

State Engineer's Office

HERSCHLER BUILDING, 4-E CHEYENNE, WYOMING 82002
(307) 777-7354 FAX (307) 777-5451

MATTHEW H. MEAD
GOVERNOR

PATRICK T. TYRRELL
STATE ENGINEER

GUIDANCE: WATER METER SELECTION SPECIFICATIONS

AND

WATER PRODUCTION REPORTING

SELECTING THE RIGHT FLOW METER

When selecting a flow meter, consider the volume of water produced annually, the well yield, and the discharge pipe diameter.

For applications such as Industrial Use or Irrigation Use, units of Acre-Feet or Acre-Inches may be more suitable than Gallons. For other applications that fall within the Miscellaneous use category such as stock water pipelines, office buildings, or other applications that don't use a significant amount of water, units of Gallons may be more appropriate.

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 or the Superintendent of the appropriate Water Division:

- 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 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
 - Barrels (only for temporary permits)
- 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

INSTALLING A FLOW METER

Flow meters **Ordered** to be installed by the State Engineer, or if 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

If you are required to install a meter to meet the conditions of a State Engineer Order (e.g., the Horse Creek area and the Laramie County Control Area), the physical meter installation must be approved by the Superintendent of your respective water division (contact information is provided under the "Agency Divisions" tab on the State Engineers Office website home page).

All other meter installations must be acceptable to the State Engineer. If you require guidance, please contact the Ground Water Division at (307) 777-6163.

READING A FLOW METER

Photographs of several makes and models of flow meter faces or digital displays are attached, together with instructions on what information is provided by each meter, and how to report that information on the *Water Meter Information Form* (attached):

Installation Date – the date the flow meter was installed (or the date any testing of the flow meter after installation was completed).

Initial Reading – reading upon installation of the flow meter (or after any testing was completed).

Make – usually noted on the cover or the face of the meter, or both.

Model – usually noted on the cover or the face of the meter, or both.

Serial Number – is normally printed on top of the lid of the meter cover, the meter body or meter flange, or it may be printed on the meter face.

Total Number of Dials – number of dials that move on the register, or the number of digits visible on a digital display.

Units – normally printed on the meter face or are displayed on the digital display.

Multiplier – normally printed on the meter face, or is displayed on the digital display (if no multiplier is indicated, check "1").

Fixed Numbers – number of “zeros” that are printed on the meter face on the right side of the dials.

Meter GPS Coordinates – the State Engineer’s Office will accept coordinates, describing the location of the flow meter, in one of three coordinate systems:

1. Latitude and Longitude (preferred),
2. Universal Transverse Mercator (UTM), or
3. State Plane Coordinates.

The adopted datum are North American Datum of 1983 (NAD83) for horizontal measurements and the North American Datum of 1988 (NAVD 88) for vertical measurements.

The coordinates may be determined using a hand-held recreational GPS unit. Using the Wide Area Augmentation System (WAAS) feature on GPS units generally achieves an accuracy of \pm 10 feet and is preferred. However, coordinates generated with recreational GPS units without WAAS capability are also acceptable.

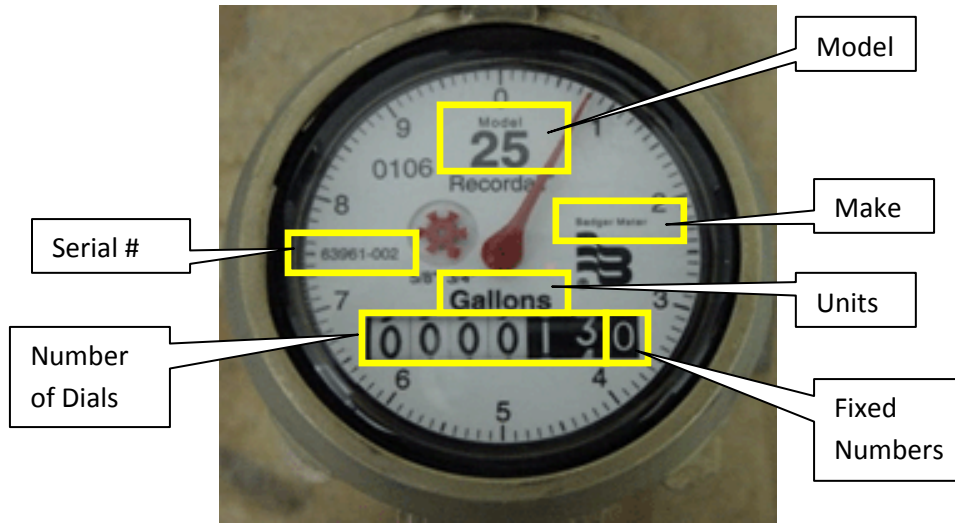
Flow meter information must be submitted to the State Engineer’s Office – Ground Water Division on the Water Meter Information Form. Forms may be submitted via mail, fax, or email. The ability to report online will be available in the near future.

