

SPECIFICATION

Category: Cold Water Meter

Type: Ultrasonic Transit-Time

Size: 2" – 8"

Applicable AWWA Standard: C750



1. GENERAL

Except as otherwise modified or supplemented herein, the latest revision of AWWA Standard C750 Transit-Time Flowmeters shall provide theory and operation specifics on the basic ultrasonic concept. This document will govern the materials, design, manufacture and testing of all meters furnished under this specification or equal as approved by the Director or his appointed agent.

AWWA Standard C750 is considered by the [\[Click here and type Name of Utility\]](#) to be only the minimum requirements and shall be supplemented herein to ensure the quality required by the utilities department.

Meters shall be manufactured by a company with a minimum of ten (10) years experience in manufacturing *various types* of cold water meters such as Multi-jet, Positive Displacement, Compound and Turbine Type water meters. The Manufacturer's corporate home office shall be in the United States.

Meters shall be bid without strainers and without companion flanges.

The water utilities department reserves the right to request a sample meter of a small size to study prior to awarding bids.

2. METER MAIN CASE

Outer cases shall be made of a cast ductile iron alloy equaling or exceeding AWWA Standards such as those listed in ASTM A536 or ASTM A126. The maincase shall be protected by a complete fusion-bonded coating conforming to AWWA C-550.

All external bolts and nuts shall be made of bronze or stainless steel, and shall be so designed for easy removal after having been in service for a long period of time.

The main case shall withstand a working pressure of 175 PSI without leakage, seepage in the castings, or distortion affecting the free and accurate operation of the measuring unit.

The size of the meter and the direction of flow shall be case in raised letters on the outer surface of the case.

3. REGISTER COVER

The register box shall be made of an engineering plastic with the manufacturer's serial number inside the register lid. Serial number of the meter shall also be permanently programmed in the electronic register.

Register cover box shall be attached to main case in a tamper resistant manner. The register cover box shall be equipped with a hinged lid that will overlap the register to protect the reading area.

4. REGISTER

The factory sealed register shall be electronically driven only and shall be furnished with a low flow leak detection symbol and with a reverse flow notification symbol. The register shall be identical within a given size or model subject to the programming of appropriate flow factors for the particular meter. An effectively tamper proof meter with a displayed tamper indication symbol, is required. The register shall be programmed initially to read in US. Gallons or Cubic Feet as ordered by the [\[Click here and type Name of Utility\]](#). The transparent LCD register glass lens shall be made of molded heat-treated 0.25" glass to ensure against scratching and breakage. Serial number shall be permanently programmed in the electronic register.

As defined in these specifications, a "factory sealed" register shall mean a non-fogging, moisture and dust-proof register, electronically driven by the measuring section transit time sensors. Appearance of any fogging or moisture inside the register within the warranty period shall constitute component failure and will require a factory replacement. Register shall indicate reverse flow, rate of flow, low battery indication, leak alert, as well as no flow condition.

5. MEASURING SECTION

The measuring section shall be a unitized unit, completely integral to the meter body. The measuring section shall not include any moving parts and the measuring section shall have an unobstructed flow passage area at least equal to 50% of the nominal Schedule 40 pipe size corresponding to the meter's size.

All parts of the measuring section shall be similar with assemblies of the same size and material.

The measuring section shall be secured in a position in the main case in such a manner that slight distortion of the outer meter case will not affect the sensitivity or registration of the meter.

To ensure longevity of service, the performance of the measuring chamber shall be guaranteed to meet required Compound meter accuracy standards of AWWA M6 Manual for a period of two years from date of manufacturer's shipment.

The measuring section shall be covered for this period by written warranty as required or mentioned elsewhere in these specifications.

6. SIGNAL PROCESSING

Two pairs of sensors are to be mounted in the chordal direct configuration in the measuring section to measure the actual transit time of the initiated and reception-generated ultrasonic sound pulses. Transit time measurements for a single pass of initiated and return pulses are to be accurate to within 300 pico-seconds for a loop time.

