



## **WINTERIZING HISTORIC BUILDINGS**

In order to face conservation challenges for collection care, winter seasons offer a great opportunity for planning preservation programs and put in place large-scale renovation projects. Whether the institution closes or remains open to public, proper winterizing strategies need to be carefully addressed to help safeguarding the building and its collections, saving money, and potentially avoiding disasters. This technical bulletin offers an overview of various topics that need to be considered when preparing for historic building winter closure in a well-organized manner. While it is intended to be useful for all type-institutions, this bulletin should be consulted keeping in mind the climate zone of the building location; in areas where temperature falls below 0°C certain precaution must be considered.

### **EXTERIOR MAINTENANCE**

It is very important that at least one staff member has been assigned the responsibility for building maintenance even when visitors closure is in place.

#### **Building and surroundings**

Caring for the external environment that surrounds the building is essential for its preservation. It is important to inspect trees and other foliage overhanging or near the building for dead or weak branches; remove any branches that could break under the weight of a heavy/wet snow and potentially damage the building; check the outside of the building, securing anything else that could blow around in high winds.

Attention should also be brought to ensure that gutters and downspouts are securely attached and free of any debris. Installing ice dams under the gutters will help prevent ice build-up from forming and water backing up.

Roof checks should be conducted for damaged or missing shingles and flashing for leaks. Ensure that the building's external cladding is intact and have damaged components replaced and any other repairs made promptly. Know the designed snow load of the roof of the building would help monitor heavy and/or wet snowfalls that may exceed the weight-bearing capacity of the structure. This is especially important for structures with flat, low pitched, or already physically compromised roofs. Consider buying a long-handled snow rake so that staff can clear the roof in the event of a severe snow storm.

#### **External Plumbing**

Pipes in exterior walls should be insulated if possible and closely monitored for freezing (occasionally running the faucets, flushing the toilets). If there is a sink located against an

outside wall, any cabinet doors beneath it should be left open in order to help prevent freezing.

If the water in an unheated area (such as a shed or outbuilding) is turned off for the winter, the pipes, toilets, and any other water-containing device should be drained. If the water in an unheated area is, instead, left on for the winter, the pipes should be properly insulated and closely monitored for freezing.

## **Security**

Make sure fire and police departments are informed of building closure and connected to respective active systems. Assure that emergency exits, and fire escapes are unobstructed and access by emergency response vehicles isn't blocked by construction activity at any time. Conduct regular inspections outside the building to avoid vandals' attractions. Check for large windows shutters to discourage birds from flying in.

## **INTERIOR MAINTENANCE**

If possible, always keep record of collection materials and objects conditions prior to closure. This will allow to detect any additional change or deterioration when re-opening.

### **Basements**

In order to avoid foundation structural damages such as separation or caving, long periods of circulating cold water should be prevented. Sub-freezing temperatures and build-up condensation can cause serious moisture-related issues.

Pipes in an unheated basement could freeze and form a leak if the plumbing system has been poorly winterized. For this reason, any collection materials in the basement should be stored 4 to 6 inches above the floor in case of flooding. If possible, store non-collections material 4 to 6 inches above the floor as well; in the event of a flood, this will expedite salvage and recovery of all materials.

Moisture problems can occur in heated-basement too from a variety of factors, including poor drainage, insulation, and foundation grading that can cause condensation to form. For this reason, consider installing a water/moisture alarm in the basement. Variations in the type of alarm available include an audible alarm, a remotely triggered alarm, or an alarm wired into the institution's security system. Be sure that the alarm is in a location where it will be quickly noticed. Have a submersible pump and the necessary discharge hoses available on-site or establish a contract with a known vendor.

### **Internal Plumbing**

If water and heat are turned off, make sure to drain all pipes and toilets. S-traps and toilet bowls can be filled with antifreeze or salt to prevent freezing. If the water supply is pumped in, shut off the switch to the pump, drain water from all the faucets and from the pump itself. To accomplish the latter, a plug can usually be removed from the bottom of the pump, with a wrench. Turn off the hot water heater and drain the hot water tank. In case water stays on, to prevent freezing, run plug-in heat-wraps along pipes and pour antifreeze into toilet tanks.

## **Pest Management**

Begin increased monitoring for potential pest infestation in the fall since rodents often attempt to enter buildings during this time. Housekeeping staff should look for evidence of droppings, bedding materials, and holes. Always leave clean pest traps in place for IPM and inspect them at re-opening. Inspect roof for nesting. Seal any cracks in the foundation and cover any means of ingress (e.g. fireplaces, door sweeps, wood framing, beneath roof eaves, etc.) with wire mesh. Keep in mind that other materials, such as candles and flowers, may also attract pests.

