

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 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.

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.

§597.2. Definitions

- a) For purposes of this article, the terms used are defined in this section.
 - 1) “Accuracy” means the measured flow rate, velocity, or volume relative to the actual flow rate, velocity, or volume, expressed as a percent. The percent shall be calculated as $100 \times (\text{measured value} - \text{actual value}) / \text{actual value}$, where “measured value” is the value indicated by the device 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.
- 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 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) and (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:

- 1) An existing measurement device shall be certified to be accurate to within $\pm 12\%$ by flow rate, velocity or 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 by flow rate, velocity or volume to within:
 - A. $\pm 5\%$ in the laboratory when using a laboratory certification;
 - B. $\pm 10\%$ when installed in the field when using a 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 that meets the provisions of paragraph (b)(2) of this section may measure water delivered at a location upstream of the delivery points or

farm-gates of multiple customers using one of the following measurement options:

- A) An existing measurement device shall be certified to be accurate to within $\pm 10\%$ by flow rate, velocity or volume. After replacement of an existing measurement device, the new or replacement measurement device must meet the requirements of paragraphs (b)(1)(B) of this section.

Or,

- B) A new or replacement measurement device shall be certified to be accurate by flow rate, velocity or volume to within:
- (i) $\pm 3\%$ in the laboratory when using a laboratory certification;
 - (ii) $\pm 6\%$ when installed in field when using a non-laboratory certification.

An alternative has been proposed by some members of the Agricultural Stakeholder Committee to use the Option (a) numeric accuracy standards for Option (b), namely:

- $\pm 12\%$ for an existing measurement device
- $\pm 5\%$ in the laboratory for new or replacement devices with laboratory certification
- $\pm 10\%$ in the field for new or replacement devices with non-laboratory certification

- 2) An agricultural water supplier choosing an option under paragraph (b) of this section shall provide documentation in its Agricultural Water Management Plan(s) submitted pursuant to Water Code §10826 of paragraphs (A) and (B) as follows:

- A) The downstream customer delivery points or farm-gates shall meet any one of the following two conditions:
- (i) The agricultural water supplier does not have legal access to the customer delivery points or farm-gates downstream of the point of measurement to install, measure, maintain, operate, and monitor the measurement device.

Or,

- (ii) The agricultural water supplier has determined, and approved by an engineer, that the applicable accuracy standard of §597.3(a) cannot be met with a single measurement device at the individual downstream customer delivery points or farm-gates due to large fluctuations in flow rate or velocity during the irrigation season; for example during rice cultivation,

and provided the large fluctuations condition is applicable to all customers' irrigated areas downstream of the identified measurement location to multiple customers.

And,

B) The methodology the agricultural water supplier uses to apportion the volume of water delivered to the individual downstream customers must meet all of the following criteria:

(i) Account 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) Sufficient for establishing a pricing structure based at least in part on the volume delivered,

and;

(iii) Approved by the agricultural water supplier's governing body (e.g., Board of Directors).

Two other alternatives have also been proposed to potentially include as a third measurement Option (c) for CVP Water Suppliers:

c) Measurement Option for Agricultural Water Suppliers Subject to either the Central Valley Project Improvement Act (CVPIA) (Public Law 102-575) or the Reclamation Reform Act (RRA) of 1982, or both:

Alternative from the April 22, 2011 Draft Regulation:

An agricultural water supplier subject to CVPIA or RRA shall be deemed in compliance with this article if all irrigation water delivered by that water supplier to each customer is delivered through measurement devices that meet the United States Bureau of Reclamation accuracy standards defined in Reclamation's Conservation and Efficiency Criteria Standards of 2008 or future amendments that meet the criteria of options 597.3(a) or 597.3(b) of this article.

