

## Idaho Department of Water Resources List of Approved Closed Conduit Flow Meters

The tables below list flow meters (meters) that have been independently tested and subsequently approved by the Idaho Department of Water Resources (IDWR) for use in closed conduit measurement applications. These meters were tested by the Utah Water Research Laboratory at Utah State University using NIST\* traceable instrumentation. Meters on this list performed at or above the standard established by IDWR for: 1) accuracy of +/- 2% of flow rate over the entire range of tested flows; and 2) repeatability of +/- 0.5% defined as the percent deviation of flow rate from average accuracy at each data point. More details on IDWR minimum acceptable standards can be at the following URL:

<https://idwr.idaho.gov/files/water-measurement/Measuring-Devices-Minimum-Acceptable-Standards.pdf>

***Prior to selecting a meter, review this list completely and consult the manufacturer's installation requirements to ensure that all installation specifications for the specific model can be achieved. The specific models listed below must also be installed consistent with IDWR installation requirements (below) and any applicable notes (see page 4).*** This list is subject to change as additional meters are added or removed. The most current list can be found here:

<https://idwr.idaho.gov/files/water-measurement/approved-flow-meter-list.pdf>

**Straight Pipe Length** - The required minimum length of straight pipe immediately upstream and downstream of the meter or meter transducers. Straight pipe lengths must be free of flow disturbers and be in-line with the meter or transducer location. For spooled (flanged) meters, this pipe length must be the same nominal diameter as the meter. ***Chemical injection ports must not be located upstream of a meter or meter transducer location.***

**Flow Disturber** - Any fitting or appliance in the piping that may disturb flow through the meter or meter transducer locations. Flow disturbers may include but are not limited to: pump discharges, elbows, check, butterfly or gate valves, pipe reducers, couplings, intrusions, bells or reducers.

### ***IDWR Installation Requirements:***

***Magnetic meters and spooled ultrasonic meters must be installed with a minimum straight pipe length equivalent of three (3) pipe diameters upstream and two (2) pipe diameters downstream from the center of the meter. Ultrasonic meters with remote mount transducers require a minimum straight pipe length equivalent of ten (10) pipe diameters upstream and five (5) pipe diameters downstream of the nearest transducer. These straight pipe spacing requirements must be maintained regardless of the manufacturer specifications, unless a variance has been approved by IDWR. All other manufacturer installation specifications must be met.***

### **Notice to Meter Installers:**

Installation of flow meters included on this list may require a permit from a local electrical authority or the Idaho Division of Building Safety (DBS). Please contact DBS or your local electrical authority if you need information regarding electrical permitting requirements that may be associated with your specific application.

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\* NIST - National Institute of Standards and Technology

| <b>Approved Full Profile Magnetic Flow Meters</b> |                                          |                     |                                                            |                           |
|---------------------------------------------------|------------------------------------------|---------------------|------------------------------------------------------------|---------------------------|
| <b>Manufacturer</b>                               | <b>Model/Specifications</b>              | <b>Power Supply</b> | <b>IDWR-accepted Pipe Applications (Nominal Pipe Size)</b> | <b>NOTES</b>              |
| ABB                                               | WaterMaster                              | AC                  | 3/8" to 96"                                                | See note 1, page 4        |
| ABB                                               | AquaMaster 3 with FER Series Transmitter | INTERNAL            | ½" to 24"                                                  | See note 1 and 8, page 4  |
| Badger                                            | M2000 Amplifier with M2000 Detector      | AC                  | 1/4" to 54"                                                | See note 1, page 4        |
| Burkert                                           | 8054/8055 with Magflow Transmitter       | AC                  | 1" to 80"                                                  | See note 1, page 4        |
| Endress+Hauser                                    | ProMag L400                              | AC                  | 1" to 90"                                                  | See note 1, page 4        |
| Endress+Hauser                                    | ProMag W400                              | AC                  | 2" to 78"                                                  | See note 1, page 4        |
| FloCat                                            | MFE                                      | AC                  | ¾" to 24"                                                  | See note 1, page 4        |
| Growsmart by Lindsay                              | IM3000                                   | INTERNAL            | 4" to 12"                                                  | See note 1, page 4        |
| Khrono                                            | Enviromag 2100 C                         | AC                  | 3/8" to 80"                                                | See note 1, page 4        |
| Khrono                                            | Waterflux 3100 C/F                       | AC                  | 1" to 24"                                                  | See note 1, page 4        |
| McCrometer                                        | Dura Mag                                 | DC                  | 4" to 12"                                                  | See notes 1 and 7, page 4 |
| McCrometer                                        | Ultra Mag with M-Series Converter        | AC                  | 2" to 48"                                                  | See note 1, page 4        |
| Rosemount                                         | 8705 with 8732E Transmitter              | AC                  | 1/2" to 36"                                                | See note 1, page 4        |
| Rosemount                                         | 8750W with 8732 or 8712 Transmitter      | AC                  | 1/2" to 48"                                                | See note 1, page 4        |
| <b>Seametrics</b>                                 | <b>AG 2000 (retired)</b>                 | <b>DC</b>           | <b>4" to 10"</b>                                           | <b>See note 2, page 4</b> |

