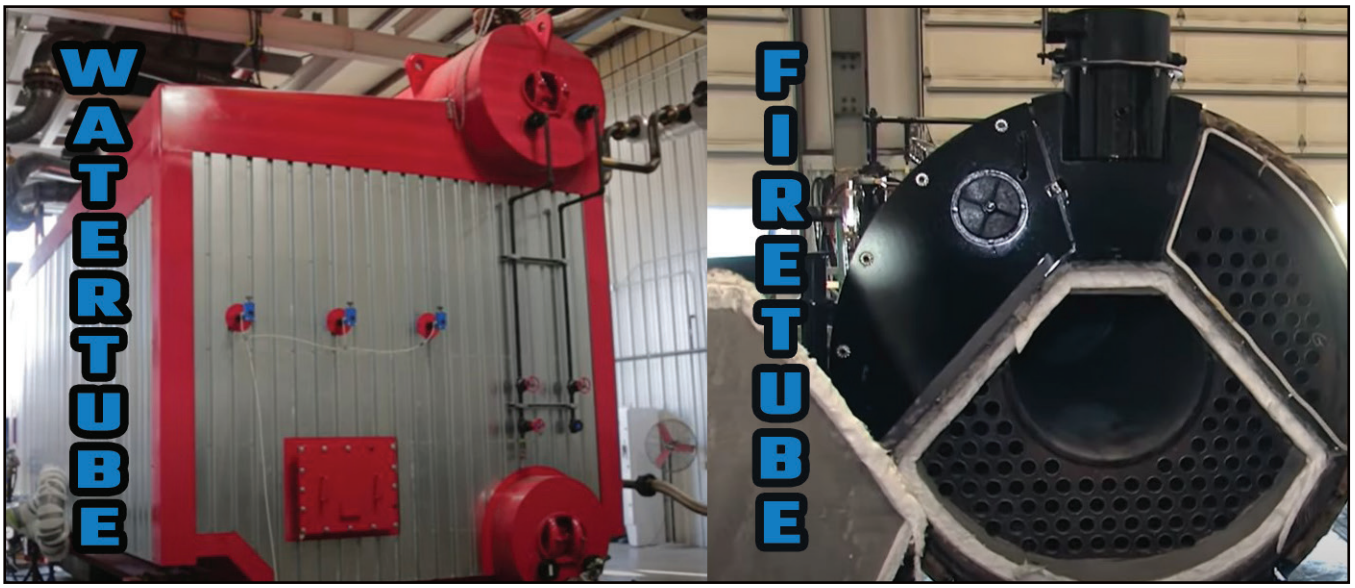
WARE
ALL WAYS STEAM
THE GRIME
WINTER 2023 Newsletter

It's What's Inside That Counts

By STEVE TAYLOR



To most people, a boiler is a boiler. Fill a tank with water, add heat, wait a while, and steam comes out the top. Those of us who really know how the world works, though, understand that boilers come in two configurations: watertube and firetube. While they both do a good job of converting fuel into useable steam, they're innately different on the inside. But do you know why? You're about to.

WHICH SIDE ARE YOU ON?

The main difference between a firetube boiler and a watertube boiler has to do with how the heat is transferred from the burners to the water. While both types of boilers use some combination of tubes and tanks to transfer heat from one medium to another, it's what's inside those tubes that makes the difference. The clue is right there in their names, too.

In a firetube boiler, heat (in the form of combustion gases) is sent back and forth along the length of the boiler through a series of tubes that are surrounded by water. In a watertube boiler, however, water is sent through the tubes, which are surrounded by heat from the boiler's furnace. So why do both kinds exist? Because each kind works best in a specific type of application. Right now, there is no ideal boiler design that works for any and every situation. So depending on your requirements for capacity, load handling, physical footprint, ease of service, and other factors, you might pick a firetube boiler, or a watertube boiler.

COST

Every business has a budget, and there's a boiler to

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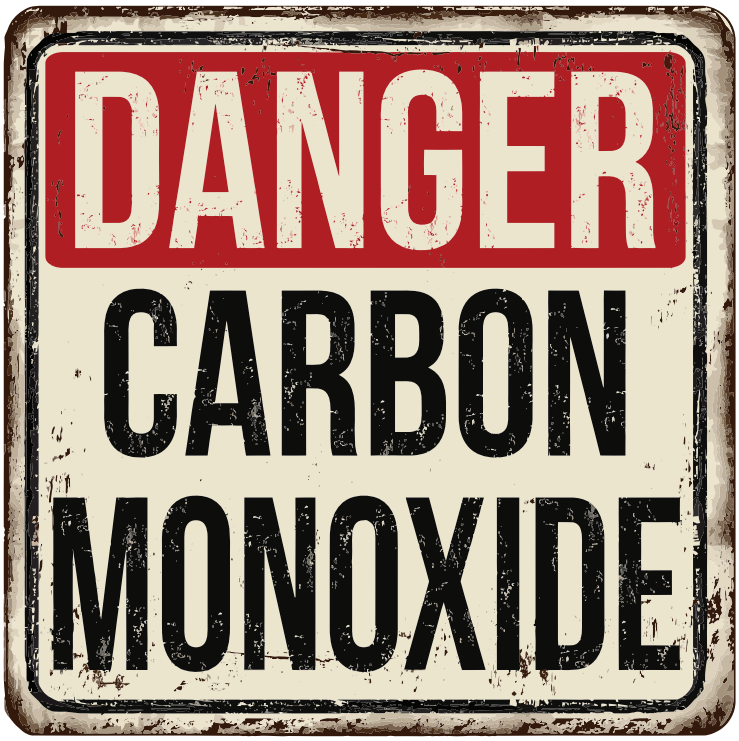
WHAT YOU CAN'T SEE CAN HURT YOU

