10. MAINTENANCE

⚠ WARNING

Product Safety Information
Refractory Ceramic Fiber Product

This appliance contains materials made from refractory ceramic fibers (RCF). Airborne RCF, when inhaled, have been classified by the International Agency for Research on Cancer (IARC), as a possible carcinogen to humans. After the RCF materials have been exposed to temperatures above 1800°F (982°C), they can change into crystalline silica, which has been classified by the IARC as carcinogenic to humans. If particles become airborne during service or repair, inhalation of these particles may be hazardous to your health.

Avoid Breathing Fiber Particulates and Dust

Suppliers of RCF recommend the following precautions be taken when handling these materials:

<u>Precautionary Measures:</u>
Provide adequate ventilation.
Wear a NIOSH/MSHA approved respirator.
Wear long sleeved, loose fitting clothing and gloves to prevent skin contact.
Wear eye goggles.
Minimize airborne dust prior to handling and removal by water misting the material and avoiding unnecessary disturbance of materials.
Wash work clothes separately from others. Rinse washer thoroughly after use.
Discard RCF materials by sealing in an airtight plastic bag.

<u>First Aid Procedures:</u>
Inhalation: If breathing difficulty or irritation occurs, move to a location with fresh clean air. Seek immediate medical attention if symptoms persist.
Skin Contact: Wash affected area gently with a mild soap and warm water. Seek immediate medical attention if irritation persists.
Eye Contact: Flush eyes with water for 15 minutes while holding eyelids apart. Do not rub eyes. Seek immediate medical attention if irritation persists.
Ingestion: Drink 1 to 2 glasses of water. Do not induce vomiting. Seek immediate medical attention.

⚠ WARNING

Do not store or allow combustible or flammable materials near the boiler. Substantial fire or explosion hazard could result, causing risk of personal injury, death or property damage.

Do not use this boiler if any part of it has been under water. Immediately call a qualified service technician to inspect the boiler. Any part of the control system, any gas control or any burner or gas component which has been under water must be replaced.

Should overheating occur or the fuel supply fail to shut off: Shut off the fuel supply at a location external to the boiler. Do not turn off or disconnect the electrical supply to the pump. Immediately call a qualified service technician to inspect the boiler for damage and defective components.

A. PLACING BOILER IN OPERATION

1. Start up the Burner/Boiler per the Burner Manual and the instructions in this manual on starting the boiler.
2. Prove the correct operation of all controls on the boiler and burner as outlined below.
3. Check the operation of the ignition and flame proving controls as described in the Burner Manual.
4. Test the limit and operating controls to assure they are operating correctly.
5. Inspect and test all low water cutoffs.
6. Test the safety relief valve(s) using the procedure given by the valve manufacturer on the valve tag.
7. Visually inspect the burner and pilot flames (if applicable).

B. TO SHUT DOWN THE BOILER

1. Turn off Burner.
2. Open main line power disconnect switch to boiler/burner.
3. Close fuel shut-off valves.
4. To take boiler out of service if the boiler and system are not to be used when temperatures are below freezing:
   a) Drain the boiler and system completely and shut off make-up water supply.
   b) Open main line power disconnect switch to boiler/burner. Remove the fuses or secure the switch so that the power cannot be turned on accidentally.
   c) Be certain that the boiler and system are refilled before returning to service. Follow the Instructions in this manual and the Lighting Instructions to operate.
   d) The system may be filled with a 50% inhibited propylene glycol solution for protection down to -35°F. Use only antifreeze solutions specifically designed for hydronic use.

C. MAINTENANCE – ANNUAL

1. **Before the start of each heating season**, inspect and make all necessary adjustments to insure proper boiler and burner operation. Use the maintenance and inspection procedures following.
2. Inspect the Venting System

⚠ CAUTION

Before servicing the boiler:

- **Turn off all electrical power to the boiler.**
- **Close the Gas Service Valve and Oil Shut-Off Valve.**
- **Allow the boiler to cool if it has been operating.**
- **Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.**

   a) Check the chimney or vent to make sure it is clean and free from cracks or potential leaks.
   b) All joints must be tight and sealed.
   c) The vent connector must extend into, but not beyond the inside edge of the chimney or vent.

