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# Imaging materials — Magnetic tape — Care and handling practices for extended usage

*Matériaux pour l'image — Bandes magnétiques — Pratiques de soins et de manutention pour usage étendu*

ICS 35.220.22

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18933 was prepared by Technical Committee ISO/TC 42, *Photography*.

This International Standard is one of a series of International Standards dealing with the physical properties and stability of imaging materials. To facilitate identification of these International Standards, they are assigned a number within the block from 18900 to 18999 (see annex A).

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## Introduction

Magnetic recording tape has served as a major means of processing, distributing and preserving information, including video, audio, computer and other data since the 1930s. Unlike earlier data recording media such as paper and photographic material, the information recorded on magnetic tape is not directly human readable and requires a machine interface and interpretation. In addition, the machine/medium interface must occur within precise conditions for the machine interpretation to be accurate. Therefore, the physical integrity of magnetic tape necessary to provide a proper interface with the interpreting machinery is critical. Correct care and handling is essential to preserve the needed physical integrity of magnetic tape both for short-term usage and long-term archiving.

Magnetic tape has proven itself an easy to use and versatile medium. Yet, despite the substantial resources put into creating recordings and the historical, intellectual and financial assets they represent, tapes often are not treated as valuable objects. Many important and unique recordings are lost due to inadequate care and handling of the tape. This poses problems for users who wish to preserve content. Among these problems are the following:

- a) Improper handling can damage magnetic tapes and compromise the future ability to retrieve content;
- b) Due to the enormous volume of existing tapes, the impracticality and cost of making copies of each and every one frequently results in large numbers of unique records being subjected to excessive use and wear without any back-up or protection. Repeated use of magnetic tape can cause wear or physical damage that shortens its effective life;
- c) Some magnetic tapes are known to have a finite shelf life and will eventually decay. Recorded tape documents on these tapes must be copied to new media before decay precludes access;  
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- d) The ability to play back a tape in the future depends on the existence of functional playback equipment. As new tape formats become popular, equipment manufacturers discontinue the production and support of older, superseded equipment. Eventually, usable equipment to play older obsolete magnetic tape formats becomes impossible to find. Before this occurs a migration plan should be in place.

Like all media, magnetic tape is subject to both damage and decay. Consequently, its effective life can increase or decrease significantly depending on the conditions under which it is stored and handled. This document contains recommendations for the care and handling of magnetic tape. Recommendations for the preservation and storage of polyester-base magnetic tape appear in ISO 18923. Following these recommendations promotes the physical integrity of the media and increases the effective life of magnetic tape.



# Imaging materials — Magnetic tape — Care and handling practices for extended usage

## 1 Scope

This standard concerns the care and handling of magnetic recording tape during use. It addresses the issues of physical integrity of the medium necessary to preserve access to the data (information) recorded on the tape. This standard recommends handling procedures to maximize the effective life of magnetic tape. Faulty handling, packing and transporting techniques and methods often cause damage to magnetic tape and the content recorded thereon. Extending the longevity of magnetic tape requires the identification of appropriate handling methods and well-developed training programs.

While some of the recommendations in this standard, such as staff training, apply specifically to large-scale or archival usage, the basics of all recommendations in this document can and should be applied in all circumstances where the desired result is long-term usage of the medium whether archival, commercial or personal. This standard is not aimed at casual home users of tapes.

This standard addresses the following subjects:

- handling techniques, including common hazards and methods to mitigate those hazards;
- handling environments, including pollutants, temperature and humidity, lighting, magnetic fields, and robotics;
- use of tape, including inspection, playback, mounting/loading and removing, winding speed, tension, and robotic systems;
- cleaning and maintenance techniques, including contaminants, cleaning methods and frequency;
- transportation, both in-house and shipping outside the storage facility;
- disasters, including water, fire, construction and post-disaster procedures;
- staff training, including schedule for training and contents of the training program;
- archival issues.

## 2 Normative reference

The following standard contains provisions that, through reference in this text, constitute provisions of this document. At the time of publication, the edition indicated was 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.

ISO 18923:2000, *Imaging materials – Polyester base magnetic tape – Storage practices*.

ISO 14644-1:1999, *Cleanrooms and associated controlled environments – Part 1: Classification of air cleanliness*.

