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Let's Solve Water

SteamTeam®

Bell & Gossett®
McDonnell & Miller®

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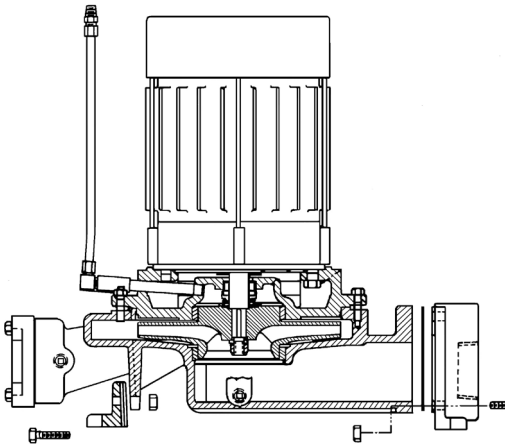
The Domestic Workforce

Is the brain more important, or the heart? Last time, we covered the controls of Domestic Pump® units. Now it's time to look at the heart of Domestic condensate handling equipment – their pumps and motor assemblies.

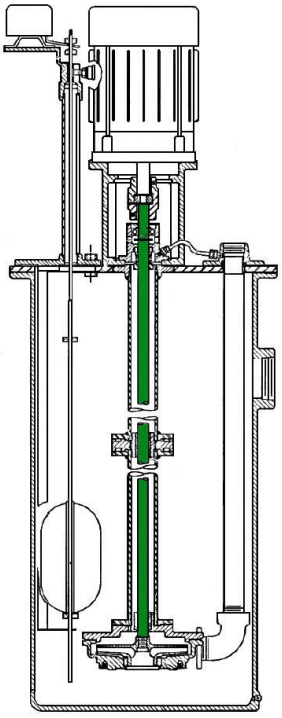
Domestic pumps are base components in the Domestic steam condensate handling equipment. They are also suitable for a variety of other applications, including hot water heating, irrigation, evaporative condensers, cooling towers, air conditioning units, milk coolers and booster service.

Generally there are two groups of pumps produced for all Domestic units, whether for condensate return, boiler feed or vacuum units: Centriflo® C-types and B-types.

Centriflo® C-types are the most common pumps used in Domestic condensate handling equipment. Specially designed for the rigorous demands of this application, Centriflo pumps require a lower NPSH than conventional pumps. Vertical mounting saves floor space and gets the motor up above dirt and water. PF-style flange-mounted pumps can be simply bolted to flat vertical surfaces such as condensate receivers, eliminating suction piping completely. PVF vertical foot-mounted models come with footed NPT connect suction flanges and NPT discharge connections, for ease of use in other, piped applications. Here is an example of a C-type pump.



All pumps for the Domestic underground units are C-type, as well, but with longer shafts, as highlighted in green below.

