

Maximizing Hydronic System Design - PART II Q&A

Q: Is the pump for the Non-condensing Boiler in a Hybrid System controlled in tandem with the condensing boiler(s)?

A: No. The primary pump for the non-condensing boiler is typically controlled with the boiler. It is typically a constant volume pump to maintain the required minimum flow and prevent condensing in the non-condensing boiler.

Q: You mentioned the use of condensing boilers for pools-- is there a concern with pool water chemistry causing damage to the boiler? Should a heat exchanger be used to separate the flows?

A: Yes; a heat exchanger should be used to separate the pool water from the boiler.

Q: How does blending of two different return temperatures reduce efficiency?

A: When two different returns are coming back to the boiler(s), they will blend in the system piping, raising the return temperature. This reduces the boiler operating efficiency due to less condensing operation compared to a system that can utilize dual returns. If the boiler is equipped with dual returns, the separate return flows can be brought back to the boiler, and if one of the returns is below the flue gas dew point, this will cause the flue gases in the boiler to condense, leading to condensing operating efficiencies.

Q: What should be considered when deciding to centralize or de-centralize heating plant?

A: Most central heating plants are steam with hot water conversion at the heating locations through steam to water heat exchangers. When converting these heating locations to individual hydronic heating systems, there are several things to consider:

1. What is the condition of the central steam plant and its associated piping system?
2. What is the cost of producing steam?
3. What would the cost be to totally replace/operate this system with independent hydronic systems?
4. What would the cost be to provide the flue gas venting for these systems?
5. What would the cost be to run the utilities to these facilities?
6. Would it be possible to financially justify a partial renovation affecting only part of the complex?

Q: One of the selling features of the Cleaver Brooks model CFC-E is the fact that it holds enough water to act as its own buffer tank. I noticed the CFC-E was shown on the buffer tank piping slide. Is that because the CFC-E does not have enough capacity to do so?

A: No, the CFC-E is a high mass boiler normally not requiring a buffer tank unless the piping system is very small requiring additional volume. The graphic you are referring to was only there to reflect the placement of a boiler in the system relative to the buffer tank.

Q: Why are all the pumping configurations drawing through the boiler in lieu of pushing through?

A: We generally recommend pumping away from the boiler. However, low mass boilers that require higher minimum pressures typically pump into the boilers. Higher mass boilers are less susceptible to minimum pressure requirements and therefore you can pump away from the boilers giving better control.

Q: Is a combination boiler a condensing boiler

A: A combi boiler is generally defined as a boiler that handles both space heating and domestic hot water heating, and are usually seen in the residential market.

Q: With more efficient boilers available today and an emphasis on energy savings, what is happening with the use of central steam plants?

A: Note the answer above concerning central plant heating. Each condition is unique and should be evaluated independently. Central systems are still viable, but it will depend on existing infrastructure and first cost investments to determine if the change from steam to hot water is a viable solution.

Q: On what basis is your conclusion that lower water temperatures can often be used come from?

A: Direct experience with these new low temperature heating designs in several buildings in the Midwest. Also, heat recovery chiller designs have been proving this concept for years. We also provided a couple examples of how lower hot water supply temperatures can be used in VAV boxes and fin pipe radiation that still provide the required capacity. As engineers we always like to see the proof, so a good exercise would be to contact your local AHU manufacturer with some coil requirements in MBH and the entering and leaving air conditions. Request for them select the coil for the same water delta T using 180, 160, and 140 degree HWS temperatures to see that is it possible to get the capacity with the lower water

temperatures. There will most definitely be some trade-offs with depth of coils, fin spacing, etc. but as long as you are aware of the limitations, it can be done.

Q: How does a condensing boiler interface with a heat recovery chiller?

A: We would recommend putting the heat recovery condenser water and condenser boiler hot water in parallel with one another. This allows either or both systems to act as the heating hot water source for the building. A relatively simple way to do this is put these in a primary-secondary configuration with a dedicated primary pump for the chiller and a dedicated primary pump for the condensing boiler just as if you had multiple boilers in parallel. They can then provide the heat needed to the secondary loop which is distributed out to the system.