

Freeze Precautions

Establish a written ERP and perform recommended activities prior to the onset of seasonal cold weather.

Perform the following activities for all buildings. This includes buildings with any freezable liquids, including domestic water, chilled water, process water, wet pipe sprinkler systems, dry pipe valve rooms, and fire pump areas.

A. Verify there is adequate heat (e.g., minimum 40°F [4°C]), insulation, and the building envelope is adequately sealed in all buildings where needed to prevent freeze damage from low temperatures. This includes the coldest points in the building (e.g., corners at the windward side, the eaves, and concealed spaces with no direct heat), buildings with wet pipe sprinkler systems, as well as fire pump areas. Ensure fire pump areas with diesel engine drivers have a minimum temperature of 70°F (21°C).

B. Hang thermometers in normally cold areas/buildings, including penthouses and concealed spaces and/or above suspended ceilings with vulnerable piping or equipment, and monitor these areas closely.

C. Develop equipment contingency plans for items susceptible to freezing, with emphasis on key process bottlenecks to production. Include equipment, service or process lines that are outdoors or in unheated/ unattended buildings, non-self-draining steam traps, liquid drains, and high pour-point fuel oil lines.

D. Develop plans to inspect wet-pipe sprinkler systems, service water and other piping for leaks after and other items.

E. Assess the reliability of the electrical supply to the facility and determine any permitting needs for backup power.

F. Verify emergency supplies are present and in good condition. Consider the following items:

1. Extra tarpaulins for windbreaks
2. Steam hoses for thawing frozen lines
3. Portable heaters for keeping repair crews warm or instrument houses from freezing
4. Antifreeze supplies for cooling systems
5. Shovels, wheelbarrows, and snow blowers
6. Warm clothing and hand protection for maintenance and operating crews

Prepare all systems and equipment for cold weather by completing the following actions:

- A. Winterize equipment with history of freeze damage.

- B. Fuel all mobile equipment and review/confirm sources for obtaining additional fuel supplies for mobile equipment. Maintain two fuel sources if one is on an “interruptible” contract.
- C. Fuel all stationary equipment, including boilers, and review/confirm sources for obtaining additional fuel supplies for stationary equipment, particularly if supplied on an “interruptible” contract. If the backup fuel is oil, verify the tank is full and the delivery system to the heating unit is fully operational.
- D. Check that heat-tracing systems are operating properly.
- E. Examine/repair portable heating to ensure it is ready for emergency use.
- F. Drain all idle pumps and compressors and make sure they are vented.
- G. Lubricate equipment for cold weather operation.
- H. Provide heated enclosures around operating equipment as necessary and appropriate.
- I. Verify the operation of no-flow switches and alarms in cooling water lines.
- J. Verify instrumentation lines and other in-service equipment are insulated or provided with heat tape or other heat sources.
- K. Drain and blowout all seasonal equipment, condenser lines, tubing, and piping.
- L. Inspect all boilers and other heating equipment to ensure they are in proper operating condition.
- M. Check all steam traps for proper operation.
- N. Check pressure-vessel vents and relief and safety valves for frost or ice.
- O. Drain low-point drains on dry-pipe fire protection systems.
- P. Check fire hydrants and sprinkler control valves for tightness. Repair any leaks.
- Q. Flush the circulating heaters and associated piping on gravity and suction tanks to remove scale and sediment. Overhaul steam traps and strainers if necessary.

Review procedures with security personnel and other staff who will remain on site to check areas that may be subject to freezing.

Perform other site-specific activities as outlined in the ERP.

Describe the hazard and likely freeze scenarios. This includes a description of likely weather event(s) or weather history.

Include a readily available, reliable, and practical method for monitoring developing events and freeze warnings. This may include sources such as the national weather service, weather bulletins, and local emergency information sources.

Include procedures to accomplish the following, as applicable, during unusually cold weather:

- A. Fuel all mobile equipment and review/confirm sources for obtaining additional fuel supplies for mobile equipment.
- B. Seal the building envelope.
- C. Avoid shutting down operations.
- D. Increase building temperature(s). Include when the supply of heating fuel or electricity may be interrupted.
- E. Check automatic sprinkler risers for frozen piping daily by opening 2 in. (50mm) drains (if safe to do so) and observing the drop in pressure.
- F. Set priorities for steam usage to keep critical equipment in operation.
- G. Prevent freeze damage to the building, stock, and machinery and equipment, including wet-pipe sprinkler and fire protection system(s) if building heat is lost and all efforts to restore adequate heating have failed. Include the following:
 - 1. Drain sprinkler piping if freezing is deemed imminent. Only do this for brief periods of time and strictly follow industry guidelines regarding system impairment procedures (i.e., shutting down hazardous operations, notifying the fire service, posting a fire watch, etc.).
 - 2. Safe shutdown of production/process equipment to documented standard and emergency operating procedures.
 - 3. Drain service water and process piping, condensate piping, pumps, compressors, boilers, water cooled jackets, heat exchangers, air conditioning systems, hydraulically operated devices and other equipment and systems that may be damaged by freezing of water or other liquids. Add antifreeze to equipment that cannot be drained.
- H. Safely restore operations that were shut down. Inspect wet-pipe sprinkler systems, service water and other piping and pumps etc. for cracks, leaks, or other damage when unusually cold weather ends or building heat is restored. Take special care thawing frozen piping and equipment; avoid open flames.