Engineering Spec for C&I Ultrasonic Water Meter

1 - GENERAL

The water meters have to be based on ultrasonic transit-time technology. The details of the technology and theory of operation are explained in the AWWA Standard C750.

The water meters shall operate on multi-path, preferably quad-path, flow measurement technology. The flow sensor of the water meters shall have at least two pairs, preferably four pairs, of ultrasonic transducers, with each pair installed face-to-face so to provide one sound path.

It is also preferred that the water meter has a built-in pressure sensor to measure water pressure in the pipe.

The whole meter shall be rated for IP68 water-proof.

2 – METER MAIN CASE

The main case of the flow sensor shall be made of a cast ductile iron or stainless steel. If made from cast ductile iron, it shall be protected by proper coating.

The main case shall withstand up to 232 PSI without seepage or leakage in the castings, or distortion affecting the operation and the accuracy of the system.

The size of the meter and the direction of the meter shall be engraved on the main case.

3 – REGISTER

The register box shall be attached to the main case in a tamper-proof manner and must be rated for IP68.

The register shall have one IR (Infrared) port and allow the user to do programming or maintenance through the IR port.

Preferably, the register shall allow a separate interface module to be attached to its top. It shall communicate with this interface module via a second IR port. The interface module shall be detachable without opening the register box.

The register shall be able to detect leakage and reverse flow. The threshold of the leakage event shall be programmable through IR port. When such even is detected, the register shall display an alarm indication on its LCD and record the event accordingly.

The register shall be water-proof and shall be free of water condensation on the LCD.

The register shall have a data logger able to record at least 600 days of daily flow totals. The data in the data logger shall be downloadable to a computer though the register’s IR port.

The battery lifetime of the meter must be at least 5 years.

4 – FLOW SENSOR

The flow sensor shall be ultrasonic based. It shall have at least two pairs with preference of four pairs of PZT ultrasonic transducers. Each pair of the PZT transducers shall be installed face-to-face.

Flow sensor with less than two pairs of ultrasonic transducers is not acceptable.

Flow sensor with reflector is not acceptable.

The frequency of the ultrasonic transducer shall not exceed 3MHz as high frequency sound is sensitive to air bubbles and solids which could reduce system reliability and accuracy.

5 – REMOTE OUTPUT

The remote output shall be provided by a separate interface module which is attached to the top of the register as mentioned in the REGISTER section. The interface module shall be easily detachable from the register so that one can replace it with a different module in order to provide a different output interface.

The manufacturer shall be able to provide the following interface modules for the customer to choose:

Pulse output interface module  
MBus output interface module  
RS485/Modbus output interface module  
4-20mA interface module  
Radio wireless interface module