

## SEASONAL LAYUP PROCESSES FOR BOILERS

### YOUR BOILER MAY BE IDLE, BUT CORROSION ISN'T

If you're a college basketball fan, the month of March conjures up visions of half-court shots, slamming dunks, and game-winning layups. If you're responsible for a building heating system, it also brings thoughts of another kind of "layup:" the seasonal layup of your boiler.

The layup process is a critical part of your maintenance playbook. The goal is to keep corrosion from damaging the boiler during the offseason. The spread of corrosion doesn't stop just because the boiler is out of service; in fact, the majority of oxygen pitting actually takes place while boilers are idle. The layup process addresses this issue by ensuring the boiler is fully drained, vigorously cleaned, carefully inspected, thoroughly repaired (if needed), and appropriately prepared for the offseason. Done properly, the process will extend the life of the boiler, minimize maintenance costs, and set the stage for a smooth return to service.

As you design your process, there are two different options you can consider. One approach is to drain the boiler, dry the internal surfaces, and let it sit empty during the offseason. This is known as a "dry layup." The other choice is to fill the boiler with water that's been treated with corrosion inhibitors. This is called a "wet layup." To choose which is right for your site, ask yourself the following questions:


1. How long will the boiler be out of service?
2. How much notice will I have before I need to bring it back into service?
3. Will the boiler be subjected to freezing temperatures during the offseason?

Wet layups are best when the temperature will be above freezing and the boiler will only be out of service for a short period (less than a month), *or* in cases where the boiler may need to be brought into service on short notice. Dry layups are recommended for situations where the boiler will be out of service for more than a month or where the temperature might fall below the freezing mark.

### PERFORMING A WET LAYUP

In preparation for the wet layup, the boiler should be fully drained and cleaned of existing contaminants, inspected for damage, and repaired if needed. These steps will speed the process when the boiler is returned to service and reduce the risk of issues during the next heating season. The boiler is then refilled with water that's been treated with chemicals to keep corrosion from spreading. The detailed steps look like this:

1. Shut off the boiler and allow the water to cool to a safe temperature.
2. Drain the boiler and flush it to remove any sludge that's accumulated on the bottom.
3. Clean the boiler to remove scale and sediment that will promote corrosion.
4. Inspect the boiler for damage, paying special attention to signs of existing leaks or areas where leaks might form. Repair these areas as necessary.
5. Refill the boiler, using one of the options below to treat the water and protect against corrosion:
  - a. Option 1

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- i. DEHA 20%: 1.5 – 2.0 gallons per 1,000 gallons of water
      - ii. Polymer/Dispersant 20%: 1 – 2 pints per 1,000 gallons of water
      - iii. Cyclohexylamine 40%: 1 gallon to 1,000 gallons of water (or as needed to raise pH to at least 10.0)
    - b. Or Option 2
      - i. Solid Blend product CLS (Sulfite): Enough to maintain a minimum residual of at least 400 ppm as Sulfite (635ppm as Sodium Sulfite)
      - ii. Solid Blend product BT 400 (Alkalinity Builder plus Phosphate): 1 gallon to 1,000 gallons of water to obtain a minimum Hydroxide alkalinity of 700 ppm and a pH of 10.0 or higher and a Phosphate residual of 75m ppm.
  6. Place the boiler on “low fire” to circulate the water and ensure the chemicals are properly mixed.
  7. Fill the boiler completely to the top of the drum and blank off any outlets to avoid getting water into the steam header or superheater. Fill the boiler to achieve 1 psi above atmospheric pressure.
  8. Test the boiler weekly to ensure that proper chemical residuals are being maintained.

## PERFORMING A DRY LAYUP

As with the wet layup, the first steps in preparing for the dry layup are to fully drain and clean the boiler to remove contaminants, inspect for damage, and repair if needed. The dry layup also requires that the boiler be completely dried and filled with desiccant to absorb moisture while it's out of service. The detailed steps are:

1. Shut off the boiler and allow the water to cool to a safe temperature.
2. Drain the boiler and flush it to remove any sludge that's accumulated on the bottom.
3. Clean the boiler to remove scale and sediment that will promote corrosion.
4. Thoroughly dry the boiler using warm air. If you need to, an electric heater can be used to speed the process. Ensure that the superheaters are completely dry.
5. Inspect the boiler for damage, paying special attention to signs of existing leaks or areas where leaks might form. Repair these areas as necessary.
6. Place trays of desiccant in the boiler drum to absorb moisture from the air. The trays should be raised so that air can circulate beneath them. We recommend the following:
  - a. Quick Lime: 6 to 10 pounds per 100 cubic feet of volume or 7 pounds per 1,000 pounds steam rate.
  - b. Silica Gel: 7 to 10 pounds per 100 cubic feet of volume or 8 pounds per 1,000 pounds steam rate.
  - c. Activated Alumina: 7 to 10 pounds per 100 cubic feet of volume or 8 pounds per 1,000 pounds steam rate.
7. Carefully seal the boiler, blanking off any openings through which air or steam might enter.
8. Check the desiccant every two months and replace as needed.

## QUESTIONS?

If you have questions or would like assistance with your layup, Solid Blend is available to help.