

***Conservation Standards***  
**For implementation of the**  
***Preservation Policy* of the National**  
**Library of New Zealand Te Puna**  
**Mātauranga o Aotearoa**

**Conservation Services**  
**Revised 2008**

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# 1.0 INTRODUCTION

## 1.1 Purpose of these *Standards*

The National Library Act 2003 requires that the Alexander Turnbull Library should be administered “*To preserve, protect, develop and make accessible for all the people of New Zealand the collections of that library in perpetuity and in a manner consistent with their status as documentary heritage and taonga.*”

The National Library *Preservation Policy* outlines principles to support the development of other policies and programmes for the Library to fulfil this obligation to the people of New Zealand. The *Conservation Standards* in turn provide an implementation framework, including:

- Application of the *Preservation Policy* principles in an operational context
- Detailed and specialised operational standards and procedures
- Operational relationships with other Library policies and guidelines

The *Conservation Standards* also enable the Library to develop and implement standards-based preservation and conservation management programmes that are responsive to evolving Library needs without constant review of the *Preservation Policy* and principles.

## 1.2 Preservation Policy Principles

1. Access should never compromise the preservation of an object requiring permanent preservation.
2. The observance of the appropriate tikanga is essential for the preservation of collections.
3. Preservation requires a constant respect for the integrity of the original object.
4. Preservation recognises the full range of aesthetic, historical, technological, scientific, social, spiritual and other values for future, present and past generations.
5. Preservation requires the achievement of basic standards of preventive care for all collections to minimise damage and deterioration.
6. Any remedial treatment, alterations and/or additions to an original object must be documented and identifiable, and should be as minimal and reversible as possible.

## **Definitions:**

### ***Tikanga:***

Cultural practice appropriate to the object. Tikanga Māori will be central to preservation of many collections, but it is acknowledged that the understanding and application of other tikanga may be required for the preservation of some objects. An example may be an object coming from a specific religious context.

### ***Original object:***

The format and full range of information of the object as accessioned whether in analogue or digital media format. The principles and guidelines in the Collections Policy will define acquisitions criteria.

## **Explanatory Guidelines Supporting the Preservation Principles:**

1. Application of the Preservation Principles to the management of the Dorothy Neal White and Susan Price heritage collections will recognise that they are built for long-term preservation and permanent retention.
2. Application of the Preservation Principles to the management of the General and Schools Collections will recognise that they are built for current use and to maximise access by all New Zealanders.
3. The use of preservation considerations to control access to the collections of the Alexander Turnbull Library is intended to enable access to collection items without compromising their preservation in perpetuity. An example of this is providing for use copies of fragile and deteriorated objects that could be damaged by direct access.
4. We will observe tikanga, recognising that preservation requires more than the protection of the basic chemical and physical characteristics of an object. For example, the observance of tikanga Māori is essential for preservation of taonga as outlined in *The Care and Protection of Māori Materials Te Mauri o te Mātauranga: Purihia, Tiakina*.
5. When an object is accessioned into the collections of the Alexander Turnbull Library the Library has made a commitment and accepted responsibility for the preservation of that object.
6. The integrity and meaning of an object should be recognised as the combination of a number of values and types of information; including aesthetic, historical, technological, social, and spiritual. Preservation of the object therefore requires an understanding that these aspects of the object must be considered in the same way as the basic chemical and physical characteristics.
7. Maintenance and conservation treatment should always be approached with caution, with the minimum practicable intervention required to promote preservation. Treatment to enhance the appearance or aesthetic presentation of an original object should never be considered if it would compromise the integrity or ongoing preservation of an object.

8. Any remedial treatment, alterations or additions should be fully documented in permanent Library records, be readily identifiable, and as minimal and reversible as possible. It is particularly important that alterations or additions are only carried out after consultation with curatorial and conservation staff and others as appropriate, and with the direct or delegated agreement of the Chief Librarian.

9. The copying of original objects for either preservation or access should never be carried out in such a way as to compromise the integrity or preservation of the original object, and must always be fully documented in permanent Library records. A copy of an original object must always be recognised as being different from the original object, particularly when a format change has taken place. Therefore when copying for preservation has occurred the original object retains its integrity and meaning, and must continue to be preserved and protected.

10. Copies may be used as preservation masters or primary sources, particularly those in electronic or digital format, or when originals are loaned to the Library for copying and the copies accessioned into permanent collections. Comprehensive documentation of such format shifting, migration or other preservation copying will ensure that both actual or potential losses of original information and other characteristics of the original object can be recognised.

11. Sections 15 and 18(d) of the National Library of New Zealand Te Puna Mātauranga o Aotearoa Act 2003 specifically allows items from the collections of the Alexander Turnbull Library to be made *'available on a temporary basis for public exhibition in New Zealand or elsewhere on terms and conditions that the Chief Librarian thinks fit,'* and outlines the issues that the Chief Librarian should address. These include the physical condition and rarity of the item, the proposed exhibition environment, and potential risks in transport or out of the direct custody of the Chief Librarian. An appendix to this Policy will outline conditions and procedures of loan for exhibition. These conditions and procedures will also apply to the exhibition of collections within National Library buildings for implementation of the Exhibitions Policy.

12. National Library Preservation staff will develop recommendations for the Chief Librarian for guidelines to outline conditions and procedures required by the Chief Librarian for authorisation of outsourced copying and conservation treatment activities. These conditions and procedures will also apply to the copying and conservation of collections within the National Library.

### 1.3 Standards development

The *Standards* document has been compiled by the Manager of Preservation Services in consultation with the Senior Conservators in Conservation Services. All recommendations and procedures have been reviewed against:

- National and international standards
- Published recommendations of best practice
- The *Code of Ethics* of the New Zealand Professional Conservators Group Pu Manaaki Kahurangi
- Other applicable specialised codes of ethics and professional practice

Alexander Turnbull Library collection managers and curators have also been consulted to ensure that all information is clearly presented, and that procedures and recommendations meet collection management needs.

**British Standard 5454:2000 *Recommendations for the storage and exhibition of archival documents*** and **PD 0024:2001 *Guide to the interpretation of BS 5454:2000*** have been the primary sources used for the development of operational standards, guidelines and procedures. As this general standard advises, additional specialised national and international standards, guidelines and codes of best practice are also required to develop recommendations to meet the specific preservation needs of some parts of the collections. The “Scope” statement on the first page of BS 5454:2000 describes the application of the standard:

*This British Standard makes recommendations for the storage and exhibition of archival documents, including library materials.*

*These recommendations apply to the long-term, permanent storage of archival documents. The temporary storage of such documents in restricted access and their display in exhibitions is also covered. The recommendations apply to new buildings, whether purpose-built or adapted, and to existing buildings.*

*The recommendations mainly concern traditional materials, i.e. paper and parchment, although some guidance on more modern media is given in clause 11. This guidance is intended for the storage of modern media in general-purpose repositories and further specialist advice may also be required.*

*This standard is for use by archivists, librarians, conservators, museum curators, architects, designers, contractors, engineers and others concerned with the planning, construction, equipment, maintenance and working of such repositories.*

### 1.4 Standards review and modification

Library Conservation staff have tried to ensure that the *Standards* are as comprehensive as possible, but it is inevitable that not all operational details can be included. Library staff should always remember that the primary responsibility of the Alexander Turnbull Library is:

*‘To preserve, protect, develop and make accessible for all the people of New Zealand the collections of that library in perpetuity and in a manner consistent with their status as documentary heritage and taonga.’*

The *Standards* are a living document that should provide a framework for the Library to achieve this objective. If there do not seem to be any policies and procedures that

apply to a situation or the care of particular types of collection items, Conservation staff should always be consulted. Professional advice can be used to provide immediate assistance, and Conservation Services will research and develop appropriate guidelines for the future.

The Senior Conservators will carry out an annual review of the *Standards* in consultation with the Manager of Preservation Services to ensure that the *Standards* are based on the most current standards and information, and provide a good operational framework for preservation and conservation management programmes and projects.

The overall document will be reviewed after any review of the *Preservation Policy* to ensure that the *Standards* are still consistent with the principles outlined in the policy.



## 2.0 PREVENTIVE CONSERVATION

Preventive conservation is an essential and effective strategy for the preservation of large collections. Resources are focused on the prevention of damage and deterioration, and on procedures and actions that benefit large parts of the collections. This approach also takes into account the reality that it is difficult and sometimes even impossible to repair damage or reverse deterioration. There are also limits to the amount of collection treatment that can be provided. Conservation and restoration treatment is a labour-intensive activity that must be carried out by skilled staff using specialised equipment and facilities, and can only be provided for a small number of items each year.

The preventive conservation guidelines and programmes for Alexander Turnbull Library collections are developed with recognition of the particular purpose and status of these collections as documentary heritage and taonga belonging to all the people of New Zealand--past, present and future. The Library needs to ensure that *all of the values* contained in the collections are preserved and accessible to *future* as well as to present New Zealanders. Preventive conservation policies, programmes and procedures may require limitations on certain types of immediate access and use of collections in order to achieve this primary objective.

The major components of the Library preventive conservation programme are:

- Environmental control
- Storage systems and procedures
- Handling and access procedures
- Archival storage supplies
- Disaster preparedness

Policies and procedures developed for these programmes have been designed to achieve a balance between preservation and access. For example, the environmental conditions and storage procedures necessary for the long-term preservation of collection items may restrict immediate or comprehensive access. Items removed from low temperature/low relative humidity storage require conditioning periods before they can be safely handled or used in reading or work rooms. Items in specialised supports or protective packaging may not be able to be arranged for viewing in the way preferred by the researcher. In most cases access to Library collections can be provided, but with limitations on retrieval times or the preferred use by the researcher.

The Library is also able to provide useful access in a variety of ways including direct access in a reading room, through surrogate copies in a variety of media, and through physical and online exhibitions and displays. When one particular type of access such as a long exhibition, copying using a flatbed scanner, or access in a general reading room may be recognised as likely to in irreversible damage or loss, the Library can restrict that type of access knowing that there are other effective access alternatives that will not threaten *future* access, or affect some of the wide range of values specific to the collection item.

For example, a watercolour has obvious value as a pictorial illustration or fine art object, but it was acquired by the Library primarily for its documentary heritage value to provide information (about architecture, plants and animals, people, social attitudes, economic development, tikanga Maori, the activities of the 'artist' who was actually a surveyor, land developer and/or politician, etc.). One important form of access for this type of object is use in exhibitions where the value as a pictorial illustration or fine art object can be enjoyed. Limiting exhibition exposure that results in cumulative and irreversible light damage will ensure that the object retains its value for other uses in the future.

Another example of balancing preservation and access is when a project designed to produce copies for an online publication may require digital copying of a fragile bound volume. The use of a flatbed scanner will result in damage to the binding and brittle text pages that will affect future direct access, destroy some of the value of the item, and hamper future copying activities. Even though the use of overhead digital photography will be more time-consuming and expensive, Library preventive conservation policy and procedures ensure that this alternative is used to ensure effective preservation and future access.

Other aspects of Library preventive conservation policies and procedures are further explained and developed in documents and guidelines including:

- *Copying Standards*
- *Exhibition Policy*
- *Disaster Preparedness Plan*

## 2.1 ENVIRONMENT

All collections benefit from storage in environmental conditions that:

- Limit the onset or speed of chemical reactions that cause deterioration or damage
- Limit physical damage from fluctuations that cause physical changes in materials
- Limit exposure of sensitive materials to chemical and particulate materials that will chemically or physically react with them

In theory we can determine the best combination of storage conditions for optimum preservation for each of the separate materials found in collections such as paper, parchment, leather, plastic, metals, and organic emulsions. However, most objects in the collections are combinations of materials that may have conflicting ideal storage conditions, or have been built into structures that have other requirements. Ideal conditions may also reduce levels of access to an unacceptable level, or be difficult and expensive to achieve and sustain. This is an important consideration because fluctuating conditions that meet the theoretical ideal only some of the time are more harmful in the long term than stable, compromise conditions that can be maintained.

