



SUBJECT: Steam Boiler Water Treatment

This Technical Services Bulletin replaces SB1002, dated April 28, 2010.

Our update is an effort to help steam boiler service professionals and end users identify an emerging issue of internal corrosion in cast iron steam boilers.

Chlorides

Over the last several decades, the level of chlorides in some ground water and city water supplies have increased due to use of salt during the removal of snow and ice from roads and highways, and the increased use of water softeners. Elevated levels of chlorides (over 200 ppm) in the water of steam boilers will accelerate water side corrosion and shorten the operating life of the boiler.

Chlorides and other dissolved solids are present in boiler make-up water and are not removed from the boiler when the boiler is producing steam. The level of chlorides and dissolved solids in the boiler water increase when make-up water is added to the boiler because of normal maintenance to low water cut-offs and system leaks. If there are high chlorides and dissolved solid levels in boiler make-up water, boiler water treatment should be considered.

In general, cast iron steam boilers do not require water treatment for protection. However, some boiler water treatment chemicals can promote water level instability. Surging and priming in steam boilers can result even though the boiler was thoroughly cleaned before the treatment was added. Systems where treatments should be considered are:

- Process applications
- Contaminated condensation
- Large make-up water requirements
- Systems components requiring corrosion inhibitor
- Extremely hard water
- Make –up water supply with higher than 30 ppm of chloride

Beware of Foam . . .

Water treatment chemicals should be thoroughly reviewed before they are introduced into the boiler and heating system. Of particular concern are foaming agents that will interfere with the disengagement of the steam at the boiler waterline. For this reason, foaming agents cannot be tolerated in steam boilers.

Testing & Treatments

To test the boiler water treatment chemicals, prepare a small amount of the chemical intended for the boiler with water. In a ventilated area, put this mixture into a pan and bring to a 'rolling boil' on the stove. If the mixture foams, it is not suitable for the boiler.

Recognized treatment compounds used for oxygen scavenging and corrosion protection should not affect the life of the elastomer sealing rings. Asking the treatment supplier to test a sealing ring in the proposed compound can eliminate any doubt. In all cases, a compound containing petroleum should not be used.

Without Chemical Treatment

- When the chloride level is above 400 ppm or the total dissolved solids (TDS) are above 1000 ppm, drain and refill the boiler with fresh water and bring the boiler to pressure for 15 minutes per the boiler manual to drive off excess oxygen.
- If chemical treatment is not used, and the chloride level and the TDS level are not monitored, at the end of each heating season, drain and refill the boiler with fresh water to 4-6 inches above the normal water line. Bring the boiler to pressure for 15 minutes per the boiler manual to drive off excess oxygen. The boiler is ready for summer storage.

These steps will help prevent corrosion caused by high conductivity, but may not prevent under-deposit corrosion.

In general, cast iron steam boilers do not require water treatment for protection. However, some water conditions may require the boiler to be drained and refilled, or in more aggressive areas, chemically treated.

If you have any questions or for more information, please contact our Technical Services department at 1-800-526-6636.