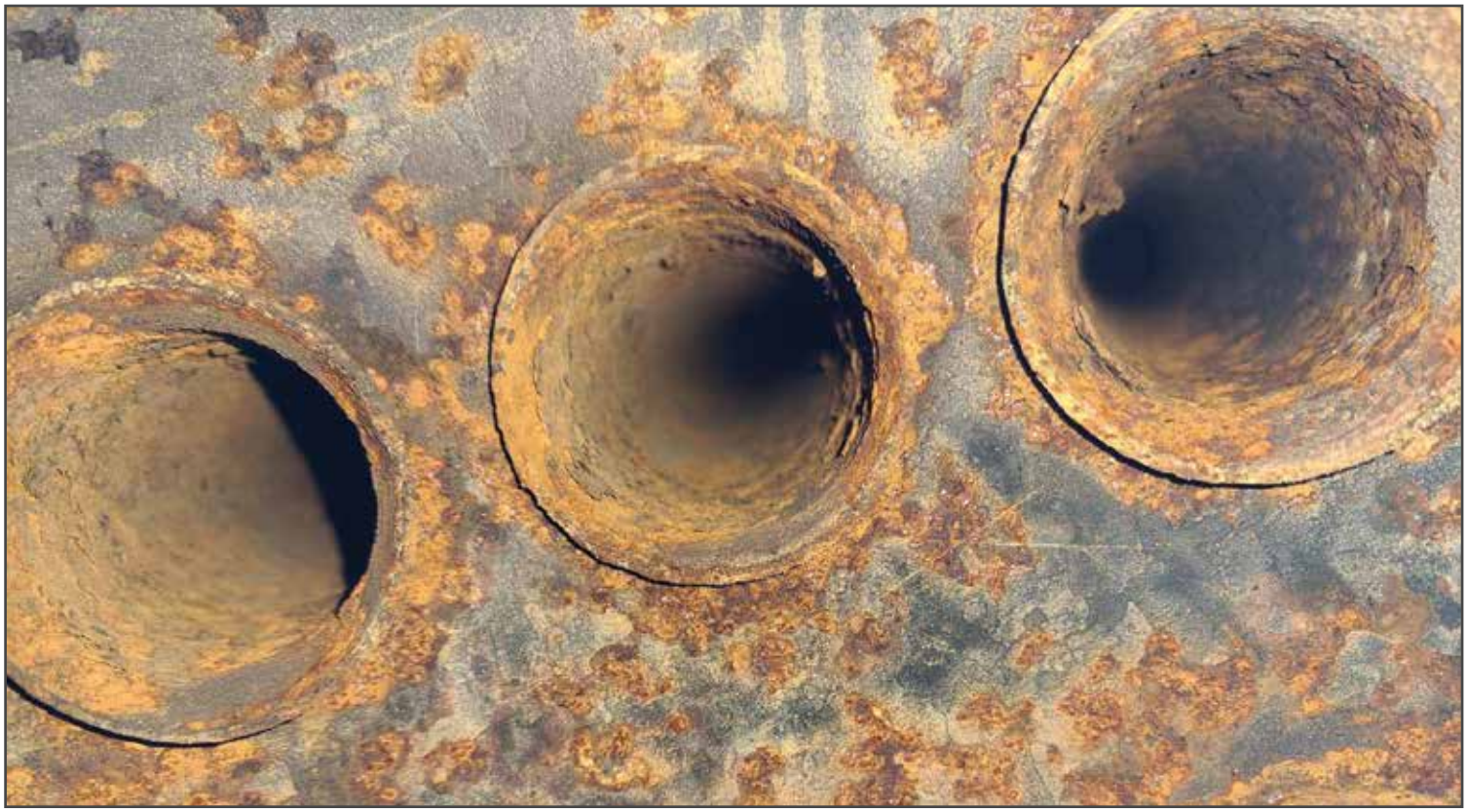
WARE
ALL WAYS STEAM
THE GRIME
FALL 2022 Newsletter

WHY PITTING IS, WELL, THE PITS

By MIKE TAYLOR



Look at an old piece of iron or steel that's been laying around a while, especially one that's been exposed to the elements. Not exactly smooth, is it? Kinda rough and pitted. As we all know, boilers are made from the same stuff. Which means they have to play by the same rules of chemistry and physics. In other words, when the metal in a boiler comes in contact with oxygen, it starts to break down and form metal oxides – also known as rust.

Rust in small localized areas is known as pitting, and it's a serious problem for any boiler. Pits are literally places where metal used to be before oxygen consumed it. Some pits are so tiny you can't see them without magnification. But every little pit has the potential to turn into a big pit. Which can eventually turn into a hole, which is the last thing you want anywhere in your boiler. Pitting doesn't just cause holes (and the corresponding leaks), though. It also weakens the metal around the pit. Weak spots are the last thing you want in a pressurized vessel full of scalding steam.

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IS YOUR BOILER AT RATE?

