xylem
Let's Solve Water

SteamTeam®

Bell & Gossett®
McDonnell & Miller®

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Steam Vapor/Vacuum Systems

Back in the days of coal and wood fired boilers, heating contractors used vacuum air vents to help them get the maximum efficiency out of their steam heating systems. They called these old systems "Vapor/Vacuum," and the principle that made them work was a simple one: At very low pressure, steam takes up about 1700 times more space than water. When that steam condenses, it will create a vacuum if air can't get back into the system. The old timers let the steam expand naturally. It pushed air ahead of itself, through the vacuum vents and out of the system. When the steam condensed in the radiators, it contracted to 1/1700th its size. Air couldn't reenter the system through the vacuum vents because they have check valves at their outlets. If the piping was tight, a deep vacuum would form throughout the system. The nice thing about a vacuum is that it lowers the boiling point of water. If the system was set up right, a vapor/vacuum system could continue to make steam, even after the water temperature dropped as low as 140°F. The old timers could take advantage of every bit of heat from the coal or wood fire as it burned down to embers. They wasted almost nothing. However nowadays most of us fire our steam boilers with gas or oil. Coal and wood fired boilers are still around, but they're the exception to the rule.

Natural gas and oil are convenient fuels however they're not a good choice for systems using vacuum vents because gas and oil burners cycle on and off. This ON/OFF cycling creates problems in systems that have vacuum vents. The vacuum quickly forms when the burner shuts off. Any air that doesn't get vented on the first cycle expends greatly, blocking the movement of the steam "vapor" to the radiators, and because gas and oil burners shut off completely between firing cycles, there's no longer a hot bed of embers to keep the low temperature water boiling. When you mix vacuum vents with gas or oil burned boilers you usually end up with uneven heat through the building, condensate that doesn't return quickly enough from the system, and that can lead to problems with overfilled boiler or flooded system.

Model 75 and 75H Air Valve
Float-type thermostatic vent.
Model 75 for system up to 3 psig.
Model 75H for systems up to 10 psig.

Model 76 Vacuum Valve
Float type thermostatic vent for vacuum systems.
Maximum operating pressure 3 psig.

Hoffman Specialty stopped offering most of vacuum vents more than 25 years ago. Today, we only offer one vacuum vent - the #76 Main Vent. We continue to make this vent for the two pipe coal fired systems that remain.

If you have a two pipe, vapor/vacuum system running on gas or oil, you should be using our #75 Main Vents near the end of each dry return. The steam will push the air through the radiators, into the dry return and out through #75 Vent. The system won't drop into vacuum as long as your radiator traps are working as they should, your old vapor/vacuum system will heat evenly at very low pressure. It usually takes no more than 12 ounces of pressure (0.75 psig). If you suspect your steam traps aren't working as they should, test them with a contact thermometer or a temperature-sensitive crayon. You should see 10 to 15°F drop in temperature across the thermostatic trap if it's working correctly. If the traps are passing steam into the returns, you'll have uneven heat, high fuel bills, boiler water level problems and water hammer noise.

Steam traps are as important on those old coal or wood fired systems as they are on more modern oil or natural

gas systems. You can replace those old steam traps with Hoffman Specialty Thermostatic Traps or repair with Hoffman Specialty Dura-stat® Replacement Module.

Our replacement parts are built to last for many years under the toughest conditions. They fit most old fashioned steam traps, and they pay for themselves in no time with fuel savings and even heat and comfort. Your customer will be thankful for these upgrades.

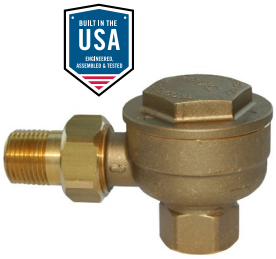
When you think steam system, think Hoffman Specialty. We have the parts and the specialized knowledge to help you solve those tough problems - we are always happy to help you and we appreciate your business!

For all your steam system needs please contact our Factory Representative.
http://bellgossett.com/representatives/

Hoffman Specialty Thermostatic Steam Traps

Excellent choice for residential or commercial heating application 1/2"-1" NPT or BSPT connection.

Maximum working pressure up to 125 psig.



Hoffman Specialty Dura-stat Replacement Modules

Think about upgrading your customers' Thermostatic Trap. There is no better product than Dura-stat Module from Hoffman Specialty.