Alternative proposed by CVP Water Suppliers at the May 4, 2011 ASC meeting:

An agricultural water supplier subject to CVPIA or RRA shall be deemed in compliance with this article if all irrigation water delivered by that water supplier to each customer is delivered through measurement devices that meet the United States Bureau of Reclamation accuracy standards defined in Reclamation's Conservation and Efficiency Criteria Standards of 2008 or future amendments. ~~that meet the criteria of options 597.3(a) or 597.3(b) of this article.~~

§597.4 Certification and Performance Requirements of Measurement Devices

a) Certification of Device Accuracy:

Certification of accuracy for an individual device or type of device, as required in §597.3, shall be documented by the following methods:

- 1) For existing measurement devices, the device accuracy as required in section 597.3(a)(1) shall be initially certified and documented by either:
 - A) A report documenting 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 (2), and approved by an engineer. Field-testing shall be performed by individuals trained in the use of field-testing equipment.Or,
 - B) A report documenting field-inspections and analysis that is completed for every existing measurement device as described in §597.4(b)(3), and approved by an engineer. Field-inspections and analysis shall be performed by trained individuals.
- 2) For new or replacement measurement devices, the device accuracy as required in sections 597.3 (a)(2) and (b)(1)(B) shall be initially certified and documented by either:
 - A) Laboratory Certification prior to installation of a measurement device as documented by 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 results of laboratory testing of an individual device or type of device.

Or,

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

(i) An affidavit approved by an engineer of either (1) the design and installation of the 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,

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

3) For existing measurement devices covered by §597.3(b)(1)(A) (measurement at a location upstream of the delivery points or farm-gates of multiple customers), field-testing shall be completed on a random and statistically representative sample of the existing devices as described in §597.4(b)(1) and (2).

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

- 1) If the device accuracy certification method described in §597.4(a)(1)(A) or 597.4(a)(2)(B)(ii) or 597.4(a)(3) is selected, field-testing protocols shall be performed for a sample of existing measurement devices following best professional practices. It is recommended the sample size be no less than 10% of existing devices, with a minimum of 5, and not to exceed approximately 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)(1), 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 sample.
- 3) If the device accuracy certification method described in §597.4(a)(1)(B) is selected, field-inspections and analysis protocols shall be performed for every existing measurement device to demonstrate that the design and installation standards used for the installation of existing measurement devices are capable of meeting the

requirements of §597.3(a)(1) and that existing operation and maintenance protocols meet best professional practices.

c) Records

- 1) Records documenting compliance with the requirements in §597.3 and §597.4 shall be maintained by the agricultural water supplier for two Agricultural Water Management Plan cycles.
- 2) The records shall include at a minimum: documentation of certification for an individual device or device type as necessary to show compliance with §597.3 and additional device-specific data where warranted, including dates of inspections, maintenance, repairs, calibrations and adjustments of measurement devices.
- 3) The results of laboratory testing used to demonstrate compliance with §597.3(a)(2)(A) or §597.3(b)(1)(B)(i) shall be provided to the agricultural water supplier in the form of either (1) manufacturer's literature referencing the laboratory testing, or (2) the actual laboratory reports documenting the testing results for the specific device or installation.
- 4) The results of field-inspections and analysis shall be approved by an engineer and provided to the agricultural water supplier documenting the results for the specific device or installation as a notice of the accuracy.

d) Performance Requirements and Reporting

- 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. Measurement device testing protocols shall be according to manufacturer's recommendations or design specifications and follow best professional practices.
- 2) If, as part of an agricultural water supplier's field-testing or field-inspections and analysis of existing measurement devices for the purposes of accuracy certification as required in section 597.4 (a), or during maintenance and operations, an installed device is determined by the agricultural water supplier to no longer meet the requirements of §597.3(a) or §597.3(b), 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.
- 3) For measurement devices identified as out of compliance with §597.3 that the agricultural water supplier is unable to bring into compliance before submission of

its Agricultural Water Management Plan, the agricultural water supplier shall include, in its Agricultural Water Management Plan, a schedule, financing plan and budget for future corrective actions.

- 4) A description of best professional practices shall be included in the Agricultural Water Management Plan about (1) the collection of measured data and method of determining irrigated acres, (2) data quality assurance and control procedures, and (3) for devices measuring flow rate or velocity, the methods and frequency of measurements used for determining volumetric deliveries.
 - A) For devices that measure flow-rate, the documentation shall describe the measurement of the duration of delivery needed to calculate volume with the following formula: $\text{Volume} = \text{flow rate} \times \text{duration of delivery}$.
 - B) For devices that measure velocity only, the documentation shall describe the measurement of the cross-section of flow and the duration of delivery needed to calculate volume with the following formula: $\text{Volume} = \text{velocity} \times \text{cross-section flow area} \times \text{duration of delivery}$.
 - 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 describe 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).