
Commercial Property Snow Melting System Boiler Startup

1.0 Maintenance Objective & Frequency

The objective of this procedure is to safely and systematically start up a commercial snow melting system boiler after seasonal shutdown or extended idle period. This PM ensures proper combustion, correct flame signal, adequate water flow, and leak-free operation to prevent freeze damage, carbon monoxide hazards, and premature component failure.

This procedure is to be performed annually, prior to the first forecasted snowfall of the season, or immediately following any boiler service that required draining or component replacement.

2.0 Lockout/Tagout (LOTO) & Safety

- **Electrical Isolation:** Disconnect main power to the boiler at the dedicated disconnect switch. Apply personal lock and tag. Verify zero voltage with a multimeter at the boiler control panel.
- **Gas Isolation:** Close the manual gas shut-off valve upstream of the boiler gas train. Lock and tag the valve handle in the closed position.
- **Hydronic Isolation:** Close the isolation valves on the supply and return lines to the boiler. If the system is under pressure, bleed pressure via the relief valve before proceeding.
- **Mandatory PPE:** Safety glasses, Class B hard hat, CSA-approved steel-toed boots, cut-resistant gloves, and hearing protection (if boiler room exceeds 85 dBA).
- **Atmospheric Hazard:** Verify boiler room ventilation is operational. Use a calibrated combustible gas detector to check for gas leaks before re-establishing power.

3.0 Required Tools, Parts & Lubricants

- Combustion analyzer (calibrated, with O₂, CO, CO₂, NO_x, and stack temperature sensors)
- Manometer (0-15 inches w.c., for gas pressure measurement)
- Multimeter (True RMS, CAT III rated)
- Dial thermometer (0-250°F, for verifying aquastat calibration)
- Pipe wrench and adjustable wrench set
- Propylene glycol test kit (refractometer or hydrometer)
- Boiler water treatment test kit (pH, hardness, inhibitor levels)
- Replacement gaskets for burner access door and flue collector
- High-temperature anti-seize compound (for burner bolts)
- Non-detergent SAE 30 oil (for circulator pump bearings, if applicable)
- Approved thread sealant (for gas fittings, rated for natural gas/propane)

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO as per Section 2.0. Confirm zero energy state with a multimeter at the boiler control panel and verify gas valve is closed and locked.
2. Open the boiler access panels. Visually inspect the heat exchanger tubes for soot, scale, or debris. Clean with a wire brush and vacuum if necessary. Inspect the burner for cracks or warping.
3. Remove the burner assembly. Inspect the igniter electrode for wear and gap (set to 0.125 inches per OEM spec). Replace if ceramic is cracked. Inspect the flame rod for pitting; clean with fine emery cloth.
4. Check the gas train components: verify the main gas valve, safety shut-off valve, and pressure regulator diaphragms are intact. Replace any gaskets on the flanged connections. Apply thread sealant to any disturbed fittings.
5. Reinstall the burner assembly using new gaskets. Torque the burner mounting bolts to 35 Nm in a cross pattern. Reconnect the gas line and tighten to 45 Nm.
6. Open the hydronic isolation valves. Fill the system with a 50/50 propylene glycol/water mixture. Use the test kit to verify freeze protection to -30°C. Bleed air from all high points in the system using manual vents.
7. Check the expansion tank pre-charge pressure using a tire gauge. Adjust to 12 psi (or 5 psi above system static pressure, whichever is higher). Verify the air separator is free of debris.
8. Lubricate the circulator pump bearings with 3 pumps of SAE 30 non-detergent oil (if equipped with oil ports). Rotate the pump shaft manually to ensure free movement.
9. Remove LOTO from the gas line. Slowly open the manual gas shut-off valve. Use the manometer to verify inlet gas pressure is within OEM spec (typically 7 inches w.c. for natural gas, 11 inches w.c. for propane). Check for leaks with gas detector or soap solution.
10. Remove LOTO from the electrical disconnect. Restore power to the boiler. Set the aquastat to 180°F. Initiate a call for heat. Observe the ignition sequence: pre-purge (15-30 seconds), spark, flame establishment. Verify flame signal is above 2.0 microamps on the controller display.
11. Once the boiler is firing, use the combustion analyzer to measure O₂, CO, and stack temperature. Adjust the air shutter to achieve O₂ between 3.5% and 5.0% at high fire. CO must be below 100 ppm. Record final readings.
12. Allow the boiler to run for 15 minutes. Check the supply and return temperature differential (should be 20-30°F). Verify the system pressure remains stable (no more than 2 psi drop). Inspect all joints for leaks.

5.0 Verification & Return to Service

1. Cycle the boiler through three complete on/off cycles via the aquastat. Confirm the burner lights reliably and the flame signal remains stable above 1.5 microamps during each cycle.
2. Simulate a low-water condition by briefly closing the supply isolation valve (if safe to do so) to verify the low-water cutoff shuts down the burner. Reopen the valve immediately.
3. Test the high-limit safety: temporarily set the aquastat to 10°F below the current water temperature. The burner should shut down. Reset the aquastat to 180°F.
4. Verify the snow melting system controller is communicating with the boiler. Initiate a manual snow melt cycle (if weather permits) and confirm the circulator pump starts and the boiler fires.
5. Record all combustion readings, pressure settings, and test results on the PM work order. Sign off in ServiceGrid, attaching photos of the burner flame and combustion analyzer screen.
6. Return the boiler room to a clean, organized state. Remove all tools and debris. Ensure all access panels are secured. Leave the boiler in automatic mode, ready for the first snowfall.

Regulatory Disclaimer: This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.