Preventing Boiler Water Problems

Leading manufacturer of boiler room equipment across commercial, institutional, and industrial markets

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KEY FACTS

- Scale on a boiler's heat transfer surface denotes a water treatment problem
- No amount of scale in a boiler is acceptable
- Solubilized oxygen is one of the most damaging gases to boilers

A key indicator that a boiler's chemical or mechanical treatment is out of balance is when scale forms on the boiler's heat transfer surface. This condition may result from improper control of hardness formers such as iron, calcium and magnesium. The situation can be further aggravated by not maintaining proper conductivity through reliable surface blowdown, and/or not maintaining the proper alkalinity in the boiler or the proper level of sludge conditioner.

> "No amount of scale in a boiler is acceptable as it impedes heat transfer..."

One of the problems may be that the water softener is not operating correctly due to an empty brine tank, resin bead breakdown through drying and cracking, or a control malfunction. If you see this condition, test the water coming from the softener with a proper reagent to determine if it meets the hardness limits prescribed by a water treatment expert. If it does not, immediately act to correct it.

At the same time, check levels of sludge conditioner, alkalinity and conductivity, which equates to the amount of total dissolved solids (TDS) in the boiler water.

If the scale continues, a boiler will likely overheat and crack the welds holding the tubes to the tube sheet or rupture the boiler tubes. No amount of scale in a boiler is acceptable as it impedes heat transfer and allows Btu's to leave the boiler instead of directing them to the boiler water where they are needed to make either steam or hot water.

Solubilized oxygen is one of the most damaging gases to boilers. Deaeration combined with a proper sulfite dose will rid a boiler of this harmful gas. This action captures the oxygen that remains (solubilized) in the water. After the boiler feedwater has been heated and agitated in the deaerator, nearly all of the oxygen is released to the atmosphere, leaving only trace amounts to be handled by the sulfite treatment.

Failure to properly eliminate oxygen from the boiler water will result in oxygen pitting. Whenever your boiler is down and drained, always look for signs of oxygen pitting.

Carbon dioxide (CO_2) often gets into boiler water as a solubilized carbonate of alkalinity. Through heating and its phase change to steam

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followed by condensing, CO2 is released, lowering the pH in the condensate thus forming a weak carbonic acid (H2CO3). This acidic solution will attack the condensate lines and form a groove along their bottom surface. It will also aggressively attack threaded connections.

Employing mechanical CO2 removal equipment such as a deaerator and a dealkalizer will help mitigate the situation along with administering an effective chemical amine treatment program to supplement the mechanical remediation.

Be sure to maintain good records and note any deviation in hardness or conductivity of the makeup water coming into the boiler system. For boiler feedwater leaving the feeding device, routinely check for hardness, conductivity, alkalinity and iron.

If hardness is high, examine the water softener for proper operation and then check the water meter again to verify the amount of raw makeup coming into the system. If the softener is regenerating on a timer and not a meter, this could be the source of the elevated hardness problem.

In addition, be sure to monitor the sludge conditioner and the oxygen scavenger. Note the amount in the boiler itself as well as your chemical inventory.

To learn more about boiler safety controls, including inspection instructions, click to watch the webinar titled Addressing Boiler Water Problems Before They Start. For questions about chemically treating your boiler water, visit www.chemtexcorp.com.

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