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SPRING 2024 Newsletter

MDA-9

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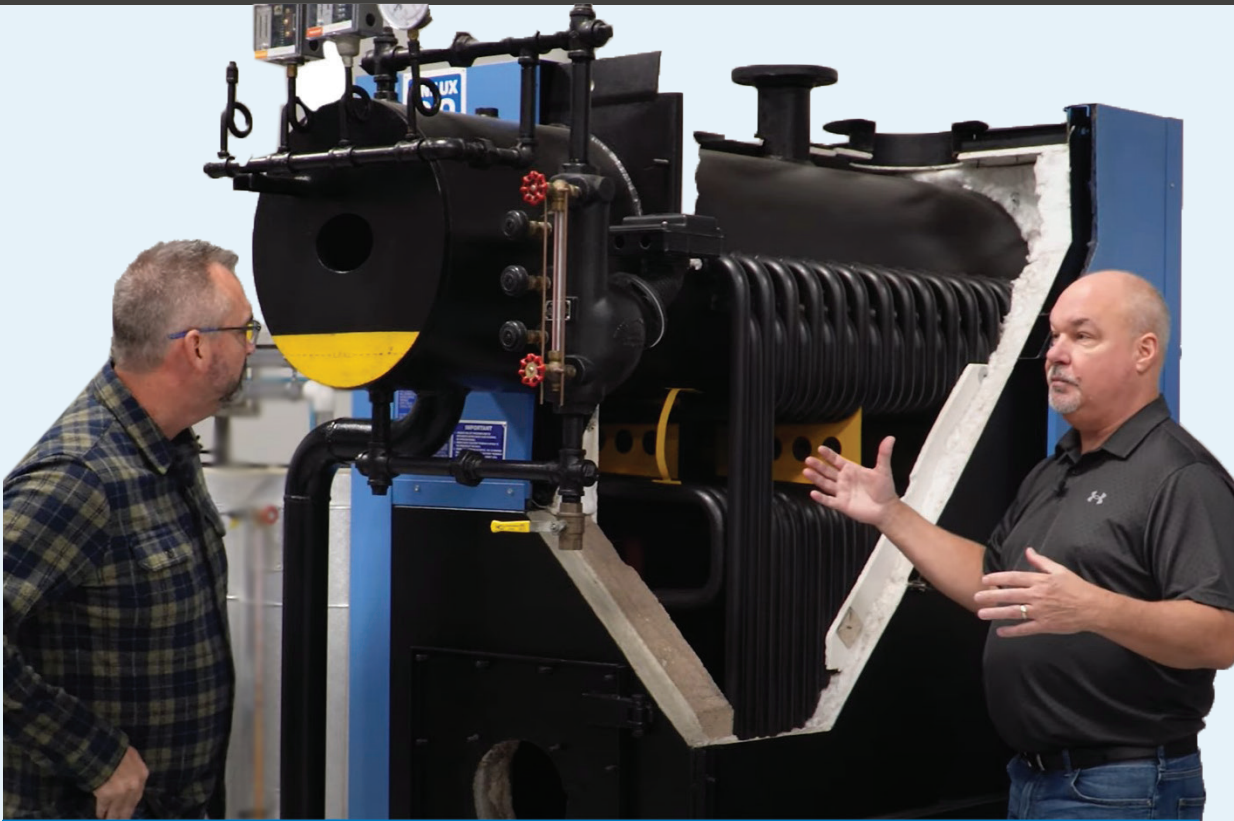
The MDA-9 is a self-contained, portable, large-scale solution for optimizing water quality and removing excess corrosive oxygen on even the largest boiler applications. It offers the best of everything in one, including a deaerator, an integrated water softening system, and variable-speed pump drives, with a massive throughput of 200,000 lb/hr at 100 to 325 psi.

Now, large-scale rental and emergency boiler customers can get truly optimized efficiency and performance without a lot of effort, and without the need for the extensive pipe runs or wasted space that come with modular component connection. We've put it all together for you, and we're standing by to help. It's just one more way we're elevating our customer experience, and our industry.



