By John Barba

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THE STRAIGHT STORY ON PUMP CURVES

Residential circulators are interesting things. You stick 'em in a system, wire 'em up, turn 'em on, and they run.

That's the first of the two criteria most people look at when it comes to circulators: Does it run? It does? Good!

The second: Is anyone calling me to complain that they don't have heat? No?

Ha! Even better … must be the right pump then.

But as we know there are all kinds of circulators out there. There are circulators with steep curves and there are circs with flat curves. There are circulators with multiple curves, and there are circs with variable curves.

Isn't there just one pump that'll do everything? Come to think of it – isn't that why we have three-speed circulators? Why do we need to have all these different circulators?

The short answers: No … no … and because different circulators, with different curves, have different applications.

MYSTERIES R US

I love a good mystery. And this whodunit has Sherlock Holmes, Columbo, and Shaggy, Scoobie and the Mystery Machine, all rolled into one. The mystery in question involved a boiler change out.

The new 80,000 BTUH boiler serves five zone valves. Along with the new boiler, a new expansion tank, pressure reducing valve and air scoop were also installed. The installer, told that a three-speed circulator is the only circulator he'd ever need as it can do everything, installed exactly that, a shiny, new, three-speed beauty.

The old boiler had an old three-piece circulator. The system was nice and quiet, and it heated just fine. Its only crime was that it was old and, therefore, not as efficient as a newer one would be.

The new system was much more efficient and provided the heat needed, but there was one problem – it wasn't quiet at all. The zone valves banged like crazy!

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THREE-SPEED TO THE RESCUE?

I'm sure we've all been told at some point that three-speed circulators are the only ones you'll ever need. After all, it has three speeds, so it must be versatile. Keep it on the truck for service and you'll never go wrong.

Well, that may be correct in theory. You may find that the three very similar pump performance curves of a typical three-speed circulator might technically cover most flow and head requirements you're bound to encounter out there.

But there's one small problem. We don't install circulators in theory.

We install them in houses. And we connect them to systems.

Some jobs, such of those with zone valves, require flat curve (high flow, low head) circulators. Other jobs, such as panel radiator and thermostatic radiator valve installations, require the higher head, lower flow performance of a steep curve circulator (and your most common three-speed circulators have steep curves).

But what if you try sticking the proverbial square peg into a round hole?

For instance, what if you were to install one of those high-head, low-flow, steep-curve three-speed circs in a system with zone valves? Well, if the performance curve of the speed you selected covered the flow and head requirements of the job, it would certainly work. No one would be yelling at you about being cold.

No problem, right? Job done, let's move on … hold up a sec partner … "working" doesn't mean working right.

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"Come Watson, the game is afoot!"

Any good detective starts solving a mystery by asking questions. After all, zone valves don't bang just because they feel like it. Something changed.

So, let's start asking:

- Do all five zone valves bang all the time?
- If all five are calling and one closes, do they bang then?
- Does the banging occur when only one or two zones are calling, and then one closes?

With sound detective work, we learn the banging only happens when one or two zones are calling. When all five zones are calling there's no banging.

"Like zoinks Scoob, a clue!"

Let's examine the evidence more closely. Everything's new, including the circulator. The old three-piece circulator that was quiet and working was replaced with a new three-speed circulator. When the new three-speed model made noise, the installer was told to swap it out for another brand of three-speed instead.

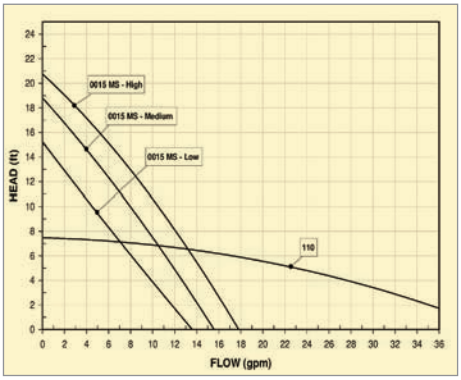
Of course, nothing changed. The system still banged – on all three speeds.

As Scoobie-Doo might say, "Ruh-roh!"

The solution, as it is with most mysteries, is in the details. In this case, it has to do with pump curves.

TO THE CHARTS!

Here are the pump curve charts for the Taco 110 (the original three-piece that was changed out for three-speed pump), as well as the Taco 0015 and the Grundfos 15-58, both being three-speed pumps.

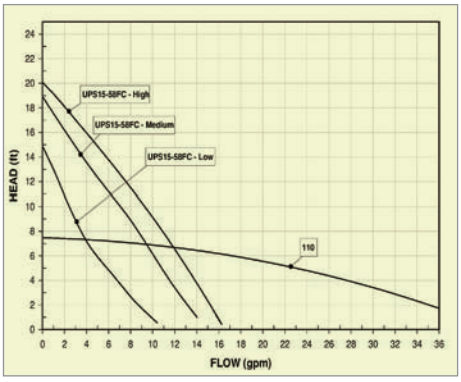


Notice anything?

The 110 is what we call a "flat-curve" pump. It's a high-flow, low-head circulator, perfect for zone valve applications.

The 0015 and 15-58 are so-called "steep-curve" pumps. They have lower flow, but higher head pressure. These are great for radiant floor heating, and are well-suited to be system pumps for panel radiator and thermostatic radiator valve jobs.

The only substantive change in the system in our mystery was in the style of circulator.



TUNE IN NEXT TIME...

So, now that you know the difference in the style of circulators from our mystery, it is time for you to put your thinking cap on. What's making these zone valves bang?

And what are some of the options for making it go away?

Yep – it's a mystery alright. What are your thoughts? I'm eager to share mine, and to offer a firm foundation for solving it … in the very next issue of *Mechanical Business*.