

Caring for your collections:

Freezing water damaged and insect infested collections

Freezing is an effective alternative to chemical methods for insect eradication in certain types of material, particularly paper-based collections. It can also be used to buy time when treating water damaged and mould affected material. It provides valuable time to seek assistance from a conservator or occupational hygienist.

NOTE: Always check with a conservator if you are unsure of the suitability of this procedure for your objects.

The use of anoxia (low oxygen) is another effective method of insect eradication and can be used on all types of objects.

It is important to remember that not all material can be safely frozen. The list below shows some types of material not suitable for this process.

Material unsuitable for freezing

- Cased photographs (e.g. daguerreotypes, tintypes, ambrotypes)
- Photographs on glass (e.g. glass plate negatives and lantern slides)
- Wooden objects and furniture
- Canvas and wood-panel paintings
- Objects containing ivory or teeth
- Objects under tension (e.g. drums, stretched canvases, strung parchments)
- Leather objects (saddles, bags, shoes, etc.)
- Composite objects containing inorganic materials such as glass, high-fired ceramics, and metal.

Even for material considered safe to freeze, serious damage can occur if the freezing procedure is not carried out correctly.

Basic freezing procedure

Materials needed

- Freezer bags or strong garbage bags (do not use degradable bags)
- Plastic packing tape
- Labels
- Freezer

Locate a suitable chest freezer that can (ideally) reach -20 °C, however any freezer is better than none. If a large amount of material is required, you may need to use a commercial freezing facility.

The object(s) should be left in a chest freezer for a minimum of 14 days; during which time the lowest temperature should remain constant.

- Larger items or large numbers of items will need longer.
- Try not to open the freezer during this time.

Step 1: Place object/s into freezer bags or thick garbage bags. Double bag.

- If possible, keep objects at room temperature and the relative humidity (RH) as close to 50% as possible (RH must be within the range of 35-65%) before bagging.
- Place object/s into freezer or garbage bags.
- Pack carefully to prevent damage of contents. This is particularly important if placing several objects in the one bag.
- Double bag to minimise risk of holes. It is crucial that there are no holes in the bag. If holes are present, moisture will form on the object which can cause major problems once defrosted.
- If bagging in humid conditions, add extra absorbent material such as unprinted kitchen towel, a piece of cloth such as a towel or calico.

Books:

- Place each book in a freezer bag or for oversized volumes place in a garbage bag.
- If putting more than one book into a bag, wrap each book in greaseproof paper in a U-shape around the spine or interleave. This prevents the books from sticking to each other and makes their removal easier.

Paper documents:

- If documents are not blocked together, and time allows, interleave sheets with absorbent paper and place flat in freezer bags.
- Remove corner staples, paper clips and any other metal fasteners if time allows. Don't remove binding staples unless necessary.
- For paper documents, interleave sheets with absorbent paper and place flat in freezer bags. It may be necessary to place board on freezer shelving before placing bagged documents on top, to prevent wire shelving imprinting wet paper.

Photographic prints and negatives:

- Interleave with greaseproof paper if not blocked.
- Framed prints should be removed from their frames before placing in a bag.

Step 2: Expel excess air

- Remove excess air from the bag before sealing. Be careful not to crush the object or create holes in the bag.

Step 3: Seal

- Seal bag thoroughly using packaging tape (do not use masking tape).
- Ensure the package is completely airtight and free of holes.

Step 4: Place in freezer

- When placing the bagged object(s) into the freezer, ensure that adequate room is left to permit air circulation around each bag to assist rapid cooling.
- Be careful not to damage items if placing on top of each other.
- Books should be packed flat in the freezer or in a single row with the spine down. Too many books on top of each other or placed at angles can cause permanent deformation.
- The object(s) should be left in the freezer for a minimum of 48 hours (if freezer is -20°C) during which time temperatures should remain constant.
- Larger items or large numbers of items will need longer.
- Try not to open the freezer during this time.
- If using a domestic chest freezer, leave object(s) in for 2 weeks or more as the temperature is higher and can take longer to freeze material.

Step 5: Remove from freezer

- If you are dealing with water damaged collections, do not remove from the freezer until you have received treatment advice from a qualified conservator.
- It is also important to ensure you have time to work on the collections before removing. Collections can remain indefinitely in the freezer if packaged correctly.
- When you are ready to remove the object/s from the freezer, leave bagged and sealed in a cool location until completely thawed (minimum of 48 hours) This is very important because if it is removed from the packaging whilst still frozen, major water damage can occur.
- Condensation should not form inside the bag during defrosting, but it will occur on the outside of the bag during this process.
- The defrosting process can take several days depending on the size of the object. It is better to leave it longer if unsure.
- Objects should always be handled with extreme care.

Step 6: Treatment

- Once thawed completely, remove the object(s) from bagging.
- Carefully inspect the damage.
- Treat object according to type of damage.

Insect activity:

- Clean the object with a soft brush (and low suction HEPA filtered vacuum if necessary) to remove pest remains and frass.
- Ensure storage area/shelving has been thoroughly cleaned and checked for pest activity before returning object(s), otherwise reinfestation is likely to occur.

Water damaged collections:

- The defrosted object(s) will be wet, so it will be necessary to air dry immediately. Follow instructions as outlined in the guide: *Salvaging water damaged collections*. (This guide can be found on our website at this link – [How to guides](#).)

Mould activity:

- If mould damage is minor, clean as outlined in the guide *Dealing with mould*. (This guide can be found on our website at this link – [How to guides](#).)

Step 7: Place in clean, cool, dry storage environment

- Please refer to State Library's [Conservation unit](#) webpage to find information on caring for paper and photographic collections.

Useful websites


- AICCM Australian Institute for Conservation of Cultural Material www.aiccm.org.au
- AIC American Institute for Conservation <https://www.culturalheritage.org/>
- Find a conservator in private practice through the Australian Institute for Conservation of Cultural Material (AICCM) <https://www.aiccm.org.au/find-a-conservator>

The procedures described here have been used by State Library of Queensland in the care of its collections and are considered suitable by State Library as described; however, State Library will not be responsible for damage to your collections should damage result from the use of these procedures.

Need further information?

(07) 3840
7810 | <http://www.slq.qld.gov.au/preservation>

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