By GERALD BLAIN



If you want the kind of heat that a boiler requires, you're going to need some sort of combustion. And while burning natural gas, oil, or propane will produce heat very efficiently, they also bring something else with them: carbon monoxide. This odorless, tasteless, colorless gas is generated when pretty much anything burns. It's also nothing to mess around with, which is why it's important to keep your boiler room free of it, and do regular safety checks to make sure there's none hanging around.

HARMFUL AND UNDETECTABLE

When a human being breathes in carbon monoxide, it makes its way from the lungs into the bloodstream where it starts to displace oxygen. Eventually, there isn't enough oxygen flowing through the body to keep the brain and other organs alive. And even if carbon monoxide doesn't kill you, it can still cause permanent brain damage if enough of it is inhaled.

One of the things that makes carbon monoxide so insidious is that people that are breathing it in may not even realize it at first, until they're too incapacitated to call for help or get to a safe, well-ventilated room. Depending on the amount of carbon monoxide in the air, the symptoms can come on slowly and gradually, which may make them even harder to notice until it's too late.

Carbon monoxide poisoning symptoms can include:

- Fatigue
- Headache
- Nausea
- Shortness of breath
- Dizziness
- Disorientation
- Loss of consciousness

If you or anyone around you is experiencing these symptoms in the boiler room, you need to check for carbon monoxide immediately. It claims up to 400 lives per year and sends around 20,000 people to the emergency room. You don't need to be one of them.

STAYING SAFE

Your first defense against carbon monoxide in a boiler room is the most obvious: the stack. In a well-running boiler room, all appreciable carbon monoxide is carried out of the boiler's furnace by the draft. The draft is technically the difference in air pressure between the air around the boiler, and the air inside the boiler and the stack. Colder air is denser and heavier, while warmer air is lighter and less dense. Because of that difference, the colder air flowing into the boiler's furnace will naturally push the hotter, lighter air through the furnace, up through the stack, and out into the atmosphere.

It's incredibly important to keep your stack properly maintained and inspected. If any part of your stack is obstructed or leaky, this will not only release carbon dioxide into the boiler room or surrounding areas, it will also prevent a proper draft from forming. Without a proper draft to carry the byproducts of combustion (including carbon monoxide) away, more and more of it will build up. That's why even small stack leaks are kind of a big deal.

BURN LEANER

A properly tuned and adjusted burner is also important to maintaining safe carbon monoxide levels. The more completely the fuel burns, the less carbon monoxide is generated. By maintaining the fuel/air mixture of the boiler's furnace, the fuel can burn more completely and, in turn, generate fewer byproducts. Which means less carbon monoxide hanging around to deal with.

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Continued from pg. 2, What you can't see can hurt you

Improper combustion can also create another very dangerous situation, as well. If the boiler isn't burning at the proper efficiency, the burners can generate enough carbon monoxide to actually snuff out the flame. That could release extra unburned fuel into the fireside, causing explosions that could damage the boiler or even the people around it.

A BIG FAN OF FANS

Exhaust fans are another crucial piece of equipment for keeping carbon monoxide safely in check. When a furnace first starts, there's obviously not a lot of heat happening. However, the fuel is still being burned, which means carbon monoxide is still being generated. The draft fans kickstart the removal of waste gases, pushing them up and out of the stack until the natural heat-induced draft can take over and do most of the work.

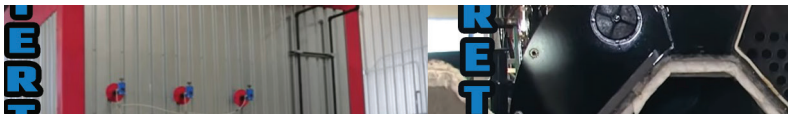
Exhaust fans are also the hero of the purge cycle, which is all about carbon monoxide removal. When a boiler's purge cycle is activated, those exhaust fans are responsible for driving all the remaining exhaust gases up and out of the stack.

KEEPING CO IN CHECK

Modern boiler systems can use sensors to monitor the levels of carbon monoxide in the fire side. In fact, in some states, it's a legal requirement to have carbon monoxide monitoring equipment connected to the boiler's master control system that will sound an alarm if there's too much of the gas present, and then shut everything down or perform an emergency purge if the levels get high enough. Many boiler systems can even modulate the dampers and fans to adjust the forced draft of the boiler to make sure carbon monoxide levels stay within safe limits.

