66 Gbytes per side) DVD recordable disk for dual layer (DVD-R for DL)* (ECMA-382)

ISO/IEC 13170:2009, *Information technology — 120 mm (8,54 Gbytes per side) and 80 mm (2,66 Gbytes per side) DVD re-recordable disk for dual layer (DVD-RW for DL)* (ECMA-384)

ISO/IEC 16448:2002, *Information technology — 120 mm DVD — Read-only disk* (ECMA-267)

ISO/IEC 16449:2002, *Information technology — 80 mm DVD — Read-only disk* (ECMA-268)

ISO/IEC 17592:2004, *Information technology — 120 mm (4,7 Gbytes per side) and 80 mm (1,46 Gbytes per side) DVD rewritable disk (DVD-RAM)* (ECMA-330)

ISO/IEC 17341:2009, *Information technology — Data interchange on 120 mm and 80 mm optical disk using +RW format — Capacity: 4,7 Gbytes and 1,46 Gbytes per side (recording speed up to 4X)* (ECMA-337)

ISO/IEC 17342:2004, *Information technology — 80 mm (1,46 Gbytes per side) and 120 mm (4,70 Gbytes per side) DVD re-recordable disk (DVD-RW)* (ECMA-338)

ISO/IEC 17344:2009, *Information technology — Data interchange on 120 mm and 80 mm optical disk using +R format — Capacity: 4,7 Gbytes and 1,46 Gbytes per side (recording speed up to 16X)* (ECMA-349)

ISO/IEC 23912:2005, *Information technology — 80 mm (1,46 Gbytes per side) and 120 mm (4,70 Gbytes per side) DVD Recordable Disk (DVD-R)* (ECMA-359)

ISO/IEC 25434:2008, *Information technology — Data interchange on 120 mm and 80 mm optical disk using +R DL format — Capacity: 8,55 Gbytes and 2,66 Gbytes per side (recording speed up to 16X)* (ECMA-364)

ISO/IEC 26925:2009, *Information technology — Data interchange on 120 mm and 80 mm optical disk using +RW HS format — Capacity: 4,7 Gbytes and 1,46 Gbytes per side (recording speed 8X)* (ECMA-371)

ISO/IEC 29642:2009, *Information technology — Data interchange on 120 mm and 80 mm optical disk using +RW DL format — Capacity: 8,55 Gbytes and 2,66 Gbytes per side (recording speed 2,4X)* (ECMA-374)

ECMA-394, Recordable Compact Disc Systems CD-R Multi-Speed

ECMA-395, Recordable Compact Disc Systems CD-RW Ultra-Speed