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VOLUME 14 ISSUE 1



CounterPoint™

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Helpful HVAC design information from ITT Residential & Commercial Water

WHY INSTALL A "WEATHER-RESPONSIVE" CONTROL SYSTEM?

“How can I lower my fuel bill?” You are probably getting used to hearing that question! Homeowners everywhere are asking the same question, and it’s a golden opportunity for you to talk to homeowners about their heating system. One of the easiest options you can offer any customer with a hot water heating system is to install a “weather responsive” control. Simply turning down the temperature of the water in the boiler - even to a minimum of 140°F - will provide on average...10-15% fuel savings.

Consider the way we size boilers for our heating systems: we pick the boiler based on the design conditions for the coldest day of the year, and we are trying to keep the customers warm by maintaining 70°F inside their homes while the outside temperature may be as low as 0°F or even colder. However, when the outdoor temperature is not at design conditions, our boilers and radiation are in effect oversized, and for most of the heating season the heating load conditions are 50%-60% of design conditions. So here we are...sizing, selling and installing systems that are oversized for 95% of the season. This is where “temperature-responsive” controls provide an opportunity to sell a better job, provide more comfort and cost savings to the customer.

Outdoor reset is accomplished when you increase or decrease the water temperature going out to the system according to the outdoor temperature. The system incorporates an outdoor sensor to inform the control of the

outdoor temperature since this temperature has the greatest impact on the building’s heating load. When you reduce the supply water temperature, you reduce the Btu/h output of the heating terminal unit, ie, the baseboard. This is because you are changing the difference between the air temperature surrounding the baseboard and the water temperature inside the baseboard. By lowering the supply water temperature, you can input the right amount of heat, offsetting the heat loss of the building. A lower water temperature will also create a more comfortable environment for the homeowner because the wide temperature swings that normally occur will be eliminated.

TYPICAL HEATING SYSTEMS

A typical heating system uses a thermostat, which sends a signal to the boiler and a circulator. The circulator turns on and sends 180°F water out to the baseboard zone, and this happens whether it is 10°F or 50°F outside. Most of the time, the 180°F water heats up the zone quickly, and the thermostat - sensing this temperature rise - shuts off the circulator. However, the heat loss from the building has not stopped. It continues as long as the outdoor temperature is below the desired indoor temperature. Therefore, the system continues to cycle on and off, becoming too cold and then too warm.

The Bell & Gossett ZoneTrol™ II Zone Pump Controller is a technologically advanced device that can be



equipped with integrated weather-responsive controls to optimize a hydronic heating system.

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(continued)

THE RESET SOLUTION

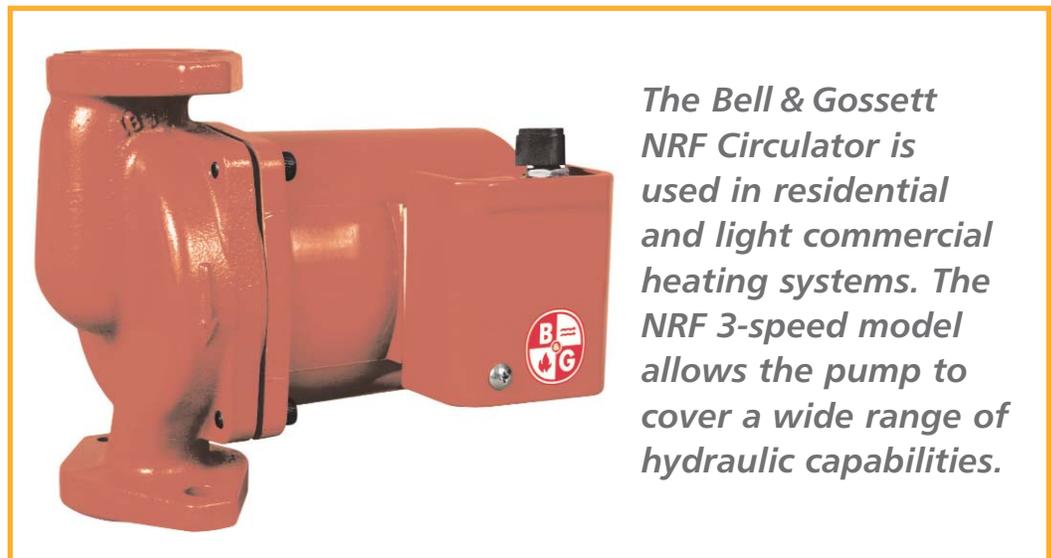
With reset, however, when you change the temperature of the water to match the load, the circulators and/or zone valves stay on for longer periods. This keeps the radiation warm all the time instead of cycling on and off. This more constant supply of cooler, comfortable water also eliminates the creaking and groaning noises usually heard in systems that cycle 180°F water into a zone. Plus, the room temperature will not override due to the excessive water temperatures. Another benefit of resetting a hydronic system is fuel savings. By lowering the water temperature in the boiler and piping system, the stand-by losses and stack losses are minimized.

The concept of changing the water temperature to match the load of the heating system is very logical and has been around for quite some time. Recently however, control technology has advanced considerably, providing some reasonably priced yet very effective residential and commercial hydronic controls.

FLUE GAS CONDENSATION

You should be aware of flue gas condensation. If the temperature of the boiler water is allowed to operate below the dew point of the flue gases, they will condense back into liquid, possibly corroding the boiler, its breaching and flue pipe. The boiler will also experience plugged flue gas passageways between its sections. To prevent this problem from occurring, most boiler-reset controls have a minimum supply temperature setting that is adjustable and can be set to satisfy any boiler manufacturer's minimum water temperature requirements.

If you have any hydronic questions, contact your local Bell & Gossett Representative. They have solutions for all your hot water heating problems.



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