

The advantages of multi-speed hydronic circulation

Multi-speed pumps reduce inventory and easily adapt to various jobs.

By John Vastyan, Special to Oilheating



(Above) Dave Yates wiring.



(Left) Pump wiring.

Hydronic systems aren't built. They're born. And like children in their formative years, we want them to perform well, to be sensitive to their environment, and respond quickly to need.

First, there's the gestation period when the system exists only as a plan. In the mind of a talented and experienced contractor, its many parts and functions are clearly visualized. A design takes shape and is fine-tuned as preparations are made to develop it.

Birth occurs when assembly begins, and the many parts of the system are brought together. Tubing runs are made, copper and black pipe is carefully aligned as components are brought together in the mechanical room. The near-boiler connections look like a work of art. Just add water, right? Well . . . not so fast.

Zen master, chief Wet Head and hydronic sensei Dan Holohan urges us to "Be the Wa-

ter." He encourages installers to visualize the course it will take, to step into the pipe, go with the flow and to see it pass through myriad pumps, valves and manifolds like blood through the circulatory system.

One of the newest developments to enter this "bionic," piped environment is the concept of multi-speed circulation. Not variable speed, but *multi-speed*. Now offered by a few manufacturers, new wet rotor circs—available at the same price point as single speed pumps—have quickly gained the attention of hydronics pros nationwide, including the Dan Foley, Dave Yates and Bob "Hot Rod" Rohr. There are many advantages to multi-speed circulation, including:

- Variability or adjustability of the pumps.
- Suitability for later system retrofits or changes.
- Better overall system performance, making callbacks less likely.
- Fewer pumps in shop and truck inventory.

One of the most important facets to optimal circulation for hydronic systems is for contractors to match a pump's performance, or flow characteristics, to the specific job that it needs to perform within the system. A single-speed pump has one performance curve—a measurement of head (ft) and flow (gpm)—and operates at that level only, with great predictability. But these new circulators offer a much broader range of performance. With the flick of a

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(Photo, right) Bob Sieger (left) and Dave Yates discuss installation of the new pumps.

switch, various speeds can be chosen, easily changing head and flow to meet the specific needs of the system.

The performance of a leading multi-speed circulator, for instance, has a flow range of 0 to 17 gallons per minute and a head range of 0 to 19 feet. The three-speed circulator has a 2-pole, single-phase motor, integrated (removable) check valve and can handle closed-system fluid temperatures of up to 230°F, and all the way down to 36°F.

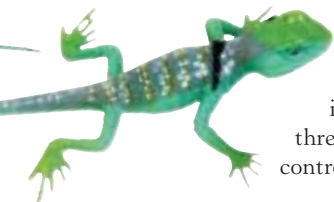
NEW MANTRA: "BE THE LIZARD"

"I like to think of it as lizard-like changeability," says Dave Yates, president of F. W. Behler, Inc., a York, PA-based plumbing and mechanical contracting firm. "Just as a chameleon can change its colors and virtually disappear into the background, a multi-speed circulator dissolves into the system with quiet, almost invisible operation that's set to meet the exact demands of the system."

"I was recently introduced to the SuperBrute pumps [made by Grundfos] through a job that specified the circulator," said Vince Youndt, president of Vertex Mechanical, Inc., based in Stevens, PA. "We were very impressed with the concept of having three speeds to choose from. With radiant heating, we already have the

ability to create as much or little heat in any particular zone by cutting back on the valves, and to

introduce a circulator with three speeds only gives us more control and versatility."



"Our core business is radiant and hydronic systems," offered Dan Foley, president of Foley Mechanical, Inc., based in Alexandria, VA, and past-president of the Radiant Panel Association. "Most of our installations are split into multiple zones. Some are large zones requiring high flow rates and some are small zones requiring low flow rates. We also use injection mixing controls which require relatively low flow rates.

"I always do the math and calculate heat loss, flow rate, and pressure drop for each zone," added Foley. "I use this information and the manufacturer's pump curve to select the proper pump for each zone. In the past, we might have three or four different pump models on one job, all selected to match the exact needs that we've determined. With multi-speed pumps, I can use one pump and select the speed to match the flow and head that we want.

"This also helps us to avoid over-sizing the pumps using a "one-size-fits-all" approach that's not only expensive on the front end, but isn't efficient electrically, either," he said.

"That's an important advantage for us, as well," added Youndt. "We're doing a large radiant heat installation right now where the

Bob Sieger installing.



The Advantages of Multi-Speed Hydronic Circulation

Bob prepares a new circulator for installation.



multi-speed circs have given us the ability to balance water flow to each manifold no matter how many loops are on it. On this job, we have some manifolds with up to seven loops, and one manifold with only one loop. With multi-speeds, we can deliver as much water as we need to each manifold.”

SUITABILITY FOR LATER SYSTEM RETROFITS OR CHANGES

“Let’s face it: many pumps aren’t operating within the ‘sweet spot’ on their flow chart,” added Yates. “By checking the Δ -P across the pump’s inlet and outlet, or by monitoring the loop’s Δ -T for desired results, a field technician can adjust a multi-speed pump to operate within the most desirable pump curve. That saves energy and promotes longer pump life.”

And, say the experts, the use of multi-speed pumps permit downstream adjustments, changes, and retrofits in stride. “We had two situations in one week where multi-speed pumps made our day,” said Yates. “One customer wasn’t getting sufficient heat in a master bath floor for months. Then the circ went out on it. Rather than doing an exact replacement of the single-speed pump, we replaced it with a multi-speed circ and monitored its performance. The pump’s middle setting did the job

sufficiently, but the high setting performed perfectly. Now a high-end job has no compromise.”

The other installation that Yates referred to was at a home where the owners planned, later, to activate 16 feet of fin-tube baseboard radiation in an unfinished part of the house. As they did the install, they calculated that the existing circ zone worked optimally at the pump’s lowest setting. And, for whenever the room would be finished, all that Yates’ crew would need to do would be to fill the line and switch the pump to a higher setting.

126 MILES FROM NOWHERE . . . AND YOU HAVE THE WRONG PUMP?!

Another key advantage for installers is the ability to standardize on one pump line. Multi-speed pumps are adept at serving so many needs that firms like Yates’ and Foley’s are standardizing on one pump line.

“We do a lot of remote jobs,” continued Yates. “Last year one of my crews was working on a large radiant system in one of the state’s most undeveloped regions, 126 miles from the shop. Thinking that they had all the right circs, they discovered that wasn’t the case at all when it was time to install them. This was a major deal at the time. Multi-speed pumps would’ve solved the problem instantly.”

“We now have far fewer pumps in the shop inventory and on the trucks,” added Yates. “It’s allowed us to reduce our inventory, and the supply house is doing the same thing. It’s a definite win-win.”

Grundfos says that in developing its Super-Brute multi-speed circulator, it engineered-in two other characteristics that are useful for contractors. It has super-high starting torque, made possible by a starting torque booster that pulsates DC current into the winding, making the pump act like an impact driver, virtually eliminating a no-start situation. It also has an integrated, removable, check valve that doesn’t reduce pump performance and eliminates the expense of an in-line check valve. □

