



**Badger Meter**

## E-Series® Model E-35 Cold Water Stainless Steel Ultrasonic Meter

Size 3/4" (DN 20 mm)

NSF/ANSI Standard 61 Certified, Annex G

### Description

The Badger Meter E-Series® meter is an electronic meter using ultrasonic technology and solid-state electronics contained in a compact, totally encapsulated, weatherproof, and UV-resistant housing for residential and commercial applications. Electronic metering provides information and data not typically available from traditional, mechanical meters and registers such as rate of flow, reverse flow indication and has eliminated measurement errors due to sand, suspended particles and pressure fluctuations.

The E-Series meter is designed to comply with applicable portions of ANSI/AWWA Standard C700 and NSF/ANSI Standard 61, Annex G. There is currently no AWWA standard that specifically addresses ultrasonic meters for residential applications.

### Applications

E-Series meters can be used for measuring potable cold water in residential, commercial and industrial services. It is ideal for non-potable, reclaimed irrigation water applications or less than optimum water conditions where small particles exist.

### Features

- Minimum extended low-flow rate is lower than typical positive displacement meters.
- Simplified one piece electronic meter and register are integral to the meter body and require virtually no maintenance.
- Meter and register are sealed, non-removable and protected from tampering.
- 9-digit LCD display presents consumption, rate of flow, reverse-flow indication and alarms.
- Available with Badger Meter 308 in-line connector for approved endpoints or prewired to ORION® and GALAXY® AMR/AMI endpoints.
- Also available with Itron's in-line connector, pit endpoint with in-line connector or prewired to Itron remote endpoint.
- Compatible with AMR/AMI endpoints requiring either an encoded input (ADE®) or scaled input (RTR®).

### Operation

As water flows into the measuring tube, ultrasonic signals are sent consecutively in forward and reverse directions of flow. Velocity is then determined by measuring the time difference between the measurement in the forward and reverse directions. Total volume is calculated from the measured flow velocity using water temperature and pipe diameter. The LCD display shows total volume and alarm conditions and can toggle to display rate of flow.

### Operating Performance

Providing "new meter" consumption measurement, the E-Series meters are accurate to:

- ±1.5% over the normal flow range at a normal temperature range of 45° F to 85° F (7° C to 29° C)
- ±3.0% from the extended low flow range to the minimum flow value in the normal temperature range

ESM-T-02 (12-11)



### Construction

E-Series meters consist of a stainless steel, lead-free meter housing, an engineered plastic and stainless steel metering insert, a meter-control circuit board with associated wiring, LCD and battery. The wetted elements are limited to the pressure vessel, plastic/stainless steel metering insert and the transducers. The electronic components are housed and fully potted within a molded, engineered plastic enclosure, which is permanently attached to the meter housing. The transducers extend through the stainless steel housing and are sealed by O-rings.

The metering insert provides a method of holding the stainless steel ultrasonic reflectors in the center of the flow area, enabling turbulence-free water flow through the tube and around the ultrasonic signal reflectors. The metering insert's patented design virtually eliminates chemical buildup on the reflectors, ensuring long-term metering accuracy.

### Materials

<b>Meter Housing</b>	316 stainless steel
<b>Measuring Element</b>	Pair of ultrasonic sensors located in the flow tube
<b>Register Housing</b>	Engineered thermoplastic
<b>Register Lid</b>	Engineered thermoplastic
<b>Metering Insert</b>	Engineered thermoplastic and stainless steel
<b>Transducers</b>	Piezo-ceramic device with wetted surface of stainless CrNiMo

### Meter Installation

The meter is completely submersible and can be installed using horizontal or vertical piping, with flow in the up direction. The meter will not measure flow when an "empty pipe" condition is experienced. An empty pipe is defined as a condition when the flow sensors are not fully submerged.

