Bundle Up! by Alex Taylor, National Account Rep

Winter is coming, and while you are preparing to bundle up and shield yourself from the cold, it is important to know that your equipment should be 'bundled up' as well. We are talking, of course, about insulation. There are three main reasons to insulate a steam or hot water system. The first reason is personnel safety; steam and hot water lines can get extremely hot, so to avoid the chance of employees, contractors, and visitors getting burned by accidentally coming into contact with a hot surface, insulation can offer a layer of protection. Generally the rule of thumb is any hot equipment, pipes or valves that are up to 6 feet from the ground should be insulated. Even if you have an area marked as being off limits or with a barrier around it, people might still get inside and potentially injure themselves, so it is best not to risk lost time incidents, insurance claims, lawsuits, and other undesirable results by leaving that to chance.

The second reason is good payback. Bare metal will allow heat to transfer to the surrounding area, which creates inefficiency and can make the space excessively warm. You are paying for fuel and power to generate heat and make steam or hot water, so you want to make sure that you get your money's worth and that the fluid reaches its destination at the proper temperature to operate your processes or heat something as required. Since it is ultimately costing you in fuel, you can think of this heat loss as a fuel leak in your vehicle—if you were to fill up your fuel tank, and you know that a full tank of gas should take you about 250 miles, you are probably going to be pretty upset when you can't make it anywhere near that far due to a leak in your fuel line; ultimately, you will have to refill the tank more frequently, costing you money. Insulate your system—fix the leak—and save yourself some money.

But just how much money can you save? Most boilers come insulated from the factory, but many deaerators and feedwater systems are ordered bare; insulating these tanks usually results in a 6-8 month payback, depending on the size of the unit, type of insulation, etc. As for steam lines, using the table below, you can take the number of feet of exposed pipe in your facility, cross-reference that with the line size and pressure that you have, and determine how many millions of Btus you are losing each year. Take the total MMBtus that you are losing, multiply that by the price per MMBtu of steam at your facility, and then multiply by the efficiency percentage of the insulation you are considering. The resulting product will be the dollars per year that you can save by insulating your steam lines. Continued on pg.7

Heat Loss per 100 feet of Uninsulated Steam Line

Steam Line Diameter (in.)	Heat Loss per 100 feet of Uninsulated Steam Line (MMBtu/yr)*			
	Steam Pressure (psig)			
	15	**150**	**300**	**600**
1	140	285	375	495
2	235	480	630	840
4	415	850	1,120	1,500
8	740	1,540	2,030	2,725
12	1,055	2,200	2,910	3,920

*Based on horizontal steam pipe, 75°F ambient air, no wind velocity, and 8,760 operating hrs/yr.
Source: U.S. Department of Energy

The Battle Against Oxygen Pitting

How Your Boiler's Sidekick Helps Evens the Odds

Every superhero has an arch nemesis. Superhero's also have sidekicks to help them bring their enemy to justice. One of the biggest enemies of your steam system is oxygen in your feedwater. Among other issues, oxygen present in your boilers feedwater leads to "oxygen pitting" also known as "oxygen attack". The dearator or (DA), is your boilers sidekick, helping fight against oxygen attack.

Oxygen pitting most commonly attacks boiler tubes – it looks like tiny pinholes on the surface of water tubes. When oxygen is in hot water and under pressure, it is highly corrosive. Even the smallest amounts of oxygen present in boiler feedwater can cause catastrophic failure. For all the chemists out there, oxygen attack is an electrochemical process that can be described by the following reactions:

- Anode: Fe è Fe2+ + 2e-
- Cathode: ½ O2 + H2O + 2e- è 2 OH-
- Overall: Fe + ½ O2 + H2O è Fe(OH)2

In this reaction a temperature rise provides enough additional energy to accelerate reactions at the metal surfaces, resulting in a rapid and severe corrosion.

How to guard against oxygen pitting:
Maintain proper DA operation by preforming routine checks:

1. Integrity and functionality of pressure and temperature gauges and sensors
2. Visually check vessel welds for cracks and leaks
3. Visually check for debris and corrosion
4. Semi-annual testing of unit performance – measuring dissolved 02 without chemical feed
5. Evaluate sulfate levels – large swings can be an indication of spray valve malfunction
6. Visually check all valves and man heads
7. Calibrate all instrumentation on an annual basis

Regular checks of O2 levels coming out of the DA: When functioning as specified, your DA liberates the vast majority of O2 in the feedwater – but not all of it. A DA built to today's industry codes will typically provide water with a dissolved O2 content between the range of 6-10 parts per billion. An oxygen scavenger is required to eliminate all dissolved O2 in the feedwater makeup.