3. Inspect the Boiler Area
   a) The boiler area must be clean and free from combustible materials, gasoline or any other flammable liquids or vapors.
   b) The combustion air openings and the area around the boiler must be unobstructed.
4. Inspect boiler flueways and burner for cleanliness. Follow the cleaning procedure in part F. of this chapter.
5. Inspect the boiler and piping for signs of leaks. Check to see if there are signs of heavy make-up water addition to the system.
6. When placing boiler into operation, follow Burner Manual, all instructions supplied with the boiler and the instructions in this chapter.
7. Test the operation of all limit controls, float controls and ignition components as described in Part A, “Placing Boiler in Operation”, of this chapter.

D. MONTHLY MAINTENANCE

1. Inspect the burner and pilot flames as for the annual inspection.
2. Inspect the boiler and system for any signs of leakage or excessive make-up water usage.
3. Inspect and check the operation of the venting system.

E. DAILY MAINTENANCE

1. Inspect the boiler area to make sure the area is free from combustible or flammable materials and that there are not obstructions to the flow of air to the boiler or combustion air openings to the room.
2. Make sure there are no signs of abnormal operation, such as overfilling or leakage.

F. CLEANING HEATING SURFACES

NOTE: BOILER IS TO BE CLEANED AT LEAST ONCE A YEAR. THIS BOILER MAY BE CLEANED FROM THE LEFT SIDE OR TOP.

1. Turn off all electrical power to boiler before beginning cleaning operation.
2. If cleaning from the side, remove left jacket panel and side clean-out cover plates.
3. If cleaning from the top, remove flue pipe, left top jacket panel and flue collector.

⚠ CAUTION

Be very careful when adding water to a hot boiler. Add very slowly or, if possible, allow the boiler to cool naturally before adding water.

If an excessive loss of water occurs, check for a leak in the piping and correct the problem. Excessive make-up water will cause corrosion and damage to the boiler.

4. Brush the flue passages with a wire brush to remove all scale or soot from these heating surfaces.
5. Remove any scale or soot from the fire box by means of vacuum cleaning or any other available means.

   NOTE: THE OIL BURNER MUST BE REMOVED TO FACILITATE THIS OPERATION.
6. Install clean-out covers or flue collector, be sure the gasket or rope seal is in good condition. If not, replace.
7. Install jacket panels and flue pipe as required.

G. CLEAN THE BOILER (STEAM BOILERS ONLY)

1. Clean the boiler within one week after initial start-up. Cleaning will be more effective if boiler operates a day or two to loosen sediment and impurities in system.
2. Boiler must be cleaned to remove any accumulation of oil, grease, sludge, etc. in the system. These substances can cause foaming and surging of boiler water, producing an unstable water line and water carryover to system.
3. Connect a skim valve off the 1-1/2 NPT skim tapping on rear of boiler. See Figure 11.1 for skim tapping location. Run a 1-1/2 NPT drain line off skim valve to a point of safe discharge.
4. Provide a means of supplying continuous fresh water to the boiler for the cleaning process.
5. Use common washing soda, such as Arm and Hammer Super Washing Soda. Mix 1/2 pound of soda with water in a 10 quart pail. Mix a proportion of one (1) pound of washing soda for each 800 square feet EDR net boiler rating. Pour the mixture into the boiler through the safety relief valve tapping.

⚠ WARNING

Cleaning the boiler requires the use of very hot water and corrosive chemicals. Use care when handling to prevent injury.

6. Open the skim valve. Fill boiler until water begins to flow out of the valve.
7. Turn on burner. Allow boiler water to heat up to just below steaming (180 - 200°F). Do not allow boiler to steam; steaming mixes up contaminants instead of floating them at surface.
8. Open make-up water valve to continually feed water to boiler. Adjust flow to maintain water temperature at 180 - 200°F.
9. Continue skimming boiler until water flowing from skim tapping flows clear. This will take some time, possibly several hours for a dirty system.
10. Turn off burner, close make-up water valve.

⚠ CAUTION

Do not leave boiler unattended while firing burner. Operating boiler with water below minimum permissible water level may fracture sections.

11. Drain boiler completely. Refill and drain one or two times to wash out all washing soda.
12. Remove skim valve and piping. Pipe a nipple and cap in the skim valve

⚠ CAUTION

Do not allow make-up water to flow too fast. Excessive quantities of cold water may fracture sections.

⚠ NOTICE

If gauge glass becomes dirty more contaminants have worked loose in system. Repeat cleaning and skimming process as needed to clean system.