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Delta BoilOUT Instructions for Hot Boilers (see page 3 for cold boilers)

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The internal surfaces of a new fire tube boiler contain deposits of residual oil, grease and protective coating inbuilt in manufacturing procedures. It is essential that these deposits be removed from the heating surfaces, since this contamination will lower the heat transfer rate and possibly cause overheating of pressure vessel metal. These deposits can generally be removed with ***Delta BoilOUT***.

The boiler should be ready for firing and the operator must be familiar with the operation of the burner and follow instructions contained in the manual. The operating conditions of all auxiliary equipment and instrumentation should be formally checked out. Be sure that auxiliary equipment is of adequate size and pressure to ensure proper operation.

Check for proper voltages, fuses, and overloads. Check rotation of all motors by momentarily closing the motor starter or relay. Check the reset of all starters and controls having the manual reset feature. To the extent possible, all operating mechanisms, valves, and dampers should be checked for evidence of operation and freedom from binding. Check the settings of all controls.

Before operating a boiler feed pump or an oil supply pump, be sure that all valves in the line are open or properly positioned, and that all strainers are clean. Be certain that pump rotation is correct. If in doubt, remove the coupling and check motor rotation. Some pumps can be severely damaged by even a momentarily reversed rotation. Also recheck the coupling alignment.

Make a final and complete pre-startup inspection, especially checking for any loose or uncompleted piping or wiring or any other situation that might present a hazard.

1. If the unit is furnished with prismatic type gauge glass, replace it with the temporary boil-out glass to prevent chemical attack on the operational gauge glass.

2. Remove all manway and/or hand-hole covers to verify that tubes and nozzles are not plugged with foreign materials.

3. Unbolt steam drum girth baffle sections and stack them within the drum to permit exposure of the tube ends to ***BoilOUT*** solution.

4. Wire brush any heavy scale on drum surfaces and vacuum out.

5. Close all inspection openings such as manways, hand-holes, etc.

6. For new boilers, slowly add 3–4 gallons of ***BoilOUT*** for each 100 gallons of boiler water. For re-tubed boilers, add 2–3 gallons of ***BoilOUT*** for each 100 gallons of boiler water.

7. Fill the boiler to the lower visibility level of the water gauge glass.

8. Blow-off valves, drain valves and gauge cocks should be examined and closed.

Note: The normal operating water level is 2" below the geometrical centerline of the steam drum. The low-low water level is 4" below the centerline, and the high water level is 4" above the centerline. Operation of the boiler with high water level will affect the steam purity and with low-low water level may result in overheating of the tubes.

10. Verify proper operation of the gauge glass by opening the gauge glass drain. If no liquid runs out, the obstruction blocking the flow must be removed. If liquid drains out, close drain valve.

11. Purge the flue gas passages, with air, in accordance with the burner manufacturer's recommendations or at least for five minutes.

14. The boiler should not produce steam; however, if it does, allow the unit to steam freely for at least four (4) hours. Watch the level in the gauge glass and always maintain normal water level (midpoint of the gauge glass). It may be necessary to add more ***Delta BoilOUT*** when the water level falls.

15. Close all vents.

16. Hold drum steam pressure at 5–10 psig while maintaining water level near the midpoint of the gauge glass. Adjust heat input, as required, to maintain this pressure.

18. Continue boil-out for at least 48 hours. During this period, open the intermittent blowdown valve and drain an amount of solution equal to one-half of the gauge glass every eight (8) hours, then refill the unit to the midpoint of the gauge glass with ***Delta BoilOUT***.

19. If, at the end of 48 hours, the blowdown is not clean continue the boil-out for an additional eight-hour cycle, continue this cycle until the blowdown is clean. *Blowdown is considered clean if it is oil-free.*

20. When blowdown is clean, remove the heat source, and allow the unit to cool gradually overnight.

21. Drain the boiler when water temperature drops to about 120° F. Remove the inspection covers, and flush the system with water at least three (3) or four (4) times.

23. Inspect pressure parts internally. If any remnant oil is found, repeat the ***BoilOUT*** procedure.

24. Remove the temporary gauge glasses, and replace with the normal service gauge glass.

25. Take the necessary precautions to protect boiler internal surfaces from corrosion by utilizing the appropriate layup procedure.

If oil, dirt, and scale accumulations are permitted to get into the boiler system, it may be necessary to repeat the ***BoilOUT*** procedure. The waterside of the pressure vessel must be kept clean from grease, sludge, and foreign material. Such deposits, if present, will not only shorten the life of the pressure vessel and interfere with efficient operation and functioning of control or safety devices, but might also cause an unnecessary and expensive re-work, repairs, and downtime.

The waterside should be inspected on a periodic basis, which will serve as a check against conditions indicated by chemical analysis of the boiler water. Inspection should be made three (3) months after initial starting and at regular six (6), nine (9), or twelve (12) month intervals thereafter. Use ***Delta Descalers*** for the removal of water-scale deposits for obtaining the utmost in fuel efficiency, for general maintenance, and for prolonging the life of your boiler.

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Delta BoilOUT Instructions for Cold Boilers

Revised May 2025

To use ***BoilOUT*** *without* firing the boiler follow the instructions below.

1. Isolate the boiler to be cleaned.

2. Connect the outlet of a recirculation pump to the lower manway of the boiler. Include a valve near the manway.

3. The inlet boiler fitting should be a 2” pipe connection, or larger, for adequate flow.

4. Connect a 2” fitting, or larger, to the steam drum of the boiler to act as an outlet, or return the flow back to the pump, or recirculation vessel (typically, the shipping tote). Include a valve near the manway.

5. Fill the boiler with water to test all the connections. Circulate the water in the bottom mud drum out the top steam drum, and back to the pump.

6. Inspect and repair any leaking fittings.

7. Introduce ***BoilOUT*** chemical to the boiler.

8. Once the target solution of approximately 4% ***BoilOUT*** solution is introduced, begin circulation.

9. Circulate to stir, using the external pump, returning the steam drum hose to the recirculation vessel.

The goal is a minimum of 48 hours of contact time at a 4% concentration, and at ambient temperature. *Do not exceed the maximum contact time of 72 hours*.

To mitigate the inconvenience of a leak, do **not** circulate when unattended. If leaking, isolate the boiler as effectively as possible to save the chemical charge .

10. Drain after 48 hours to sewer. Rinse with fresh water until clear.

11. Make a final and complete pre-startup inspection. Check for any uncompleted cleaning. If any is found, repeat ***BoilOUT*** procedure.