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July 20th 2009 ~ Monday Morning Minutes:

Condensing Boiler Piping – Part 1

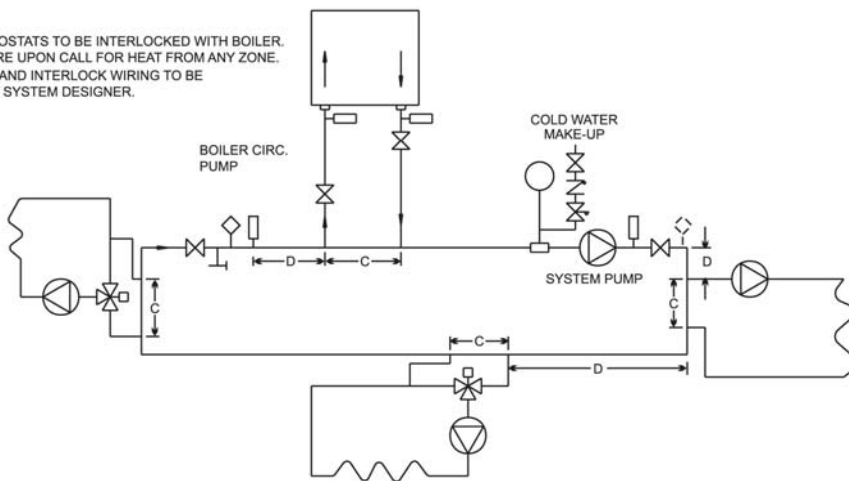
Over the next several weeks, the Monday Morning Minute articles will focus on the piping side of boiler and water heater layout. We will focus on the Laars products and Aerco products separately, for better clarity about the difference in the product installation.

The Laars Neotherm and Rheos + boilers and water heaters are perfect examples of copper fin condensing boilers. When piping these appliances, the manufacturer recommends the use of primary secondary piping arrangements. The Aerco Benchmark and Modulex products also may require primary secondary piping in some system designs. Let's start with a brief description of what primary secondary piping is all about.

Primary Secondary piping is a piping arrangement introduced by Gil Carlson in the ITT Bell and Gossett Engineering Design Manual. The drawing below is from the Laars Rheos + installation manual.

NOTES:

1. ZONE THERMOSTATS TO BE INTERLOCKED WITH BOILER. BOILER TO FIRE UPON CALL FOR HEAT FROM ANY ZONE.
2. ZONE PIPING AND INTERLOCK WIRING TO BE DESIGNED BY SYSTEM DESIGNER.



The piping loop, with the system pump, is called the secondary loop, and the piping loop, with the boiler, is called the primary loop. The three pumps, off of the secondary loop, would be referred to as tertiary loops.

The primary loop is pumped by the Boiler Circ. Pump. The flow rate of the pump is determined by the temperature difference (ΔT) of the boiler design. The pump head is the friction through the boiler, piping, elbows or fittings, and valves in the primary piping.

The secondary loop pump is sized similarly for the secondary piping losses. Please note the piping pressure drop, designated as "C dimension" on the drawing, is included in both the Primary and Secondary pump calculations. This is referred to as the common pipe. Our goal in piping these systems is to keep the pressure drop of the common pipe low. Laars suggests the "C" dimension be 4 pipe diameters or less. By keeping the common pipe pressure drop low, changes in flow rate in the secondary pipe do not cause changes in flow in the primary pipe. This allows us to have a variable flow secondary loop and still use the constant flow boiler in the primary loop.

Next week we will examine the piping of a Laars Neotherm and Laars Rheos +

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