Each groundwater permit requires a ***Water Meter Information Form***. A form shall be submitted 1) each time a new meter is installed and/or 2) each time a meter is replaced by another meter (including temporary meter installations).

REPORTING YOUR GROUNDWATER PRODUCTION

Metered flow, or groundwater production, shall be reported on the ***Water Production Report*** (attached) at the frequency and interval indicated in the Permit Conditions, Order, or as indicated in any other ruling or determination by the State Engineer’s Office. As an example, most Permit Conditions require annual reporting (the frequency), with monthly groundwater production totals (the interval) reported on the applicable form. Reports may be submitted via mail, fax, or email. The ability to report online will be available in the near future.

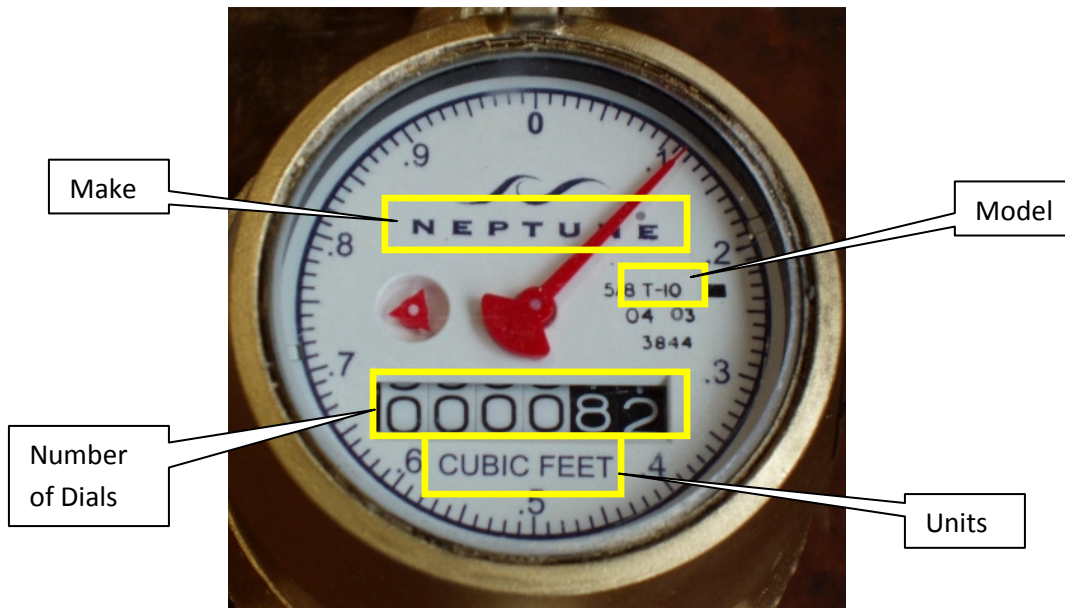
Water Meter Illustrations



Example 1:

(What to report on meter information form)

Make:	Badger	# of Dials:	6
Model:	25	Multiplier:	1
Serial #:	63961-002	Fixed Numbers:	0
Units:	Gallons	Current Reading:	130.8 Gallons

