



# State Engineer's Office

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## GUIDANCE: CLOSED CONDUIT MEASURING DEVICES

**Flow Meter Specifications** – In the case where a flow meter has been **Ordered** to be installed by the State Engineer, or required by permit conditions, said meter shall conform to the following specifications unless a variance request has been received and approved by the State Engineer:

- Flow meter shall be of the magnetic head, ultrasonic, vortex cone, velocity-propeller type, shunt line venturi type, or others subject to approval by the Division Superintendent or designee
- Materials shall be non-corrosive and/or coated to resist corrosion and of sufficient strength and rigidity as to maintain integrity during normal field operation
- Meter shall register both instantaneous rate and totalize volumetric quantity within the normal operating capacity of the facility and shall display both clearly on the face of the register
- Meter shall have sufficient capacity to totalize no less than the volume of water to be conveyed over the course of a two year period
- Flow meter shall be certified by the manufacturer to register at +/- 2%; that is neither less than 98% nor more than 102% of actual instantaneous rate or totalized volume that has passed through the meter when installed according to the manufacturer's specifications
- Instantaneous rate shall be expressed in gallons per minute (gpm)
- The totalizing register shall be continuously updated and expressed as one of the following based upon the expected usage:
  - Acre-Inches
  - Acre-Feet
  - Gallons
- Decimal multiplier's shall be clearly indicated on the face of the register
- Electronic meters that rely on data storage shall utilize non-volatile memory
- Totalizers shall not be field reset without approval of the Division Superintendent or designee

**Flow Meter Installation** – Flow meters **Ordered** to be installed by the State Engineer, or required by permit conditions, shall be installed according to the manufacturer's instructions to meet the above accuracy specifications and the following:

- Flow meter shall be installed at the point of diversion
- In the case where multiple wells serve one point of use (i.e. multiple wells serving one center pivot), each appropriation shall be metered independently

- Flow meter shall be installed in the pipe size in which it was designed to be operated in including pipe gauge or wall thickness (i.e. not all 8" pipe is the same)
- Flow meter shall be installed such that a "full pipe" is present at all times. Though some meters that are capable of accurate measurement in "partially full pipe" situations exist – those installations shall be reviewed on a case-by-case basis
- There shall be no turnouts or diversions between the source of water and the meter
- In a situation where multiple uses are authorized from a single well, it is the responsibility of the appropriator to determine the amount of water appropriated for each use (and may require installation of more than one meter per facility)
- It is the responsibility of the appropriator to maintain the meter in a state of functionality and good repair that is acceptable to the State Engineer, Division Superintendent, or their designee
- Flow meter shall be installed such that a maximum run of straight, unobstructed, flow may be obtained. Generally, the manufacturer specifies a minimum of no less than five pipe diameters upstream and one to two pipe diameters downstream from anything that may create turbulent, non-laminar, flow; however, the manufacturer's specifications must be followed to achieve the desired accuracy
- If the facility does not provide enough "straight-run (see above)," flow straightening vanes, or other provisions which meet the manufacturer's specifications to provide accurate representation of flow shall be evaluated on a case-by-case basis
- Registers shall be installed to provide access in the most efficient manner feasible
- Registers shall be protected by a suitable plate and/or cover