The four major environmental factors we need to control are:

- Temperature
- Relative humidity
- Air quality
- Light

**Temperature** is a measure of heat. Heat is a form of energy that will initiate or speed chemical reactions, and some chemical reactions require a specific range of temperature. For most Library collections the theoretical ideal is the cooler the better, but access considerations as well as the related factor of relative humidity result in a wide range of recommended temperature conditions.

**Relative humidity (RH)** is a measure of the moisture level of the air relative to the temperature. High RH is required for some chemical reactions such as acid hydrolysis of the cellulose in paper, or the chemical breakdown of the cellulose acetate film base in some photographic negatives and magnetic tapes. Published standards and research provide ideal RH ranges for specific materials. Adhering to these standards promotes preservation by slowing or eliminating these damaging chemical reactions.

Collection items that come to the Library have already been exposed to a wide variety of moulds, microbes and insects. Optimum mould and microbial growth occurs in conditions of RH over 60%, and mould spores can remain unnoticed and dormant for decades until even a short period of exposure to high humidity causes the spores to grow. In addition, most insects prefer higher relative humidity conditions and insect eggs may readily hatch in these conditions. RH should always be kept below 55% in any areas where collections are stored or used.

Organic materials such as paper, parchment and leather are hygroscopic, which means that as they absorb and release humidity from the air their fibres change shape and dimension. Rapid fluctuations in RH cause equally rapid dimensional changes that result in dramatic physical damage: bindings split; ink, paint or photographic emulsion surfaces separate as the underlying support expands and contracts. Removing an item from a low RH storage environment for access can cause damage if correct procedures are not followed.

Stable and low RH levels are difficult to maintain in spaces where people are present because respiration produces significant effects on relative humidity. This is one of the reasons why it is important to separate storage and work areas as much as possible even when the temperature and RH storage conditions are similar to those maintained in staff work rooms and reading rooms.

Finally the determination and maintenance of appropriate environmental conditions is particularly important for composite collection items such as magnetic tapes or photographic negatives. Each component material has an ideal temperature/RH range for optimum long-term preservation that may conflict with recommendations for the other materials making up the object, or even affect the bonds that hold the material components if the item together. Differences of a few degrees or a small percentage of RH may have a significant effect on preservation of such materials.

**Air quality** is an important factor since many common particulate and chemical air pollutants will damage collections. Chemical pollutants are found in untreated air, or can be emitted from poor quality storage furniture and packaging materials, or even from other collection items manufactured from unstable materials. Small air-borne particulates such as dust, mould spores and microbial contaminants are hazardous to both human health and for collections

**Light** is a source of energy that initiates or accelerates deterioration reactions. Exposure of sensitive materials to light causes damage including fading, colour shifting, discolouration, and embrittlement. The higher energy level of light in the ultraviolet wavelengths is known to be particularly damaging for many Library collection materials, but many materials will be damaged by any light exposure at all. This damage is cumulative so low level exposure over many years will result in as much damage as high-level exposure in a short time.

## 2.1.1 Temperature, Relative Humidity and Air Quality

Analysis of the recommended environmental conditions for the range of materials and formats in the Alexander Turnbull Library collections has resulted in the development of six standard Library environments for the storage and use of collections. These model environments may or may not be currently available in the Library, but are an update of the standards established during the design of the Molesworth Street building in 1985/6.

### Standard Environments for Alexander Turnbull Library Collections

Environment	T Range	RH range	Air Quality	Comments
1	20 C $\pm$ 5	50% $\pm$ 5%	External air filtered for dust & major gaseous pollutants (eg SO <sub>2</sub> under 10ug/m <sup>3</sup> ).	Environment required for workrooms, reading rooms, etc. where collection materials are used, if separate from storage areas.
2	18 C $\pm$ 2	45% $\pm$ 5%	External air filtered for dust & major gaseous pollutants (eg SO <sub>2</sub> under 10ug/m <sup>3</sup> ).  Internal air filtered using activated chemical media to remove gaseous and particulate pollutants (eg as 2W101).	Environment required for chemically stable materials and collections with mixed media.  Compromise environment for large book collections.
3	14 C $\pm$ 1	40% $\pm$ 2%	External air filtered for dust & major gaseous pollutants (eg SO <sub>2</sub> under 10ug/m <sup>3</sup> ).  Internal air filtered using activated chemical media to remove gaseous and particulate pollutants (eg as 2W101).	Environment required for most unpublished collections, and published collections with unstable materials and media.  Conditioning procedures for retrieval required.
4	9 C $\pm$ 1	35 % $\pm$ 2%	External air filtered for dust & major gaseous pollutants (eg SO <sub>2</sub> under 10ug/m <sup>3</sup> ).  Internal air filtered using activated chemical media to remove gaseous and particulate pollutants (eg as 2W101).	Environment for unstable & low use media.  Conditioning procedures for retrieval are required.
5	2 C $\pm$ 1	30% $\pm$ 2%	External air filtered for dust & major gaseous pollutants (eg SO <sub>2</sub> under 10ug/m <sup>3</sup> ).  Internal air filtered using activated chemical media to remove gaseous and particulate pollutants (eg as 2W101).	Environment for unstable and low use media.  Conditioning procedures for retrieval are required.
6	-29 C	Nil	N/a	Environment for unstable and low use media.  Special packaging and conditioning procedures for retrieval are required.

## 2.1.2 LIGHT

It would be extremely difficult to divide Alexander Turnbull Library collections on the basis of light sensitivity, so protection from light has to be provided by a management system and procedures designed to minimise light exposure to all collection materials. When it is possible to identify items or groups of material that are extremely sensitive to light damage, specialised storage and handling procedures are used including restrictions on some types of access such as exhibitions that result in high levels of exposure to damaging light.

Overall procedures and policies include:

- Exclusion of ultraviolet light from exhibition areas.
- Minimisation of ultraviolet light in storage areas and workrooms by use of UV filtering glass, blinds, filters and low-UV lighting
- Timers and 'lights off' procedures used in storage areas to minimise light exposure
- Boxing and other packaging used for collection storage whenever possible.
- Closing blinds, turning off lights and covering collection materials in use in work rooms outside of working hours.
- Limiting duration of exhibition and number of exhibitions of light-sensitive collection items.

## 2.2 STORAGE ENVIRONMENTS AND PROCEDURES

A number of factors have been considered in determining which of the six standard Library environments should be applied for the storage of each ATL collection. These were used to develop recommended 'environmental groupings' of collections requiring similar environments, but having different storage and handling needs. These factors included:

### 1. Level of access required

The two primary factors that determine the level (and ease) of access required are:

- Demand (how often retrieval is required)
- Access copy status (if access copies are available and are the preferred access form)

International standards such as *BS 5454:2000* discuss this consideration in terms of 'low use/high use.' It will also affect the type of storage and packaging used.

### 2. Type of storage and packaging used

The primary factors that influence the storage and packaging options selected include:

- Support and protection requirements of the format and materials
- Specialised packaging required for storage in some environments (in particular environments 5&6)
- Level of access required

In many cases the recommended storage furniture will change when the access level changes. For example, some original media formats may be stored in cabinets until access copying is completed, when they can be shifted to denser shelving storage that provides more protection and is more cost-efficient.

### 3. Layout and handling logistics

Layout considerations that will improve efficiency include:

#### 1. Shared conditioning and packaging facilities

Many media types stored in environments 3, 4, 5 and 6 require conditioning and/or repackaging when they are moved in and out of storage. Locating specialised storage areas so that it is convenient to share conditioning and packaging facilities will reduce the need for duplication, and improve retrieval efficiency.

#### 2. Staged environmental storage

The more extreme the change from the ambient environment, the greater the need for airlocks, conditioning spaces and other design features to buffer effects on collection items moving in and out of the storage area, and to reduce the burden on climate control plant.

With environments 3, 4 and 5 using a 'lesser' controlled environment storage area as the entry to a more controlled environment can be a cost-effective and space-saving alternative. This is especially true with media types that will be stored in different environments depending on whether they have access copies.

#### 3. Storage system groupings

It is usually more efficient to group material using similar storage systems, regardless of collection area (ie intellectual divisions). For example, the most economical use of space is achieved by developing separate storage areas for items stored in cabinets, and items stored in boxes on shelves.

Following completion of preservation and access copying, many collection items can be moved to denser low-use storage at regular intervals, freeing up high-use storage areas for new accessions.

## ATL Collections In Library Standard Environments: Recommended Environmental Groupings

Grouping	Alternative environment	Materials	Storage furniture	Packaging	Conditioning	Collections
<b>1A</b> 18C/45%	3A environment better for poor quality paper	Primarily paper-based	shelving	Optional	None required	<ul style="list-style-type: none"> <li>NZ&amp;P: 20/ 21<sup>st</sup> century monographs &amp; serials</li> </ul>
<b>1B</b> 18C/45%	2A or even 3C environment better for long term usability	Non paper-based	Cabinets	Boxes	None required	<ul style="list-style-type: none"> <li>NZ&amp;P: microfilm access copies</li> <li>OH: access tapes/ disks if NDHA accessible</li> </ul>
<b>2A</b> 18C/45% high air quality	3A environment better for poor quality paper	Primarily paper-based	shelving	Mixed	none required	<ul style="list-style-type: none"> <li>Carto: bound vols, small wop</li> <li>D&amp;P: bound vols, small wop</li> <li>Eph: small wop</li> <li>PA: small B&amp;W prints, B&amp;W albums</li> </ul>
<b>2B</b> 18C/45% high air quality	3 environment better for poor quality paper	Primarily paper-based	cabinets	folders	None required	<ul style="list-style-type: none"> <li>Carto: med-large wop</li> <li>D&amp;P: med-large wop</li> <li>Eph: med-large wop</li> <li>PA: med-large prints</li> </ul>
<b>2C</b> 18C/45% high air quality	3 for some. Case-by case evaluation recommended	Mixed	Cabinets racks	Special packaging	None required	<ul style="list-style-type: none"> <li>Carto: OS paper</li> <li>D&amp;P: OS paper &amp; other, some curios</li> <li>Eph: OS paper</li> <li>PA: OS prints</li> </ul>
<b>2D</b> 18C/45% high air quality	3 for some. Case-by case evaluation recommended	Mixed	racks	Framed works	None required	<ul style="list-style-type: none"> <li>D&amp;P: framed oils, acrylics, wop</li> <li>PA: framed prints</li> </ul>
<b>3A</b> 14C/40% security	3D for some materials such as parchment (conditioning)	Primarily paper-based	shelving	Folders & boxes	None or minimal	<ul style="list-style-type: none"> <li>Mss: files, bound vols, med-lg documents</li> <li>SPC: octavo, quarto, folio</li> <li>OH: all original mss, photos, transcripts, etc.</li> </ul>
<b>3B</b> 14C/40%		Primarily paper-based	shelving	Optional	None required	<ul style="list-style-type: none"> <li>NZ&amp;P: uncopied monographs, serials and nps</li> </ul>
<b>3C</b> 14C/40% security		Non paper-based	Cabinets	Envelopes and boxes	None or minimal	<ul style="list-style-type: none"> <li>OH: access tapes/disks not accessible via NDHA, preservation masters</li> <li>All collections: uncopied original digital disks</li> </ul>
<b>3D</b> 14C/40%		Non paper-based	Cabinets or special shelving	Special packaging	24 hours+	<ul style="list-style-type: none"> <li>PA: uncopied glass negs &amp; trans.</li> <li>NZ&amp;P: undigitised microfilm masters, uncopied original audio &amp; video tapes</li> <li>Archive NZ Music: analogue audio disks, etc</li> <li>Unpublished: uncopied non-acetate audio &amp; video tapes</li> <li>All copied original digital disks</li> </ul>