FLEX TUBE BOILERS

By STEVEN TAYLOR



"Third type of boiler that's becoming increasingly popular, and that's the flex tube design."

Historically, there have been two main kinds of boilers out there: water tube and fire tube. The difference between the two is defined by the function of the tubes in the process of transferring heat to water, and converting that water into steam.

In a water tube boiler, water flows through a series of tubes that are surrounded by hot combustion gases. As the water passes through the tubes, it absorbs heat through the tube walls. Water tube boilers tend to offer a larger capacity, greater operating efficiency, and operate at a higher pressure than fire tube boilers.

By contrast, a fire tube boiler has a series of hollow tubes that are surrounded by water. As hot combustion gases flow through these tubes, the heat passes through the tube walls and is absorbed by the water around them. Fire tube boilers tend to have simpler designs, lower capacities, less efficiency, and operate at lower pressures than water tube boilers.

As far as applications go, you'll

typically find water tube boilers in high-output applications such as power generation and large industrial processes. Fire tube boilers, on the other hand, are most often used in building heating applications, hot water generation, and smaller industrial processes.

Water tube boilers tend to respond more quickly to sudden changes in load and demand, making them a better solution for applications that don't have an even, consistent steam demand.

But there's a third type of boiler that's becoming increasingly popular, and that's the flex tube design. While similar to a water tube boiler in that water flows through tubes surrounded by hot combustion gases, the tubes of a flex tube boiler are actually flexible, allowing the boiler to endure rapidly changing heat levels better than a water tube boiler with rigid, fixed tubes.

DELTA T

If a boiler is suddenly placed under an extreme load and must generate a lot of hot water or steam, a lot of heat

is going to be lost to end work processes. So much heat, in fact, that the boiler won't be reclaiming much of it to preheat the condensate and feedwater. That means any replenishment water is going to be at a lower temperature than normal.

The difference in temperature between the water in the boiler and the water that's being introduced

is known as ΔT . If that difference is too great, it can cause thermal shock, which is what happens when a solid material is subjected to sudden and substantial temperature differential. Since some areas of the solid will expand more rapidly than others, the material will undergo cracking, splitting, and even complete separation. If you've ever dropped an ice cube into a warm drink and heard it snap or pop, you've witnessed thermal shock firsthand.

Most boilers have a certain degree of tolerance to small temperature differences between the tank water and the incoming water. However, if too much of a ΔT occurs in a water tube boiler, the resultant thermal shock can cause the tubes inside to crack and rupture.

That's where the flex tube boiler really shines. Since the tubes are flexible, they are able to withstand a greater ΔT than the rigid tubes in a conventional water tube boiler. Which means that flex tube boilers are able to replenish lost water immediately, even during the greatest demand for steam, with

GAS LEAK DETECTED

GAS LEAKS

By JUDE WOLF

KEEP YOUR TRAIN SAFE

If you have a gas-fired boiler, congratulations, you're using efficient, clean-burning energy to create steam. Right now, your burners are converting gas into energy, and that energy into the steam you need. But it's important to keep all that burning in the fire side where it belongs. After all, gas doesn't know where it is. All it knows is, if you give it some oxygen and a spark, it's going to burn. So it's important to keep your gas flow safe, which means regular inspection of your gas train.

GET ON THE TRAIN

The gas train is technically everything between your boiler's burners and the utility connection. Of course, you'll have pipes through which the gas will flow, but you're going to have a few other important pieces of equipment in there, as well. One of the most crucial is a pressure regulator. The pressure regulator does what the name implies: It makes sure your boiler gets a steady, even flow of gas, even if the supply coming in from the utility has occasional fluctuations.

A consistent flow of gas will let your boiler operate at its most efficient level, because the control system will be able to match the quantity of incoming fuel with the right amount of air to promote efficient combustion. If the supply were to suddenly increase or decrease, and you didn't have a pressure regulator installed,

you'd end up with too much or too little fuel. That would harm your efficiency, obviously, but it could also cause your boiler to run hot, or cause your burners to flame out.

