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Re: Testing of Commercial Flow Management Device, Residential Zenn Valve and Municipal UFR

MARS Water has finished the first phase of testing on the Zenn Valve and Hydronomics products project. MARS staff utilized standard test procedures as outlined by AWWA and ISO. MARS tested a ¾", 2" and 3" Flow Management Device (FMD) and a 1" Unmeasured Flow Reducer (UFR). These tests were conducted to evaluate meter performance and the percentage of accuracy at particular AWWA flow rates. For this reason MARS Water can prove and certify certain improvements in meter performance as stated below.

First, not all test meters were new and in pristine condition which is to be expected and normal for any functioning water utility. That is a good condition under which to evaluate meter accuracy and unaccounted loss of measured water. For example, new meters should produce an average performance of 100 percent when tested at all three AWWA standard flow rates. The measured flows are averaged to produce the correct performance across the entire flow range, on average, for this new meter. However, customers do not use their water system in a true average of all three flow rates. Therefore, the normal home or business will use 30 percent of the water at low flow, 60 percent at mid flow and the remaining 10 percent at high flow. These are ranges and not exact flow rates. For example, low flow is 0 to ¼ GPM, mid flow is above ¼ GPM to about 4 GPM, and high flow is just above 4 GPM to 20 GPM. Water meters normally lose most of their accuracy in the mid flow and low flow range since low flow is the first to be compromised over time and age and then through the effects of suspended solids in the water which damages the surfaces of the measuring chamber and cause performance loss first at lower flows then mid flows and eventually high flows.

The water meters with the FMD's installed passed all the AWWA / ISO flow test ranges except for the used 2" water meter. The 2" water meter had failed initial "Mid Flow" testing of the water meters without the installation of the FMD's. The 3" meter at the high flow rate without the FMD computed 350 GPM and with the FMD installed it was reduced to 145 GPM. The 3" meter passed all AWWA flow standards with the lower GPM.

There are numerous advantages to the Zenn Valve product. Most meters produced for the U. S. Market are known as Positive Displacement meters. This means the measuring chamber is either an "oscillating disk" type or a "piston" type.

We are confining our study to these two types at this time which represent 85% of the U. S. market. The correct phase is "semi positive displacement" not just "positive displacement". The difference is that

positive displacement means for every drop of water passing through a piston or disc, there is a related and measureable movement of the piston or disc. Whereas “semi positive displacement” means that for every quantity of water that drives the piston or disc, there is a certain amount of the fluid being measured that flows through and actually bypasses the chamber and provides lubrication and the ability to flush unwanted suspended solids from the meter.

The Zenn Valve demonstrated that it is a well-functioning flow device that retards the flow of water that is occurring below the “best operating range” and holds the flow back until the valve can release a volume of water that is adequate to operate the meter. Water meters of all sizes have a weak spot at the extreme low flow since the measuring chamber is not designed for low flow but for normal flow. To retain water until the cascade of water is adequate to power the meter within its’ best operating range is the best way, we believe, to provide water conservation through reduction in water loss. The more the meter wares from normal use, the more valuable the FMD becomes. We have proven that it is capable providing a water flow that is more accurately read by water meters and of nearly eliminating ultralow flow loss and loss through worn meters and measure water in these short flow releases and dramatically improve accuracy and lifespan.

Very Truly Yours,

A handwritten signature in black ink, appearing to read "F. Salser, Jr.", written in a cursive style.

Floyd S. Salser, Jr.  
MARS Company