AES standard for
audio preservation and restoration -
Life expectancy of information stored in
recordable compact disc systems -
Method for estimating, based on effects of
temperature and relative humidity

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Abstract

This standard specifies test methods for estimating the life expectancy of information stored in recordable compact disc systems. Only the effects of temperature and relative humidity on the media are considered.

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Foreword

[This foreword is not a part of AES standard for audio preservation and restoration — Life expectancy of information stored in recordable compact disc systems — Method for estimating, based on effects of temperature and relative humidity, AES38-2000.]

This standard was prepared by the SC-03-03 Working Group on Optical Systems and Media of the SC-03 Subcommittee on the Preservation and Restoration of Audio Recording as part of project AES-X53, Test methods for estimating the life expectancy of information stored in recordable compact disc systems based on effects of temperature and relative humidity. The standard was developed as part of project AES-X80, Liaison with ANSI/PIMA IT9-5.

The writing group was lead by William Murray.

William Murray, chair SC-03-03
1999-12-24
AES standard
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1 General

1.1 Scope
This standard specifies test methods for estimating the life expectancy of information stored in recordable compact
disc systems. Only the effects of temperature and relative humidity on the media are considered.

The standardized life expectancy estimated using this model is defined for discs maintained at 25 °C and 50 % RH.
Discs exposed to more severe conditions of temperature and humidity are expected to experience a shorter life. The
test plan documented in this standard does not attempt to model degradation due to exposure to light, corrosive
gases, contaminants, or mishandling, and variations in the playback subsystem.

1.2 Purpose
The purpose of this standard is to establish a methodology for estimating the life expectancy of information stored
in recordable compact disc systems. This methodology provides a technically and statistically sound procedure for
obtaining and evaluating accelerated test data. The methodology deals only with the effects of temperature and
humidity on the retrievability of stored information. For this reason, this standard is primarily directed to those
storage applications, for example, libraries and archives, in which exposure to other influences potentially
detrimental to information life expectancy, such as chemical agents, intense light sources, and improper handling, is
controlled and minimized.

NOTE It is possible that audio information can be played back using error correction from a disc that
has exceeded its life expectancy according to this standard.

1.3 Summary
A sampling of eighty recorded discs is divided into five groups according to a specified plan. Each group of discs is
exposed to one of five stresses, which are combinations of temperature and relative humidity. Periodically during
the course of the exposure, each disc from each stress group has its block error rate measured. Data collected at
each test interval for each individual disc are used to determine a lifetime for that disc. The disc lifetimes at each
stress are fitted to a log-normal distribution to determine a mean lifetime for the stress. The resulting five mean
lifetimes are regressed against temperature and relative humidity according to an Eyring acceleration model. This
model is then used to estimate the distribution of lifetimes at a usage condition.

1.4 Assumptions
The validity of the procedure defined by this standard relies on three assumptions. It is assumed that the sample life
distribution is appropriately modeled by the log-normal distribution. Also, it is assumed that the kinetics of the
dominant failure mechanism are appropriately modeled by an Eyring acceleration model. Finally, it is assumed that
the dominant failure mechanism acting during use is the same as that at the accelerated conditions.