

How should I decide which boiler layup method to use?

Waterside surfaces of boilers that are out of service are particularly susceptible to corrosion. The length of time the boiler will be out of service and how quickly the boiler may need to be ready for service will determine the layup method.

DRY STORAGE

The dry storage method is recommended whenever a boiler will be out of service for an extended period of time, but must also be available for unit operation in a moderately short period of time.

The following steps must be taken to ensure proper storage using this dry storage method:

1. Bottom blow the boiler at least twice daily for a few days before the boiler is to be shut down. Once the boiler is turned off, bottom blow the boiler every 10-20 psi drop in pressure.
2. Begin to drain the boiler once the pressure is at zero and the temperature is under 140°F. Opening the boiler when it is at this temperature helps dry internal surfaces.
3. The boiler should be thoroughly cleaned and inspected. If possible, all horizontal and non-drainable boiler tubes should be blown with compressed air to remove all water and moisture.
4. Heat should be applied using an external heat source to dry the boiler walls, insulation, tube internals and refractory. Fuel fired heaters should not be used inside the boiler because of the moisture that is generated during the heating process. Please note, a boiler should **never** be dry fired to remove moisture.
5. Immediately after the surfaces are dried, use of specialty drying agents made specifically for dry layup of a boiler can be very effective and convenient and can in many instances remain in the boiler for startup because they volatilize upon heating. One of these unique products is *Boiler Lizard*. Contact your Watertech representative to learn more about these specialty boiler layup products.
6. Manholes, vents and connections should be tightly blanked and closed. The drain between the non-return and main steam stop valves should be left open. The waterside of the boiler should be as air tight as possible.
7. The boiler should be opened every 3-4 months for inspection of the drying agent. It should be replaced as needed.

Although dry storage methods are most recommended, wet storage is an acceptable option in the event of a more temporary standby. The back side of this sheet outlines steps for wet storage.

Laying up a boiler not only extends the overall life of your equipment, but also reduce downtime and maintenance costs.

When a boiler is taken offline and cools down, proper layup is necessary to handle increased oxygen in the system and avoid pitting and corrosion.



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CASCADE BLOWDOWN METHOD

This method consists of piping surface blowdown from an operating boiler to the bottom of the stand-by boiler to keep the idle boiler filled with hot, treated water. The overflow from the vent goes to heat recovery or to the drain. This method is typically not used on boilers with superheaters.

- If the unit to be laid-up has not been cooled and drained, connect the continuous blowdown line from an operating unit to a convenient bottom drain line or blowdown line of the laid-up boiler.
- If refilling an idle boiler, first open a vent line and close it only after completely filling the unit with surface blowdown water from the operating boiler. Then open the continuous blowdown line of the stored boiler to allow a flow of water from the idle boiler. The standby boiler must have no air pockets in the upper portion of the boiler.
- Enough hot surface blowdown from the operating boiler must be available on a continuous basis to keep the standby boiler warm and exterior surfaces of boiler tubes and other components warm enough to prevent condensation from forming on those surfaces. Proper care should be taken to ensure chemical levels are properly maintained in the operating boiler.

Advantages of this method:

- Good corrosion control due to proper sulfite and alkalinity readings
- Boiler contains proper chemical residuals when you return it to service
- Boiler remains hot, so less time and thermal energy is needed to get the unit up to pressure
- Refractory stays hot and fireside corrosion is eliminated
- No need to maintain high chemical residuals. No need to fire the boiler to promote circulation

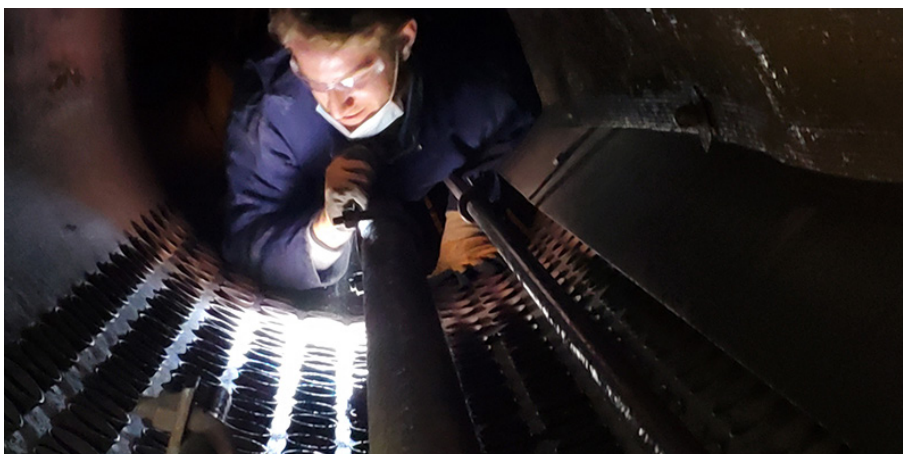
Disadvantages of this method:

- Possible suspended solids deposition if you have poor feedwater quality on operating boiler (1 ppm = 1# sludge/100,000 gallons feedwater)
- Installation cost
- Possible short circuiting
- May not work on multiple boiler operations
- May negate blowdown heat recovery

QUESTIONS?

CALL YOUR WATERTECH SERVICE REPRESENTATIVE

It is not always easy to decide which layup method is best for your boiler. If you have any questions, or concerns regarding your facility's water treatment program, or which layup method may be best for your operation, reach out to your Watertech service representative. We are always happy to help!



WET STORAGE

When using the wet storage method, take at least one of the following precautions to avoid freezing:

- Auxiliary heat
- Cascade lay up boiler with hot boiler water from an operating boiler
- Light firing of the boiler
- Use of a 50/50 water/ethylene-glycol mixture (this however, requires that the boiler be drained, flushed, and filled with fresh feedwater, and a boil out performed prior to start up)

Even though dry storage methods are preferred, wet methods are acceptable whenever a boiler is on emergency standby.

The boiler should be filled to the normal water level with deaerated feedwater. Then add 3-4 pounds caustic soda and 1.5-3.0 pounds sodium sulfite per 1000 gallons of water contained in the boiler. A minimum 200ppm of Hydroxide alkalinity as CaCO_3 , and 200 ppm (mg/L) sulfite as SO_3 should be maintained at all times

- It is highly recommended that a method of boiler water movement be installed such as a circulating pump running water from bottom to top of the boiler to keep chemical mixed. Sulfite will settle to the bottom of the boiler.



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