## **Light sensitivity**

Light exposure should be limited as much as possible. Lights should be kept off and windows should be boarded up or shuttered. If shutters/boards are not acceptable, ultraviolet filtering window blinds or shades should be kept closed for the duration of the seasonal closure. If possible, leave light readers in place and collect data.

## **Environmental Conditions: Temperature and Humidity**

Whether an institution chooses to seasonally lower or maintain a constant year-round temperature, sudden and dramatic fluctuations should be minimized. If staff is present working within the institution during the off-season, a temperature set point compromise between staff comfort and energy savings might have to be made. Once this off-season temperature has been determined, fluctuations from it should also be minimized. Any changes in temperature should be done gradually, over the course of two or three days. This slow heating or cooling will give collection materials time to acclimate to the new temperature and the corresponding new humidity levels within the building.

Historic buildings with seasonal closings may open periodically for wintertime special occasions. In order to avoid sudden dramatic changes in temperature and relative humidity that could damage materials and the historic structure, temperature should be raised gradually, and consequently lowered back to original winter level. A good general rule is to keep temperatures on average 5 degrees above outside temperatures, to reduce humidity to safe levels, if there is no HVAC system installed in the building envelope. Materials that require a more constant RH can be kept in a micro-environment.

Enclosed spaces such as cupboards and wardrobes have a natural buffering capacity, which helps reduce sudden changes in RH. On the other hand, moist air can condense when trapped in such environments. When they are sitting on cold floors, wardrobes and cabinets can also retain moisture, due to increasing damp. For this reason, it is advisable to raise them on blocks.

It is also recommended to cover furniture to avoid dust deposition. The most popular coverings for furniture are polyethylene or cotton. Cotton can be used inside polyethylene to provide a buffer against condensation.

If environmental systems are used on site, it is advisable to keep them on to acquire data during closure and activate their alarm systems so that action can be taken in case of emergency. An HVAC engineer, a conservation scientist or preventive conservator must be consulted before making environmental modifications with portable or whole building humidifiers.

## WINTERIZING AN HISTORIC BUILDING CHECKLIST

Once a closing procedures policy for the historic building has been established, duties in preparation for closing should be assigned to staff, and contingency plans drawn up to deal with emergencies. A sample checklist for the weekly inspection of buildings with staff and visitor hours is shown below.

<b>EXTERIOR</b>	
	Trees and other foliage are intact and away from structure(s) - especially trees and foliage overhanging or next to building(s)
	Roof and building cladding are intact
	Sidewalks, driveways, and parking lots are clear, especially areas near building entrance(s) and other access doors
	Gutters and downspouts are secure, free-flowing, and clear of debris
<b>INTERIOR</b>	
<b>BASEMENT</b>	
	Materials are stored 4-6" above the floor
	Basement is dry (no damp areas at outside corners or near supporting columns)
	Dehumidifiers are operating properly
	Water alarms are connected to power supply
	Sump pump discharge hose is clear and free-flowing
<b>WALLS, CEILINGS AND WINDOWS</b>	
	No evidence of moisture incursion from roof and window leaks (no stains, efflorescence, flaking paint and/or plaster)
<b>LIGHT EXPOSURE</b>	
	Lights are shut off
	Windows are boarded, shuttered, or covered with ultraviolet-filtering blinds or shades
<b>ENVIRONMENT</b>	
	Temperature and relative humidity are consistent and controlled in collections storage areas and exhibition spaces (inspect the thermostat, download information from data loggers, check alarm systems activity)
	Micro-climate cases are working properly

	Water runs unimpeded in pipes (test water taps by briefly running them, occasionally flush toilets)
	Whole building humidifiers are operating properly (connected to power supply, evaporative panels are functioning, water supply is unimpeded)
<b>MECHANICAL AND ELECTRICAL SYSTEM</b>	
	Fire and security access systems are effective
	All control panels are active and working, all fuses in box are intact
<b>PEST MANAGEMENT</b>	
	No evidence of droppings or bedding materials (in corners and along baseboards, in collection display/storage areas and food preparation areas)
	Any cracks or other means of access are sealed
	All food is removed in closed areas

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## GENERAL REFERENCES AND USEFUL RESOURCES

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