Multiple measurements are sampled at a minimum of 1 second intervals of these transit time loops that are made to significantly improve accuracy over a single pass transit time measurements as employed in typical AWWA C750 ultrasonic meters to achieve low flow rate measuring accuracy.

Ultrasonic meters using single directional sound transmission to determine flow measurements are not acceptable. Meters that use measurement principals based on Faraday's Law are not permitted.

6A. SIGNAL OUTPUTS

The meter shall have 3 optional outputs – Analog, Dual Digital pulse output, or encoder output.

The Analog Output is a 4 – 20 mA current loop (the end user must supply power to the unit). 4 mA is always the set as the lower flow cutoff and the 20 mA output corresponds to the Max Flow Rate of the meter.

The Digital (pulse) Output is to be an open collector (open drain) transistor output that provides pulse per quantity with these options:

1. Two scaled forward flow pulses.
2. One scaled pulse forward flow and one flow direction.
3. One scaled forward flow pulse and one scaled reverse flow pulse.

The Encoder Output is to be serial communication collector utilizing UI1203 or UI1204 communication protocol.

The [\[Click here and type Name of Utility\]](#) shall choose one of these three basic output choices with dependent options on the Digital pulse option.

7. INSTALLATION REQUIREMENTS

Meters shall be designed so that no strainer or straightening vanes are required. There shall be no internal parts blocking the waterway. No straight runs of pipe shall be necessary before or after the meter.

8. ACCURACY AND HEAD LOSS TESTS

Meters shall EXCEED current AWWA C-702 test flow, head loss and accuracy standards as follows.

SIZE	SAFE MAXIMUM FLOW RATE	ACURACY RANGE ± 1.5 % NORMAL LOW FLOW	EXTEDNDED ± 5 % NORMAL LOW FLOW	HEAD LOSS @ SAFE MAXIMUM	LOW FLOW SENSITIVITY ALERT
8"	3,500 GPM	5 GPM-3,500 GPM	4 GPM	2.9 PSI	3/4 GPM
6"	2,000 GPM	3 GPM-2,000 GPM	2 GPM	1.1 PSI	3/4 GPM
4"	1,000 GPM	1 1/2 GPM-1,000 GPM	0.75 GPM	5.1 PSI	1/16 GPM
3"	500 GPM	1 GPM-500 GPM	0.50 GPM	2.4 PSI	1/16 GPM
2"	250 GPM	1/2 GPM-250 GPM	0.25 GPM	1.3 PSI	1/16 GPM

9. PRESSURE CAPABILITY

Meters shall operate up to a working pressure of one hundred seventy five (175) pounds per square inch (PSI) and to a temperature of 122 degrees Fahrenheit, without leakage or damage to any parts. The accuracy shall not be affected when operating at this pressure to possible distortion.

10. ACCEPTABLE METERS

In the interest of standardization, the following meter lines are acceptable to the [\[Click here and type Name of Utility\]](#) provided they fully comply with the above specifications and meet all requirements in the bid package:

- 1. MASTER METER OCTAVE
- 2. APPROVED EQUAL

All meter models above shall be at a minimum ultrasonic type with at least two transit time paths. All meters not listed above shall pre-qualify. In order to pre-qualify, the manufacturer shall send necessary drawings and technical data to the [\[Click here and type Name of Utility\]](#) and complete a minimum of six-months in field testing. Any exceptions to the specifications shall be pre-qualified by the above method.

11. BIDDERS RESPONSIBILITY TO THIS SPECIFICATION

It is the responsibility of each bidder to carefully examine these specifications and the bid documents and become familiar with the requirements set forth herein. In addition, it is the responsibility of each bidder to submit all necessary information concerning their product to the [\[Click here and type Name of Utility\]](#). Failure to do so could result in your bid being declared as non-responsive.