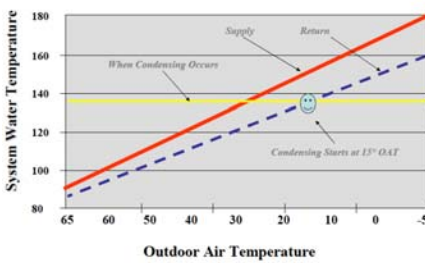


November 30, 2009

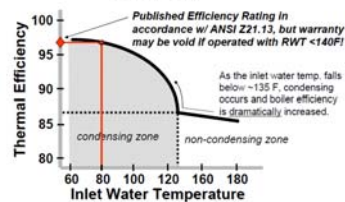
Boiler Outdoor Reset and its Effect on Condensing Boiler Efficiencies (Part 3) By Brad Notter with edit by Norm Hall

Let's continue to examine the reset example we started last week. Using the reset schedule below as our example, we know our supply water temperature will be 120° at an outdoor temperature of 40° and the return water would be at 110° or even lower.

Condensing Boiler Reset example



Return Water Temp Effect on Boiler Efficiency



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.

This increase in efficiency is due to the capture of the latent (hidden heat) of the flue gas turning into condensate. For every pound of condensate made by the boiler, 970 BTUs are recovered. In our example above of 110 degree return water, the efficiency of the boiler operating at 100% input is increased from 86% to 89%. For a 2 million BTU boiler operating at 100 percent input, the 3% increase is equal to 60,000 BTU from 7.75 gallons of condensate.

If we couple the higher efficiency due to temperature with the higher efficiency due to turndown (see Oct 26th & Nov 2nd MMM), we have the increased efficiency of the AERCO boiler.

As the boiler modulates to a lower input firing rate, the efficiency is increased due to the fact the heat transfer surface of the boiler does not change and that surface can capture more of the heat from the burner. If the boiler is operating at 5% input, the efficiency is increased from 86.5% to 92.5%.

(continue on page 2)

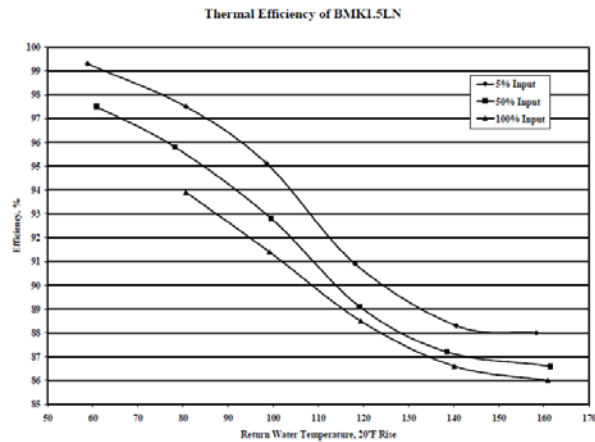
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