Grouping	Alternative environment	Materials	Storage furniture	Packaging	Conditioning	Collections
<b>4A</b> 9C/38%		Primarily non paper-based	Cabinets or special shelving	Special packaging	24 hours+	<ul style="list-style-type: none"> <li>Unpublished: all acetate based audio &amp; video tapes</li> </ul>
<b>4B</b> 9C/38%		Primarily non paper-based	Cabinets or low access shelving	Low access packaging	48 hours+	<ul style="list-style-type: none"> <li>NZ&amp;P: digitised microfilm masters, copied original audio &amp; video tapes</li> <li>Unpublished: copied original audio &amp; video tapes</li> <li>PA: copied glass negs. and trans.</li> </ul>
<b>5A</b> 2C/30%		Primarily non paper-based	Low access shelving	Low access packaging	Rec. 24 hours	<ul style="list-style-type: none"> <li>NZ&amp;P copied nps and serials</li> </ul>
<b>5B</b> 2C/30%		Primarily non paper-based	Low access shelving	Special packaging	24 hours+ repackaging	<ul style="list-style-type: none"> <li>NZ&amp;P, SPC: conditioning stage or alternative to Wrapped Reserve</li> <li>All collections: unstable items</li> </ul>
<b>5C</b> 2C/30%		Primarily non paper-based	Cabinets	envelopes	24 hours	<ul style="list-style-type: none"> <li>PA: All uncopied film negs and trans</li> </ul>
<b>5D</b> 2C/30%		Primarily non paper-based	Low access shelving	Low access or specials packaging	24 hours+	<ul style="list-style-type: none"> <li>PA: Copied b&amp;w film negs and trans</li> <li>PA: Uncopied loose colour prints</li> <li>PA: Uncopied colour albums</li> </ul>
<b>6</b> -29C/na		Mixed	shelving	Vacuum packaging and boxes	48 hours+ repackaging	<ul style="list-style-type: none"> <li>NZ&amp;P, SPC: Wrapped Reserve</li> <li>PA: copied colour media</li> <li>All collections: copied unstable items</li> </ul>



## 2.3 ARCHIVAL STORAGE SUPPLIES

Well-designed protective packaging manufactured from appropriate materials contributes to preservation, the efficient use of storage space, and improved access.

The materials used to produce protective packaging should be inert and chemically stable so that there are no chemicals, colouring agents or other substances that could react with or transfer to the collection items they house. In some cases they may also provide buffering barriers between individual collection items to prevent the transfer of harmful chemicals between an unstable collection item and an adjoining object.

Specific packaging is recommended for different collection materials, and conservation and curatorial staff work together to ensure that all envelopes, folders, boxes and other storage supplies are:

- Chemically inert and physically safe
- Provide effective protection
- Allow efficient use of storage furniture and storage space
- Enable appropriate identification and labelling
- Contribute to physical collection access

### Manufactured Supplies

The word 'archival' is a popular term used for convenience to refer to packaging that is appropriate and contributes to preservation. Another term often used interchangeably with 'archival' is 'acid-free.' Commercial suppliers use both terms quite freely, but these terms have no legal meaning and do not refer to any set of standards or specifications.

'Acid-free' is a particularly deceptive term. Newly manufactured newsprint produced from high-lignin content wood pulp has a neutral pH so is 'acid-free.' However, natural chemical deterioration processes will cause the lignin to break down producing acids that make the paper very acidic in a relatively short period of time. Any collection items that come into contact with this material will be damaged by acid migration.

Another way to produce 'acid-free' materials using less expensive high lignin-content wood pulp is to add an alkaline material such as calcium carbonate during manufacture. The resulting paper or board will have a high (alkaline) pH, and the 'buffering' will neutralise acids produced by any deterioration of the lignin in the wood pulp. This makes the material 'safe' for many collection items, but unfortunately some types of objects such as blueprints can suffer chemical damage from alkaline reactions.

Starting with published standards, specifications to meet our needs are developed in consultation with curatorial staff and professional colleagues. These specifications are used when sourcing and ordering from commercial manufacturers and suppliers. The current 'catalogue' of the manufactured supplies we routinely purchase can be found at: **CLIO #182023**. Hard copies have also been provided to all ATL collection managers and curators.

## **Supplies Produced In-House**

It is not cost-effective to contract an outside supplier to manufacture small quantities of supplies to our own specifications, and some individual items require one-off packaging. In these cases packaging is produced in-house using materials that meet the required chemical and physical specifications. The most common packaging items produced in house are:

- Polyester encapsulation
- Custom boxes and portfolios
- Storage mats

### **1. Polyester encapsulation**

Common designs and applications:

### **2. Custom Boxes**

Common designs and applications:

### **3. Storage Mats**

Common designs and applications:

## **Materials Testing**

The Library carries out materials testing to:

- Determine the suitability of new materials for storage, and other uses such as exhibition supports or packaging for transport
- Quality control for purchased materials to check if they meet specifications

The most common tests used are:

- PAT tests
- Oddy tests
- Spot tests
- Cold extraction pH tests

**[Descriptions of what the various tests measure and our applications/uses, with links to Clio documents or Working Tools publications for procedures are under development.]**

## **Standards**

**[A list of the major storage enclosure standards and reference to the Conservation Management Plans for specialised references is under development.]**

## 2.4 HANDLING PROCEDURES

### Background

Original Alexander Turnbull Library collections are only accessible for use on Library premises under the supervision of the Chief Librarian and the Alexander Turnbull Library staff. Direct researcher access to fragile or damaged items, or items requiring specialised handling, is restricted and often only available for most purposes through surrogate copies. While immediate access may be limited, by also limiting damage and deterioration ongoing and long-term access can be achieved.

This approach provides component of the Library preventive conservation programme designed to prevent unnecessary damage to the heritage collections. It is also worth noting that many handling recommendations and procedures will also contribute to staff safety. Overloaded book trolleys, poor shelving practices, and items piled on the floor of a workroom are as dangerous for staff as for collections.

### Curatorial and collection management

#### Shelving

#### Retrieval

#### Copying

*Copying Guidelines* references

#### Exhibitions

The Library limits both the frequency and duration of exhibition of original collection items, and will even decide to withdraw some items from any exhibition access in recognition of the need to ensure long-term preservation and access for the wide range of uses for documentary heritage collections. This approach is different from some other types of institutions that find exhibition of originals to be the best and primary form of access.

For example, limitation of exhibition duration and frequency is particularly important for light-sensitive materials for which *any* exposure to light will result in cumulative, ongoing and irreversible damage. The usual compromise between preservation and access for light-sensitive materials in institutions where exhibition is seen as the primary form of access is to limit the extent of damage for any one exhibition by restricting the light levels and period of exhibition, and requiring long 'rest' periods. While these 'rest' periods do not allow the object to recover from the light damage, this 'rationing' of exhibition access at least means that a few more generations may

be able to take advantage of brief access opportunities before irreversible change to the object becomes evident.

Library policy is to promote the use of copies when light-sensitive collection items are in regular demand for exhibition. We keep records of exhibition demand and will suggest alternative items or the use of copies when light –sensitive originals have been in frequent demand. This strategy is also useful in promoting the breadth and depth of Library collections by ensuring that a wider range of collection items are used in exhibitions.

### ***Loan for Exhibition procedures***

The applicable *Loan for Exhibition* (CLIO # 131852 v3) procedures outlined in Appendix 1 of the Preservation Policy also form the basis for overall Library exhibition policy and procedures as it is considered that the Library should not have stricter requirements for loans than for use within the Library. This is seen as particularly important for loans within New Zealand that ensure wider access to Library collections to the people of New Zealand in the spirit of the National Library Act.

Applicable procedures include:

#### **4. Photography, Film and TV image capture procedures for loan items**

- Increases in overall room illumination or additional light including lamps and flash should not be used where they may affect highly light-sensitive paper, textile, photographic and dyed organic items, and light intensity will exceed specified levels. For items with moderate and low sensitivity, a maximum of 2 minutes additional light is recommended.
- Cold light sources should be used whenever possible with the lamps positioned at least 3 metres away from the items.
- Indirect flashlight is allowed, as long as this light in any way does not illuminate paper, textile, highly light-sensitive photographic material and dyed organic items.
- Items on display should not be handled or moved, and exhibition supports should not be manipulated in the course of filming or photography.
- Crews and presenters should keep at least one metre in front of any exhibition object located behind the photography or film work area to avoid accidents with objects out of the line of sight.
- Technical equipment such as tripods, electrical cords etc. should not be left without supervision in the exhibition area. This particularly applies to lights on tall poles, and where exhibition areas are open to staff not involved with the photography or filming, or the public.

## **8. Duration of Exhibition**

- The Library will specify the length of exhibition permitted for each loaned item under a stated light intensity, based on light sensitivity of materials and the physical condition.
- The exhibition duration for all light sensitive items (no more than once every 2 years) will not exceed 12 weeks, followed by a minimum of 2 years dark storage.
- To protect the mechanism of certain items, such as bound volumes, permitted exhibition duration may be specified based on structure and condition.

## **9. Light Intensity**

- The Library will specify maximum levels of light intensity permitted for the duration of the exhibition period for each loan item.
- The level of visible light should be kept as low as possible minimise damage but still allow adequate viewing.
- Unless otherwise specified, visible light levels will not exceed:
  - 50 lux (5 footcandles) for very sensitive materials
  - 100 lux (10 footcandles) for moderately sensitive materials
  - 250 Lux (25 footcandles) for materials with low light sensitivity
- During the entire exhibition period, total light levels will not exceed the set values; this period includes after-hours times and general maintenance schedules.

## **10. Light Exposure**

- Unless otherwise specified, ultraviolet levels must be limited to a maximum of 75 microwatts per lumen.

## **11. Relative Humidity**

- The maximum acceptable total relative humidity variation or operating range shall be 5% on either side of the set point of 50%.

## **12. Temperature**

- Environmental temperature shall be set at a value (set point) not to exceed 21°C (72°F).
- A temperature range of 3°C (5°F) on either side of the set point shall be the maximum acceptable total temperature variation.



## **References to Conservation Standards**

The International Standards that the Library uses for its storage environments and display conditions include:

- NISO Technical Report:1 NISO-TR01-1995. Environmental Guidelines for the Storage of Paper Records
- BS 5454: 2000. Recommendations For Storage And Exhibition Of Archival Documents
- ISO/WD 11799 (1999). Document Storage Requirements
- ISO 10214 (1991). Photography - Processed photographic materials - Filing enclosures for storage
- ISO 6051 (1997). Photography - Processed reflection prints - Storage practices
- ISO 3897 (1997). Imaging Materials - Processed Photographic Plates - Storage Practices
- ISO 5466 (1996). Processed Safety Photographic Films - Storage practices
- ANSI/PIMA IT9.23-1998. Imaging Materials - Polyester Base Magnetic Tape - Storage
- ANSI/PIMA IT9.25-1997. Imaging Materials-Optical Disc Media-Storage
- ANSI/NISO Z39.77 - 199x. Preservation Product Information (in preparation)
- ANSI/NISO Z39.79-2001. Environmental Conditions for Exhibiting Library and Archival Materials

## **Exhibition Management**

- **Internal**
- **Travelling**

## **3.0 DISASTER PREPAREDNESS**

## **4.0 CONSERVATION MANAGEMENT PROGRAMMES**

### **BACKGROUND**

### **CONSERVATION MANAGEMENT PROGRAMME PLANNING**

### **CONSERVATION TREATMENT**

- Background
- Prioritisation
- Levels of treatment
- Treatment documentation procedures
- Forms and templates

### **FREEZE DRYING PROJECT MANAGEMENT**

### **EXHIBITION PROJECT MANAGEMENT**

## 5.0 DIGITAL PRESERVATION POLICY AND GUIDELINES

The preservation of collection materials originally created in digital format requires consideration of the preservation needs of both physical carrier used for storage, and the digital information itself. Policies, guidelines and procedures for the preservation of physical carriers or physical digital objects such as magnetic tapes and optical discs are discussed in other sections of these *Guidelines*. This section is concerned with the preservation of the original digital information itself.

