

**ECMA**

**EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION**

---

**GUIDELINES FOR THE HANDLING  
AND STORAGE OF MAGNETIC TAPES**

**TR/11**

**January 1981**

Free copies of this document are available from ECMA,  
European Computer Manufacturers Association  
114 Rue du Rhône – 1204 Geneva (Switzerland)

**ECMA**

**EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION**

---

**GUIDELINES FOR THE HANDLING  
AND STORAGE OF MAGNETIC TAPES**

**TR/11**

**January 1981**

# AMERICAN

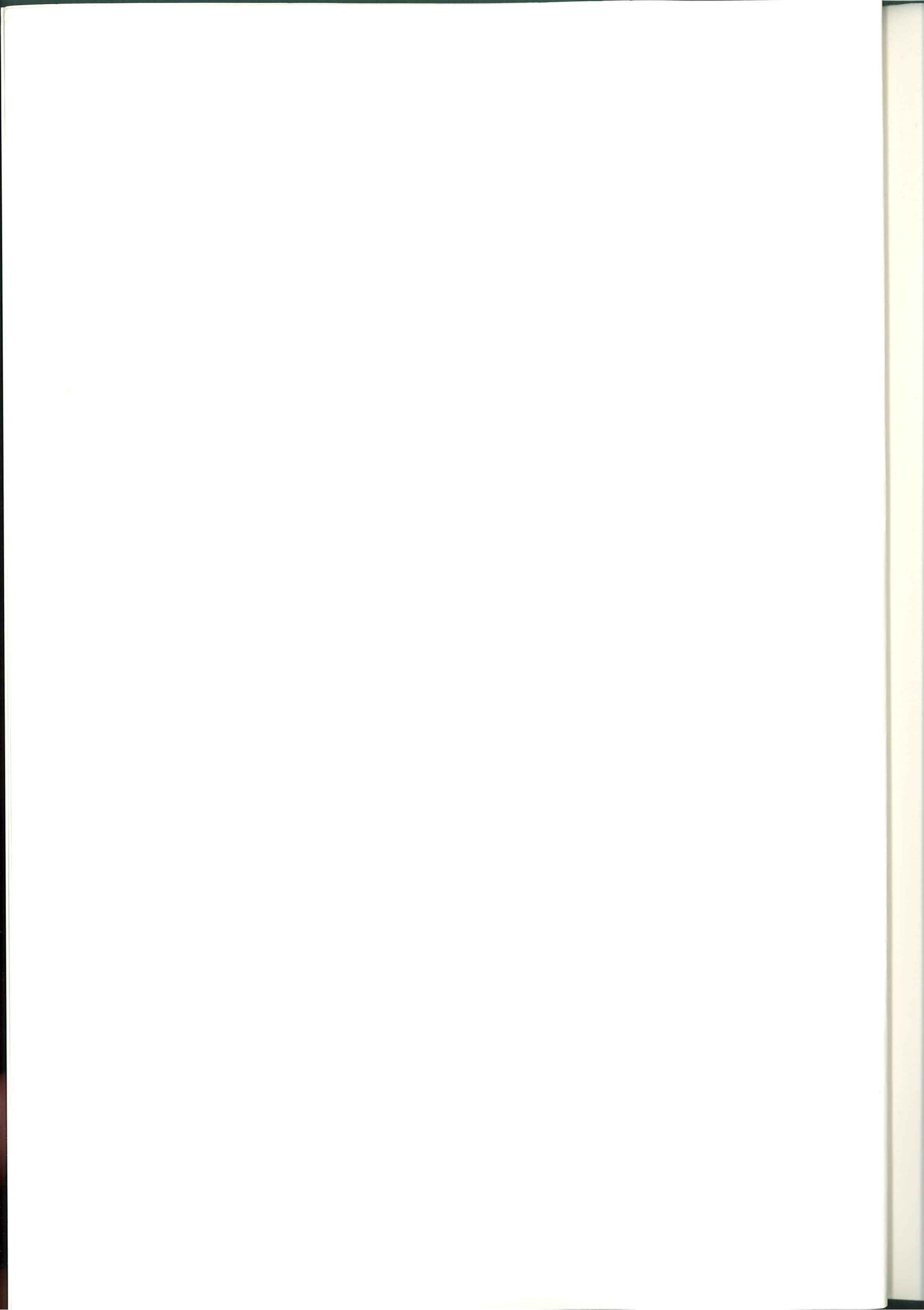
PHOTOGRAPHIC ARCHIVE

AMERICAN PHOTOGRAPHIC ARCHIVE  
PHOTOGRAPHIC ARCHIVE

AMERICAN

## TABLE OF CONTENTS

	<u>Page</u>
1. SCOPE AND INTRODUCTION	1
2. REFERENCES	1
3. GENERAL HANDLING	1
3.1 Environment	1
3.2 Handling	2
4. STORAGE	4
4.1 Environment	4
4.2 Recommendations	4
5. ACCLIMATIZATION	5
6. TRANSPORTATION	5
6.1 Environment	5
6.2 Hazards	5
APPENDIX A - TAPE DISTORTIONS	7



1. SCOPE AND INTRODUCTION

Magnetic tape forms an integral part of any magnetic tape equipment design and must be in good condition to obtain optimum system performance. Failure to maintain this good condition can lead to wasted computer time, extra off-line work, time delays all of which can be expensive and could cause customer dissatisfaction. It is important therefore that magnetic tapes receive due care and attention at all times during their life cycle.

Therefore this document provides guidelines for the handling and storage of magnetic tapes during use on tape equipment, in computer rooms, libraries, archival storage or transportation.

2. REFERENCES

- ECMA-56 Self-loading Cartridge for 12,7 mm wide Magnetic Tape
- ECMA-62 Data Interchange on 12,7 mm 9-Track Magnetic Tapes
- ECMA-68 Reels for 12,7 mm Wide Magnetic Tapes, Sizes 16, 18 and 22.

3. GENERAL HANDLING

3.1 Environment

The conditions specified below refer to the ambient conditions in the test or computer room and not to those within the tape equipment.

3.1.1 Testing Environment

Test and measurements made on the tape to check requirements shall be carried out under following conditions:

Temperature : 23 °C ± 2 °C

RH : 40% to 60%

Conditioning before testing : 24 hours

3.1.2 Operating Environment

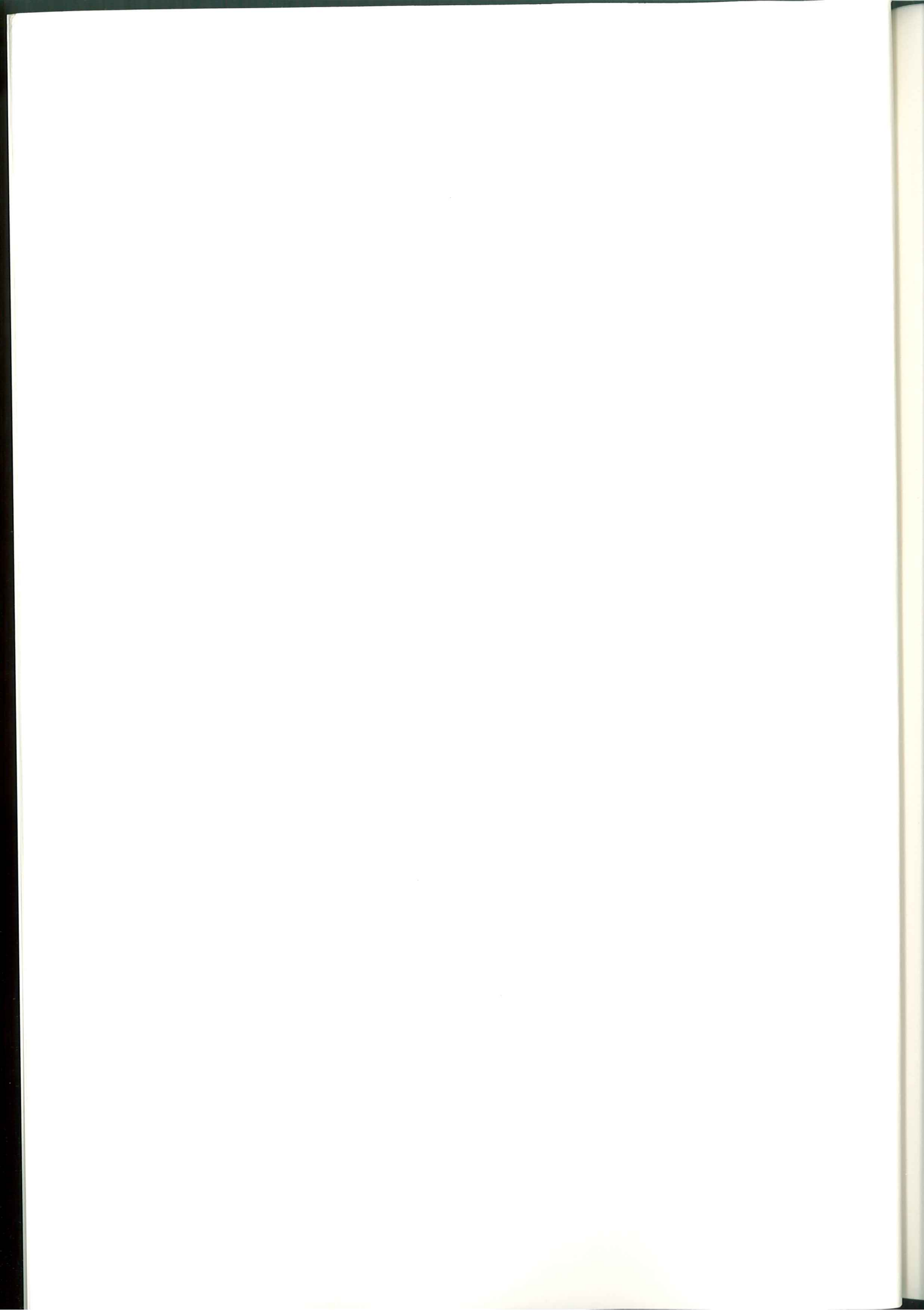
Tapes used for data interchange shall be operated under the following conditions:

Temperature : 16 °C to 32 °C

RH : 20% to 80%

Wet bulb temperature : not greater than 26 °C

Conditioning before operating : if a tape has been exposed during storage and/or transportation to conditions outside the above values, it should be conditioned for a period of at least 12 hours, preferable 24 hours.





### 3.1.3 Computer room and library

- 3.1.3.1 The computer room should be kept dust-free and cleaned with a vacuum cleaner not with dusters, dry mops or sweeping brushes.
- 3.1.3.2 Air conditioning and filtration systems also accomplish this necessary cleaning. Whenever possible, air pressure in the data processing area should be maintained at a level slightly higher than that of the adjacent areas. A positive room pressure prevents the infiltration of dust through ceilings, windows and doors.
- 3.1.3.3 Periodic cleaning of shelves and floors in the computer area helps assure a dust-free integrity. Floors should never be waxed because even normal foot traffic abrades wax, causing fine dust that can contaminate an entire room. If vacuum-type equipment is used in cleaning operations its exhaust must be ducted outside the computer room.
- 3.1.3.4 The computer room should not be used to unpack stationery or used for storing stationery. Paper stock and card-board are known to produce fibre lint which, if uncontrolled, can defeat all attempts at keeping the area dust-free. Printers, card readers, and card punching equipment should be situated in areas of lowest air pressure or separated where possible. This will ensure movement of air-borne contaminants, generated by paper handling, away from tape and tape transports, thus reducing the possibility of contamination.
- 3.1.3.5 Smoking, eating or drinking should not be allowed in the computer room and no dirty or dust covered objects allowed inside.
- 3.1.3.6 Nylon overalls should be worn in the computer room.
- 3.1.3.7 Allow only authorized persons into the computer room.

### 3.2 Handling

- 3.2.1 The tape should remain in its container except when in use and unwanted tapes returned to the library. The inside of the container is probably the cleanest area in the computer centre. For this reason, tapes should remain in their containers until actually placed on the tape transport unit. To maintain this cleanliness, the cover of a canister should be replaced after the tape has been removed for use. Tape containers should not be opened outside the clean room environment.