Even if you don't have sophisticated monitoring equipment, it's always smart to have a carbon monoxide detector (or a few) mounted in the boiler room just to be safe. Even the most basic carbon monoxide detector is sensitive enough to sound an alarm before the level in the room becomes life-threatening.

If you suspect your boiler may be leaking carbon monoxide into the surrounding area, don't hesitate to get a professional on the scene immediately. Remember, carbon monoxide can be sneaky and silent, but that doesn't make it any less deadly. Rest assured, the professionals at WARE are always ready to help when you need us. We also have carbon monoxide detection and monitoring equipment built into every one of our rental boilers, as well. Because when it comes to steam, safety is always the most important thing.



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meet yours. Typically, firetube boilers have a lower initial cost of ownership, so you can get the steam flowing for less money up front. In fact, they can be half the cost of a watertube boiler. However, your savings are going to come at a cost. Firetube boilers can't put out as much steam per hour as a watertube boiler, and they operate at lower pressures. So if you need a lot of steam under a lot of pressure, you're going to be a watertube fan. But you're going to pay more for it.

SIZE

If you don't have a lot of space, the firetube boiler is for you. They have a smaller physical footprint, and they are easier to service and maintain. Watertube boilers are larger, and more difficult to maintain and repair. So as long as you don't need the massive steam output of a watertube boiler, a firetube boiler will do the job while taking up a lot less space.

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WARE's YouTube CHANNEL

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

#1 ON-LINE SOURCE FOR BOILER EDUCATION

BOILING POINT

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

STEAM CULTURE

Steam Culture - Brent Falcone
Where steam and culture intersect.

BOILER UNIVERSITY WARE

Boiler Tips - Jude Wolf
Learn boiler tips from a true Boiler professional

OTHER VIDEOS INCLUDE:

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- WARE CAPABILITIES
- FUN WARE VIDEOS

NEW VIDEOS UPLOADS EVERY WEEK

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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
750	70,000	1996	Nebraska	(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-63	800 XID	2022	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-243	400	2018	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD1
SB-138	350	1994	Cleaver Brooks	G/#2	Steam	150	
SSB-39	300 XID	2016	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
SB-258	300	2016	Cleaver Brooks	Gas	Steam	150	ULs
SSB-61	250	2022	Victory Energy	G/#2	Steam	150	UL/CSD-1
SSB-65	250	2023	Victory Energy	(Low Nox) G/#2	Steam	150	UL/CSD-1
SB-148	200	1995	Kewanee	Gas	Steam	325	IRI
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

ONE HOUR QUOTE ON-LINE AT WAREINC.COM OR CALL 800-228-8861

WARE new and used List

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-264	175	2022	Victory Energy	G/#2	Steam	150	UL/CSD1
SB-266	150	2022	Victory Energy	G/#2	Steam	150	UL/CSD1
SSB-66	150	2023	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD1
SB-265	150	2022	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-260	75	2010	Johnston	Gas	Steam	150	UL
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-270	50	2022	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-263	50	2022	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-268	10	2017	Lattner	Gas	Steam	150	

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WARE new and used List

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PRESSURE

The processes your boiler will be supplying will also help determine if you need a firetube or watertube boiler. If you're just using the boiler's steam to supply heat to one or two small buildings, you're not going to need a lot of pressure. Firetube boilers typically operate at 250 psi or less, so they'll get the job done. However, if you're heating a large building or a series of buildings, or if you need the boiler's steam to do some sort of work like powering machinery, you're going to need a lot more pressure. That's where watertube boilers come in.

Watertube boilers operate under a lot of pressure, in the thousands of pounds per square inch, so they can generate, move, and pressurize a lot of steam to get stuff done. Watertube boilers also have the ability to generate superheated steam, which is extremely useful in a lot of industrial processes including chemical reactions, sterilization, cleaning, drying, curing, and even food processing.

DEMAND

In industrial applications or larger operations where a boiler will be serving multiple facilities or buildings, a watertube boiler is the way to go. Because they can generate tremendous amounts of steam, in the millions of pounds per hour, watertube boilers can keep a lot of processes and applications supplied. Firetube boilers, on the other hand, are better suited for a single building or facility that won't require such huge amounts of steam.

Watertube boilers are also better at handling demand surges. Because they generate so much steam, they have the ability to compensate for sudden demand on the fly. Firetube boilers can handle load surges, too, and they can do a fine job of it, but watertube boilers do it with greater precision.

THE FINAL PASS

Watertube and firetube boilers are each ideal for their given applications. Either one is a great choice, depending on how much steam and pressure you need, how many buildings you're supplying, and how much space you have available. Of course, the experts at WARE have the experience and training to help you make the right choice. If you want to do an even deeper dive, why not take a few courses from WARE Boiler University? That's where the experts train. It's pretty fascinating stuff, too. Whatever we can do to help, just let us know.

Watch YouTube **WAREboilers channel**
How a Watertube Boiler Works or
How a Boiler Feedwater Valves

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