### Approved Full Profile Magnetic Flow Meters (continued)

| Manufacturer | Model/Specifications                    | Power Supply | IDWR-accepted Pipe Applications (Nominal Pipe Size) | NOTES                     |
|--------------|-----------------------------------------|--------------|-----------------------------------------------------|---------------------------|
| Seametrics   | AG 3000                                 | DC           | 4" to 12"                                           | See notes 1 and 3, page 4 |
| Seametrics   | iMag 4700                               | DC           | 4" to 12"                                           | See notes 1 and 3, page 4 |
| Siemens      | Sitrans Mag5100W w/ Mag5000 Transmitter | AC           | 1" to 78"                                           | See note 1, page 4        |
| Siemens      | Sitrans Mag8000                         | INTERNAL     | 1" to 24"                                           | See note 1, page 4        |
| Sensus       | iPerl                                   | INTERNAL     | 5/8" to 1"                                          | See note 1, page 4        |
| Sparling     | TigermagEP – FM656 (Flanged)            | AC           | 3/8" to 48"                                         | See notes 1 and 5, page 4 |
| Valmont      | Valley 3000                             | DC           | 4" to 12"                                           | See notes 1 and 3, page 4 |

### Approved Spooled Ultrasonic Flow Meters

|              |          |          |            |                    |
|--------------|----------|----------|------------|--------------------|
| Badger       | E-Series | INTERNAL | 3/4" to 2" | See note 1, page 4 |
| Master Meter | Octave   | INTERNAL | 2" to 10"  | See note 1, page 4 |
| Netafim      | Octave   | INTERNAL | 2" to 12"  | See note 1, page 4 |

### Approved Clamp-on and Wetted Transducer Ultrasonic Flow Meters

|                |                                                   |    |      |                              |
|----------------|---------------------------------------------------|----|------|------------------------------|
| Fuji           | Time Delta C w/ 1MHz Transducers                  | AC | 14"+ | See notes 1 and 4, page 4    |
| GE Panametrics | AT868 w/ 1MHz Transducers                         | AC | 14"+ | See notes 1 and 4, page 4    |
| Siemens        | Sitrans FUS1010 w/ High Precision Sensor (type H) | AC | 14"+ | See notes 1, 4 and 6, page 4 |

**Notes:**

1. Installation must be consistent with manufacturer specifications and IDWR installation requirements.
2. Removed from approved list October, 2016 (retired and replaced by AG 3000). AG 2000 meters installed prior to October, 2016, may continue to be used unless the meter becomes inoperable or fails to meet the required accuracy standard.
3. Seametrics AG3000, iMag 4700, and Valmont Valley 3000 must be installed with external DC power supply. External power supply options may include: AC/DC transformer or external battery with solar panel. Power supplied must meet the manufacturer specification for DC input voltage sufficient to maintain the meter in a continuous sampling mode. A functional internal battery must remain in the meter.
4. Ultrasonic meters with remote transducers may not be used on pipe smaller than 14 inches unless a variance is approved by IDWR.
5. Sparling FM HT-hot tap model was not tested or approved.
6. Sitrans High Precision sensor selection is based on pipe wall thickness and may only be used on steel pipe.
7. McCrometer Dura Mag must be installed with an external DC power supply. External power supply options may include: an AC/DC transformer, external battery with solar panel, or other charging source. Power supplied must meet the manufacturer specification for DC input voltage sufficient to maintain the meter in a continuous sampling mode.
8. Meter may be operated in connection with an external power supply. Consult the manufacturer specifications for external power supply options. A functional internal battery must remain in the meter.