Retrofit Focuses on Multi-Speed Hydronic Circulation

By John Vastyan
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Even a state-of-the-art hydronic system can have downstream issues. A few years after a radiant heat system was installed in a large home, the owners put in a call to installer Dave Yates, owner of F. W. Behler, Inc., a York, Pa.-based plumbing and mechanical firm. He learned that mid-winter temperatures of the master bath and great room floors, radiantly heated, were uncomfortably cold.

Yates tested the system and found that the bathroom's circulator "had issues" and would be replaced. He found that heat to the great room could be increased by either stepping-up the heat, or increasing the speed of water circulation within the floor.

But because the room wasn't separately zoned, increasing the water temperature would not be the easiest solution. Increasing circulation speed would entail replacing the existing circulator with one that would do the job.

"Once we'd studied the system, and taken plenty of floor temperature readings, it was clear that the customer wasn't getting sufficient heat a couple floor areas, including the master bath, a challenge they'd endured for months," Yates said. "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."

He added, "We were able to find a similar solution for the other floor areas. It all came down to tightening the performance of the system's circulation, something we were able to do readily, and at a reasonable cost to the homeowner. Now a high-end job has no compromise."

One of the newest developments to enter the world of hydronics is the concept of multi-speed circulation. Not variable speed, but multi-speed. Now offered by Grundfos, Versaflo and SuperBrute wet rotor circs are available at essentially the same price point as single-speed pumps. They've quickly gained the attention of residential and commercial hydronics pros nationwide, including Yates, who has been installing hydronic systems for more than 25 years.

Pictured above is Avon, Co.-based Concept Mechanical's mechanical room with several multi-speed VersaFlo circulators installed.

Advantages to include:

- Variability or adjustability of the pumps.
- Suitability for later system retrofits or changes.
- Better overall system performance, making callbacks less likly.
- 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. But these new circulators offer a much broader range of performance. With the flick of a switch, various speeds can be chosen, easily changing head and flow to meet the specific needs of the system.

Remarkably, the performance of a SuperBrute circulator has a flow range of 0 to 17 gallons per minute and a head range of 0 to 19 feet. The three-speed pump 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. And, the pump line grows this year to include two new, larger circulators, making the products even more attractive for larger hydronic applications.

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Photos courtesy of Grundfos

"I always do the math and calculate heat loss, flow rate, and pressure drop for each zone," said Yates. "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 dif-

In developing its SuperBrute multi-speed circulator, Grundfos engineered-in two other characteristics that add to its value for contractors; one of which is its 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 no-start situation.

ferent pump models on one job, all selected to match the exact needs that we've determined. With the multi-speed SuperBrutes, I can use one pump and select the speed to match the flow and head that we want.

"Let's face it: many pumps aren't operating within the 'sweet spot' on their flow chart," added Yates. "By checking the delta-P across the pump's inlet and outlet, or by monitoring the loop's delta-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."

"My techs are also impressed with the concept of having three speeds to choose from," continued Yates. "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."

The use of multi-speed pumps also helps Yates to avoid over-sizing the circulators. A "one-size-fits-all" approach to circulation is not only expensive on the front end, but isn't efficient electrically, either.

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

And, 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 was the larger home with cold floors. The other installation was at a jobsite where the building owners planned, later, to activate baseboard radiation in an unfinished part of the building. As they did the install, Yates and his crew calculated that the existing circ zone worked optimally at the pump's lowest setting. And, for whenever the other area 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.

In developing its SuperBrute multi-speed circulator, Grundfos engineered-in two other characteristics that add to its value 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 no-start situation. It also has an integrated, removable, check valve that doesn't reduce pump performance and eliminates the expense of an inline check valve.

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