ISO 14644-2:2000, *Cleanrooms and associated controlled environments – Part 2: Specifications for testing and monitoring to improve continued compliance with ISO 14644-1.*

### 3 Terms and definitions

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

#### 3.1

##### **acclimatization**

process of conditioning material from one set of temperature/moisture conditions to another

NOTE Sometimes called "staging"

#### 3.2

##### **backcoat (magnetic tape)**

rough surface layer added to the back of the basefilm to increase friction and minimize slippage between tape strands

#### 3.3

##### **basefilm**

plastic (polymer) substrate to which the magnetic layers are attached

NOTE Sometimes called "the base"

#### 3.4

##### **binder (magnetic tape)**

plastic (polymer) in which the magnetic particles are bound to create the recording layers of the tape and which binds the recording layers to the basefilm

#### 3.5

##### **carrier**

medium upon which the information is recorded

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#### 3.6

##### **carton box**

outer container that can hold one or more individual units and may be a fabrication of paper, card stock, or plastic

#### 3.7

##### **cartridge**

housing for a roll of recording material, such as photographic film or magnetic tape, wound on a single hub or reel

[See cassette (3.8)]

#### 3.8

##### **cassette**

housing for a roll of recording material, such as photographic film or magnetic tape, whose ends are attached to two hubs or reels

#### 3.9

##### **cinching**

tape condition in which the tape is folded back upon itself within the tape pack

**3.10****class 100,000 clean room**

controlled environment in which the levels of airborne contaminants meets the requirements of ISO 14644-1

**NOTE** The number of particles larger than one micro-metre (one micron) in one cubic foot (0,0283 cubic metres) of air shall not exceed 100,000. Class 100,000 is like a dust-free office. Class 10,000 requires clean room clothing.

**3.11****conditioning**

exposure of a specimen to air at a given relative humidity and temperature until equilibrium is reached

**3.12****container**

box, can, or carton used for storage and shipping of recording materials

**NOTE** Reels, cassettes, cartridges, or shells are not containers; the box into which a reel, cassette, cartridge, or shell is placed is defined as a container.

**3.13****copy**

reproduction of the information from a master

**3.14****domain**

cluster of the embedded magnetic particles which all align in the same north-south direction

**NOTE** Sometimes referred to as a "magnetic domain".

**3.15****extended-term storage conditions**

storage conditions suitable for the preservation of recorded information having permanent value (See ISO 18923)

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**3.16****flange**

fixed or removable circular disc that is connected to the hub to make a reel for the purpose of protecting the roll of recording materials [See reel (3.34)]

**3.17****flange pack**

condition where the whole tape pack rests against one flange

**3.18****format**

dimensions of the magnetic recording and its assembly as well as the physical and magnetic specifications of the recording on the tape

**3.19****heads out**

configuration of magnetic tape stored on its reel or in its cassette, such that the tape is positioned to play from the beginning of the recorded information

**3.20****hub**

cylindrical object, around which the recording material is wound

**3.21****hydrolysis**

process of decomposition involving a reaction with water that results in the splitting of chemical bonds

**3.22**

**leader**

flexible plastic or paper strip which can be spliced to either end of a roll of recording material.

NOTE This practice is not recommended for archival recordings.

**3.23**

**leafing**

multiple popped strands in a magnetic-tape wind

[See popped strand (3.32) and stepped pack (3.41)]

**3.24**

**library wind**

low-speed rewind at controlled tension to achieve a smooth tape pack (typically one to three meters per second)

**3.25**

**loose pack**

undesirable pack condition in a roll of recording material, such that the outer portion of the roll can be moved and tightened by pulling on the end

**3.26**

**magnetic field intensity**

magnitude of the magnetic field, in amperes per meter, at a point in space

**3.27**

**master**

the original or primary recording of the data or any version of the data (e.g. camera master, edited master, foreign language master)

**3.28**

**medium**

**media, pl**

material on which information is recorded

[See carrier (3.5)]

**3.29**

**medium-term storage conditions**

storage conditions suitable for the preservation of recorded information for a minimum of 10 years

**3.30**

**migration**

transferring information from one format to another

**3.31**

**oligomer**

low molecular weight polymer which can be produced by degradation of the magnetic tape binder

**3.32**

**popped strand**

lateral displacement of a single strand or wrap of magnetic tape extending beyond the plane of the tape pack

[See leafing (3.23) and stepped pack (3.41)]

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