NOTE:

*The word container throughout this document applies equally to tape canisters, rim seals or self-loading cartridges (as ECMA-56) unless otherwise stated.*



- 3.2.2 The tape reel should be held by the hub and not by the flanges. If a tape is stored using self-loading cartridges, one should exercise care when removing or replacing the reel, as it is easy to squeeze the flanges inadvertently during this operation.
- 3.2.3 In handling tapes, operators should use the utmost caution to keep the tape from being contaminated by finger-prints. Simply stated, finger-prints are deposits of body oils and salts. These oils will not attack the oxide-binder system, but they form excellent "holding-areas" for dust and lint. Clean hands are a must in the computer room.
- 3.2.4 Magnetic tapes should be used only on tape equipment that are cleaned and maintained to their relevant cleaning and maintenance procedures. In particular the cleaning fluid should be only that recommended by the equipment manufacturer.
- 3.2.5 Work tapes should only be used to check suspect equipment.
- 3.2.6 When needed, write-enable rings should be fitted before loading magnetic tapes.
- 3.2.7 Magnetic tapes should not be allowed to touch the floor.
- 3.2.8 Magnetic tape reels should be properly seated on the hub before loading tape takes place. When mounting the reel on the tape equipment, pressure should be applied only to the hub, never on the flanges.
- 3.2.9 Magnetic tape reels should not be stacked horizontally.
- 3.2.10 Magnetic tape reels should be removed from tape transports that have been switched off.
- 3.2.11 Magnetic tapes should have their own record card to retain information on their current contents and comments on their condition and history.
- 3.2.12 The manufacturer's identification may be placed on the reel.
- 3.2.13 A labelling area or card holder may be provided on the front flange. Suitable labels shall be used for marking the contents of the reel of tape. Adhesive labels, if employed, shall be of a type which leave no residue when removed. The use of pencil or similar erasable marking is not allowed.
- 3.2.14 Magnetic tapes should be periodically cleaned. The frequency of cleaning, e.g. a six-month interval, depends on the usage and condition of the tape.

Defective or suspect magnetic tapes should not be used. This includes damage to containers or reels such as chips, cracks or buckled reel flanges, and tape defects such as poor wind, edge lip, cinching, stretched or creased tape, etc.



- 3.2.15 Write-enable rings should be removed from magnetic tapes for library purposes and prior to data interchange.
- 3.2.16 New tapes should receive an end-to-end pass at constant tension of 2 N to 3,6 N before first usage.

#### 4. STORAGE

##### 4.1 Environment

It is recommended that tapes are stored within the following conditions:

##### 4.1.1 Unrecorded tapes

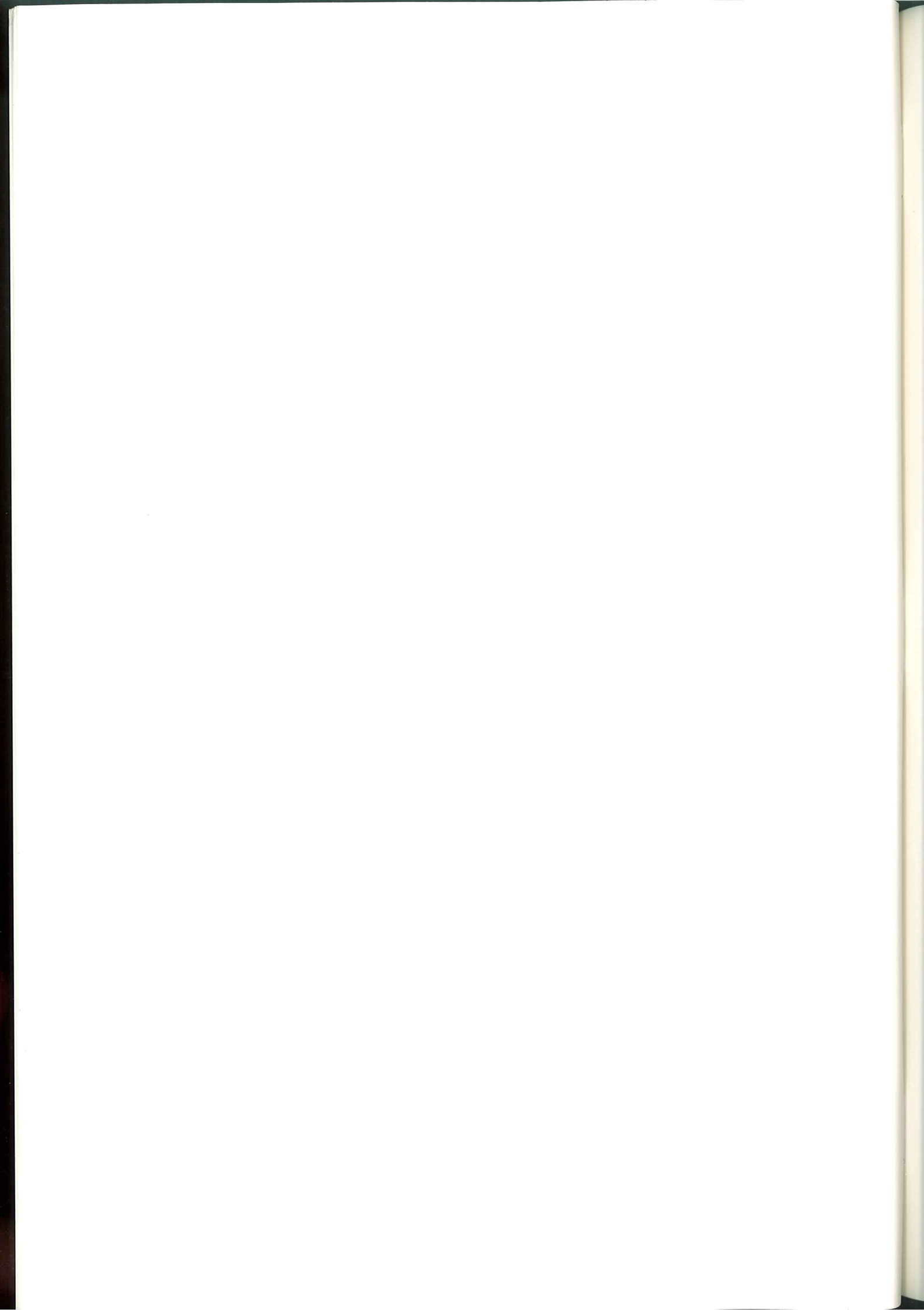
Temperature	: 5 °C to 48 °C
RH	: 20% to 80%
Wet bulb temperature	: not to exceed 26 °C

##### 4.1.2 Recorded tape

Temperature	: 5 °C to 32 °C
RH	: 20% to 80%
Wet bulb temperature	: not to exceed 25 °C

##### 4.2 Recommendations

- 4.2.1 Magnetic tapes should be stored in their containers at all times when not in use. The container should be closed after removing or replacing the tape.
- 4.2.2 Empty reels should be inspected and thoroughly cleaned before being used for tape storage. Reels with damaged hubs - such as a plastic burr - or dirty hubs can cause tape distortion. The necessity of maintaining reel integrity cannot be over-emphasized in any discussion of operational errors. Valuable information can be lost, not because of tape failure, but because a tape has been distorted by a dirty reel.
- 4.2.3 It is preferred that the tape in its container be kept in a sealed polyethylene bag.
- 4.2.4 Magnetic tape reels should not be stacked horizontally but in approved racking. This racking should therefore be such that the plastic containers can be stored in an upright position, each container being supported individually by the racking.
- 4.2.5 When long-term storage is planned the magnetic tape should be given an end-to-end pass to ensure that the whole reel is wound at a constant tension of 2 N to 3,6 N.
- 4.2.6 Magnetic tape in storage should be given an end-to-end pass every 6 months at the correct tension. The record card for each tape should log the dates of retensioning.



## 5. ACCLIMATIZATION

Variations in temperature and relative humidity at any time can cause dimensional changes or set up stresses in the tape. To minimize these effects, a careful re-conditioning period should take place in a computer room environment.