For most collection items even a faithful copy using the original materials can be recognised as different from the original. However, it is *possible* to migrate or transmit digital information from one storage carrier to another without being able to distinguish any difference between the object as it existed in each location. The challenge of digital preservation is to develop and follow standards and procedures to ensure that archived original digital objects change as little as possible in the care of the Library from the time they are accessioned.

Digital preservation is based upon the underlying principles outlined in the National Library *Preservation Policy*:

### Preservation Policy Principles

7. Access should never compromise the preservation of an object requiring permanent preservation.
8. The observance of the appropriate tikanga is essential for the preservation of collections.
9. Preservation requires a constant respect for the integrity of the original object.
10. Preservation recognises the full range of aesthetic, historical, technological, scientific, social, spiritual and other values for future, present and past generations.
11. Preservation requires the achievement of basic standards of preventive care for all collections to minimise damage and deterioration.
12. Any remedial treatment, alterations and/or additions to an original object must be documented and identifiable, and should be as minimal and reversible as possible.

However, only some of the *Explanatory Guidelines Supporting the Preservation Principles* in the *Preservation Policy* have clear application to digital preservation. These include:

3. The use of preservation considerations to control access to the collections of the Alexander Turnbull Library is intended to enable access to collection items without compromising their preservation in perpetuity. An example of this is providing for use copies of fragile and deteriorated objects that could be damaged by direct access.
4. We will observe tikanga, recognising that preservation requires more than the protection of the basic chemical and physical characteristics of an object. For example, the observance of tikanga Māori is essential for preservation of taonga as

outlined in *The Care and Protection of Māori Materials Te Mauri o te Mātauranga: Purihia, Tiakina*.

5. When an object is accessioned into the collections of the Alexander Turnbull Library the Library has made a commitment and accepted responsibility for the preservation of that object.

8. Any remedial treatment, alterations or additions should be fully documented in permanent Library records, be readily identifiable, and as minimal and reversible as possible. It is particularly important that alterations or additions are only carried out after consultation with curatorial and conservation staff and others as appropriate, and with the direct or delegated agreement of the Chief Librarian.

9. The copying of original objects for either preservation or access should never be carried out in such a way as to compromise the integrity or preservation of the original object, and must always be fully documented in permanent Library records. A copy of an original object must always be recognised as being different from the original object, particularly when a format change has taken place. Therefore when copying for preservation has occurred the original object retains its integrity and meaning, and must continue to be preserved and protected.

*10. Copies may be used as preservation masters or primary sources, particularly those in electronic or digital format, or when originals are loaned to the Library for copying and the copies accessioned into permanent collections. Comprehensive documentation of such format shifting, migration or other preservation copying will ensure that both actual or potential losses of original information and other characteristics of the original object can be recognised.*

## **5.1 International context: standards and best practice**

See section 1.3

## **5.2 Summary of Library standards and procedures derived from international standards and best practice**

## **6.0 MEDIA FORMAT-BASED CONSERVATION MANAGEMENT STANDARDS**

[All categories are not yet finalised, boldface are completed standards.]

6.1 Bound materials printed, manuscript, scrapbooks, sketchbooks, albums, etc)

6.2 Curios (objects, furniture, etc)

### **6.3 DOCUMENTS AND MANUSCRIPTS**

6.4 Easel paintings

### **6.5 FILM-BASED PHOTOGRAPHIC MEDIA**

### **6.6 GLASS-BASED PHOTOGRAPHIC MEDIA**

### **6.7 MAGNETIC TAPE**

5.8 Newspapers and serials

### **6.9 OPTICAL DISCS**

6.10 Phonograph discs (shellac, vinyl, lacquer)

### **6.11 PHOTOGRAPHIC PRINT MEDIA**

6.12 Pictorial works on paper (drawings, prints, watercolours, maps, plans, etc)

## 6.1 BOUND MATERIALS

## 6.2 CURIOS



### 6.3 DOCUMENTS AND MANUSCRIPTS (revised 2006)

These guidelines are applicable to manuscripts and printed artefacts on paper in both bound and flat formats, and parchment, and are based on the following standards:

- BS5454: 2000 *Recommendations for the storage and exhibition of archival documents.*
- ISO11799: 2003 *Document storage requirements for archive and library materials*
- NISO TR01-1995 *Environmental Guidelines for the storage of paper records*

## ENVIRONMENTAL CONDITIONS

### Temperature and Relative Humidity

Controlled environmental conditions are essential to ensure the long-term preservation of manuscripts and archival materials. The frequency of and length of time spent outside of recommended relative humidity and temperature conditions should be limited, using conditioning procedures if changes in environment conditions will exceed 2C or 5% relative humidity.

Format	Maximum temperature °C	Relative humidity range %	Comments
<b>Paper</b>	15	40% +/- 5%	Includes loose and bound MSS & Archives, as well as parchment.
			Parchment requires conditioning on retrieval

### Light

Collections to be kept in the dark unless a collection item is being retrieved, being used by a patron, or temporarily on exhibition. When in use or on exhibition the amount of time a document or manuscript is exposed to light should be limited. In addition, all wavelengths of light below 415 nanometers should be filtered to remove ultraviolet light components.

### Air quality

Gaseous pollutants such as chlorine, sulphides, peroxides, ozone, oxides of nitrogen, smoke and acidic gases can react with manuscripts and archival materials causing and accelerating deterioration.

Particulate filters should be of the dry-media type with an arrestance rating of not less than 85%. Gaseous pollutants may be removed from the air by washers or absorbers.

Maximum recommended levels of pollutant gases:

- Sulphur dioxide - 1 µg/m<sup>3</sup>
- Oxides of nitrogen - 5 µg/m<sup>3</sup>
- Ozone - 25 µg/m<sup>3</sup>
- Carbon dioxide - 45 µg/m<sup>3</sup>
- Dust particles – 75 µg/m<sup>3</sup>

## ACCESS PROCEDURES

### Conditioning procedures

#### General materials:

Manuscripts and archival materials **not** stored in protective enclosures should be preconditioned before storage in low temperature environments, and allowed to equilibrate in stages to the higher room temperature when retrieved to reduce physical stresses caused by temperature and relative humidity cycling.

#### Parchment:

Flat items on parchment supports and bound volumes with parchment covers or pages, will need to be allowed to equilibrate to changes conditions over 24 to 24 hours if subject to more than 2C or 5% RH change with retrieval for use. This will reduce physical stresses set up by the rapid reactions of the hygroscopic parchment to changes in relative humidity.

### Handling

- Work surfaces must be clean, flat, uncluttered and adequately lit.
- Manuscripts and archival materials should be examined over a flat surface such as a table.
- Hands must be clean and dry when handling manuscripts and archives collections.
- Protective thin, well-fitted, clean nylon or plastic gloves may be required when handling dirty, mould affected items, or materials sensitive to moisture or oils from hands.
- Move unbound manuscript and archival material on a flat, rigid support such as cardboard during use to prevent distortion.
- Handle any unprotected photographic material within manuscripts and archival collections by their edges or margins, and if possible wearing clean cotton, nylon or plastic gloves.
- Return manuscripts and archival materials to storage enclosures and protect from light when not in use.
- No eating and drinking in all areas where manuscript and archival materials are used or stored.
- Always transport manuscripts and archival materials within their enclosures, kept flat, unstacked, on trolleys.

## STORAGE AND IDENTIFICATION

Manuscripts and archives collection items should be enclosed in 4-flap wallet enclosures, archival envelopes, single fold folders, manuscript standing boxes, flat boxes, cased folders, and/or corrugated clamshell boxes in order to exclude dirt and light, protect them against mechanical damage, and facilitate identification and handling. Storage containers also help buffer rapid environmental changes that can stress the objects.

<b>Enclosures</b>	<ul style="list-style-type: none"><li>• Unbound manuscripts and archival collections of standard sizes (A4/A5) are stored individually or in small groups inside four flap enclosures. Groups of the four flap enclosures are then placed vertically and snugly within Manuscript Standing Boxes.</li><li>• Unbound oversized archival collection items are stored horizontally in single fold folders or other large flat enclosures in flat boxes or map cabinet drawers to a maximum height of 5cm.</li></ul>
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	<ul style="list-style-type: none"> <li>• Bound manuscripts and archival materials up to foolscap size are shelved vertically in corrugated clamshell boxes or cased folders.</li> <li>• Bound materials over foolscap size are shelved horizontally in corrugated clamshell boxes or other custom made enclosures, with stacking limited to a total of two volumes.</li> <li>• All loose photographic prints within archival collections are encapsulated or stored in photographic enclosures.</li> <li>• Enclosure materials must be chemically inert and meet the requirements of ISO18902 and the Photographic Activity Test as described in ISO14523.</li> <li>• Recommended materials: non-acidic paper (pH between 7.0 and 9.5) and plastic (uncoated polyester, polystyrene, polyethylene, polypropylene). Glassine envelopes and enclosures composed of polyvinyl (PVC) plastic are NOT acceptable.</li> <li>• Enclosures shall be sufficiently fire-resistant so that they will not ignite or develop reactive fumes after heating for 4 hours at 150°C in the package that is to be stored.</li> </ul>
<b>Storage furniture</b>	<ul style="list-style-type: none"> <li>• Closable chemically inert, non-combustible, non-corrosive housings such as drawers, cabinets or containers on open shelves shall be used. Materials used must meet the requirements of the Photographic Activity Test as described in ISO14523.</li> <li>• Recommended materials for cabinets or shelving: anodized aluminium, stainless steel and powder-coated, plated or tinned metals, or some other corrosion-resistant finish.</li> <li>• Storage containers should not exceed the size of the supporting shelf.</li> </ul>
<b>Storage spaces</b>	<ul style="list-style-type: none"> <li>▪ Storage spaces should be separated from offices or work areas.</li> <li>▪ Lighting should be active only when required for access.</li> <li>▪ Eliminate carpet, draperies, fibrous wall coverings or other dust and/or debris-generating materials in the storage room.</li> </ul>

### Identification

Processed manuscripts and archives collections may be inscribed with identification marks using reversible methods such as 2B pencils on the back or border area.

## **Cleaning and pest control**

Regular cleaning programmes for storage areas should ensure the removal of dust without blowing fine particles around and the removal of dirt without the use of chemical cleaning solutions.

- Dust should be removed by vacuuming using a HEPA exhaust filter.
- Floors can be cleaned by mopping with a minimum amount of water, with immediate dry mopping.
- Non-chemically treated, clean and static-free wipes can be used to remove dirt and dust from shelves and from exterior surfaces of containers by trained staff.
- The use of integrated pest management (IPM) techniques should be incorporated into the overall cleaning plan. IPM focuses on preventive techniques to minimise food, moisture and environmental conditions required for pest survival.