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Watch a video on -
The difference between dearator and a condensate tank

Wet and Dry Boiler Storage

Believe it or not, boiler storage can make a considerable difference in the overall lifespan of your boiler. Proper storage reduces the risk of corrosion as well as maintenance costs throughout the life of your boiler. There are two common ways to store your boiler when you take it offline, wet boiler storage and dry storage – also known as wet lay-up and dry lay-up.

Q: When should you "lay-up" your boiler?

A: Simply put, when you take your boiler offline for an extended period of time.

Q: Do I need to preform wet lay-up or dry lay-up on my boiler?

A: There are several factors that play into the decision to preform wet lay-up or dry lay-up. Boiler size, boiler style, the length of the time the boiler will be offline, the temperature where the boiler is stored are all factors that should be considered. In general, if the boiler is going to be offline for a longer period of time, dry lay-up is more appropriate. If the boiler is going offline for a shorter period of time and needs to have a faster response time in start-up, wet lay-up is more appropriate. If the temperature of the storage location of the boiler is below freezing dry storage is best. Dry storage requires less maintenance and requires little to no monitoring.

Q: How do you preform dry lay-up?

A: The following steps should be considered while preforming dry lay-up:

1. Cool the water to below atmospheric boiling point but not lower than 180 degrees F.
2. Flush the boiler and inspect to determine if any repairs are necessary.
3. Thoroughly clean and dry all wetted areas of the boiler.
4. Add moisture absorbing material such as silica or quick lime.
5. In high moisture areas an oil based treatment may be necessary, consult a boiler specialist to determine if oil based treatment is needed.

Q: How do you preform wet lay-up?

A: The following steps should be considered while preforming wet lay-up:

1. Cool the water to below atmospheric boiling point but not lower than 180 degrees F.
2. Flush the boiler and inspect to determine if any repairs are necessary.
3. Thoroughly clean and dry all wetted areas of the boiler.
4. The clean, empty boiler should then be filled to the top with water that has been chemically treated to minimize corrosion during standby.
5. Keep water pressure above atmospheric
6. Add caustic soda and sulfite until water levels reach 450 ppm.
7. Close drains and vents – the boiler can now be filled with clean service water, provided it is treated with hydrazine and volatile alkali.
8. The boiler should then be circulated to prevent chemicals from falling out of the solution.

Storing your boiler properly is critically important to the life of your boiler. For more information on how to properly store and maintain your boiler, reach out to a WARE boiler specialist today.

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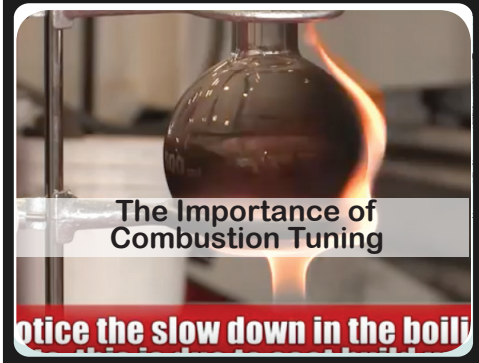
BOILING POINT