The following recommendations are made:

- 5.1 Magnetic tape should be acclimatized in its plastic container in the computer room environment for a period of up to 24 hours. For each °C and each 5% RH difference between previous and acclimatization conditions, one hour of acclimatization must be allowed. The period needed for the temperature acclimatization and the period needed for the humidity acclimatization may run concurrently.

In extreme conditions, care must be taken not to impose more than a 10 °C temperature step or to allow condensation to form on the tape.

- 5.2 If a magnetic tape has been outside the computer room environment for any period up to 8 hours and the outside conditions are not known then the acclimatization period should be at least one hour longer than the time outside the computer room.
- 5.3 If the period and conditions to which the magnetic tape has been exposed are unknown, the magnetic tape should remain in its packing for 24 hours in the computer room environment. The tapes should then be unpacked and held in their containers for a further 8 hours in the computer room environment.
- 5.4 Give each magnetic tape an end-to-end pass to ensure that the full length of the tape is at the correct tension.

## 6. TRANSPORTATION

### 6.1 Environment

It is recommended that during transportation the tapes are kept within the following conditions:

Temperature	: 5 °C to 32 °C
RH	: 20% to 80%

### 6.2 Hazards

There are three potential hazards when transporting magnetic tapes which should be carefully considered.

#### 6.2.1 Impact loads and vibrations

These can cause damage to the reel or movement within the tape pack with consequential loss of wind tension. The following recommendations are made:

- 6.2.1.1 The free end of the tape should be secured to prevent any tendency to unwind.





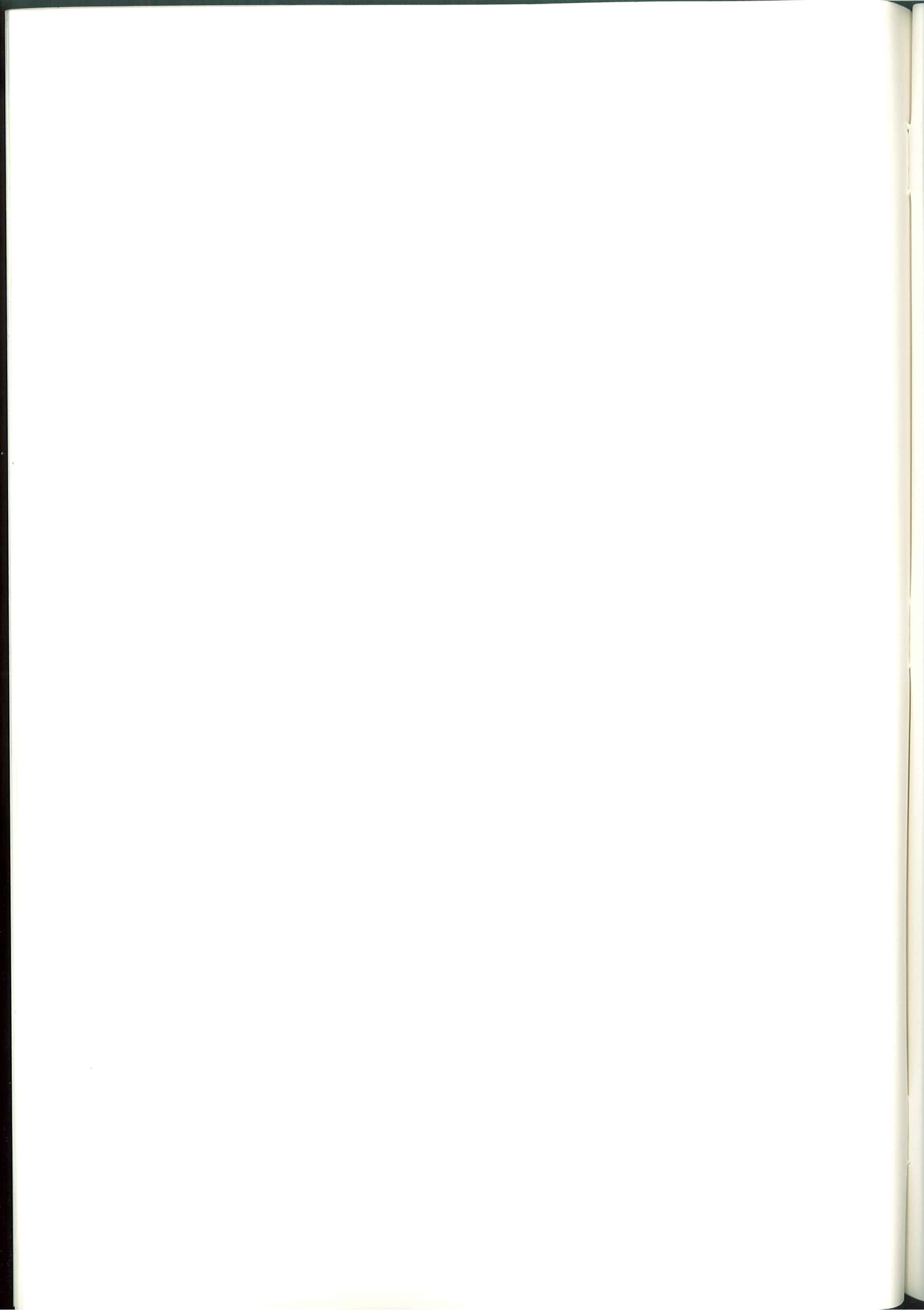
- 6.2.1.2 The reel shall be enclosed in a rigid plastic container free from dust or other extraneous matter and hermetically sealed in a polyethylene bag.
- 6.2.1.3 The polyethylene bags containing the magnetic tape assemblies shall be fitted into a rigid box containing adequate shock absorbent material.
- 6.2.1.4 The final box must have a clean interior and a lid construction that provides sufficient sealing to prevent the ingress of dirt and water. This box should be capable of being handled by one person.
- 6.2.1.5 The orientation of the reels within the final box should be such that their axes are horizontal.
- 6.2.1.6 The final box should be clearly marked to indicate its correct orientation with internationally acceptable symbols.
- 6.2.2 Extremes of temperature and humidity