Determining the proper fuel pressure and flow rate isn't something you can do by eyeballing it, which is where the next important piece of equipment in your gas train comes into play: gauges. You'll typically find them on either side of the pressure regulator, so you'll know if your regulator is doing its job.

INSPECTION IS PROTECTION

Typically, whoever insures your building and/or boiler will require a professional inspection of your gas train at least once a year. However, as with most safety guidelines, that's just the minimum. Regular leak-testing is important for a few reasons. First, you'll notice small leaks before they can become big leaks. And second, you'll maximize the return on your energy dollars by making sure every cubic foot of gas is used for its intended purpose.

Leak-testing your gas train starts with an external inspection of the piping, regulators, and gauges outside of your boiler's combustion chamber. Remember, gas under pressure will look for any possible way to escape. That means every joint, every coupling, every fitting, and every gauge housing is a potential place for a leak to develop. Even if they were installed correctly, pipes and housings can shift over time due to physical contact and temperature expansion and contraction. Furthermore, seals, gaskets, and pipe dope can break down

over time, reducing the integrity of the seal.

There are two different methods that will detect a gas leak during your inspection. The method to start with is a gas leak detector, which is a portable device that detects the presence of gas and sounds an alarm or illuminates a warning light if any is detected. Before you use a leak detector, though, the first thing to do is to read the instruction manual and make sure you know how it works. Different detectors use different kinds of alerts to let you know a leak is present, so make sure you know what to look for and listen for.

Once you're familiar with your leak-detecting equipment, the next step is to make sure it's properly calibrated. While different detectors may have different calibration procedures, they all serve to give the detector a zero baseline against which to compare any air it samples. Getting that baseline means calibrating your detector when it's surrounded by clean air that has no gas in it, and that can be as simple as walking outside. If you try to calibrate the leak detector in the boiler room, and you have any sort of a leak going on, the detector won't be as sensitive, and you run the risk of missing small leaks simply because they aren't putting out enough gas to register.

Once the detector has been properly calibrated, you're ready to start the external inspection. Part of the external gas train test can be done when the boiler is shut down. Even when the boiler is off, every part of the gas train up to the first safety shutoff valve is still under pressure. If there's a leak anywhere up to that point, your detector will detect it. The rest of your gas train

[Continued on pg. 7](#)

WARE's YouTube CHANNEL



YouTube channel wareboilers has informational and fun videos involving boilers, burners and more from an industry leading boiler company

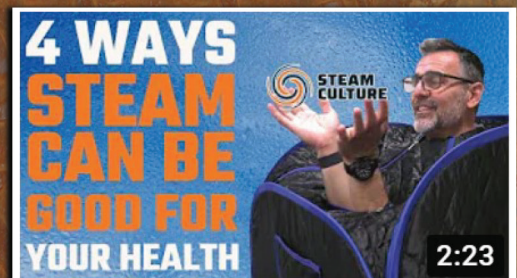
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Boiling Point - Ritchie Ware
Learn different aspects of your
boiler room equipment.



Steam Culture - Brent Falcone
Where steam and culture intersect.



Boiler Tips - Jude Wolf
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professional



