**California Code of Regulations**
**Title 23. Waters**
**Division 2. Department of Water Resources**
**Chapter 5.1. Water Conservation Act of 2009**
**Article 2. Agricultural Water Measurement**

## §597. Agricultural Water Measurement

Under the authority included under California Water Code §10608.48(i)(1), the Department of Water Resources (Department) is required to adopt regulations that provide for a range of options that agricultural water suppliers may use or implement to comply with the measurement requirements in paragraph (1) of subdivision (b) of §10608.48.

For reference, §10608.48(b) of the California Water Code states that:

> *Agricultural water suppliers shall implement all of the following critical efficient management practices:*
>
> *(1) Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2).*
>
> *(2) Adopt a pricing structure for water customers based at least in part on quantity delivered.*

For further reference, §531.10(a) of the California Water Code requires that:

> *(a) An agricultural water supplier shall submit an annual report to the department that summarizes aggregated farm-gate delivery data, on a monthly or bi-monthly basis, using best professional practices.*

Notes:

1. Paragraphs (1) and (2) of §10608.48(b) specify agricultural water suppliers' reporting of aggregated farm-gate water delivery and adopting a volumetric water pricing structure as the purposes of water measurement. However, this article only addresses developing a range of options for water measurement.
2. By reference, the agricultural water suppliers reporting agricultural water deliveries measured under this article shall use the reporting format and criteria developed for Water Code §531.

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3. The Department shall consider the availability of new water measurement technologies and impediments to implementation of this Article when reporting to the Legislature the status of adopted Agricultural Water Management Plans in plan submittal years 2012, 2015 and every five years thereafter as required by California Water Code §10845; and based on its findings, the Department may propose amendments to this article.

Note: Authority cited: §10608.48 (b), §531.10 Water Code.

**§597.1. Applicability**

a) An agricultural water supplier providing water to 25,000 irrigated acres or more, excluding acres that receive only recycled water, is subject to this article.

b) A wholesale agricultural water supplier providing water to another agricultural water supplier (the receiving water supplier) for ultimate resale to customers is subject to this article at the location at which control of the water is transferred to the receiving water supplier. However, the wholesale agricultural water supplier is not required to measure the receiving agricultural water supplier's deliveries to its customers.

c) A water supplier providing water to wildlife refuges or habitat lands where (1) the refuges or habitat lands are under a contractual relationship with the water supplier, and (2) the water supplier meets the irrigated acreage criteria of §10608.12(a), is subject to this article.

d) An agricultural water supplier providing water to less than 10,000 irrigated acres, excluding acres that receive only recycled water, is not subject to this article.

e) An agricultural water supplier providing water to 10,000 or more irrigated acres but less than 25,000 irrigated acres, excluding acres that receive only recycled water, is not subject to this article unless sufficient funding is provided specifically for that purpose, as stated under Water Code §10853.

f) A canal authority or other entity that conveys or delivers water through facilities owned by a federal agency is not subject to this article.

g) Pursuant to §10608.8(d), an agricultural water supplier “that is a party to the Quantification Settlement Agreement, as defined in subdivision (a) of Section 1 of Chapter 617 of the Statutes of 2002, during the period within which the Quantification Settlement Agreement remains in effect,” is not subject to this article.

h) Pursuant to §10608.12(a), the Department of Water Resources is not subject to this article.

Note: Authority cited: §10828, Water Code.

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**§597.2. Definitions**

**a) For purposes of this article, the terms used are defined in this section.**

1) "Accuracy" means the measured volume relative to the actual volume, expressed as a percent. The percent shall be calculated as 100 x (measured value – actual value) / actual value, where "measured value" is the volume indicated by the device or determined through calculations using a measured value by the device, such as flow rate, combined with a duration of flow, and "actual value" is the value as determined through laboratory, design or field testing protocols using best professional practices.

