



State of Oregon
Water Resources Department
725 Summer Street NE, Suite A
Salem Oregon 97301-1266
(503) 986-0900 www.wrd.state.or.us

How to Select and Install a Suitable Flow Measuring Device

Note: Installation of a measuring device is subject to inspection and approval by the Watermaster.

For Piped Diversions

Diversions of less than or equal to 0.01 cfs (about 4.5 gpm):

- Install a flow regulator or control valve (*commonly called a dole valve*) to allow water to flow at a pre-determined rate, or a flow meter, or other device approved by local Watermaster.

Flow Meter Specifications for total diversions of greater than 0.01 cfs:

- Meter type may be magnetic head, ultrasonic, vortex cone, velocity-propeller, shunt line or venturi.
- The meter must have an accuracy rating within plus or minus 2% of actual flow rate for the full range of flow rates allowed.
- The register face must show a cumulative "totalizer", and have a protective plate or cover.
- The meter must measure the instantaneous rate of flow, either displayed directly with a readout or a dial, or by calculating using the totalizer. To calculate the flow: 1) Record a totalizer reading; 2) Run the system for a set number of minutes; and 3) Record another totalizer reading.

Calculation: (end reading minus beginning reading) divided by # of minutes = x measurement units/minute flow rate.

- The units of measure may be in acre-feet, cubic feet or gallons. Any multiplication factor must be clearly indicated on the face of the register.
- Totalizer must have sufficient capacity to record the maximum quantity of water authorized to be pumped over a period of 2 years without "rolling over" to show 0000000.
- Meter may be protected with a locked shelter, provided the Watermaster has access.

Flow Meter Installation:

- Match the meter to pipe size according to manufacturer's specifications.
- There must not be any turnouts or diversions between the source of water and the meter.
- Install the meter according to manufacturer's directions, which is typically in-line with a straight, horizontal length of pipe at least 5 pipe diameters upstream and downstream from any valve, elbow or other obstruction.
- Position the meter so that the pipe will be full at all times when water is being measured.
- Note the use of variable speed pump drives, which can pump a wide range of rates, may require a valve installed after the flow meter to obtain a full pipe of water.

For Ditch or Open Channel Diversions

- To measure only instantaneous flow: Use weirs, submerged orifice devices, Parshall flumes, long-throated or ramp flumes.
- To measure instantaneous flow and volume: Use a method for measurement of diversion discharge. Establish or maintain a rating curve with values for the full range from low to high discharge, conforming to U.S. Geological Survey methods for velocity-area measurements.

For Reservoirs

- Install a staff gage to measure the full range of storage volume. Establish a rating elevation-capacity table to relate water surface elevation to storage volume. In areas where the reservoir typically ices over during the winter, significant protection of the staff plate is required.

Contact your local Watermaster for more information, and to obtain approval of your measuring device. If you have any concerns, please contact the Watermaster prior to purchasing and installing your measurement device.

Last revised: 12/1/2016