

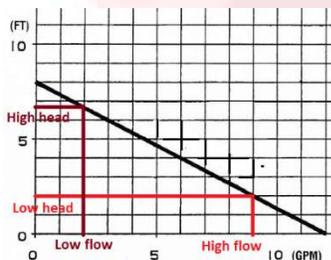
## JB Tech Talk No. 2: A Metric Bite in the Butt & Jerry's Pump Laws

I can't recall why I was in this mechanical room that day, but it was unrelated to this story. One of the contractor's tradesmen asked me if I would look at an issue they were having with the building's domestic hot water recirculation (DHWR) pump. He was a bit sheepish about it; they hadn't bought the pumps from us.

He explained that they weren't getting any DHWR flow. They had concluded this because there was almost no differential across the pump, which immediately got my attention.

There are mathematical laws for centrifugal pumps to define the relationships between flow, differential pressure and power consumption. For everyday use, without need of a calculator, I have some additional centrifugal pump laws of my own:

- Pumps are not very bright and will do whatever the system allows
- They *must* run on their curve
- Low differential pressure (vs. the specified amount) at the pump usually indicates *high* flow (and vice-versa)



That last “Jerry law” seems to be the opposite of what one would expect, but it's true, as shown in the simple pump curve to the left. So, if in this situation they had low pump head, they were not short of flow – they had too much.

I didn't understand why this was happening because I knew that the DHWR system had been specified with automatic flow limiting valves on the branch returns (an excellent idea) to peg the flow at the right amount. I asked if they had the submittal drawings for these valves on site and they did. Fortunately, there was a schedule listing all the valves and flow rates.

The DHWR valves had been specified for 0.063 l/s flow (1.0 USgpm). The supplier (not me in this case) had slipped a digit in his conversion and supplied 0.63 l/s (10 USgpm) valves; an easy mistake that got past everyone in the submittal review process. This had allowed the pump to drift almost off the end of its curve and pump too much water.

They changed the cartridges, and all was well.

*Question – if the flow limiters had been supplied with the correct cartridges, what else could have caused them to overflow? The answer is in the next JB Tech Talk.*