By JUDE WOLF

When a boiler is firing at its maximum capacity, making its maximum amount of heat and steam, it's firing at "rate". Think of rate as a sort of cruising altitude for a boiler. Right at the top of its power output, firing on all cylinders (metaphorically) and doing the most work it can safely and reliably do. Running your boiler at too low a rate could result in insufficient steam for the processes that rely on your boiler. But running it above rate is even worse.

Rate isn't just a measurement of capacity, it's also a safe limit. By firing your boiler over its maximum rate, a few bad things happen. First, you get diminishing returns on your investment. In other words, cranking up the fuel and the heat by a certain amount past rate will not get you the same corresponding amount of extra steam. Second, and most importantly, you'll be pushing your boiler past its safe operating limits.

When a boiler gets too hot, this can cause damage in several ways. First, it can stress the metal of the boiler, shortening its life. Too much heat can also over heat tube ends, causing cracks or leaks. Over-firing your boiler can also send flames into the second pass and cause combustion problems. So it's best to keep it under the speed limit, so to speak.

FIND YOUR RATE

Finding your boiler's rate starts with knowing how much you're feeding the fire. The incoming fuel flow rate of your boiler will show you how much fuel,

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continued from pg 2, Is Your Boiler At Rate?

and therefore how much potential heat energy, you are putting into your boiler system. Checking your fuel flow rate, also known as "clocking the meter" is actually the best way to determine if your boiler is at rate. By checking the meter frequently, you can get a picture of how much fuel is used on average, so you'll know whether or not you're using too much or too little.

However, it's important to remember that the meter on the utility supply line is also going to be registering the gas used by other equipment besides your boiler, for example space heaters or cooking equipment. Therefore, installing an independent, dedicated gas flow meter just for your boiler's fuel line will give you the most accurate picture of how much fuel is being consumed.

READ THE MANUAL

Another way to determine if your boiler is at rate is by comparing the fuel manifold pressure with the pressure that's specified by the manufacturer. Many boilers have the values clearly indicated on the burner data sheet, so checking to see if you're at rate is just as simple as making sure the readings on the manifold match what the manufacturer says they should be.

When checking your rate this way, though, it's important to take the furnace's pressure into account and subtract it from the manifold pressure sensor reading to get the actual differential of the fuel flowing in. Otherwise, your values maybe off, and you won't get an accurate rate indication.

CHECK YOUR TEMPS

Another way to determine that you're not over rate is by checking the stack temperature. If you're putting too much heat into your boiler, it stands to reason you'll be getting more heat out of it in the exhaust. So if your stack temperature is higher than it should be, it might be an indication that your boiler is over rate.

High stack temperatures can be caused by other things, though. For example, if your water is improperly treated, the impurities inside can collect inside your boiler and act as an insulator. This can indicate that the boiler is over rate even if your fuel flow values are where they're supposed to be. High stack temperatures can also be caused by soot buildup in the fireside of your boiler.

No matter what the cause, high stack temperatures need to be addressed immediately for the safe and efficient operation of your boiler.

If you need any assistance with determining your boiler's rate, let the experts at WARE help you out. You can also learn more about your boiler and how it operates through WARE's Boiler University. No matter what you need, we're here to help.

How To Tell if your boiler is at Rate -Boiling Point

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WATER WATER EVERYWHERE

Pitting is most often found in the boiler's waterside, simply because there's a lot of oxygen floating around there (literally). However, oxygen levels in your waterside can be controlled. One of the most popular ways to combat pitting is with the use of a deaerator.

A deaerator works by heating up the water before it enters the boiler tank. That heat, created by boiler steam, causes the water to release its extra oxygen and other gases before it makes its way to the boiler.

The other popular method for removing excess oxygen is proper water treatment. By adding the right combination of chemicals, the excess oxygen is kept in suspension, or collected in sediment, which is removed by regular blowdowns.

FIRED UP

Pitting isn't just a menace to the waterside, though. It's a problem that can affect your fireside, too. Unburned oxygen in the fireside is still oxygen, and

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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-57	600 XID	2021	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
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

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-59	150	2022	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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it will still attack metal wherever it finds it. That means carbon steel fire tubes. Fire tube pitting is dangerous because it will gradually weaken the metal over time. It can also cause uneven heating that will lead to further stress on the fire tubes.

UNSEEN ENEMY

Pitting can be as sneaky as it is harmful. All too often, it can hide under the scaling in your boiler tank, doing its damage out of sight. So what looks like simple scale buildup could be hiding a much more sinister secret underneath. One that could end up with a leak, or even an explosion.

Pitting isn't just a problem in a working boiler, either. In fact, boilers that are offline may suffer even worse pitting due to the nature of the air left inside. Since the air inside is colder, it's denser. It can also hold more water vapor. Both of those things together mean more oxygen is hanging around. When oxygen hangs around steel, as we all know, it gets up to no good. That's when the pitting starts.

If you see pitting in your boiler and you want an expert to check it out, our highly trained experts are standing by. If there's anything else you need including parts, service, or maintenance, just let us know.

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