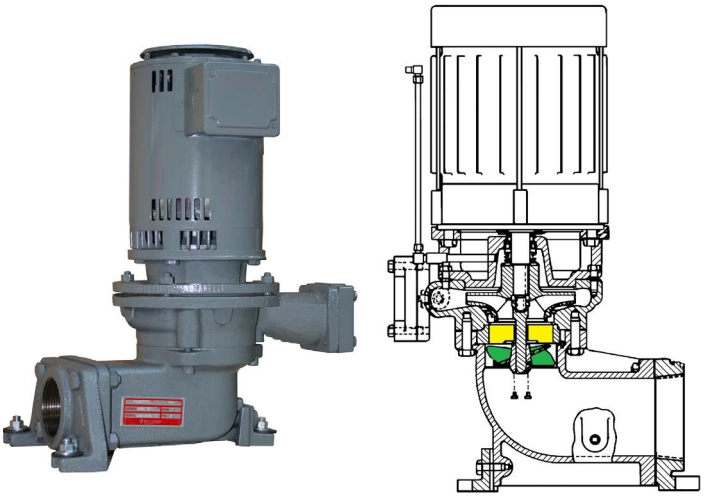


Also, C-type pumps are exclusively used in Domestic vacuum units. They transfer the condensate, and play a major part in producing the vacuum, as well. The pump impeller lacks the close tolerances of other vacuum pumps. System debris of up to 1/8" can pass through the impeller with little to no detrimental impact, all the while continuing to assist in the production of the vacuum. The same can be said for the other vacuum producing components, which are not the topic of this article. However, please stay tuned for the next SteamTeam article to learn how the Domestic vacuum units work, and how that same water pump helps to produce and maintain the required negative pressure.

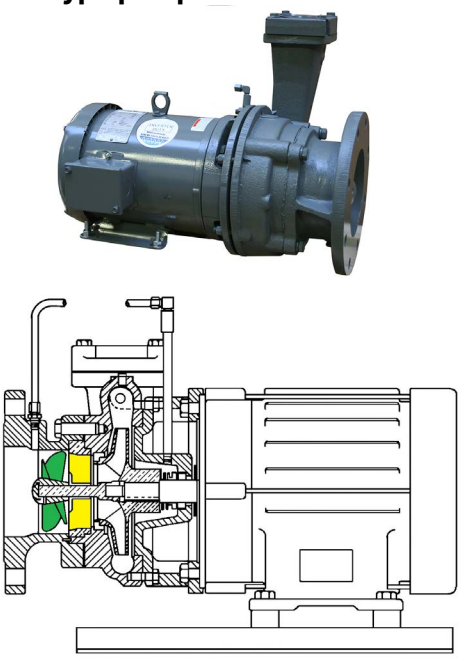
Now, let's turn our attention to B-type pumps. The difference here is an additional suction inducer (propeller) and straightening vanes that create a positive pressure at the main centrifugal impeller, thus guaranteeing low NPSH pump requirements. Those pumps require only 2' NPSH, and can pump condensate with a temperature of up to 210°F at sea level from a vented tank at the same level as the pump suction. Pumps mounted to a vented tank elevated 24" above the pump suction can pump 212°F water. Pumping from a closed loop system is limited to a maximum of 35 psi suction pressure, and may require alternate seals if temperatures exceed 250°F. The PF-B vertical pump can be flange mounted for connection directly to a tank. PVF-B is a vertical pump for separate, standalone floor mounting, and HB horizontal pumps are available for separate mounting. All pumps are bronze-fitted with bronze case wear rings, bronze suction inducers, bronze flow straightening vanes and stainless steel shafts.

Here are examples of vertical and horizontal B-type pumps, with the propellers highlighted in green and the straightening vanes highlighted in yellow.

Vertical B-type pump



Horizontal B-type pump



Features and benefits of all Domestic pumps

- Cast iron, bronze-fitted with stainless steel shaft
- Easily renewable bronze case wearing ring
- Heavy-duty ball bearing motor
- Stainless steel shaft
- Low NPSH, enclosed impeller
- Additional axial flow booster impeller for 2 ft. (0.6 m) NPSHR in B-type pumps
- Large impeller eyes and generously sized suction pipes and passages, to facilitate the pumping of hot water in condensate and boiler feed applications
- Vertical pump versions that protect the motor from moisture and dirt
- Suction flange for mounting directly on a tank or receiver
- Available feet for free-standing operation
- Standard carbon/ceramic mechanical seals designed for 250°F
- Optional Viton seals available
- 35 psi suction pressure
- pH = 7-9
- Available in 3500 RPM and 1750 RPM
- Impellers trimmed to nearest 1/16"
- C-pump capacities to 600 GPM, and pressures to 100 psi
- B-pump capacities to 160 GPM at 100 psi for vertical models, and to 340 GPM at 50 psi for horizontal models

Any questions? Let me know.