2) "Agricultural water supplier," as defined in Water Code §10608.12(a), means a water supplier, either publicly or privately owned, providing water to 10,000 or more irrigated acres, excluding acres that receive only recycled water. "Agricultural water supplier" includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells water for ultimate resale to customers. "Agricultural water supplier" does not include the Department of Water Resources.

3) "Approved by an engineer" means a California-registered Professional Engineer has reviewed, signed and stamped the plans, design, testing, inspection, and/or documentation report for a measurement device as described in this article.

4) "Best professional practices" means practices attaining to and maintaining accuracy of measurement and reporting devices and methods as described in this article.

5) "Customer" means the purchaser of water from an agricultural water supplier who has a contractual arrangement with the agricultural water supplier for the service of conveying water to the customer delivery point.

6) "Delivery point" means the location at which the agricultural water supplier transfers control of delivered water to a customer or group of customers. In most instances, the transfer of control occurs at the farm-gate, which is therefore, a delivery point.

7) "Existing measurement device," means a measurement device that was installed in the field prior to the effective date of this article.

8) "Farm-gate," as defined in Water Code §531(f), means the point at which water is delivered from the agricultural water supplier's distribution system to each of its customers.

9) "Irrigated acres," for purposes of applicability of this article, is calculated as the average of the previous five-year acreage within the agricultural water supplier's service area that has received irrigation water from the agricultural water supplier.

10) "Manufactured device" means a device that is manufactured by a commercial enterprise, often under exclusive legal rights of the manufacturer, for direct off-the-shelf purchase and installation. Such devices are capable of directly measuring flow

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rate, velocity, or accumulating the volume of water delivered, without the need for additional components that are built on-site or in-house.

11) "Measurement device" means a device by which an agricultural water supplier determines the numeric value of flow rate, velocity or volume of the water passing a designated delivery point. A measurement device may be a manufactured device, on-site built device or in-house built device.

12) "New or replacement measurement device" means a measurement device installed after the effective date of this article.

13) "Recycled water" is defined in subdivision (n) of §13050 of the Water Code as water that, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur, and is therefore considered a valuable resource.

14) "Type of device" means a measurement device that is manufactured or built to perform similar functions. For example, rectangular, v-notch, and broad crested weirs are one type of device. Similarly, all submerged orifice gates are considered one type of device.

Note: Authority cited: §10608.48, Water Code. Reference: §10608.

**§597.3 Range of Options for Agricultural Water Measurement**

An agricultural water supplier subject to this article shall measure surface water and groundwater that it delivers to its customers, excluding recycled water, pursuant to the accuracy standards in this section. The supplier may choose any applicable single measurement option or combination of options listed in paragraphs (a), or (b) of this section. Measurement device accuracy and operation shall be certified, tested, inspected and/or analyzed as described in §597.4 of this article.

**a) Measurement Options at the Delivery Point or Farm-gate of a Single Customer**

An agricultural water supplier shall measure water delivered at the delivery point or farm-gate of a single customer using one of the following measurement options. The stated numerical accuracy for each measurement option is for the volume delivered. If a device measures a quantity other than volume, for example, flow rate, velocity or water elevation, the accuracy certification must incorporate the measurements or calculations required to convert the measured quantity to volume as described in §597.4(e).

1) An existing measurement device shall be certified to be accurate to within ±12% by volume. After replacement of an existing measurement device, the new or replacement measurement device must meet the requirements of paragraph (a)(2) of this section.

Or,

2) A new or replacement measurement device shall be certified to be accurate to within:

   A) ±5% by volume in the laboratory if using a laboratory certification;

   B) ±10% by volume in the field if using a non-laboratory certification.

**Staff Alternative 1 for Measurement Options (a) & (b)**

To simplify the regulation, DWR staff proposes using only two numeric accuracy standards for both Option (a) and Option (b).