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NEW AND USED LIST

ALL EQUIPMENT LISTED IS FOR SALE OR LEASE AND SUBJECT TO AVAILABILITY

Unit	HP/PPH	Year	Manf.	Fuel	Type	PSI	Ctrl.
796	82,500	2016	Victory Energy Faber	(Low NOx) G/#2	Steam	350	IRI
797	82,500	2016	Victory Energy Faber	(Low NOx) G/#2	Steam	350	IRI
767	75,000	2011	Victory Energy	(Low NOx) G/#2	Steam/SH	750/750	IRI
747	75,000	2000	B&W	(Low NOx) G/#2	Steam/SH	750/750	IRI
791	75,000	2016	Victory Energy	(Low NOx) G/#2	Steam/SH	750/750	IRI
709	60,000	1979	Zurn	(Low NOx) G/#2	Steam	500	IRI
741	60,000	1979	Zurn	G/#2	Steam	550	IRI
795	40,000	1986	Cleaver Brooks	Gas	Steam	260	IRI
SWVB4	2500	2021	Victory Energy	(Low Nox) G/#2	Steam	250	UL/CSD-1
SWVB3	1500	2021	Victory Energy	(Low Nox) G/#2	Steam	250	UL/CSD-1
SSB-56	1200	2021	Victory Energy	(Low NOx) G/#2	Steam	250	UL/CSD-1
634	800	1972	York-Shipley	G/#2	Steam	150	IRI
620	800	1975	York-Shipley	G/#2	Steam	250	IRI
SSB-72	800 XID	2023	Victory Energy	(Low NOx) G/#2	Steam	250	UL/CSD-1
SSB-67	600 XID	2023	Victory Energy	(Low NOx) G/#2	Steam	250	UL/CSD-1
SB-139	500	2001	Cleaver Brooks	G/#2	Steam	150	
SB-277	400	2023	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD1
SB-138	350	1994	Cleaver Brooks	G/#2	Steam	150	
SSB-71	300 XID	2023	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
SSB-70	250	2023	Victory Energy	(Low Nox) G/#2	Steam	150	UL/CSD-1
SB-278	250	2023	Victory Energy	(Low Nox) G/#2	Steam	150	UL/CSD-1
SB-148	200	1995	Kewanee	Gas	Steam	325	IRI
SB-264	200	2022	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-273	200	2022	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-146	200	1995	Kewanee	Gas	Steam	325	IRI

TURN THE PAGE FOR MORE EQUIPMENT



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NEW AND USED LIST continued

ALL EQUIPMENT LISTED IS FOR SALE OR LEASE AND SUBJECT TO AVAILABILITY

Unit	HP/PPH	Year	Manf.	Fuel	Type	PSI	Ctrl.
SB-267	175	2022	Victory Energy	G/#2	Steam	150	UL/CSD-1
SSB-53	175 XID	2020	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
SB-280	150	2023	Victory Energy	G/#2	Steam	150	UL/CSD1
SSB-66	150	2023	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD1
SB-279	150	2018	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-274	100	2022	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-275	100	2022	Victory Energy	G/#2	Steam	150	UL/CSD1
SB-276	100	2022	Victory Energy	G/#2	Steam	150	UL/CSD1
SSB-60	100	2022	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD1
SB-271	70	2022	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-272	70	2016	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
SSB-64	70	2022	Victory Energy	(Low Nox) G/#2	Steam	150	UL/CSD-1
SB-283	50	2024	Victory Energy	G/#2	Steam	150	UL/CSD-1
SSB-68	50	2023	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
SB-268	10	2017	Lattner	Gas	Steam	150	

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no risk of damaging the internal components.

This makes them an ideal solution for small to medium applications that have a lot of demand fluctuation, but require rapid boiler recovery.

TURN THE KEY

Another big advantage offered by flex tube boilers is a faster startup time. When a boiler starts up from a cold state, the water inside must normally be warmed up gradually to avoid the aforementioned thermal shock, and to promote even heating of the tubes to prolong their life. With a flex tube boiler, however, a boiler may be heated up more rapidly, because there is no risk of damage to the tubes. That means it can be online and making steam sooner than any other type of boiler.

Flex tube boilers outperform fire tube boilers during startup, as well. Any fire tube boiler operator out there can tell you that starting one up requires a lot of care, attention, and patience. That's one of the main reasons that fire tube boilers aren't shut down as often as other types.

APPLICATIONS

Flex tube boilers work well in any small to medium application. But because of their resistance to thermal shock, flex tube boilers excel at any application that has a large swing in demand, or that requires frequent cycling. Moreover, because they start quickly, they're great for any application that doesn't need a boiler running full time, all the time. As far as pressure goes, flex tube boilers typically operate at anywhere between 160 psi and 500 psi.

