

By Jack C. Haley, ABB Water Meters, Inc.



# Selecting the Right Water Meter

Choosing the appropriate meter is key to high quality water treatment.

**T**wo-thirds of the world is covered with water. However, only approximately 3 percent of that water is fresh water for consumption. The population of the world steadily is increasing causing that 3 percent finite resource to become stretched, making conservation and water quality very significant in today's marketplace.

Water meters have for many years made the public more aware of consumption. Now, with all the new water quality products that are becoming available, water metering is more meaningful every day.

There are many ways to measure water, but there are three types of design that have been in the mainstream of metering for many years. They are volumetric (positive displacement), inferential (turbine) and electronic (magnetic) metering. The bulk of meters utilized for water quality applications is smaller meters, generally in sizes including ½-, ¾- and 1-inch positive displacement, but 1½- and 2-inch sizes also are available. Inferential (turbine) meters are used in sizes 1½ to 4 inches with sizes up to 12 inches available. Electronic cold water meters are available in sizes from ½ to 24 inches. They cover a wide range of applications such as potable water, deionization or reverse osmosis water, desalination, water vending and various types of water treatment either by filtration, chemicals or ozone.

Positive displacement cold water meters are manufactured in three basic types of materials: modified acetal copolymer (plastic), Waterworks bronze or "low lead" EnviroBrass. These meters are appropriate to applications requiring direct reading of the total number of U.S. gallons, cubic feet or cubic meters of water that have passed through the meter. The principle of operation of the positive displacement cold water meter is an oscillating piston style, each piston revolution being the equivalent to a known volume of water and an appropriate number of revolutions equal to one gallon, cubic foot or cubic meter of water. The piston movement is transferred by a

magnetic drive to a direct read register or to an appropriate pulser. Some meters are NSF Standard 061 certified for sizes ¾ × ½, ¾ × ¾ and ¾ × ¾. Positive displacement meters can be installed into any inclination except upside down.

Low speed pulsers are utilized for connection to remote counters, batch controllers, dataloggers or computers. High-speed pulsers often are connected to batch controllers, rate indicators/rate transmitters with 4–20mA output, dataloggers or computers for higher accuracy

applications. There also are pulsers utilized in applications for water vending where a coin or push button actuates the vending sequence and the machine fills either a one-gallon or one-liter bottle.

Inferential or horizontal Woltman-type (turbine) cold water meters are available in sizes 1½ inches through 12 inches and are manufactured with a bronze or cast iron body with round flat faced flanged ends. This turbine-style meter operates by passing water through the meter without a change

in flow direction, driving a helix rotor in direct proportion to the quantity of water passing through the meter. These meters are utilized where larger volumes of water are required to be accurately measured. These inferential meters are appropriate for applications for direct read in U.S. gallon, cubic feet or cubic meters. Pulsers are available for low resolution or high resolution outputs for use with remote counters, batch controllers, rate of flow devices, dataloggers or computers. The American Water Works Association (AWWA) and ISO Installation Procedures recommend these meters have 10 pipe diameters of straight pipe the same size as the meter ahead of the meter and five pipe diameters after the meter to ensure high quality flow characteristics and minimal turbulence.

The electronic water meters (magnetic) have no moving parts and operate according to Faraday's principle of magnetic induction. A conductor (water) moving through a magnetic field

Volumetric, inferential and electronic meters are the three types of designs that water meter manufacturers have relied on for many years.



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(produced by the electronic water meter) will induce an electric current proportional to the velocity of the conductor (water). These electronic meters are available in sizes ranging from 2 through 24 inches and have many advantages such as rangeability (more than 1,000 to 1 turn down), accuracy to .25 percent AC powered or 0.5 percent battery powered, low head loss, long-term stable calibration, no noise and no moving parts. An electronic water meter can be calibrated in U.S. gallon, cubic feet or cubic meters and features total and rate of flow indication at the display. These meters also will interface

with via pulse output to rate of flow transmitters with 4-20mA output, dataloggers or DCS systems for management. These meters require approximately three pipe diameters ahead of the meter and two pipe diameters after the meter of straight pipe the same size as the meter. (Note: These meters are not appropriate to applications for reverse osmosis or deionization water.)

The mechanical cold-water meters should fully comply with AWWA's Standard for their respective type of meter with regard to performance and design. **WQP**

### About the Author

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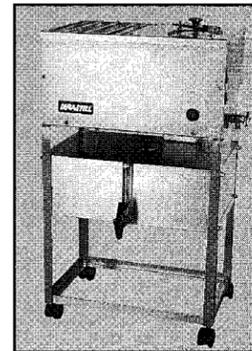
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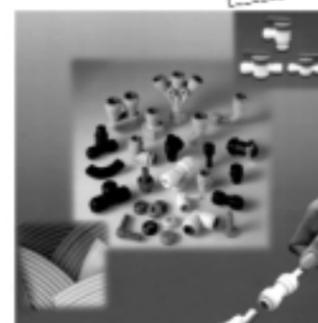
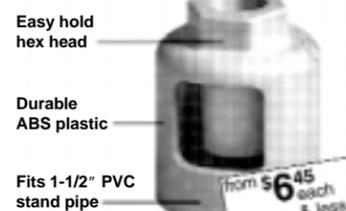
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