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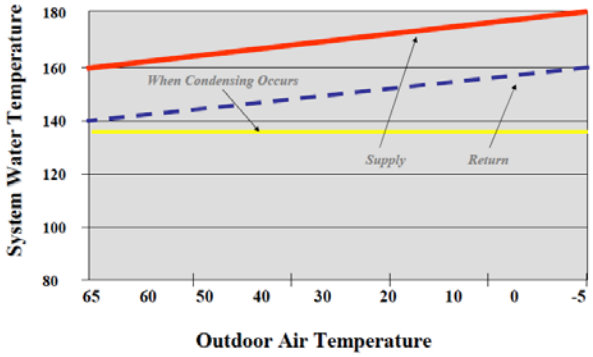
November 30, 2009

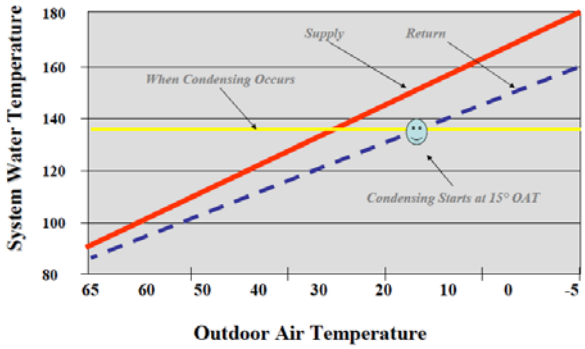
Boiler Outdoor Reset and its Effect on Condensing Boiler Efficiencies (Part 2) By Brad Notter with edit by Norm Hall

On November 9th we defined outdoor reset control. Today we will look at its positive effect on efficiency.

Older 160° Reset example



Condensing Boiler Reset example



Using outdoor reset in buildings is nothing new. Reset was applied for smoother building temperature control. For many years it was accomplished using a three way mixing valve in constant flow systems with large fire tube or bent tube boilers which required no minimum flow rate. In the years past the lowest reset temperature of a boiler was often 160° supply water. With a 20° ΔT

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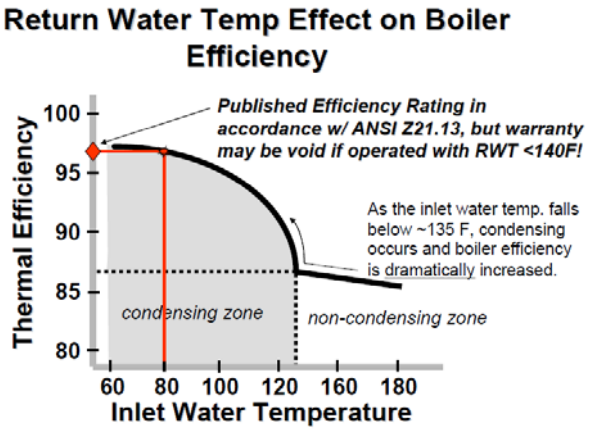
across the system, the return water would be 140° minimum. In non-condensing (older) boilers this is the lowest allowed return temperature to keep them from condensing. If you condense in a non-condensing boiler the life of the unit will be severely shortened due to the destructive acidic nature of flue gas condensate. By using today's condensing boiler technology with heat exchangers designed for the acidic condensate, your building could, for example, use the reset ratio above with a supply water temp of 120° at an outdoor temperature of 40°. At this supply temperature and using a 20° ΔT system design, the return water would be coming back at 110°or even lower.



ASHRAE Equipment Handbook, Boiler Chapter

As the boiler return water is lowered below 140 degrees condensing starts to occur and in a condensing boiler the efficiency is increased. We will continue this example next week.

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