### Meter Spud and Connection Sizes

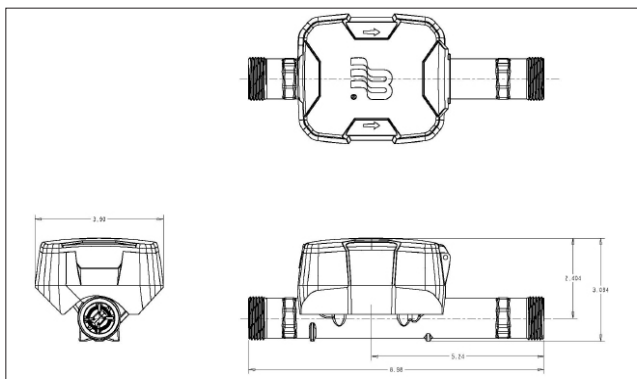
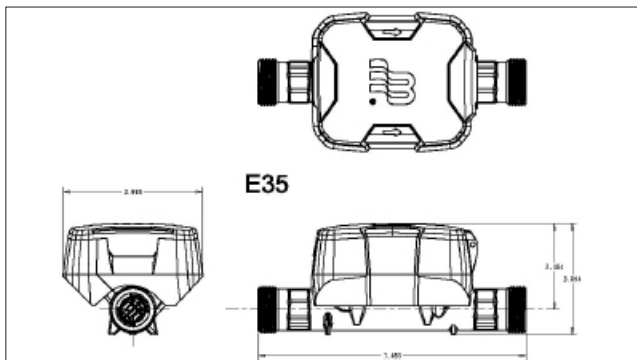
<b>Model</b>	E-35
<b>Size Designation x Lay Length</b>	3/4" x 7-1/2" 3/4" x 9"
<b>Bore Size</b>	3/4"
<b>Coupling Nut and Spud Thread</b>	1" x 11-1/2 NPSM
<b>Tailpiece Pipe Thread (NPT)</b>	3/4"
<b>Service Pipe Thread (NPT)</b>	3/4"

# Technical Brief

## Specifications

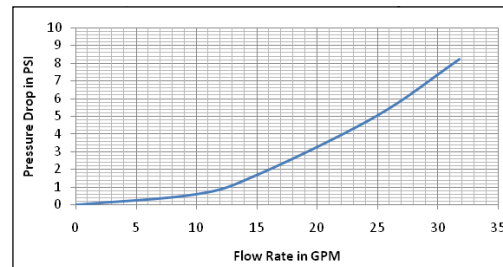
<b>Operating Range</b>	0.1 GPM - 32 GPM
<b>Extended Low-Flow Rate</b>	0.05 GPM
<b>Maximum Continuous Operation</b>	32 GPM
<b>Pressure Loss</b>	1.8 PSI at 15 GPM
<b>Reverse Flow - Maximum Rate</b>	4.0 GPM
<b>Storage Temperature</b>	-40° F to 140° F (-40° C to 60° C)
<b>Maximum Ambient Storage (Storage for One Hour)</b>	150° F (72° C)
<b>Measured-Fluid Temperature Range</b>	34° F to 140° F (1° C to 60° C)
<b>Humidity</b>	0-100% condensing; meter is capable of operating in fully submerged environments
<b>Maximum Operating Pressure of Meter Housing</b>	175 PSI (12 bar)
<b>Register Type</b>	Straight reading, permanently sealed electronic LCD; digits are 0.28" (7 mm) high
<b>Register Display</b>	<ul style="list-style-type: none"> <li>Consumption (up to nine digits)</li> <li>Rate of flow</li> <li>Alarms</li> <li>Unit of measure factory programmed for gallons, cubic feet and cubic meters</li> </ul>
<b>Register Capacity</b>	10,000,000 gallons 1,000,000 cubic feet 100,000 cubic meters
<b>Totalization Display Resolution</b>	Gallons: 0.XX Cubic feet: 0.XXX Cubic meters: 0.XXXX
<b>Battery</b>	3.6-volt lithium thionyl chloride; battery is fully encapsulated within the register housing and is not replaceable; 20-year battery life
<b>Meter Weight (without AMR)</b>	3/4" x 7 1/2": 2.1 lbs. 3/4" x 9": 2.4 lbs.

## Physical Dimensions of the Model E-35



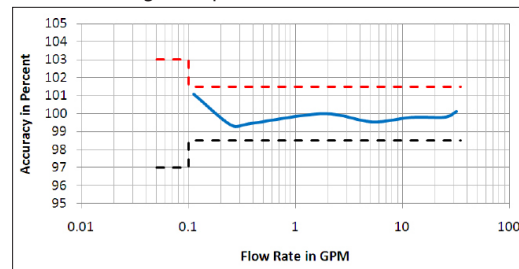
## Pressure Loss Chart for the 3/4" E-Series

Rate of flow in gallons per minute (GPM)



## Accuracy Chart for the 3/4" E-Series

Rate of flow in gallons per minute (GPM)



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