- ±5% by volume in the laboratory for new or replacement devices with laboratory certification
- ±10% by volume in the field for existing, new or replacement devices with non-laboratory certification

**b) Measurement Options at a Location Upstream of the Delivery Points or Farm-gates of Multiple Customers**

1) An agricultural water supplier may measure water delivered at a location upstream of the delivery points or farm-gates of multiple customers using one of the measurement options described in §597.3(a) if the downstream customer delivery points or farm-gates meet either of the following conditions:

   A) The agricultural water supplier does not have, and has made a good faith effort to obtain, legal access to the customer delivery points or farm-gates downstream of the point of measurement needed to install, measure, maintain, operate, and monitor a measurement device. To demonstrate lack of legal access at the customer delivery point, the agricultural water supplier shall self-certify to the Department that either:

      (i) It has sought and been denied access from its customer to measure water at the farm-gate,

      Or;

      (ii) It can provide documentation, as requested by the Department, that it is not economical to pursue legal or other remedies to access the farm-gate.

      Or,

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B) The measurement options in §597.3(a) cannot be met, as approved by an engineer, by installing a single measurement device at each of the downstream customer delivery points or farm-gates because of large fluctuations in flow rate or velocity during the irrigation season for rice cultivation, where rice cultivation represents a majority of irrigated acres, as defined in this article, of the lands served by the multiple downstream customer delivery points or farm-gates. At such time that a water measurement device becomes commercially available that can meet the measurement options in §597.3(a)(2) at the customer delivery points or farm-gates, an agricultural water supplier shall include in its Agricultural Water Management Plan a schedule, budget and finance plan to measure water at the individual customer delivery points in compliance with §597.3(a) of this Article.

2) An agricultural water supplier choosing an option under paragraph (b)(1) of this section shall provide the following documentation in its Agricultural Water Management Plan(s) submitted pursuant to Water Code §10826:

A) The agricultural water supplier shall document engineer approval that the condition in §597.3(b)(1)(B) exists.

B) The agricultural water supplier shall document all of the following criteria about the methodology it uses to apportion the volume of water delivered to the individual downstream customers:

(i) How it accounts for differences in water use among the individual customers based on but not limited to the duration of water delivery to the individual customers, annual customer water use patterns, irrigated acreage, crops planted, and on-farm irrigation system,

and;

(ii) That it is sufficient for establishing a pricing structure based at least in part on the volume delivered,

and;

(iii) That it was approved by the agricultural water supplier's governing board or body.

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## §597.4 Accuracy Certification, Records Retention, Device Performance, and Reporting

**a) Initial Certification of Device Accuracy**

The accuracy of an existing, new or replacement measurement device or type of device, as required in §597.3, shall be initially certified and documented as follows:

1) For existing measurement devices, the device accuracy required in section 597.3(a) shall be initially certified and documented by either:

   A) Field-testing that is completed on a random and statistically representative sample of the existing measurement devices as described in §597.4(b)(1) and §597.4(b)(2). Field-testing shall be performed by individuals trained in the use of field-testing equipment, and documented in a report approved by an engineer.

   Or,

   B) Field-inspections and analysis completed for every existing measurement device as described in §597.4(b)(3). Field-inspections and analysis shall be performed by trained individuals in the use of field inspection and analysis, and documented in a report approved by an engineer.

2) For new or replacement measurement devices, the device accuracy required in sections 597.3 (a)(2) shall be initially certified and documented by either:

   A) Laboratory Certification prior to installation of a measurement device as documented by the manufacturer or an entity, institution or individual that tested the device following industry-established protocols such as the National Institute for Standards and Testing (NIST) traceability standards. Documentation shall include the manufacturer's literature or the results of laboratory testing of an individual device or type of device.

   Or,

   B) Non-Laboratory Certification after the installation of a measurement device in the field, as documented by either:

      (i) An affidavit approved by an engineer submitted to agricultural water supplier of either (1) the design and installation of an individual device at a specified location, or (2) the standardized design and installation for a group of measurement devices for each type of device installed at specified locations.