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WARE 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.
779	82,500	2013	Victory Energy Limpsfield	(Low NOx) G/#2	Steam	350	IRI
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	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
496	800	1990	York-Shipley	(Low NOx) G/#2	Steam	200	IRI
634	800	1972	York-Shipley	G/#2	Steam	150	IRI
SSB30	800XID	2014	York Shipley	(Low NOx) G#2	Steam	250	UL/CSD-1
620	800	1975	York-Shipley	G/#2	Steam	250	IRI
SSB28	600XID	2012	York Shipley	(Low NOx) G/#2	Steam	250	UL/CSD-1
SSB15	500XID	2011	York Shipley	(Low NOx) G/#2	Steam	150	UL/CSD-1
SB139	500	2001	Cleaver Brooks		Steam	150	
SB226	400	2016	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD1
SB138	350	1994	Cleaver Brooks		Steam	150	
SSB39	300XID	2016	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
SB137	250	1994	Cleaver Brooks		Steam	150	
SSB36	250	2016	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
415	250	1980	Eclipse	#2 Oil	HT/HW	954	IRI
SB216	250XID	2015	York-Shipley	(Low NOx) G/#2	Steam	150	UL/CSD1
SB148	200	1995	Kewanee	Gas	Steam	325	IRI
SB146	200	1995	Kewanee	Gas	Steam	325	IRI
SB213	175XID	2014	York-Shipley	G/#2	Steam	150	UL/CSD1
SB220	175XID	2015	York-Shipley	G/#2	Steam	150	UL/CSD1
SB210	175XID	2014	York-Shipley	G/#2	Steam	150	UL/CSD1
SSB20	175XID	2012	York Shipley	(Low NOx) G/#2	Steam	150	UL/CSD-1

One hour quote on-line at www.wareinc.com or call 800-228-8861

WeRentBoilers.com

All equipment listed is for sale or lease and subject to availability

Unit	HP/PPH	Year	Manf.	Fuel	Type	PSI	Ctrl.
SSB38	150	2016	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
SB235	150	2016	Victory Energy	G/#2	Steam	150	UL/CSD1
SB236	150	2016	Victory Energy	G/#2	Steam	150	UL/CSD1
769	150	1998	Precision	Electric	Steam	150	UL
SB-232	100	2016	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-231	100	2016	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-228	100	2016	Victory Energy	G/#2	Steam	150	UL/CSD-1
SSB37	100	2016	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
SB-230	70	2016	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-229	70	2016	Victory Energy	G/#2	Steam	150	UL/CSD-1
SSB35	70	2016	Victory Energy	(Low NOx) G/#2	Steam	150	UL/CSD-1
SB-234	50	2016	Victory Energy	G/#2	Steam	150	UL/CSD-1
SB-227	50	2016	Victory Energy	G/#2	Steam	150	UL/CSD-1
SSB33	50	2015	York Shipley	(Low NOx) G/#2	Steam	150	UL/CSD-1

Chillers

Unit	Size	Manf.	Volt.	Type	Year		
RC-24	30 ton	Mc Quay	480v	3 ph	2000		
RC-26	40 Ton	Mc Quay	480 v	3 ph	1999		
RC-1	60 Ton	Mc Quay	480 v	3 ph	1995		
RC-2	60 Ton	Mc Quay	480 v	3 ph	1995		
RC-13	60 Ton	Trane	200-230 v	3 ph	1989		
RC-5	95 Ton	Mc Quay	480 v	3 ph	1995		
RC-6	105 Ton	Mc Quay	480 v	3 ph	1995		
RC-8	155 Ton	Mc Quay	480 v	3 ph	1995		
RC-10	195 Ton	Mc Quay	480 v	3 ph	1995		
RC-11	195 Ton	Mc Quay	480 v	3 ph	1995		
RC-25	300 Ton	Mc Quay	480 v	3 ph	2003		

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Bundle Up continued from pg 1.

The third major reason why water and steam lines should be insulated is a common and obvious one: protection from freeze damage. As we enter the winter months, freezing temperatures become a problem for any water-bearing systems. You may think, "My pipes are always full of steam or hot water, they keep themselves from freezing!", but if you experience an unexpected outage and your equipment goes down, they could very well freeze and bust, leaving you with unexpected repair costs and increased downtime. Keeping lines insulated buys you more time to get back online, and heat tracing the lines can offer increased assurance that you will not have this issue.

In the end, it is almost always an excellent decision to insulate your system. The safety, freeze protection, and efficiency/payback benefits from such an upgrade make it a worthwhile investment. Whether you buy traditional fiberglass insulation, newer foam insulation, or even custom-made jackets that can be easily removed and replaced around valves, pipes, etc., there are a number of options that can meet your budgetary needs and still offer a great solution. If you have a complex facility or simply do not have the time to run the analysis yourself, WARE offers steam survey services to help identify inefficiencies and give you an idea of the savings you could achieve by taking advantage of these kinds of improvements. WARE also has an in-house insulation specialist who can provide an estimate and then perform an insulation upgrade for you. As the weather turns colder, be sure that you and your equipment both stay safe and bundle up.

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