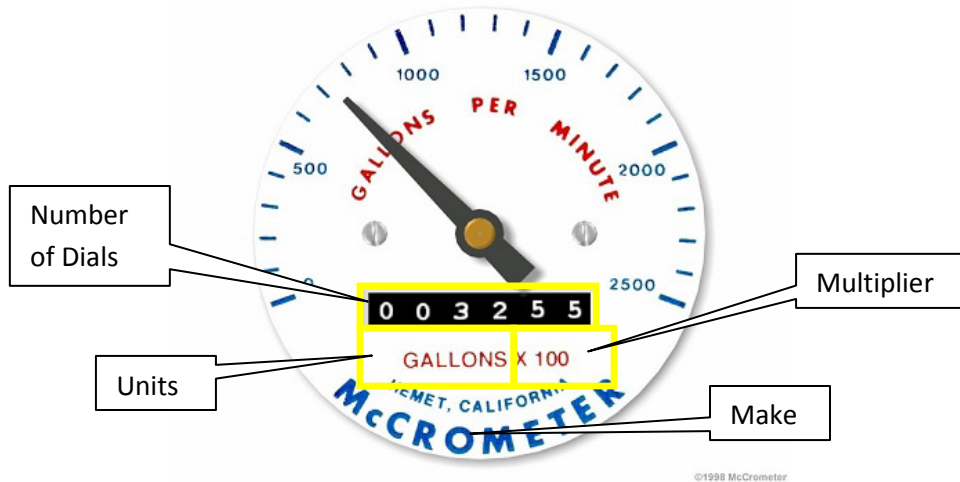


Example 2:

(What to report on meter information form)

Make:	Neptune	# of Dials:	6
Model:	T-10	Multiplier:	1
Serial #:	Read from meter cover or body	Fixed Numbers:	none
Units:	Cubic-feet	Current Reading:	82.11 Cubic-feet

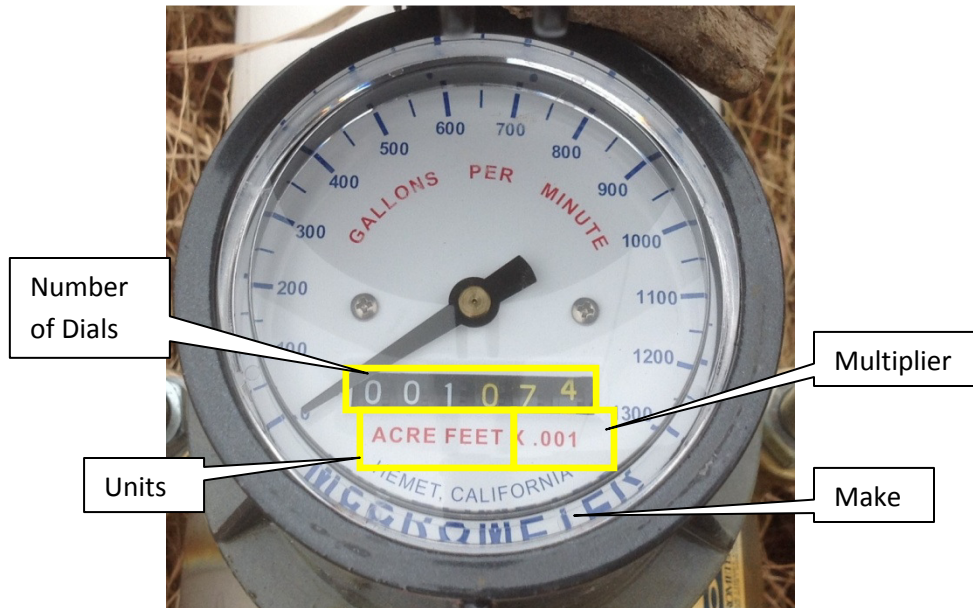
* The Wyoming State Engineer's Office does not recommend or endorse any specific flow meter manufacturer. Information in this document is simply provided for guidance purposes.



