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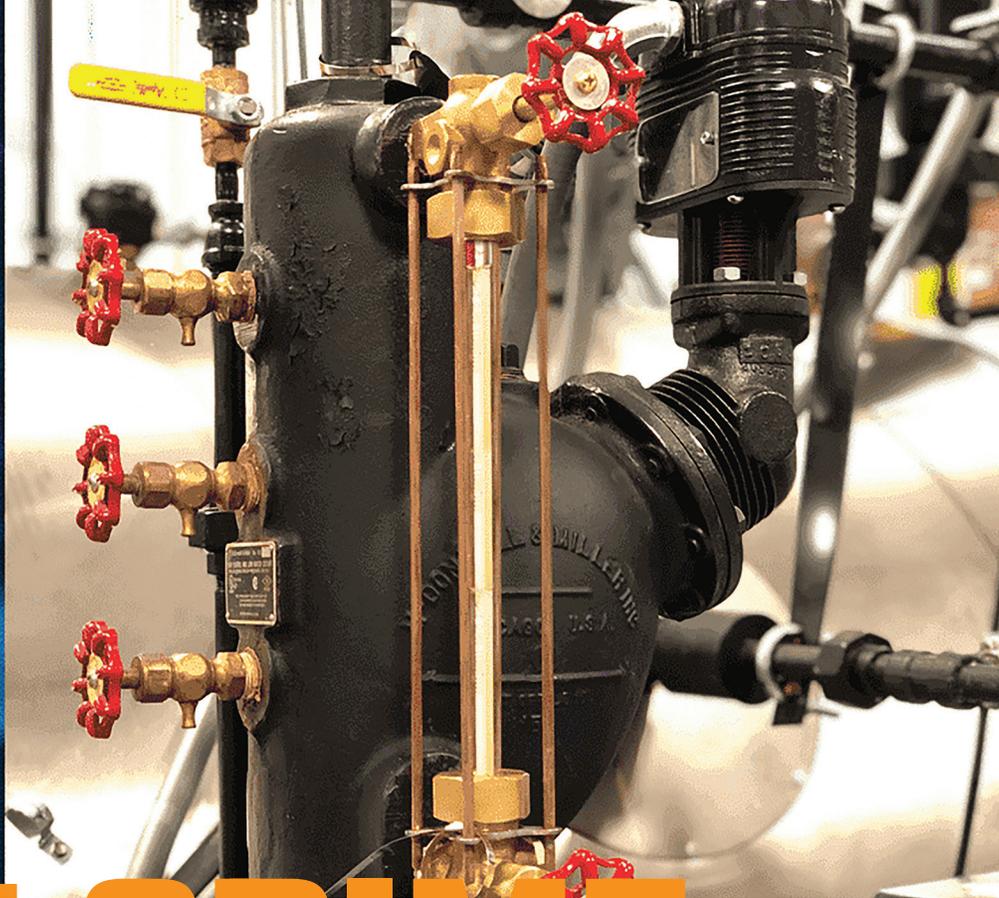
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GRUMPY THROUGH THE YEARS: A THROWBACK
FEATURED IN THE GRIME JUNE/JULY 2015 ISSUE



THE GRIME



SUMMER 2025

HOW TO MANAGE TOO MUCH WATER IN A STEAM BOILER

By: Keith Jackson, WARE Controls Specialist

TOO MUCH OF A GOOD THING

While water is a boiler's literal lifeblood, it's never a case of "more is always better." The quantity of water in a boiler has to be carefully regulated and periodically adjusted to keep your boiler running safely, efficiently, and in-spec.

THERE ARE LIMITS

When running a boiler, you will lose water over time. That's what steam's made of. However, when the water level starts to run low, "add more water, get more steam" only works up to a point. That's because your boiler is specifically designed to use a certain amount of fuel to make a certain amount of heat to put out a set amount of steam per hour.

Even if you had more water and heat to add, the physical size of your boiler will only let so much energy transfer occur between the fireside and the waterside over a given period of time. You could add three more fuel pumps to your car, but it's not going to go any faster. In fact, probably the opposite.