      Or,

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(ii) A report submitted to the agricultural water supplier and approved by an engineer documenting the field-testing performed on the installed measurement device or type of device, by individuals trained in the use of field testing equipment.

**b) Protocols for Field-Testing and Field-Inspection and Analysis**

1) Field-testing shall be performed for a sample of existing measurement devices according to manufacturer's recommendations or design specifications and following best professional practices. It is recommended that the sample size be no less than 10% of existing devices, with a minimum of 5, and not to exceed 100 individual devices for any particular device type. Alternatively, the supplier may develop its own sampling plan using an accepted statistical methodology.

2) If during the field-testing of existing measurement devices, more than one quarter of the samples for any particular device type do not meet the criteria pursuant to §597.3(a), the agricultural water supplier shall provide in its Agricultural Water Management Plan, a plan to test an additional 10% of its existing devices, with a minimum of 5, but not to exceed an additional 100 individual devices for the particular device type. This second round of field-testing and corrective actions shall be completed within three years of the initial field-testing.

3) Field-inspections and analysis protocols shall be performed and the results shall be approved by an engineer for every existing measurement device to demonstrate that the design and installation standards used for the installation of existing measurement devices meet the accuracy standards of §597.3(a) and operation and maintenance protocols meet best professional practices.

**c) Records Retention**

Records documenting compliance with the requirements in §597.3 and §597.4 shall be maintained by the agricultural water supplier for ten years or two Agricultural Water Management Plan cycles.

**d) Performance Requirements**

1) All measurement devices shall be correctly installed, maintained, operated, inspected, and monitored as described by the manufacturer, the laboratory or the registered Professional Engineer that has signed and stamped certification of the device, and pursuant to best professional practices.

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2) If an installed measurement device no longer meets the accuracy requirements of §597.3(a) based on either field-testing or field-inspections and analysis as defined in sections 597.4 (a) and (b) for either the initial accuracy certification or during operations and maintenance, then the agricultural water supplier shall take appropriate corrective action, including but not limited to, repair or replacement to achieve the requirements of this article.

**e) Reporting in Agricultural Water Management Plans**

Agricultural water suppliers shall report the following information in their Agricultural Water Management Plan(s):

1) Documentation as required to demonstrate compliance with §597.3 (b), as outlined in section §597.3(b)(2), and §597.4(b)(2).

2) A description of best professional practices about, but not limited to, the (1) collection of water measurement data, (2) frequency of measurements, (3) method for determining irrigated acres, and (4) quality control and quality assurance procedures.

3) If a water measurement device measures flow rate, velocity or water elevation, and does not report the total volume of water delivered, the agricultural water supplier must document in its Agricultural Water Management Plan how it converted the measured quantity to volume, and it must record the duration of each water delivery event, the frequency of flow rate or velocity measurements, and the cross-sectional area of flow, as needed to determine volume. The protocols must follow best professional practices and include the following methods for determining volumetric deliveries:

   A) For devices that measure flow-rate, documentation shall describe protocols used to measure the duration of water delivery where volume is derived by the following formula: Volume = flow rate x duration of delivery.

   B) For devices that measure velocity only, the documentation shall describe protocols associated with the measurement of the cross-sectional area of flow and duration of water delivery, where volume is derived by the following formula: Volume = velocity x cross-section flow area x duration of delivery.

   C) For devices that measure water elevation at the device (e.g. flow over a weir or differential elevation on either side of a device), the documentation shall describe protocols associated with the measurement of elevation that was used to derive flow rate at the device. The documentation will also describe the method or formula used to derive volume from the measured elevation value(s).

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4) If an existing measurement device is determined to be out of compliance with §597.3, and the agricultural water supplier is unable to bring it into compliance before submitting its Agricultural Water Management Plan, the agricultural water supplier shall provide in its plan, a schedule, budget and finance plan for taking corrective action in three years or less.

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