



## **BOIL-OUT PROCEDURE WATERTUBE STEAM BOILERS**

### **PREFACE**

The internal surfaces of a newly installed boiler may be contaminated with oil, grease or other protective coatings used in the manufacturing process. Such coating must be removed since they reduce the heat transfer rate and could result in tube rupture from overheating. The primary objective of pre-cleaning a boiler is to remove these impurities.

Bond Water Technologies recommends that the following procedure be performed on each new boiler put in service and on an existing boiler each time tubes are replaced.

**NOTE:** Before beginning the boil-out procedure, the burner must be ready for firing. The operator should refer to the procedure outlined under the burner operation section in the operating manual.

### **PROCEDURE**

1. Clear the boiler for firing by taking the standard precautions.
2. Inspect all internal waterside surfaces, including tubes, and remove any debris. It may be necessary to use a high pressure hose to flush out inaccessible areas.
3. Replace the regular gauge glass with temporary gauge glass that can be discarded after the cleaning.
4. Fill the unit with clean water to a point just below the lowest manhole cover in the upper drum. It is important that the water used for the filling process is warmer than 70 degrees F.
5. Add the recommended amount of BOND 8050 Boil-Out Cleaner. Never pump the cleaning chemical into the boiler before adding water.
6. Proceed to close the manhole. (Use standard service gaskets during the boil-out procedure.)
7. Continue to fill the boiler to a point eight inches above the center of the top drum. Caution must be taken to insure that water does not spill over into the superheater, if the unit is equipped with one.
8. Open the steam vent valve. If the unit is equipped with a superheater, open the superheater drain and vent valves.
9. Recheck the burner, gauge glass, pressure gauge, feedwater supply and the position of all valves. Make sure that all water feeding and level indicating apparatus are in proper working condition.

10. With the vent open, a low fire should be started to heat the unit up gradually. During this step the water level should not fall below normal (center of the water gauge glass) and no steam should be generated.
11. Gradually increase the firing rate to hold the pressure required for the remainder of the cleaning process. Do not increase the pressure at a rate greater than 50 psi/hour. The maximum pressure recommended is approximately 50% of the setting of the lowest set safety valve. A minimum pressure of 5 psi should be maintained.
12. Throughout the entire process, each blowdown point or valve should be blown at once every four hours. The total amount of water blown from all points each time should be approximately one-half gauge glass, this amount being equally divided among the various manual blowdown points and continuous blowdown system. Blow the surface and/or continuous blowdown points first, followed by the other blowdown points lower on the boiler. After each blowdown cycle, the water level should be brought back to full. If the Total Alkalinity in the cleaning solution falls to a level below 3000 ppm it may be necessary to add additional BOND 8050 Boil-Out Cleaner using a chemical pump.
13. It is difficult to provide specific recommendations regarding the duration of the cleaning process. In general, a period of 18 to 36 hours will prove sufficient to internally clean the waterside of the boiler. The condition of the water blown from the boiler is the best indicator as to whether the cleaning process is complete.
14. Shut off the burner and allow the boiler to cool with no draft and no open doors.
15. When the pressure has dropped to 2 – 3 psi, open all vents. Do not drain the unit until the water temperature has fallen to below 120 degrees F.
16. Inspect the boiler drums and remove any sludge that may be present. Wash the boiler thoroughly with a pressure hose. Use the hose on each individual tube including the superheater and economizer tubes. If possible, this washing should be done from the bottom up.
17. Check the fireside for any unusual conditions.
18. If the boiler is not to be put into immediate service, refer to the Bond Water Technologies Shutdown and Lay-up Procedures.

**CAUTION:** THE CHEMICALS USED IN THIS PROCEDURE ARE CORROSIVE TO EYES AND SKIN. ALWAYS REFER TO THE MATERIAL SAFETY DATA SHEET TO INSURE THAT THE PROPER SAFETY EQUIPMENT AND PRECAUTIONS ARE PRESENT.