GETTING SWAMPED

When you add too much water to a boiler, you actually end up doing more harm than good. First of all, you're going to lower the temperature inside the boiler. Even though it may have been preheated, that new water that just entered the boiler is always going to be a little cooler than the water already inside.

That's going to drag the whole room down, bringing more of the water to an overall lower temperature and slowing the production of steam. That'll increase your fuel usage and hamper your efficiency, because it's going to take more heat to get all that water back up to working temperatures.

THAT SUCKS

However bad the other consequences of too much water can be, the worst possible outcome from adding too much water is getting water in the steam header. When water is forced out of the header instead of steam, condensate ends up where it's not supposed to go in your steam system. That could cause catastrophic damage, and take you offline for days or weeks.



TURN DOWN THE VOLUME

If you realize your boiler water level is too high, the simplest fix is to perform a blowdown to get the level back where it's supposed to be. By draining off the excess water, you'll create more room for steam, and

help make your boiler perform better. After a high water blowdown, it's best to keep a closer eye on the boiler to make sure that the water level stays where it's supposed to be. If the water level creeps up again, get a qualified technician to perform an inspection to make sure you don't have a water leak, or something worse.

If you need service, maintenance, or inspection, WARE's highly trained and certified technicians will get the job done right. If you're in the market for a new or rental boiler, we have a huge inventory of all sizes ready to go. And if there's anything you need in the way of boiler parts or services, or if you'd like to get a deeper understanding of how a boiler operates, WARE is always here to help. Contact us at your convenience. ■

▶

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HOW TO BLOWDOWN A STEAM BOILER

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SCAN ME

Boiler Trivia

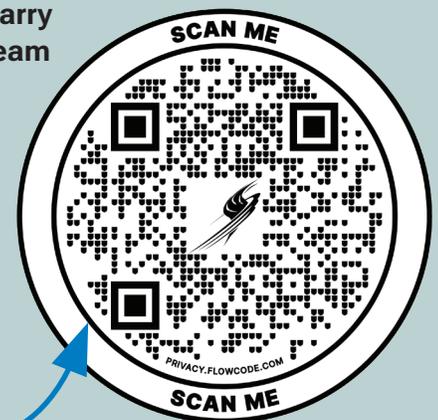
1. Today the term "boilerplate" means standardized text, but the term originally referred to:

- A) Rolled steel plates used in early boiler construction
- B) Metal plates used to print syndicated newspaper copy
- C) Thick furnace linings in marine boilers
- D) High-pressure flanges on industrial boilers

2. The Hogwarts Express in the Harry Potter films is hauled by a real steam locomotive numbered ____.

3. In 1829, Stephenson's Rocket won the Rainhill Trials (designed to choose the best locomotive for the Liverpool & Manchester Railway.) What was its top trial speed?

Reveal answers! →





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BOILING POINT

COMMON PROBLEMS WITH DEAERATOR

Common Problems with a Deaerator

By: Jude Wolf, Senior Instructor at Boiler University

These days, every well-equipped boiler system is sporting a deaerator. They serve several crucial functions on the boiler's water side, the most obvious of which is storage of the feedwater supply. In this role, the deaerator makes sure the boiler has all the feedwater it needs to keep running. But it's doing more than you might realize behind the scenes.

You'll Warm Up to It

The first function the deaerator performs is elevating the temperature of the water before it enters the feedwater supply. By pre-heating the water, the deaerator prevents thermal shock, which is a potentially damaging condition that can occur when cold water enters a boiler running at full or near-full capacity. When the cooler water hits the very hot water and steam inside, it can cause a rapid contraction of hotter surfaces that can damage the boiler shell and tubes.

No Thank You, O₂

The next important function a deaerator performs is the removal of excess oxygen from the feedwater. By removing this oxygen, the deaerator helps reduce the need for chemical additives and treatments that are otherwise required to prevent internal pitting in the boiler. If it's not removed, it will react with the components in the boiler's water side, and cause corrosion.

