

AES recommended practice for audio preservation and restoration — Storage and handling — Storage of polyester-base magnetic tape

Published by

Audio Engineering Society, Inc.

Copyright ©1997 by the Audio Engineering Society

Abstract

This standard provides recommendations concerning the storage conditions, storage facilities, enclosures, and inspection for recorded polyester-base magnetic tapes in roll form. It covers analog and digital tape and includes tape made for audio, video, instrumentation, and computer use.

An AES standard implies a consensus of those directly and materially affected by its scope and provisions and is intended as a guide to aid the manufacturer, the consumer, and the general public. The existence of an AES standard does not in any respect preclude anyone, whether or not he or she has approved the document, from manufacturing, marketing, purchasing, or using products, processes, or procedures not in agreement with the standard. Prior to approval, all parties were provided opportunities to comment or object to any provision. Attention is drawn to the possibility that some of the elements of this AES standard or information document may be the subject of patent rights. AES shall not be held responsible for identifying any or all such patents. Approval does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the standards document. Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation. This document is subject to periodic review and users are cautioned to obtain the latest printing.

Table of Contents

Foreword	3
0 Introduction	4
1 Scope	5
2 Normative references	5
3 Definitions	5
4 Environmental conditions	9
5 Materials	11
6 Enclosures	11
7 Preparation	12
8 Storage housing	13
9 Storage rooms	14
10 Fire protection storage	14
11 Identification, inspection, and cleaning	15
Annex A (informative) Stability of cellulose triacetate base	16
Annex B (informative) Distinction between master tapes and work copies	17
Annex C (informative) Relationship between temperature and RH	18
Annex D (informative) Temperature and humidity acclimatization	19
Annex E (informative) Bibliography	21
Annex F (informative) Informative references	22

Foreword

[This foreword is not a part of *AES recommended practice for audio preservation and restoration — Storage and handling — Storage of polyester-base magnetic tape*, AES22-1997.]

This standard is concerned with the storage of magnetic tape on polyester base in roll form and covers analog and digital tape. It includes tape made for audio, video, instrumentation, and computer use.

This standard was prepared by a joint technical commission of the Audio Engineering Society Standards Committee SC-03 Subcommittee on Audio Preservation and Restoration and the American National Standards Committee Subcommittee IT9-5 on Stability of Electronic Imaging Materials. At the time of completion of the draft of this standard, the commission had the following members: Peter Z. Adelstein (IT9-5 Chairman), George Boston, Jim Burke, Alan Calmes, Tom Cavanagh, Delos A. Eilers, Jean-Marc Fontaine, Gerald Gibson (SC-03 Chair), John Gignac, Stephen P. Johnson, Takashi Kirakawa, Fredrick Kolb, Jr., Fred Layn, John Mattarazzo, Daniel Matukewicz, Charles W. Mayn, Bill Murray, David Peelle, Fernando Podio, Daniel Queen (AESSC Secretary), A. Tulsi Ram (IT9-5 Secretary), Dietrich Schuller, Ted Sheldon, Michael Stamp, Susan Stinson, William Storm (SC-03 Chair Emeritus), Carl Talkington, Ron Uhlig, John Van Bogart, Don Veri, Bob Waelbroeck, Johanna Wellheiser, James Wheeler, Jim Wong, and Joe Wrobel. The commission was co-chaired by Storm and Adelstein.

Gerald Gibson
Chair, AESSC SC-03 Subcommittee on Audio Preservation and Restoration
1995-09-20

AES recommended practice for audio preservation and restoration – Storage and handling – Storage of polyester-base magnetic tape

0 Introduction

Magnetic tape is an important medium in the capturing of information and has had widespread use in audio, video, and computer applications over the past 60 years. Preservation of this information is becoming of increasing concern to society, particularly as the recorded information becomes older and frequently of greater value to libraries, archives, museums, government agencies, and commercial organizations. Magnetic tape is also widely used by individual consumers to preserve records of personal or entertainment value.

The stability of magnetic tape is dependent upon that of the complete magnetic system. This includes stability of the tape itself, the equipment on which it is run, and, in some systems, the necessary software. It is recognized that tape records will eventually have to be copied or transferred to another material when the system that produced them becomes obsolete. Nevertheless, it is advantageous to prolong the tape life so it does not become the controlling factor. Although there have been many studies of tape stability, to date there does not exist a standard specification against which tape life can be evaluated. Likewise, standards are not available on the life expectancy of hardware and the problems associated with hardware wearing out or becoming obsolete. Therefore the best approach for tape users is to store magnetic tape under conditions that will extend its life and to handle tape so that it will not be subjected to stress and undergo physical breakdown during use. This standard addresses the concerns of storage.

A major component of magnetic tape is the plastic base. Early audio magnetic tape was manufactured on a variety of base materials, including paper and various esters of vinyl and cellulose. After extended storage, or storage under adverse conditions, some cellulose triacetate base decomposes and produces acetic acid (see annex A). However, in more recent years, since about 1960, magnetic material has been coated onto polyester base, which has excellent long-term stability.

The second component of magnetic tape is the oxide (or metal particle) and binder layer that determines the magnetic characteristics. A magnetic characteristic of importance in the aging behavior of tape is the development of print-through on analog tape. However, both research and use have clearly demonstrated that the critical concerns are primarily the change in physical properties, not the loss of magnetic characteristics. Upon use and upon aging, there may be changes in the friction properties, abrasivity, binder–base adhesion, and binder cohesion that render the tape inoperable. Many of these changes occur as a result of binder degradation. Unfortunately the user has no practical means to determine the stability of the composite tape and must rely on the studies of the manufacturer.

Regardless of the inherent stability of the binder layer, it is known that good storage conditions will extend the life of all tapes. While a good storage environment cannot reverse any degradation that has already occurred, it can slow down additional deterioration.

NOTE Some degraded tape can be rendered temporarily playable by a variety of specialized procedures.

Two storage conditions are described in this document. Medium-term storage conditions are recommended for tape with an expected useful life of ten years while extended-term storage conditions are intended for tape that contains recorded information of long-term value. The conditions given in this storage recommendation represent a compromise between maximizing the tape life, considerations of convenience, and the cost of building and of maintaining a storage facility.

1 Scope

1.1 This standard provides recommendations concerning the storage conditions, storage facilities, enclosures, and inspection for recorded polyester-base magnetic tapes in roll form. It covers analog and digital tape and includes tape made for audio, video, instrumentation, and computer use.

1.2 This standard applies to extended-term and medium-term storage of magnetic tape as defined in clause 3.

1.3 This standard applies to magnetic tape records intended as master tapes, which should not be in frequent use. This standard does not apply to "work" or "use" copies (see annex B).

1.4 Deviations from these recommendations, whether before or after a tape is recorded, may result in shortened LE.

NOTE Although outside the scope of this standard, adverse conditions during shipment, handling or usage will also result in decreased LE.

2 Normative references

The following standards contain provisions that, through reference in this text, constitute provisions of this document. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent editions of the indicated standards.

[Under consideration]

3 Definitions

For the purpose of this standard, the following definitions apply:

3.1

aperture

window

opening in the flange that is used to facilitate threading of the tape on the hub and inspection of the wind

3.2

base

support in a recording material on which the magnetic layer (and, if necessary, the backing layer) is coated