Single Jet Water Meters

Single-Jet water meters have been produced by a number of manufacturers at different times throughout the last century. As single-jet technology evolved and advancements were made, a few European meter producers introduced the first high performance single-jet meters in the mid 1970s. In comparison to their predecessors, these meters were more costly but offered the utilities a much wider accuracy range and enhanced durability. Some of the high performance single-jets released achieved the coveted ISO Class C Approval. In 1990, the first of these European Class C meters was introduced to the U.S. utility market. Over the next 12 years, acceptance and the growing implementation of this technology in the U.S. led to the May 2002 approval of the AWWA C-712 standard for Single-Jet water meter. The first new meter specification created by the AWWA in over 20 years.

Operation

The single-jet meter is a velocity type meter similar to standard turbine type meters. The operational difference between the two is that turbine rotates similar to an airplane propeller, with the water flow passing axially while the Single-Jet element rotates similar to a top, with water flow impacting the impeller fins tangentially. The advantage of the Single-Jet design is its efficiency in extracting energy from the water. The force of the passing water is applied at the end of the impeller fin that acts as a moment arm creating a proportionally large torque about the vertical axis. The impeller’s axis balances on a pinpoint bearing which offers very little drag to oppose the torque generated from the flow. The combination of high torque and low drag produce a very sensitive meter with wide range and the capability to measure very low flows.

Benefits to Utilities

3” and Larger – The 3” and larger C-712 single-jet meters have accuracy ranges comparable to compound meters and much greater than turbine meters of the same size. By combining the range of a compound meter and the durability of a turbine meter, the single-jet meter offers a utility a higher degree of performance and reliability on larger metered services.

5/8” – 2” – The smaller single-jet meters are designed to replace positive displacement type meters. Single-jets can accurately measure flows at 10%-20% of the minimum flow rates of similar size displacement meters. For example, the AWWA C700 standard for 2” displacement meters calls for 95% registration at a minimum flow rate of 2 gallons per minute. A 2”, C-712 single-jet records 95% at ¼ gallon per minute. This increased accuracy range enables utilities to measure water at flow rates that cannot be detected by using a displacement meter.

Conclusion

High performance C-712 Single-jet type meters have been around for decades and have proven to be extremely efficient in operation and reliable in service use. Internationally, they meet or exceed the highest of meter standards, the ISO Class C. Utilities can use the increased measurement accuracy to reduce unaccounted for water loss, stabilize water tariffs and equitably distribute the remaining system loss among their customer base.