TESTING & MAINTAINING BOILER SAFETY DEVICES



Inspect & Clean

Check interlocked safety components (air pressure switches, flame safeguard, water-level controls) for corrosion, fouling, or physical damage.



Perform Operational Tests

Energize each device (pressure/temperature controls, relief valves) and verify correct actuation points and response times.



Document & Schedule

Log test results, note any deviations, and set up follow-up service or retraining to address issues before peak season.

Did-You-Know?

Installing an economizer can reclaim up to 79% of the heat normally lost through your exhaust stack. Preheating make-up water from 60°F to 180°F drops required BTUs from 152 to just 32 per pound of water.

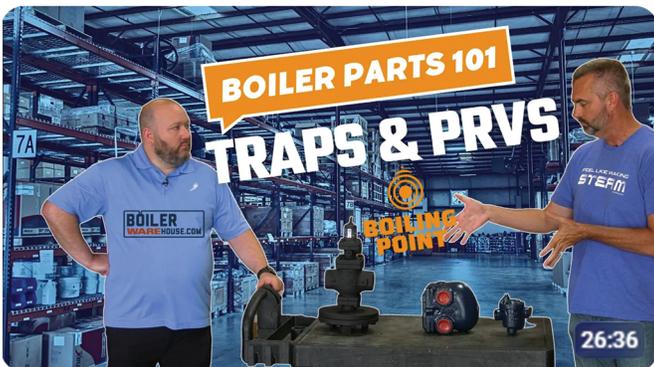
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The deaerator gets rid of oxygen by basically pushing it out of the system through a vent. It does this by heating the water it contains past the normal boiling temperature of 212° F, keeping it under constant pressure to prevent it from actually boiling.

Dial It In

Typically, a deaerator will be set to heat the water to 225-227° F, and maintain it at a pressure of 5-7 psi above ambient pressure. This combination creates ideal conditions for the removal of oxygen, and the prevention of thermal shock. To make sure a deaerator is doing its job correctly, it's important to check its gauges frequently. A drop in either temperature or pressure means something is wrong, and there are several common culprits to check.

- **The Pressure Reducing Valve**

This valve directs steam into the deaerator, while keeping it under enough pressure to allow the proper heating to occur. A malfunctioning pressure reducing valve, often indicated by an intermittent drop in pressure, means the deaerator isn't getting enough steam to do its job. That will cause a subsequent drop in deaerator temperature and pressure. In some instances, the valve may simply be sized too small to let enough steam through to do the job. In either case, the valve should be inspected and serviced or replaced by a qualified WARE technician.

- **The Nozzle**

Another potential problem that can arise in deaerator operation is a malfunctioning spray nozzle. To maximize the surface area of the water as it enters the deaerator -- thereby increasing its ability to absorb heat -- the water is actually introduced as a spray. If that spray nozzle can't distribute the water evenly and finely enough, the water won't absorb enough heat from the incoming steam, and it won't ever get hot enough. Common nozzle problems can include blockage from contaminants, a worn aperture, or a broken spring, all of which can cause uneven spray distribution and insufficient heat transfer.

- **Up, Up, and Away**

One of the most overlooked issues with a deaerator involves the vent, which provides the excess oxygen with a path to escape. If the vent is closed or otherwise blocked for any reason, the oxygen will remain trapped inside the deaerator, where it will displace useful steam. It will also allow the deaerator to maintain the proper pressure, but not the correct temperature. Therefore, one of the telltale signs of a blocked vent is a loss of temperature, but not pressure. If the pressure is within spec but the temperature is too low, the vent is a good place to start troubleshooting.

Remember to check your deaerator temperature and pressure at least daily. It also helps to make sure your gauges and sensors are up to date, and functioning properly. If your deaerator isn't operating up to spec, or you need a new one installed, the skilled, professional technicians at WARE are standing by to help. Contact us today, and we'll get your aerator back on the job and working like it should. ■



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