These can set up stresses within the body of the tape or cause condensation to form on the tape. The following recommendation is made:

  - 6.2.2.1 Extreme changes in temperature and humidity should be avoided wherever possible.
- 6.2.3 Effects of stray magnetic fields

These can produce corruption of recorded tapes. The following recommendation is made:

  - 6.2.3.1 A nominal spacing of not less than 80 mm should exist between the magnetic tape reel and the outer surface of the final box. In this case it is considered that the risk of corruption will be negligible.



APPENDIX A

TAPE DISTORTIONS

- A.1 Next in importance to dirt as a source of tape error is skewed or crooked tape. This may result from a poorly controlled slitting process during manufacture, but the main cause is improper winding. Since the tape is almost entirely plastic, it is subject to cold flow, viz. the tendency of the material to assume a semi-permanent or permanent change in shape due to stress placed on it. Such distortion can prevent the tape from lying flat against the reading head, and can result in a dropout. Some distortion considerations are the following:
- A.2 Cinched Tape  
Severe damage in the form of folds can be traced to improper winding tension control. Looseness at any point in the roll will eventually cause the tape to slip during storage, and create a series of error-producing folds.
- A.3 Scrambled Winding  
When tape is rewound at high speeds, as on most modern tape drives, it is very difficult to guide properly and is subject to so much air inclusion that sideways flutter is frequently developed, and tape is in effect wound from side to side between the limits of the reel flanges. Storage for even very short periods (hours), will result in semi-permanently skewed tape which will not run flat and straight.
- A.4 Creased Tape  
This is a serious form of flaw in that it cannot be repaired. Horizontal creases result from improper handling and from cinching. Longitudinal creases are caused by severely misaligned guides or rollers in the tape handler.
- A.5 Edge Ripple  
This is an importance source of tape failure. It appears as a tendency for one edge of the tape to become stretched or curl, and normally is accompanied by excessive wear and migration of debris from the damaged edge. Edge Ripple is caused by poorly aligned tape drives or, more commonly, by magnetic tape reels which do not meet specifications for straightness.