## **COLLECTION SURVEY AND MAINTENANCE**

### **Frequency and survey procedures**

- Representative samples of manuscripts and archives should be surveyed at least every 2 years.
- If deviations from the recommended temperature and relative humidity ranges have occurred, inspection should be more frequent.
- A random sampling plan established in advanced shall be used, and a different lot shall be surveyed each time.
- Appropriate measuring equipment and procedures should be used to objectively determine deterioration.
- Determine and eliminate the cause of the problem whenever possible as part of the survey process.
- To ensure that corrective actions are effective, periodic re-inspection is required.

### **Survey information**

- Note any deterioration to either collection items or enclosures, and determine and reduce or eliminate the cause of the problem.

## 6.4 EASEL PAINTINGS

## 6.5 FILM-BASED PHOTOGRAPHIC MEDIA (revised 2005)

These guidelines are applicable to colour and black-and-white photographic media with a plastic film support, and are based on the following standards:

- ISO18911: 2000 *Imaging materials – Processed safety photographic films – Storage practices*
- ISO18902 *Imaging materials – Processed photographic films, plates and papers – Filing enclosures and storage containers*
- BS5454: 2000 *Recommendations for the storage and exhibition of archival documents.*

### Environmental conditions

#### Temperature and Relative Humidity

Controlled environmental conditions are essential to ensure the long-term preservation of film-based photographic media. The frequency of and length of time spent outside of recommended relative humidity and temperature conditions should be limited, using conditioning procedures if changes in environment conditions will exceed 2C or 5% relative humidity.

Image	Base	Maximum temperature °C	Relative humidity range %	Comments
Black-and-white	Cellulose esters and Polyester	2 ± 2°C over a 24-hour period	20 to 50 ± 5% over a 24-hour period	<p><b>Older and historic films are generally less stable. Care should be taken when choosing the relative humidity level so that items in poor condition (eg. flaking, delaminating emulsion, or film curl) are not physically stressed by low RH in the range of 20% to 30%.</b></p> <p><b>Handle films carefully, especially those in poor condition. Storage at low temperature and/or low relative humidity can embrittle the emulsion or film layers of historic films making them more susceptible to physical damage when handling.</b></p>
Colour	Cellulose esters	-10 ± 2°C over a 24-hour period  -3 ± 2°C over a 24-hour period	20 to 50 ± 5% over a 24-hour period  20 to 40 ± 5% over a 24-hour period	
	Polyester	2 ± 2°C over a 24-hour period	20 to 30 ± 5% over a 24-hour period	
Black-and-white and colour	Any base	Below 0°C	Low RH	These environmental conditions are suitable for storing badly deteriorated film after copying, <b>in vacuum-sealed, conditioned enclosures</b> .

#### Light

Film should always be stored in enclosures and cabinets to protect from light, with light exposure minimised during handling and use.

## Air quality

Gaseous pollutants such as chlorine, sulphides, peroxides, ozone, oxides of nitrogen, smoke and acidic gases can react with photographic emulsions and supports, causing and accelerating deterioration.

Particulate filters should be of the dry-media type with an arrestance rating of not less than 85%. Gaseous pollutants may be removed from the air by washers or absorbers.

Maximum recommended levels of pollutant gases:

- Sulphur dioxide - 1 µg/m<sup>3</sup>
- Oxides of nitrogen - 5 µg/m<sup>3</sup>
- Ozone - 25 µg/m<sup>3</sup>
- Carbon dioxide - 45 µg/m<sup>3</sup>
- Dust particles – 75 µg/m<sup>3</sup>

## ACCESS PROCEDURES

### Conditioning procedures

Film-based photographic media object should be preconditioned before being stored in a controlled atmosphere storage rooms to reduce physical stresses caused by temperature and relative humidity cycling. It is even more important to equilibrate in stages to higher temperatures in order to prevent absorption or moisture condensation on cold film surfaces when objects are moved from low-temperature/RH storage into work areas.

### Handling

- Work surfaces must be clean, flat, uncluttered and adequately lit.
- Films should be examined over a flat surface such as a table or light box.
- Where possible wear thin, well-fitted, clean cotton, nylon or plastic gloves when handling. If gloves are not worn, hands must be clean and dry.
- Handle films by their edges.
- Return films to storage enclosures and protect from light when not in use.
- No eating and drinking in all areas where photographic media are used or stored.
- Transport

## Storage

### STORAGE AND IDENTIFICATION

Photographic objects should be enclosed in individual envelopes, sleeves or other forms of enclosure in order to exclude dirt and light, protect them against mechanical damage, and facilitate identification and handling. Storage containers also help buffer rapid environmental changes that can stress the objects.

<b>Enclosures</b>	<ul style="list-style-type: none"><li>▪ Store sheet films vertically with rigid supports placed in between to minimise distortions.</li><li>▪ Store sheet films in separate enclosures with emulsion surface facing away from any seams.</li><li>▪ Group sheet films by size and store vertically resting on one long edge, in one or more parallel rows depending on the film size. Divide rows by suitable rigid partitions.</li><li>▪ Do not stack sheet films on top of each other.</li><li>▪ Enclosure materials must be chemically inert and meet the requirements of ISO18902 and the Photographic Activity Test as described in ISO14523.</li><li>▪ Recommended materials: non-acidic paper (pH between 7.0 and 9.5) and</li></ul>
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	<p>plastic (uncoated polyester, polystyrene, polyethylene, polypropylene). Glassine envelopes and enclosures composed of polyvinyl (PVC) plastic are NOT acceptable.</p> <ul style="list-style-type: none"> <li>▪ Enclosures shall be sufficiently fire-resistant so that they will not ignite or develop reactive fumes after heating for 4 hours at 150°C in the package that is to be stored.</li> </ul>
<b>Storage furniture</b>	<ul style="list-style-type: none"> <li>▪ Closable chemically inert, non-combustible, non-corrosive housings such as drawers, cabinets or containers on open shelves shall be used.</li> <li>▪ Materials used for cabinets, drawers or shelving must meet the requirements of the Photographic Activity Test as described in ISO14523.</li> <li>▪ Recommended materials: anodized aluminium, stainless steel and powder-coated, plated or tinned metals, or some other corrosion-resistant finish.</li> <li>▪ Drawers and cabinets should be fitted with rigid vertical dividers of the same height as the films. Dividers should be fixed at appropriate intervals (&lt;10cm).</li> </ul>
<b>Storage Space</b>	<ul style="list-style-type: none"> <li>▪ Storage spaces should be separated from offices or work areas.</li> <li>▪ Lighting should be active only when required for access.</li> <li>▪ Eliminate carpet, draperies, fibrous wall coverings or other dust and/or debris-generating materials in the storage room.</li> </ul>

### Identification

Whenever possible directly marking films with Library identification should be avoided, as each item should be housed in an enclosure that can be marked. If this is necessary non-photographic means such as ink should be used with materials that have passed the Photographic Activity Test as described in ISO14523.

### Cleaning and pest control

Regular cleaning programmes for storage areas should ensure the removal of dust without blowing fine particles around and the removal of dirt without the use of chemical cleaning solutions.

- Dust should be removed by vacuuming using a HEPA exhaust filter.
- Floors can be cleaned by mopping with a minimum amount of water, with immediate dry mopping.
- Non-chemically treated, clean and static-free wipes can be used to remove dirt and dust from shelves and from exterior surfaces of containers by trained staff.
- The use of integrated pest management (IPM) techniques should be incorporated into the overall cleaning plan. IPM focuses on preventive techniques to minimise food, moisture and environmental conditions required for pest survival.

## COLLECTION SURVEY AND MAINTENANCE

### Frequency and survey procedures

- Representative samples of photographic sheet film should be surveyed at least every 2 to 3 years.
- If deviations from the recommended temperature and relative humidity ranges have occurred, inspection should be more frequent.
- A random sampling plan established in advanced shall be used, and a different lot shall be surveyed each time.
- Appropriate measuring equipment and procedures should be used to objectively determine deterioration.
- Determine and eliminate the cause of the problem whenever possible as part of the survey process.
- To ensure that corrective actions are effective, periodic re-inspection is required.



**Survey information**

- Note any deterioration to either films or enclosures, and determine and reduce or eliminate the cause of the problem.
- Chemical deterioration tests

## 6.6 GLASS-BASED PHOTOGRAPHIC MEDIA (revised 2005)

This guidelines are applicable to colour and black-and-white photographic media with a glass support, and are based on the following standards:

- ISO18918: 2000 *Imaging materials – Processed photographic reflection plates – Storage practices*
- ISO18902 *Imaging materials – Processed photographic films, plates and papers – Filing enclosures and storage containers*
- BS5454: 2000 *Recommendations for the storage and exhibition of archival documents.*

### ENVIRONMENTAL CONDITIONS

#### Temperature and Relative Humidity

Controlled environmental conditions are essential to ensure the long-term preservation of film-based photographic media. The frequency of and length of time spent outside of recommended relative humidity and temperature conditions should be limited, using conditioning procedures if changes in environment conditions will exceed 2C or 5% relative humidity.

Process	Maximum temperature °C	Relative humidity range %	Comments
Black-and-white silver  <i>Hand-coloured</i>          <i>Colour</i>	<i>18 ± 1°C over a 24-hour period</i>	<i>30 to 40 ± 5% over a 24-hour period</i>	Older and historic glass plates are generally less stable. Storing in cooler temperatures increases their life expectancy.

#### Light

Plates should always be stored in enclosures and cabinets to protect from light, with light exposure minimised during handling and use.

#### Air quality

Gaseous pollutants such as chlorine, sulphides, peroxides, ozone, oxides of nitrogen, smoke and acidic gases can react with photographic emulsions and supports, causing and accelerating deterioration.

Particulate filters should be of the dry-media type with an arrestance rating of not less than 85%. Gaseous pollutants may be removed from the air by washers or absorbers.

Maximum recommended levels of pollutant gases:

- Sulphur dioxide - 1 µg/m<sup>3</sup>
- Oxides of nitrogen - 5 µg/m<sup>3</sup>
- Ozone - 25 µg/m<sup>3</sup>
- Carbon dioxide - 45 µg/m<sup>3</sup>
- Dust particles – 75 µg/m<sup>3</sup>

## ACCESS PROCEDURES

### Conditioning procedures

Film-based photographic media objects should be preconditioned before being stored in a controlled atmosphere storage rooms to reduce physical stresses caused by temperature and relative humidity cycling. Before moving glass plates from low-temperature and low relative humidity storage conditions into work areas, time should be allowed for the glass plates to equilibrate to the higher room temperature in order to prevent desiccation of the gelatin and possible delamination as the temperature rises. The following procedure should be used:

- Over a clean, flat work surface, place the selected negatives, in their envelopes, into a snap-lock plastic bag.
- Squeeze out the air and seal the bag.
- Take the negatives out of the controlled atmosphere room and leave them for 24 hours before opening the bag and using the negatives as usual.

### Handling

- Work surfaces must be clean, flat, uncluttered and adequately lit.
- Plates should be examined over a flat surface such as a table or light box.
- Where possible wear thin, well-fitted, clean cotton, nylon or plastic gloves when handling. If gloves are not worn, hands must be clean and dry.
- Handle photographic glass plates by their edges and properly support during use.
- Do not stack plates on top of each other.
- Damaged or deteriorated glass plates should be assessed by a conservator.
- Return plates to storage enclosures and protect from light when not in use.
- No eating and drinking in all areas where photographic media are used or stored.
- Transport

## STORAGE AND IDENTIFICATION

Photographic objects should be enclosed in individual envelopes, sleeves or other forms of enclosure in order to exclude dirt and light, protect them against mechanical damage, and facilitate identification and handling. Storage containers also help buffer rapid environmental changes that can stress the objects.