Cross Reference Replacement

Trap Manufacturer	NPT Size In.	Model Number	BEAR TRAP® Dura-stat Part Number
Hoffman Specialty	1/2	17C	600084
Spirax-Sarco	1/2	TB-25, TH-25, TS-25, H	600056
Barnes & Jones	1/2	122	600053
Dunham-Bush/Mepco	1/2	1C, 1E	600052
Illinois	1/2	1G	600056
Warren Webster	1/2	02H, 502	600250

Running a Long Horizontal Vent Line

When we think of our Condensate Return Units the first one that comes to mind is our standard CC unit. As with any packaged unit, there are times when field conditions create a non-standard installation and operation environment. As a result, questions arise on what can be done. One scenario encountered involved a Model 306CC with a 36 gallon receiver. The location where this unit was installed required the vent pipe to run a horizontal distance of approximately 200-250 feet to reach an outside wall. "Will this be an issue?" is the question that must be answered. To provide the answer, we start by noting the "CC" series of Condensate units are rated for a maximum condensate temperature of 200°F. If the Overflow is piped and primed, the maximum is increased to 209°F. Next, it is important to ask a few additional questions about the installation to verify the "CC" is the correct Domestic Pump series choice. First question, "What is the expected condensate return temperature?" If above the "CC" maximum rating, the "CB" or "CBE" style should be considered. Regardless of final selection, a unit receiver, whether cast iron or steel, is not designed to act as a pressure vessel, and therefore must have proper venting. If the installation site has the potential to allow a condensate return temperature higher than 200°F (209°F), provisions must be made in the field to reduce it to, or below, the recommended maximum prior to entering the receiver. The receiver vent is sized to maintain atmospheric pressure conditions within the chamber at all times. If condensate at, or above, 212°F enters the receiver under this condition, "Flash" steam will develop, which can overtake the vent's ability to maintain neutral pressurization, and thus lead to potential receiver or pump damage, and the discharge of live steam out the vent. The most common method of condensate cooling prior to the receiver inlet is the installation of a vented ASME rated flash tank, which can handle flash steam, allowing the removal of additional sensible and latent heat from the condensate, lowering its temperature to an acceptable level. Other suggested cooling methods include using a heat exchanger with external cooling source, or a dedicated cool water supply piped to the inlet pipe (or the receiver) with a temperature regulating valve to blend the two fluids for a mixed temperature below recommended maximum. While not recommended from Domestic Pump, as a last resort, we have seen the unit receiver oversized to increase the time between pumping cycles, allowing the condensate to cool. Our next question, "Where will the unit be located?". With the request to run a 250' vent line, this answer could reveal possible alternate solutions. If the unit will be isolated from pedestrian traffic, and in a location

Condensate Return Pump Series CC

that does not have additional mechanical or electrical equipment, such as a crawl space, then venting right in the space may be an option, provided condensate temperature is controlled as discussed earlier. Another possible scenario may involve tapping into an existing vent line for other equipment, provided a thorough analysis is done to determine it is adequately sized to handle the equipment it already serves plus our unit, or that it is not subjected to any positive static pressure that can prevent the free flow of air from our unit, or possibly push harmful contaminants into our receiver.

When experiencing any kind of a horizontal run with the vent line, a 1" pitch is ideal (angled back towards the receiver) for every 20' of pipe. So for a 250' run, we need a total vertical height difference of 12.5" from the wall penetration back to the receiver vent elbow or tee. (NOTE: The elbow/tee will most likely be roughly 12" above the inlet threaded opening in the receiver, so looking for at least 24" of head space from top of receiver to wall penetration.)

In addition, with the distance to be traveled by the vent line, consideration to upsizing the pipe 1-2 sizes larger than our threaded vent connection size is recommended. This is due to resistance of air moving through the pipe. Over 250', it is possible the air would run out of energy, and stall somewhere in the pipe before reaching the wall penetration. All the moisture in the air will condense inside the pipe, and no doubt cause corrosion. Overall,

for proper instructions and recommendations on condensate units please reference our Domestic Pump Vented Condensates unit's instruction manual and brochures on the Domestic pump website. There you will find more information about our units, and how to properly install them out on the field.

Instruction manual: https://documentlibrary.xylemappliedwater.com/wp-content/blogs.dir/22/files/2012/11/DN0158F.pdf

Domestic Pump Series CC Condensate Unit Brochure: http://documentlibrary.xylemappliedwater.com/wp-content/blogs.dir/22/files/2012/07/S-215J.pdf

Xylem |'zīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise with a strong focus on developing comprehensive, sustainable solutions.

For more information on how Xylem can help you, go to www.xyleminc.com

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Let's Solve Water

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