KEEP IT CLEAN

As with any boiler, water quality is the key to longevity. It's especially important, though, in a flex tube boiler. Because the tubes have more bends in them, there are more places for impurities and suspended particles to collect as deposits, which can lead to corrosion or inefficient heat transfer.



**Flex Tube Boiler Design:
An In-Depth Look**

will have to be tested with the boiler up and running, so that the entire gas train is properly pressurized.

If your leak detector goes off during the inspection, it's time to pinpoint the location of the leak using the second method of leak detection: the soap test. If you've ever blown a soap bubble before, you've already got an understanding of how the soap test works.

There are commercial sprays available that do an excellent job of creating a wet film that will cause gas leaks to bubble up. If you don't have any of that handy, you can also use a mixture of dish soap and water. Whatever you're using, just pour or spray small amounts of it on any area you suspect of having a leak, wait a few minutes, and give the area a close visual inspection.

If gas is escaping, you'll see bubbles in the film. Those bubbles will give you a visual confirmation of exactly where the gas leak is, so you'll know what you're going to have to deal with when getting it fixed. Maybe it's just a loose gauge. Maybe you've got a joint that's coming apart. Whatever it is, the soap test will let you see it with your own eyes.

Remember, natural gas is lighter than air, which means it tends to rise. So while it's important to inspect every part of your external gas train, you may detect gas that isn't right by the leak. That's why the soap test is the definitive work on the location of the leak.

VALVE TESTS

Sometimes, gas leaks can develop in the shutoff valves themselves. The problem with that is, you can't detect them from the outside because technically, the gas is staying inside the pipe. To test shutoff valves, simply turn the valve off, then use a fitting or cock further on down the gas train to check and see if any gas is getting through. That kind of test involves attaching a flexible tube to the fitting or cock, then submerging the other end of that tube in a glass container full of water. If bubbles start emerging from the submerged end of the tube, you'll

know that gas is seeping through the upstream valve, and you'll need to get it repaired or replaced to make sure your gas train can be shut off completely and safely.

CHECK THE ACTUATOR

When you're testing your gas train during boiler operation, it's important to test the gas train from the safety shutoff valve all the way to the burner manifold. Again, you'll use a leak detector. But pay particular attention to the gas actuator valve. Sometimes the valve stem inside the actuator can leak. But it's not like you can hook up a hose to it for the bubble test. Typically, though, the actuator valve will have a small window in it, and that's where you'll place your leak detector to check for any leaks.

STAY SAFE

Inspections aren't the only thing you can do to keep your gas train safe. It also helps to have a permanent gas detector mounted in your boiler room. Many gas detectors are able to test for multiple substances in the air, which means they can alert you to leaks, and also monitor your air for carbon monoxide.

It's also important to make sure any dope, sealants, or tape that you use in any gas train fitting is rated for the pressure and type of fuel you're using. If you put in the wrong materials, they can cause premature leaks, or even fail completely.

If you find any leaks during your external inspection, be sure to get them repaired as soon as possible. Be sure to also re-inspect the area after the repairs are complete, to make sure the leak was resolved properly.

Remember, WARE is always here to help with your inspections. We also have all the parts, services, training, new boilers, and rental boilers you need. Whatever you need, just let us know.



**Practical Guide for
Identifying GAS Leaks**



BE SAFE. BE SMART. BE EFFICIENT

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Survey of Boiler Room, Components, and Operation

Boiler U 102 - \$800

Steam System Components and Design Overview

Boiler U 201 - \$2200.00

In-Depth Boiler Room, Components, Operation with Lab

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Hands-On Firetube and Deaerator Open/Close

Boiler U 302 - \$2500.00
Principles and Combustion

Boiler U 303 - \$2500.00
Hands On Flame Safeguard and Boiler Control Wiring

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