Example 3:

(What to report on meter information form)

Make:	McCrometer	# of Dials:	6
Model:	Read from meter body or literature	Multiplier:	100
Serial #:	Read from meter cover or body	Fixed Numbers:	none
Units:	Gallons	Current Reading:	325,500 Gallons

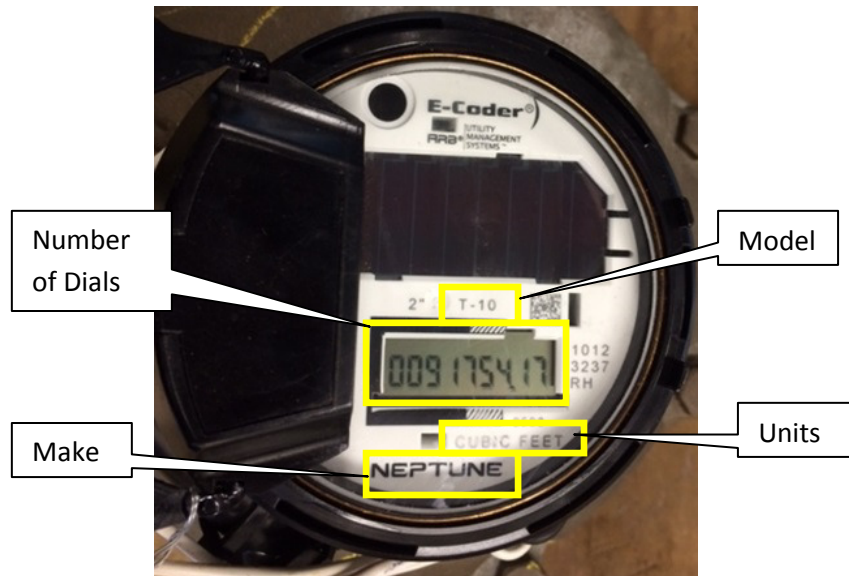


Example 4:

(What to report on meter information form)

Make:	McCrometer	# of Dials:	6
Model:	Read from meter body or literature	Multiplier:	0.001
Serial #:	Read from meter cover or body	Fixed Numbers:	none
Units:	Acre-feet	Current Reading:	1.074 Acre-feet

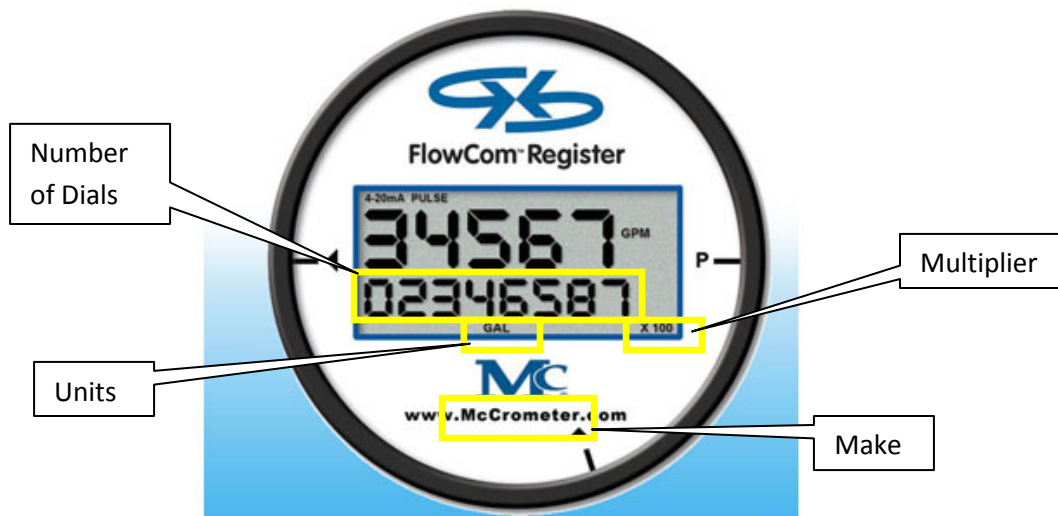
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Example 5:

(What to report on meter information form)

Make:	Neptune	# of Dials:	9
Model:	T-10	Multiplier:	1
Serial #:	Read from meter cover or body	Fixed Numbers:	none
Units:	Cubic-foot	Current Reading:	91754.17 Cubic-feet



Example 6:

(What to report on meter information form)

Make:	McCrometer	# of Dials:	8
Model:	Read from meter body or literature	Multiplier:	100
Serial #:	Read from meter cover or body	Fixed Numbers:	none
Units:	Gallons	Current Reading:	234,658,700 Gallons

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