<b>Enclosures</b>	<ul style="list-style-type: none"><li>• Store plates in separate enclosures with emulsion surface facing away from any seams.</li><li>• Group plates by size and store vertically resting on one long edge, in one or more parallel rows depending on the plate size. Divide rows by suitable rigid partitions.</li><li>• Do not stack plates on top of each other since those on the bottom may be put under excessive pressure. 19<sup>th</sup> century glass plates are especially vulnerable to stress fractures when stored horizontally as the glass usually is not flat.</li><li>• Enclosure materials must be chemically inert and meet the requirements of ISO18902 and the Photographic Activity Test as described in ISO14523.</li><li>• Recommended materials: non-acidic paper (pH between 7.0 and 9.5) and plastic (uncoated polyester, polystyrene, polyethylene, polypropylene). Glassine envelopes and enclosures composed of polyvinyl (PVC) plastic are NOT acceptable.</li><li>• Enclosures shall be sufficiently fire-resistant so that they will not ignite or develop reactive fumes after heating for 4 hours at 150°C in the package that is to be stored.</li></ul>
<b>Storage</b>	<ul style="list-style-type: none"><li>• Closable chemically inert, non-combustible, non-corrosive housings such as drawers, cabinets or containers on open shelves shall be used. Materials</li></ul>

<b>Furniture</b>	<p>used must meet the requirements of the Photographic Activity Test as described in ISO14523. Recommended materials: anodized aluminium, stainless steel and powder-coated, plated or tinned metals, or some other corrosion-resistant finish.</p> <ul style="list-style-type: none"> <li>• Drawers and cabinets should be fitted with rigid vertical dividers of the same height as the plates. Dividers should be fixed at appropriate intervals (&lt;10cm).</li> <li>• If drawers are used, the glass plates shall be oriented parallel to the direction of the movement of the drawer. Storage housings should be able to support a heavy weight load.</li> <li>• Earthquake protective brackets or bracing that anchor the cabinets to the floor and bind the cabinets together or to the walls shall be installed.</li> </ul>
<b>Storage Space</b>	<ul style="list-style-type: none"> <li>▪ Storage spaces should be separated from offices or work areas.</li> <li>▪ Lighting should be active only when required for access.</li> <li>▪ Eliminate carpet, draperies, fibrous wall coverings or other dust and/or debris-generating materials in the storage room.</li> </ul>

### Identification

Whenever possible directly marking films with Library identification should be avoided, as each item should be housed in an enclosure that can be marked. If this is necessary non-photographic means such as ink should be used with materials that have passed the Photographic Activity Test as described in ISO14523.

### Cleaning and pest control

Regular cleaning programmes for storage areas should ensure the removal of dust without blowing fine particles around and the removal of dirt without the use of chemical cleaning solutions.

- Dust should be removed by vacuuming using a HEPA exhaust filter.
- Floors can be cleaned by mopping with a minimum amount of water, with immediate dry mopping.
- Non-chemically treated, clean and static-free wipes can be used to remove dirt and dust from shelves and from exterior surfaces of containers by trained staff.
- The use of integrated pest management (IPM) techniques should be incorporated into the overall cleaning plan. IPM focuses on preventive techniques to minimise food, moisture and environmental conditions required for pest survival.

## COLLECTION SURVEY AND MAINTENANCE

### Frequency and survey procedures

- Representative samples of photographic plates should be surveyed at least every 2 to 3 years.
- If deviations from the recommended temperature and relative humidity ranges have occurred, inspection should be more frequent.
- A random sampling plan established in advanced shall be used, and a different lot shall be surveyed each time.
- Appropriate measuring equipment and procedures should be used to objectively determine deterioration.
- Determine and eliminate the cause of the problem whenever possible as part of the survey process.
- To ensure that corrective actions are effective, periodic re-inspection is required.

### Survey information

- Note any deterioration to either films or enclosures, and determine and reduce or eliminate the cause of the problem.
- Chemical deterioration, glass disease tests

## 6.7 MAGNETIC TAPE (revised 2005)

These guidelines are applicable to analogue and digital magnetic tapes made for audio, video, instrumentation and computer use. They are based on:

- ISO18923: 2000 *Imaging materials – Polyester-base magnetic tape – Storage practices*;
- BS5454: 2000 *Recommendations for the storage and exhibition of archival documents*.
- Van Bogart, JW 1995, *Magnetic Tape Storage and Handling: A Guide for Libraries and Archives*. Commission on Preservation and Access, Washington, DC.

### ENVIRONMENTAL CONDITIONS

#### Temperature and Relative Humidity

Controlled environmental conditions are essential to ensure the long-term preservation of magnetic tapes. The frequency of and length of time spent outside of recommended relative humidity and temperature conditions should be limited, using conditioning procedures if changes in environment conditions will exceed 5C or 5% relative humidity.

	Base		Comments
	Polyester, PVC, Paper	Cellulose ester	
<b>Maximum temperature</b>	13°C ± 2 over a 24-hr period	10°C ± 2 over a 24-hour period	A stable, cool, low relative humidity environment increases the life expectancy of magnetic tapes. High temperature increases tape pack tightness and tape blocking. High relative humidity allows the polymeric binder to hydrolyse. Magnetic tapes, including acetate-based tapes, should not be stored at temperatures below 8°C as the lubricant from the polymeric binder may exude.  Degradation of acetate-based tapes is known as “vinegar syndrome”. After its onset, tapes degrade at an accelerated rate. Lower temperature and relative humidity will increase the time to the onset of the vinegar syndrome.
<b>Relative humidity range</b>	30% to 40% ± 5 over a 24-hr period	30% to 40% ± 5% over a 24-hr period	
<b>Light</b>	Store in dark conditions  Filter UV		Light, especially sunlight, and heat can cause degradation.  Storage rooms shall only be lit when accessing collections and containers used for storage should exclude light.

#### Air quality

Gaseous pollutants such as chlorine, sulphides, peroxides, ozone, oxides of nitrogen, smoke and acidic gases can react with magnetic tapes. Bare metal particle (MP) and metal evaporated (ME) tapes are particularly susceptible to corrosion.

Particulate filters should be of the dry-media type with an arrestance rating of not less than 85%. Gaseous pollutants may be removed from the air by washers or absorbers.

Maximum recommended levels of pollutant gases:

- Sulphur dioxide - 1 µg/m<sup>3</sup>
- Oxides of nitrogen - 5 µg/m<sup>3</sup>
- Ozone - 25 µg/m<sup>3</sup>
- Carbon dioxide - 45 µg/m<sup>3</sup>
- Dust particles – 75 µg/m<sup>3</sup>

#### Magnetic fields

Magnetic tapes shall be kept away from external magnetic fields (eg motors, transformers and computers). Storage near other less common external fields such as some headphones, microphones or speakers should also be avoided.

## ACCESS PROCEDURES

### Conditioning procedures

Before moving magnetic tapes from low-temperature and low relative humidity storage conditions into work areas (or vice versa), tapes should be allowed to equilibrate in stages to the higher room temperature in order to avoid moisture condensation and to ensure they will play properly. Acclimatisation rates will differ depending on the width of the tape.

### Handling

- Work surfaces must be clean, flat, uncluttered and adequately lit. Magnetic tape shall be taken out of their storage cases over a flat surface such as a table.
- Where possible, wear thin, well-fitted, clean cotton, nylon or plastic gloves when handling. If gloves are not worn, hands must be clean and dry.
- Do not touch tape surfaces or edges of the tape packs. Handle reel-to-reel tapes by the centre hub or supported by the edges of the flanges.
- Return magnetic tapes to storage cases immediately after use.
- No eating and drinking in all areas where magnetic tapes are used or stored.
- Transport magnetic tapes in the same way that they are stored – vertically in their protective cases - in securely fastened padded containers.

### Tape wind and tape pack

Prior to storage, tapes in cassettes or cartridges shall be wound so that all the tape is on one hub. Open reel tapes should be stored “tails out”.

## STORAGE AND IDENTIFICATION

Magnetic tapes shall be kept in individual storage containers in order to exclude dirt, protect them against mechanical damage, and facilitate identification and handling. Storage containers also help buffer rapid environmental changes.

<p><b>Enclosures</b></p>	<ul style="list-style-type: none"> <li>• Enclosure materials must chemically inert, rigid and resistant to impact, moisture and dust intrusion.</li> <li>• Recommended materials: polypropylene or polycarbonate plastic for flanges, hubs, cassettes and cartridges; non-magnetic material for open reels.</li> <li>• Collars fitted around or between flanges may be used to provide extra protection to reels.</li> </ul> <p><b>Deteriorated acetate-based tapes</b> To avoid cross-contamination deteriorated acetate-based tapes should be stored in a separately in permeable enclosures to allow evaporation and diffusion of acetic acid. If separation is not possible, use closed containers with adsorbents (eg zeolites) placed inside the enclosures to absorb acidic vapours.</p>
<p><b>Storage furniture</b></p>	<ul style="list-style-type: none"> <li>▪ All magnetic tape should be stored vertically on racks, shelves or in drawers</li> <li>▪ Reels should be supported by the hub, not the rim.</li> <li>▪ Housings shall be chemically inert, non-combustible and non-corrosive, and able to support the shapes and weights of the containers without deformation of the containers or the shelving.</li> <li>▪ Shelves should be lipped to minimise dripping of melted plastic onto lower shelves in case of fire, with a canopy to protect the bays from water damage.</li> </ul>
<p><b>Storage spaces</b></p>	<ul style="list-style-type: none"> <li>▪ Storage spaces should be separated from offices or work areas.</li> <li>▪ Lighting should be active only when required for access.</li> <li>▪ Eliminate carpet, draperies, fibrous wall coverings or other dust and/or debris-generating materials in the storage room.</li> </ul>

## **Identification**

Adhesive “stick-on” labels applied to reels, cassettes, cartridges and containers shall be non-acidic, non-debris and non-oxidant producing. Labels shall be small and kept to a minimum to reduce the possibility adhesive migration. The magnetic tape or leader tape shall not be marked or labelled.

## **Cleaning and pest control**

Regular cleaning programmes for storage areas should ensure the removal of dust without blowing fine particles around and the removal of dirt without the use of chemical cleaning solutions.

- Dust should be removed by vacuuming using a HEPA exhaust filter.
- Floors can be cleaned by mopping with a minimum amount of water, with immediate dry mopping.
- Non-chemically treated, clean and static-free wipes can be used to remove dirt and dust from shelves and from exterior surfaces of containers by trained staff.
- The use of integrated pest management (IPM) techniques should be incorporated into the overall cleaning plan. IPM focuses on preventive techniques to minimise food, moisture and environmental conditions required for pest survival.

## **COLLECTION SURVEY AND MAINTENANCE**

### **Frequency and survey procedures**

- Representative samples of magnetic tape should be surveyed every 5 years.
- If deviations from the recommended temperature and relative humidity ranges have occurred, inspection should be more frequent.
- A random sampling plan established in advanced shall be used, and a different lot shall be surveyed each time.
- Appropriate measuring equipment should be used to objectively determine deterioration.
- Determine and eliminate the cause of the problem whenever possible as part of the survey process.
- Tapes and enclosures should be cleaned by wiping with soft clean lint-free cloths if dirt or debris is found on them during inspection.
- To ensure that corrective actions are effective, periodic re-inspection is required.

### **Survey information**

- Note any deterioration to either tapes or enclosures and determine and eliminate the cause of the problem.
- If tapes appear playable, they shall then be checked for playback performance, spoking, loose wind, stepped pack and debris.
- Acetate-based tapes should be inspected for signs of “vinegar syndrome” by measurement of acetic acid levels.



