














CHAPTER SEVEN

Service Techniques

Servicing the Boiler






Suggested servicing at the beginning of season.

-  Check water line setting. Pages 38 and 39.
-  Check operation of LWCO. Pages 104 and 105.
-  Check operation of T-Stat.
-  Check setting of pressure control. Pages 42 and 43.
-  Check operation of automatic feeder. Pages 106 and 107.
-  Check for leaks in piping.
-  Check for leaks under boiler.
-  Flush boiler if required or scheduled.
-  Check operation of any condensate, boiler feed, or vacuum pumps. Pages 108 and 109, 112 and 113.
-  Check fireside flue passages and clean if required.
-  Blow down strainers before traps.
-  Check operation of main vent(s).
-  Check pH level of water, should be between 7.0 to 8.5. Pages 34 and 35.



Questions to ask the home owner or building superintendent.

-  Any noises, new or old?
-  Any areas of home or building hot or cold?
-  Has fuel usage gone up?

Periodic Maintenance



Suggested interval for blowing down any low water cutoffs.

- 🔧 Blow down twice a month during the middle of heating season.
- 🔧 Blow down once a month in mild weather.



Suggested technique for blowing down the boiler.

- 🔧 To check operation of low water cutoff, open blow down valve while burner is firing. The burner should shut off.
- 🔧 Close valve as soon as burner is shut off. Burner should re-fire when water line is restored.



Suggested interval for flushing boiler water completely.

- 🔧 After first year of operation, flush completely.
- 🔧 If water was dirty, flush again the next year.
- 🔧 If water was clean, skip one year.
- 🔧 After 5 years of operation, flush once every 5 years.



Suggested technique for flushing boiler water completely.

- 🔧 Open boiler drain and any dirt legs or cleanouts.
- 🔧 Take off relief valve and open skim trapping.
- 🔧 Work hose nozzle or flushing pipe under full pressure through as much of the boiler as possible.

Notes on Fresh Water Make Up



Keep fresh water to a minimum.

- 🔧 Fresh water has minerals such as lime that come out of solution with the high heat required to make steam.
- 🔧 These minerals will build up over time on the inside of the boiler.
- 🔧 This build up decreases the heat transfer causing fuel bills to go up. At worst, the build up can cause cast iron sections to crack.



Fresh water also has oxygen.

- 🔧 Excessive fresh water can create holes caused by oxygen corrosion in cast iron sections or boiler tubes.

Servicing the Direct Feeder

See pages 106 and 107 for feeder operation theory and diagrams.



If boiler is over filling, break union after feeder valve.



If water is flowing through feeder valve,

- Manually open and close feeder valve several times to clean any obstructions.
- Replace or repair feeder valve if any water keeps flowing.



If water is not flowing through feeder valve,

- Check for leaking manual bypass valve.
- Replace manual bypass valve if leaking.
- Check for clogged pipe in feed line, lime deposits can build up where cold make-up water enters the hot boiler piping.
- The clogged feed pipe can cause back pressure which can hold the valve off its seat allowing too much water through.
- Repair or replace piping.



If boiler is under filling, break union after feeder valve.



Manually open feeder valve. It should move freely and water should flow at full stream.

- If valve does not move freely, open float chamber to check for sediment build up that may be blocking float movement.
- If water does not flow at full steam, check strainer ahead of valve for blockage.



Other items to check if system is experiencing feeder problems.



Check piping connections to manufacturers instructions.

- When feeder or pump control is installed with 1" equalizing pipes, connecting the bottom pipe into boiler return line or the bottom of the boiler can cause flooding.
- Check incoming water pressure. If pressure is above 100 pounds, use a pressure reducing valve.
- Inspect piping connecting feeder to boiler for obstructions.

Detailed Cleaning Techniques



Skimming the water line.

1. Locate skim valve on the side of the boiler. If there is not a skim valve, open as large as possible a tapping on the side of the boiler near the water line. Install at least a 12" nipple with a gate valve the full size of the tapping to use as the skim port.
2. Use the manual feed valve to slowly push water out of the skim port through the open valve.
3. Set system T-stat or cycle rate control to "call for heat."
4. Use the service switch to cycle the burner on and off to keep the water temperature below the boiling point.
5. Continue this process until water flowing out of skim valve is clear of impurities. This may take many hours.
6. Close valve and plug opening.
7. Refill boiler to proper water line.
8. Test operation for a "clean" boiler. Refer to [pages 34 and 35](#).
9. Repeat the process until boiler is clean. This may take many times.



Chemical treatment of the boiler water (1 hour method).

1. Purchase correct amount of cleaner at local supply house. Quantity is based on boiler size.
2. Remove safety valve from boiler and carefully set aside.
3. Pour chemical product into boiler through safety valve opening.
4. Replace safety valve on boiler.
5. Set system T-stat or cycle rate control to "call for heat."
6. Fire boiler constantly for one hour, while observing.
7. Drain the boiler water. The impurities (grease, oil, pipe dope) will drain out with the boiler water.
8. Let boiler cool.
9. Flush the inside of the boiler.
10. Refill the boiler to the proper water line.
11. Test the operation for a "clean" boiler. Refer to [pages 34 and 35](#).
12. Treat the boiler again if dirty. This may take several treatments.

Adding a Boiler Feed Unit

1. Find the end of each steam supply main.
2. Find any steam main drips to the wet return.
3. Float and thermostatic traps will need to be added at the end of each steam main and steam main drip.
4. For one pipe steam, size F+T traps for radiation load and piping load.
5. For two pipe steam, size F+T traps for piping load only.
6. Trace the return line back to the boiler room.
7. Can the condensate flow downhill from the newly installed traps to the boiler feed unit?
8. Does the wet return go under any doorways?
9. Will there be a water leg ahead of the boiler feed unit?
10. Install strainer or dirt leg ahead of trap(s) on supply main(s).
11. Install air vent on discharge side of trap if return piping passes through water leg.
12. Find the location of the new boiler feed unit.
13. Make sure that cooling legs are installed between trap and boiler feed unit. Allow at least 10' of piping distance from trap to boiler feed unit.
14. Add pump control on boiler to activate pump.
15. Install pressure reducing valve on make-up fill line to boiler feed reservoir tank.
16. Install back flow preventor on make-up fill line per local code.
17. Install balance valve on discharge of pump to adjust flow back to boiler.
18. Install check valve with Teflon® (soft) disc on discharge side to keep water in the boiler.
19. Connect pump line to Hartford Loop at least 4" below water line.

Service Ideas for the Safety of Equipment, Property, and People

1. Check the operation of the low water cutoff while the boiler is operating to make sure the burner shuts off.
2. Check the capacity of the safety valve to make sure it exceeds the gross output of the boiler.
3. Replace any safety valve that does not have a piped discharge with a properly sized safety valve that does have a piped discharge.
4. Make sure the safety valve discharge piping is open and piped to within 4" to 6" of floor, or per local code.
5. Check operation of the steam pressure operating control and the steam pressure high limit control.
6. Inform owner to keep combustible materials at least 36" from the boiler.
7. Check chimney and flue for any obstructions, blockages, or leaks.
8. Advise owner to install a carbon monoxide detector and a smoke detector in the boiler room.
9. Perform a carbon monoxide test while the boiler and any other appliances connected to the same chimney are operating.
10. Check to make sure that the available combustion air is adequate and cannot be reduced or closed off.
11. Install a second low water cutoff to act as a back-up to prevent boiler dry-fire.