

MANAGING CONDENSATE CONTAMINATION

Steam boiler condensate is a valuable resource, but sometimes it can contain impurities that, if left untreated, can lead to detrimental effects on equipment and operations.

Examples of Problems

- Hardness in the condensate can lead to insulating scale on boiler heat exchange surfaces resulting in increased fuel consumption and potential tube failures.
- Iron can lead to deposits within a boiler that impede heat transfer and flow with the potential for tube failures.

Managing

What is the best approach to managing problem-causing impurities in a condensate system? There are a few answers to this question, depending upon many factors.

Dump the Contaminated Condensate

To quickly mitigate the negative impact of the condensate contamination on boiler operation, the first answer may be to dump the contaminated condensate down the drain. There are a few things to consider when doing this, though.

- Can the softeners or other pretreatment equipment handle the increased load from having less condensate returned to the boiler?
- What is the financial impact of replacing the condensate being sent to the drain with cold makeup that must be softened and heated?
- Can the drain handle the temperature and volume of water?

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Fix the Source of the Contaminant

Leaking heat exchangers, corrosion byproducts, and boiler water carryover can all lead to unwanted impurities in condensate.

- Hardness in condensate is usually from one or more leaking heat exchangers.
- High iron levels can typically be addressed by improved corrosion protection.
- Eliminating boiler carryover may bring the elevated dissolved solids back down.

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Remove the Contaminant

If the source of the problem cannot be fixed, then the next option is to remove the contaminant with a condensate polisher.

- Typically, ion exchange resin is used, such as softening resin to remove hardness and iron.
- In larger or more problem-prone systems, a condensate polisher may be added as a safeguard against times when condensate contamination is occurring until the issue can be corrected.

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Treat for the Contaminant

When the condensate contaminants CANNOT be prevented from entering the steam boiler, the next line of defense is to chemically treat for the condensate contaminant inside the steam boiler itself.

- Deposit, scale, and corrosion inhibitors are commonly included in boiler water treatment programs to handle any undesirable contaminants that make it past the pretreatment equipment or get returned with the condensate.
- Pretreatment failures and fluctuating condensate return can make controlling these internal treatment inhibitors difficult and possibly push them to the point of failure.

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Accept the Impacts of the Contaminant

Last and least is the option of doing nothing.

- The impact may require acid cleaning the boiler, replacing failed boiler tubes, turbine blade imbalance, etc.
- There could be serious safety impacts as well, due to boiler overheating and catastrophic failure, for example.

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