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10 Reasons why steam heated buildings heat unevenly

1. The system can't vent fast enough.

If you can't evacuate air from the system, steam can't enter. It's very important to vent the system quickly, to allow the steam travel to all radiators. Main vents are vital to the proper distribution of steam, so make sure to check them.

2. The boiler is piped incorrectly.

Modern steam boilers require the near boiler's piping to help produce "dry" steam. Today's boiler steam chambers are much smaller than the old ones, and steam riser connections are smaller than they used be.

3. The boiler is undersized.

A steam boiler's job is to produce enough steam to fill the entire piping system and all the radiators. The job of the cold pipes and cold radiators is to condense this steam, but if the boiler can't produce enough steam to overcome this mass of cold iron, the steam will not make it out to the furthest radiators. This is why you must size the boiler to the connected load, and then make sure the burner is fired to that load.

4. The steam traps have failed.

Two-pipe systems have radiator traps, and float and thermostatic traps. Their job is to pass air and condensate into the return piping, while preventing the steam from getting past the radiators and the ends of the mains. When these traps fail in the closed position, the air can't get out, so the steam can't get in. But when they fail in the open position, the steam passes into the return lines. Once there, it brings the returns to the same pressure as the supply lines and, with no difference in pressure, the steam stops moving. You have to make sure the steam traps are working properly for the system to operate efficiently.

5. The insulation has been removed from the pipes.

Steam mains are insulated so steam can reach all the radiators. When insulation is removed, the exposed steel piping becomes one very large radiator, and this additional load condenses the steam before it can reach all the radiators. If you see pipes that have their insulation removed, we suggest you either re-insulate them or make sure the new boiler is sized for this additional load.

No. 40 steam radiator vent

No. 1A adjustable steam radiator vent

6. The steam pipes are pitched incorrectly.

When installed correctly, steam mains and horizontal runouts are pitched to allow the condensate and steam to co-exist in the same pipe. Over the years, a building settles and pipe hangers loosen up, changing the pitch of the pipes and allowing condensate to pool along the piping. These puddles will condense the steam as it passes by, creating uneven heat throughout the building. Make sure the steam mains and runouts maintain their proper pitch.

7. The quality of the steam is bad.

If the boiler water is dirty or has a film of oil on its surface, the boiler will make "wet" steam. Because water droplets rob the steam of its latent heat, it condenses in the piping before it reaches all the radiators. Check the quality of the boiler's water by looking at the gauge glass. When the boiler is making "dry" steam, the top portion of the glass will be dry. While the boiler is operating, raise the water line to within one inch of the top of the gauge glass. If water pours over the top, the boiler water is dirty and needs to be cleaned.

8. The wet return lines are partially plugged.

If the steam system has wet returns and is heating unevenly, make sure the returns aren't plugged. If they are, the condensate will back up into the return, trying to overcome the additional pressure drop created by the plugged returns. Condensate will also back up into the main vents, closing them off before all the air is removed from the mains. This can create very uneven distribution of steam throughout the system.

9. Someone has set the pressuretrol too high.

Radiator steam vents have a rating that's known as "drop-away" pressure. This rating has to do with the maximum system pressure at which the vent's float can drop down to re-open when the steam condenses in the radiator. If someone raises the pressuretrol setting beyond the vent's "drop-away" rating, it's possible to close all the radiator vents in the system, and this leads to uneven distribution of heat throughout the building. Always check the pressuretrol setting on the boiler, as well as the "drop-away" rating of the vents in the system.

10. You haven't contacted your local Bell & Gossett representative about your steam heating questions or problems.

Bell & Gossett's people are well versed on all steam heating subjects, and they're willing to share this information with you. All you have to do is give them a call.

Find your local representative:
http://bellgossett.com/sales-service/

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, and agricultural settings. With its October 2016 acquisition of Sensus, Xylem added smart metering, network technologies and advanced data analytics for water, gas and electric utilities to its portfolio of solutions. 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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