

Combatting Pests – Freezing

Freezing is a non-chemical, non-toxic, inexpensive, and effective pest eradication method, which is widely used in the international museum community. Unlike most commonly used chemical-based fumigation methods it has no residual action. It is popularly used for treatments of objects susceptible to damage from other chemical-based methods, usually textiles, and other organic-based materials such as paper, leather, wood, and feathers etc. Items containing a variety of materials (composites) may not be suitable - seek the advice of a Conservator if in doubt. Inorganic materials such as metal, stone, ceramics, and glass are rarely affected by pests and should not be frozen.

Materials which may be damaged by low temperatures, and composite objects, particularly those which contain materials with very different thermal properties, should not be treated with this method. Objects which cannot be well sealed or have surrounding air adequately evacuated from the packaging, also should not be treated with this method as condensation may form on their surfaces during thawing.

How to freeze insect affected items

Step 1 - Wrap object in undyed tissue paper, or clean undyed cotton pillow slip or calico (this will help reduce condensation forming on the object).



Detail of borer damage (left), wrapping object in undyed tissue (right), images by Lauren Ravi, MAGNT, 2024

Step 2 – Place wrapped object in a plastic bag or wrap in plastic. Remove as much air as possible – air may be simply pushed out, or the nozzle of a vacuum cleaner may be inserted when there is no danger of the object collapsing. Make sure that the wrapped object is fully sealed with waterproof packaging tape.

Step 3 – Label the wrapped object and place in a **pre-chilled** freezer at -20° Celsius and leave at this temperature for a minimum of 2 weeks.



Wrapping object in clear plastic (left), sealed object prior to entry into freezer (right), images by Lauren Ravi, MAGNT, 2024

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Step 4- After the treatment time, materials may be removed from the freezer and set aside to defrost, *still in their plastic bags*. Do not perforate the plastic nor open plastic or remove objects from plastic wrapping until they are fully defrosted to room temperature (usually 24 hours). If warm air leaks into the bag or onto a cold object, condensation will form and water damage will result. All dead pests should be cleaned from the treated object and the item closely monitored for further activity after treatment.



Removing dead insects and frass post freezer treatment, Image Lauren Ravi, MAGNT, 2024

Be careful!

Extreme care must be exercised when handling frozen materials, as many become brittle, and may be easily damaged. Always wear gloves for the protection of yourself and the object. The normal degree of care in handling objects should be exercised when placing objects inside a freezer. Note that a large volume or mass of materials will take longer to freeze and defrost. Over-stacking may cause physical damage to fragile materials and should be avoided.