Taco®

Sage advice for hydronic pros

System efficiency is the smarter choice

Ever heard of the expression, "Stepping over a dollar to save a dime?" It's a wise observation about the foolishness of being attentive to small matters while ignoring the bigger picture. It's our job to be sure the components we select work together, as a system, to produce the most effective energy efficient heating system possible.

There's been much discussion recently about one seemingly innocuous piece of the system — the circulator. For decades, installers had one type of circulator available to them – a standard, single-speed pump. Since 2004, Taco has sold a variable speed circulator, which varies its speed based on the heating system's Delta T (ΔT), or the water temperature differential between the supply and return piping.

The value of variable speed circulators is their affect on energy efficiency, in terms of both electrical use and system performance. A Taco 008-VDT (variable speed, ΔT pump) has a permanent split capacitor AC motor, which draws between 22-90 watts.

Over the past several months, we've seen an influx of variable speed circulators from Europe that vary their speed based on Delta P (P), or system pressure differential. Their motors are permanent magnet DC electronically commutated motors (ECM) which draw between 5-60 watts, depending on the speed. Seems like a big difference, right?

Well, once numbers are plugged in, (all of which are available by going www.floproteam.com, we found that the purported "80% energy savings" attributed to ECM circulators is actually quite small. Foolishly small.

After all is said and done, the "more efficient" ECM circulators offer a grand total average savings of $3.16 per year when compared to a standard 008-VDT. But when compared to the $50 - $60 savings that the Taco 00 variable speed ΔT circulator can save in annual fuel consumption you really are stepping over a dollar to save a dime.

Follow the Money

Taco's proven it: ΔT system pumping increases comfort and efficiency.

With a ΔT variable speed circulator, the pump varies its speed to maintain the designed-for ΔT. That means the Delta T will always be 20 degrees — or whatever you dial it in for (5 -50°) — even with heating load or outdoor temperature changes.

A circulator changing its speed based on ΔP, however — whether the ΔP is dialed in based on estimated system head loss or is automatically selected — will vary its speed to maintain a fixed system pressure differential. The system ΔT will fluctuate, often decreasing.

How's a reduced ΔT affect the system? Consider the impact on a modulating-condensing boiler. If the system is designed for a 20°F ΔT, but gets only a 12-15°F ΔT, the amount of run-time the boiler spends below the point of flue gas condensation will be affected.

If the boiler is supplying heat to radiators, and the boiler's reset control is telling it to fire to a high limit of 142°F on a 20°F day, a ΔP circ programmed on an estimated system head loss may wind up sending 130°F water back to the boiler. That's right at the condensing point, making the boiler work at, say, 86% AFUE.

But a circulator programmed to deliver a 20°F ΔT will send water back to the boiler at 122°F, creating more condensate, allowing a boiler to hum along at 89% AFUE.

Do those three percentage points make a difference in fuel consumption? Well, at an average rate of $0.80 per therm the Taco Delta T pump can decrease an end-user's annual fuel costs to the tune $50.00 to $60.00 — roughly 15 to 19 times the electrical savings seen with a "more efficient" ECM ΔP circulator.

It's good to look at numbers, see all the numbers and system application information at www.floproteam.com. ■

Taco's 008-VDT variable speed, ΔT pump varies its speed based on the heating system's Delta T — the water temperature differential between the supply and return piping. Installing one of the pumps in a hydronic system reduces condensate and allows the boiler to hum along at 89% AFUE.