## **6.8 NEWSPAPERS AND SERIALS**

## 6.9 OPTICAL DISCS (revised 2005)

This guideline is applicable to optical discs made for audio, video, instrumentation and computer use. It is based on:

- ISO18925: 2002 *Imaging materials – Optical disc media – Storage practices*
- Byers, FR 2003, *Care and handling of CDs and DVDs: A guide for librarians and archivists*, Council on Library and Information Resources, Washington, DC, and National Institute of Standards and Technology, Gaithersburg, MD.

### ENVIRONMENTAL CONDITIONS

#### Temperature and Relative Humidity

Controlled environmental conditions are essential to ensure the long-term preservation of optical discs. The frequency of and length of time spent outside of recommended relative humidity and temperature conditions should be limited, using conditioning procedures if changes in environment conditions will exceed 5C or 5% relative humidity.

		Comments
<b>Maximum temperature</b>	15 °C ± 2 over a 24-hr period	A stable, cool, low relative humidity environment increases the life expectancy of optical discs. High relative humidity allows the polycarbonate substrate to absorb moisture where it may react with any of the layers, particularly metallic reflective layers which may corrode.
<b>Relative humidity range</b>	30% to 40% ± 5 over a 24-hr period	
<b>Light</b>	Store in dark conditions	Light, especially sunlight and other high UV light sources, can degrade the plastic substrate. The dye layer in CD-Rs is degraded by UV light. Heat from sunlight and other sources can degrade the phase-changing film in CD-RWs.
	Filter UV	Storage rooms shall only be lit when accessing collections and containers used for storage should exclude light.

#### Air quality

Gaseous pollutants such as chlorine, sulphides, peroxides, ozone, oxides of nitrogen, smoke and acidic gases can react with reflective or recording layers in optical discs and potentially cause loss of data.

Particulate filters should be of the dry-media type with an arrestance rating of not less than 85%. Gaseous pollutants may be removed from the air by washers or absorbers.

Maximum recommended levels of pollutant gases:

- Sulphur dioxide - 1 µg/m<sup>3</sup>
- Oxides of nitrogen - 5 µg/m<sup>3</sup>
- Ozone - 25 µg/m<sup>3</sup>
- Carbon dioxide - 45 µg/m<sup>3</sup>
- Dust particles – 75 µg/m<sup>3</sup>

#### Magnetic fields

Magneto-optical discs Magnetic tapes shall be kept away from external magnetic fields (eg motors, transformers and computers). Storage near other less common external fields such as some headphones, microphones or speakers should also be avoided.

## ACCESS PROCEDURES

### Conditioning procedures

Before moving optical discs from low-temperature and low relative humidity storage conditions into work areas (or vice versa), discs should be allowed to equilibrate in stages to the higher room temperature in order to avoid moisture condensation and ensure that an acceptably low error rate occurs during playback.

### Handling

- Work surfaces must be clean, flat, uncluttered and adequately lit. Optical discs shall be taken out of their enclosures over a flat surface such as a table.
- Where possible wear thin, well-fitted, clean cotton, nylon or plastic gloves when handling. If gloves are not worn, hands must be clean and dry.
- Handle discs by the outer edge or centre hub.
- Return discs to storage cases immediately after use.
- No eating and drinking in all areas where optical discs are used or stored.
- Transport optical discs in the same way that they are stored – vertically in their protective cases - in securely fastened padded containers.

## STORAGE AND IDENTIFICATION

Optical discs shall be kept in individual storage containers in order to exclude dirt, protect them against mechanical damage, and facilitate identification and handling. Storage containers also help buffer rapid environmental changes that can stress the discs.

<b>Enclosures</b>	<ul style="list-style-type: none"><li>• Enclosure materials must be chemically inert, rigid and resistant to impact, moisture and dust intrusion.</li><li>• Recommended materials: polypropylene or polycarbonate plastic.</li><li>• Discs (except the hubs) should not touch any enclosure surface or paper inserts. It may be necessary to remove inserts from inside the cases and attach them to the outside in a sleeve.</li></ul>
<b>Storage furniture</b>	<ul style="list-style-type: none"><li>▪ Optical disc packages shall be stored vertically on shelves or in drawers.</li><li>▪ Housings shall be chemically inert, non-combustible and non-corrosive, and be able to support a heavy weight load without deformation of the disc containers or the shelving.</li><li>▪ Shelves should be lipped to minimise dripping of melted plastic onto lower shelves in case of fire, with a canopy to protect the bays from water damage.</li></ul>
<b>Storage space</b>	<ul style="list-style-type: none"><li>▪ Storage spaces should be separated from offices or work areas.</li><li>▪ Lighting should be active only when required for access.</li><li>▪ Eliminate carpet, draperies, fibrous wall coverings or other dust and/or debris-generating materials in the storage room.</li></ul>

### Identification

Adhesive “stick-on” labels shall not be applied to any of the disc surfaces for identification purposes. Labels already adhered onto disc surfaces should not be peeled off or repositioned. Optical discs should be identified by affixing labels to the exterior of enclosures. The labelling shall be non-acidic, non-debris and non-oxidant producing.

If it is necessary to apply identification directly onto optical discs, non-solvent-based felt-tip permanent markers shall be used mark the inner hubs. Sharp implements such as pens, pencils or fine-tip markers shall not be used to write on discs.

## **Cleaning and pest control**

Regular cleaning programmes for storage areas should ensure the removal of dust without blowing fine particles around and the removal of dirt without the use of chemical cleaning solutions.

- Dust should be removed by vacuuming using a HEPA exhaust filter.
- Floors can be cleaned by mopping with a minimum amount of water, with immediate dry mopping.
- Non-chemically treated, clean and static-free wipes can be used to remove dirt and dust from shelves and from exterior surfaces of containers by trained staff.
- The use of integrated pest management (IPM) techniques should be incorporated into the overall cleaning plan. IPM focuses on preventive techniques to minimise food, moisture and environmental conditions required for pest survival.

## **COLLECTION SURVEY AND MAINTENANCE**

### **Frequency and survey procedures**

- Representative samples of optical discs should be surveyed every 5 years.
- If deviations from the recommended temperature and relative humidity ranges have occurred, inspection should be more frequent.
- A random sampling plan established in advanced shall be used, and a different lot shall be surveyed each time.
- Appropriate measuring equipment should be used to objectively determine deterioration.
- Determine and eliminate the cause of the problem whenever possible as part of the survey process.
- Discs should be cleaned if dirt or debris is found on them during inspection by wiping with a soft clean lint-free cloth in a radial direction, or by dusting the disc with clean purified compressed air or nitrogen at a pressure of less than 275 kPA. Solvent cleaning should not generally be used.
- To ensure that corrective actions are effective, periodic re-inspection is required.

### **Survey information**

- Note any deterioration to either discs or enclosures and determine and eliminate the cause of the problem.
- If discs appear playable, they shall then be checked for playback performance, and disc imbalance.

## 6.10 PHONOGRAPH DISCS

## 6.11 PHOTOGRAPHIC PRINT MEDIA

(revised 2005)

These guidelines are applicable to colour and black-and-white prints on opaque supports (fibre-base paper, resin-coated paper and plastic films), and are based on the following standards:

- ISO18920: 2000 *Imaging materials – Processed photographic reflection prints – Storage practices*
- ISO18902 *Imaging materials – Processed photographic films, plates and papers – Filing enclosures and storage containers*
- BS5454: 2000 *Recommendations for the storage and exhibition of archival documents.*

### ENVIRONMENTAL CONDITIONS

#### Temperature and Relative Humidity

Controlled environmental conditions are essential to ensure the long-term preservation of photographic print media. The frequency of and length of time spent outside of recommended relative humidity and temperature conditions should be limited, using conditioning procedures if changes in environment conditions will exceed 2C or 5% relative humidity.

Process	Maximum temperature °C	Relative humidity range %	Comments
<b>Black-and-white</b>	18 ± 2°C over a 24-hour period	30 to 50 ± 5% over a 24-hour period	Older and historic black-and-white prints are generally less stable. Storing in cooler temperatures increases their life expectancy.
<b>Colour</b>	2 ± 2°C over a 24-hour period	30 to 40 ± 5% over a 24-hour period	

#### Light

Prints should always be stored in enclosures and cabinets to protect from light, with light exposure minimised during handling and use. Some colour and diazo media are extremely sensitive to light damage, and should not be exposed to any light for extended periods such as exhibition.

#### Air quality

Gaseous pollutants such as chlorine, sulphides, peroxides, ozone, oxides of nitrogen, smoke and acidic gases can react with photographic emulsions and supports, causing and accelerating deterioration.

Particulate filters should be of the dry-media type with an arrestance rating of not less than 85%. Gaseous pollutants may be removed from the air by washers or absorbers.

Maximum recommended levels of pollutant gases:

- Sulphur dioxide - 1 µg/m<sup>3</sup>
- Oxides of nitrogen - 5 µg/m<sup>3</sup>
- Ozone - 25 µg/m<sup>3</sup>
- Carbon dioxide - 45 µg/m<sup>3</sup>
- Dust particles – 75 µg/m<sup>3</sup>

## ACCESS PROCEDURES

### Conditioning procedures

Before placing colour prints in controlled atmosphere storage rooms, preconditioning may be necessary to reduce physical stresses caused by temperature and relative humidity cycling. Similarly, colour prints moved from low-temperature storage into work areas should be allowed to equilibrate in stages to the higher room temperature in order to prevent absorption or moisture condensation on cold print surfaces.

### Handling

- Work surfaces must be clean, flat, uncluttered and adequately lit.
- Prints should be examined over a flat surface such as a table.
- Where possible wear thin, well-fitted, clean cotton, nylon or plastic gloves when handling. If gloves are not worn, hands must be clean and dry.
- Move prints on a flat, rigid support such as cardboard during use to prevent distortion.
- Handle prints by their edges or margins.
- Return plates to storage enclosures and protect from light when not in use.
- No eating and drinking in all areas where photographic media are used or stored.
- Transport

## STORAGE AND IDENTIFICATION

Photographic prints should be enclosed in individual envelopes, sleeves or other forms of enclosure in order to exclude dirt and light, protect them against mechanical damage, and facilitate identification and handling. Storage containers also help buffer rapid environmental changes that can stress the objects.

<b>Enclosures</b>	<ul style="list-style-type: none"><li>• Store prints horizontally to a maximum height of 5cm. If prints are stored vertically, rigid supports must be placed in between to minimise slumping and curling.</li><li>• Store prints in separate enclosures with the emulsion surface facing away from the seams.</li><li>• Enclosure materials must be chemically inert and meet the requirements of ISO18902 and the Photographic Activity Test as described in ISO14523.</li><li>• Recommended materials: non-acidic paper (pH between 7.0 and 9.5) and plastic (uncoated polyester, polystyrene, polyethylene, polypropylene). Glassine envelopes and enclosures composed of polyvinyl (PVC) plastic are NOT acceptable.</li><li>• Enclosures shall be sufficiently fire-resistant so that they will not ignite or develop reactive fumes after heating for 4 hours at 150°C in the package that is to be stored.</li></ul>
<b>Storage furniture</b>	<ul style="list-style-type: none"><li>• Closable chemically inert, non-combustible, non-corrosive housings such as drawers, cabinets or containers on open shelves shall be used. Materials used must meet the requirements of the Photographic Activity Test as described in ISO14523.</li><li>• Recommended materials for cabinets or shelving: anodized aluminium, stainless steel and powder-coated, plated or tinned metals, or some other corrosion-resistant finish.</li><li>• Storage containers should not exceed the size of the supporting shelf.</li></ul>
<b>Storage spaces</b>	<ul style="list-style-type: none"><li>▪ Storage spaces should be separated from offices or work areas.</li><li>▪ Lighting should be active only when required for access.</li><li>▪ Eliminate carpet, draperies, fibrous wall coverings or other dust and/or debris-generating materials in the storage room.</li></ul>

## **Identification**

Processed prints may be inscribed with identification marks using non-photographic means such as 2B pencils on the back or border area. Other identification materials used shall pass the Photographic Activity Test as described in ISO14523.

## **Cleaning and pest control**

Regular cleaning programmes for storage areas should ensure the removal of dust without blowing fine particles around and the removal of dirt without the use of chemical cleaning solutions.

- Dust should be removed by vacuuming using a HEPA exhaust filter.
- Floors can be cleaned by mopping with a minimum amount of water, with immediate dry mopping.
- Non-chemically treated, clean and static-free wipes can be used to remove dirt and dust from shelves and from exterior surfaces of containers by trained staff.
- The use of integrated pest management (IPM) techniques should be incorporated into the overall cleaning plan. IPM focuses on preventive techniques to minimise food, moisture and environmental conditions required for pest survival.

## **COLLECTION SURVEY AND MAINTENANCE**

### **Frequency and survey procedures**

- Representative samples of photographic prints should be surveyed at least every 5 to 10 years.
- If deviations from the recommended temperature and relative humidity ranges have occurred, inspection should be more frequent.
- A random sampling plan established in advance shall be used, and a different lot shall be surveyed each time.
- Appropriate measuring equipment and procedures should be used to objectively determine deterioration.
- Determine and eliminate the cause of the problem whenever possible as part of the survey process.
- To ensure that corrective actions are effective, periodic re-inspection is required.

### **Survey information**

- Note any deterioration to either prints or enclosures, and determine and reduce or eliminate the cause of the problem.
- Chemical deterioration tests



## 6.12 PICTORIAL WORKS ON PAPER (revised 2006)

These guidelines are applicable to paper-based objects including drawings, prints, maps and watercolours and are based on the following standards:

- BS5454: 2000 *Recommendations for the storage and exhibition of archival documents.*
- BS 5454:2000 PD 0024:2001 *Guide to the interpretation of BS 5454:2000 Storage and exhibition of archival documents*
- ANSI/NISO Z39.77-2001 *Guidelines for Information about Preservation Products*

### ENVIRONMENTAL CONDITIONS

#### Temperature and Relative Humidity

Controlled environmental conditions are essential to ensure the long-term preservation of paper-base materials. The frequency of and length of time spent outside of recommended relative humidity and temperature conditions should be limited, using conditioning procedures if changes in environment conditions will exceed 2C or 5% relative humidity.

Format	Maximum temperature °C	Relative humidity range %	Comments
<b>paper</b>	21 +/-1	45 – 60 +/- 5%	Generally, the cooler the temperature can be, the better; stability in rH is more important than set point, as long as set point is maintained within given range

#### Light

Pictorial paper-based objects should be stored in the dark. When accessed for research or on exhibition, exposure to light should be limited. During exhibitions, lighting is restricted to 50 lux periods (consult Preservation Guidelines) whereas lighting during research access is at comfort level.

#### Air quality

Gaseous pollutants such as chlorine, sulphides, peroxides, ozone, oxides of nitrogen, smoke and acidic gases can react with paper, causing and accelerating deterioration.

Particulate filters should be of the dry-media type with an arrestance rating of not less than 85%. Gaseous pollutants may be removed from the air by washers or absorbers.

Maximum recommended levels of pollutant gases:

- Sulphur dioxide - 1 µg/m<sup>3</sup>
- Oxides of nitrogen - 5 µg/m<sup>3</sup>
- Ozone - 25 µg/m<sup>3</sup>
- Carbon dioxide - 45 µg/m<sup>3</sup>
- Dust particles – 75 µg/m<sup>3</sup>

## ACCESS PROCEDURES

### Handling

- Smoking, drinking, eating are prohibited in vicinity of objects and in all storage areas
- Use only pencils for writing in the vicinity of objects
- Work surfaces must be clean, flat, uncluttered and adequately lit.
- Objects should be examined on a clean, flat, stable surface that is larger than the object itself. Do not allow objects to hang over edge of surface.
- Objects should be handled as little as possible; move objects on a flat secondary support (enclosure); use enclosure to turn objects over
- Always transport objects within their enclosures, flat, when possible, on trolleys larger than the object
- Oversize objects that will not fit through doorways flat, should be transported upright in a rigid folder to prevent distortion
- Clean white cotton, nylon, or plastic gloves should be worn whenever possible. If damage could occur to an object if gloves are worn, hands must be clean and dry. Gloves should always be worn when handling photographic images.
- Return to storage enclosures and protect from light when not in use.

## STORAGE AND IDENTIFICATION

Pictorial works on paper should be enclosed in folders or other appropriate enclosures in order to exclude dirt and light, protect them against mechanical damage, and facilitate identification and handling. Oversize objects should be enclosed in folders with rigid bases for their protection during retrieval and transportation. Storage containers also help buffer rapid environmental changes that can stress the objects.

<b>Enclosures</b>	<ul style="list-style-type: none"><li>• Pictorial works are stored horizontally in mats with interleaving sheet between window mat and object, or in single folders; if several images are stored in same folder, archivally sound interleaving sheets are placed between each object, to reduce abrasion and unnecessary handling</li><li>• Folders are stored in cabinets whenever possible folders to a maximum height of 5cm or in archival boxes on shelves; large objects are housed in rigid-support folders in secure box storage if no large cabinet is available</li><li>• Brittle and fragile items are stored in rigid-based folders</li><li>• Objects stored vertically are housed in four-flap enclosures with rigid separators where necessary, in boxes or in cased folders; <b>sketchbooks are housed vertically in custom-made individual boxes</b></li><li>• Blueprints and diazotype architectural prints should be encapsulated in polyester film to provide a barrier to alkaline environmental conditions</li><li>• Objects that are in relief, have friable or fragile surfaces, have 3 dimensional inclusions or additions or are very cockled must be stored in a sink mat or folder ensuring that nothing touches the surface of the object</li><li>• Thick objects (those laminated on board, corflute, wood etc.) should be stored in specially made folders that allow for the thickness of the object</li><li>• Highly acidic materials are stored in polyester sleeves to isolate them from non-acidic materials</li><li>• Extremely large items that cannot be accommodated in cabinets or on shelves are rolled on archival tubes at least 15.0 cm in diameter and 7.5 cm longer than item; they are wrapped with acid-free paper and polyester, then rolled on tubes</li><li>• Enclosure materials must be chemically inert and meet the requirements of ISO18902 and the Photographic Activity Test as described in ISO14523.</li></ul>
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	<ul style="list-style-type: none"> <li>Recommended materials: non-acidic paper (pH between 7.0 and 9.5) and plastic (uncoated polyester, polystyrene, polyethylene, polypropylene). Glassine envelopes and enclosures composed of polyvinyl (PVC) plastic are NOT acceptable.</li> <li>Enclosures shall be sufficiently fire-resistant so that they will not ignite or develop reactive fumes after heating for 4 hours at 150°C in the package that is to be stored.</li> </ul>
<b>Storage furniture</b>	<ul style="list-style-type: none"> <li>Closable chemically inert, non-combustible, non-corrosive housings such as drawers, cabinets, or containers on open shelves shall be used. Materials used must meet the requirements of the Photographic Activity Test as described in ISO14523.</li> <li>Recommended materials for cabinets or shelving: anodized aluminium, stainless steel and powder-coated, plated or tinned metals, or some other corrosion-resistant finish.</li> <li>Storage containers should not exceed the size of the supporting shelf.</li> </ul>
<b>Storage spaces</b>	<ul style="list-style-type: none"> <li>Storage spaces should be separated from offices or work areas.</li> <li>Lighting should be active only when required for access.</li> <li>Eliminate carpet, draperies, fibrous wall coverings or other dust and/or debris-generating materials in the storage room.</li> </ul>

### Identification

Processed pictorial material should be inscribed with identification number only on secondary support or enclosure with graphite or, if on polyester enclosure, with permanent ink

### Cleaning and pest control

Regular cleaning programmes for storage areas should ensure the removal of dust without blowing fine particles around and the removal of dirt without the use of chemical cleaning solutions.

- Dust should be removed by vacuuming using a HEPA exhaust filter.
- Floors can be cleaned by mopping with a minimum amount of water, with immediate dry mopping.
- Non-chemically treated, clean and static-free wipes can be used to remove dirt and dust from shelves and from exterior surfaces of containers by trained staff.
- The use of integrated pest management (IPM) techniques should be incorporated into the overall cleaning plan. IPM focuses on preventive techniques to minimise food, moisture and environmental conditions required for pest survival.

## COLLECTION SURVEY AND MAINTENANCE

### Frequency and survey procedures

- Representative samples of pictorial works on paper should be surveyed at least every 5 to 7 years.
- If deviations from the recommended temperature and relative humidity ranges have occurred, inspection should be more frequent.
- A random sampling plan established in advance shall be used, and a different lot shall be surveyed each time.
- Appropriate measuring equipment and procedures should be used to objectively determine deterioration.
- Determine and eliminate the cause of the problem whenever possible as part of the survey process.
- To ensure that corrective actions are effective, periodic re-inspection is required.

**Survey information**

- Note any deterioration to both works on paper and their enclosures, and determine and reduce or eliminate the cause of the problem.

## **7.0 Services for the Public**

### **7.1 Advice**

### **7.2 Disaster advice and vacuum freeze drying**

### **7.3 Materials Testing**

## APPENDICES

### I. International Standards for the Preservation of Alexander Turnbull Library Collections

The following international standards are currently used to develop Library preservation management programmes and operational standards as documented in the *Conservation Guidelines*. Preservation programmes and services are designed to ensure that these standards and guidelines are achieved.

#### **General (Library and Archival Materials)**

BS 5454:2000 (ICS 01.140.20) — Recommendations for the storage and exhibition of archival documents

ANSI/NISO Z39.79-2001 (ISSN: 1041-5653) — Environmental Conditions for Exhibiting Library and Archival Materials

#### **Magnetic tape and optical media**

IASA-TC 04, Guidelines on the Production and Preservation of Digital Objects  
IASA-TC 03 The Safeguarding of Audio Heritage: Ethics, Principles and Preservation Strategy

ISO 18921: 2002(E) Imaging materials — Compact discs (CD-ROM) — Method for estimating the life expectancy based on the effects of temperature and relative humidity

ISO 18923:2000 Imaging materials — Polyester-base magnetic tape — Storage practices

ISO 18925:2002 Imaging materials — Optical disc media — Storage practices

ISO 18927:2002(E) Imaging materials — Recordable compact disc systems — Method for estimating the life expectancy based on the effects of temperature and relative humidity

ISO/DIS 18933 (2003 Draft) Imaging materials — Magnetic tape — Care and handling practices for extended usage

#### **Paper**

ANSI/NISO Z39.79-2001 (ISSN: 1041-5653) Environmental Conditions for Exhibiting Library and Archival Materials

ISO/WD 11799 (1999). Document Storage Requirements

ANSI/NISO Z39.77-2001 ISSN: 1041-5653 — Guidelines for Information About Preservation Products

#### **Photographic film, glass and prints**

ISO 18902: 2001 Imaging materials — Processed photographic films, plates and papers — Filing enclosures and storage containers

ISO 18911: 2000 Imaging materials — Processed safety photographic films — Storage practices

ISO 18918: 2000 Imaging materials — Processed photographic plates — Storage practices

ISO 18920: 2000 Imaging materials — Processed photographic reflection prints — Storage practices