

California Title 22 Information

Section 65523 - Operation Records.

(a) Except as provided in Health and Safety Code, section 116048, the pool operator of every public pool open for use at a public pool site shall test the disinfectant residual and pH of the public pool water a minimum of once per day. The pool operator shall also test heated pools' water temperature a minimum of once per day. The pool operator may perform these daily tests using a properly calibrated automatic chemical monitoring and control system if approved by the enforcing agent and in accordance with the manufacturer's equipment specifications for calibration and directions for proper use. The pool operator shall maintain a written daily record of all test results, equipment readings, calibrations, and corrective action taken at the public pool site.

Summary:

The required 1 set of readings on a daily basis can easily be automated and recorded manually plus be stored on our server for 2 years. Data can be stored and printed as many times as needed per section 65523 of Title 22 (a) (f). The PoolWarden can monitor and control pool and spa temperature levels, along with sending alarm notifications and heater shut down should temperatures exceed maximum levels. The PoolWarden will also maintain pH to required levels. Manual readings can also be entered into the controller to be recorded internally and on the server for easy retrieval and comparison to assure proper calibration required in 65523 Section (a). Daily reports can be generated and printed automatically by service provider or with an on site printer. Readings can easily be printed or retrieved from controller at the press of a button to be retrieved and recorded manually also.

(b) If the pool operator adds cyanuric acid to a public pool, the pool operator shall measure the cyanuric acid concentration in that pool a minimum of once per month and shall maintain a written record of these test results and all corrective action taken at the public pool site.

Summary:

Pool operator needs to record monthly the measured cyanuric acid levels if present in the water. The PoolWarden supports entry of manual measurements and this is included in the printouts if entered.

(c) The pool operator shall test combined chlorine at a frequency required to maintain maximum combined chlorine concentrations below 0.4 ppm. The pool operator shall maintain a written record of these test results and all corrective action taken at the public pool site.

Summary:

The PoolWarden can be set up to manage combined chlorine levels should they become an issue to satisfy 65523 Section (c). This is achieved by super chlorination or the addition of MPS by the controller and can be programmed to happen during non operational periods by day and time. This does require a minimum of weekly manual testing of combined chlorine to ensure the proper management of CAC.

(d) The pool operator shall maintain a written record of routine maintenance and repairs to the public pool at the public pool site.

Summary:

Manual log entry by pool operator

(e) If a fecal, vomit, blood contamination, near-drowning, or drowning incident occurs in a pool, the pool operator shall record the incident in accordance with the requirements of section 65546 and shall identify the affected public pool in the incident record if there is more than one pool at the public pool site. This record shall be maintained at the public pool site.

Summary:

Manual log entry by pool operator.

(f) The pool operator shall maintain data and records collected pursuant to subdivisions (a), (b), (c), (d), and (e) for at least two years for inspection by the enforcing agent and shall submit all data and records to the enforcing agent upon the agent's request.

Summary:

Pool operator needs to keep the recorded data for at least 2 years. PoolWarden handles chemistry data storage in 2 ways: (1) storage on server for 2 years with Internet connection, (2) with internal data storage which will last 341 days at a 1 hour data interval.

Section 65529

(b) The minimum (Min) and maximum (Max) levels of disinfectant residuals in public pool water shall be:

	Free Chlorine Residual				Bromine Residual	
	Without CYA		With CYA		Min	Max
	Min	Max	Min	Max		
Public Pools	1.0 PPM	10.0 PPM	2.0 PPM	10.0 PPM	2.0 PPM	10.0 PPM
Public Spa Pools, Wading Pools and Spray Grounds	3.0 PPM	10.0 PPM	3.0 PPM	10.0 PPM	4.0 PPM	10.0 PPM

* ppm is an abbreviation for parts per million; **CYA is an abbreviation for cyanuric acid.

Summary:

These ranges need to be maintained at all times. Most test kits only go to 5.0 PPM and if the enforcing agent is trying to test the water at the higher levels that can be a problem. Note the requirement is for Free Chlorine or Bromine, a calculation of free chlorine from pH and ORP is not a measurement of free chlorine.

(e) The pool operator shall maintain a test kit for measuring the disinfectant residual, pH, and, if used, cyanuric acid concentration at the public pool. This test kit shall be available for use by the pool operator and the enforcing agent at all times the public pool is in use. The chlorine or bromine test kit shall be the diethyl-p-phenylenediamine (DPD) type or otherwise be capable of testing free-halogen residual. Chlorine test kits shall be capable of testing for free chlorine and total chlorine, such that combined chlorine concentrations can be determined.

Summary:

The PoolWarden has an optional accessory sensor called the TrueDPD which will take a small sample of water and perform a free chlorine test via diethyl-p-phenylenediamine (DPD) then dump the sample to waste. This test can be done at 10, 20, 30 or 60 minute intervals and will control the injection of chlorine or bromine into the pool or spa with or without ORP backup. There are also fail safe functions in the process which include a re-test in the event of an error reading, ORP backup and monitoring % of DPD reagent remaining. When DPD reagent level falls below 20%, alarm notifications are activated and also sent in the event of non compliance of chemical and temperature levels and even loss of flow in pool or spa when connected to the Internet.

The PoolWarden controller with the TrueDPD accessory can maintain chlorine/ bromine readings to the required ppm levels because it monitors and controls FREE chlorine levels via DPD measurements - not ORP or a calculated PPM value that is derived from ORP & pH measurements.

Additional Points to Consider

(A) Automated chemical measuring and control systems have been utilized by industrial processes for many years. The purpose has been to make monitoring and control precise and reduce the variables of manual readings which include:

- Determining levels from slight differences in the shade of a color
- Determining levels of a shade of a color from someone that is color blind (this has happened)
- Determining levels when different operators make the measurements from day to day
- Not measuring at all, copying the last measurement
- The person making the measurement is in charge of the pool, this is a conflict of interest
- In a hurry, not performing the test properly
- The test kit hasn't been stored properly, is out of date or has been damaged
- The measurement levels are out of the range of the test kit

Automation helps maintain compliance continually, is not rushed by other responsibilities, does not forget to do its job and does not record readings that were never really taken.

(B) Automation also has numerous fail safe measures built in so in the event things are not working correctly, someone can be notified of the problem. The staff at ControlOMatic has many years of experience dealing with the realities of problems dealing with commercial pools and implemented many features to help operators become much more proactive in providing clean, clear and safe water for public pools and swimmers.

(C) ORP controllers have been in the pool industry since the 1970's. Some of these ORP controllers have calculated PPM scales which are estimates at best since there are so many variables that affect the ORP value of the water besides the PPM levels of chlorine in the water. These variables mainly consist of pH, cyanuric acid, combined chlorine, contaminants in the water, salt or TDS levels and even time of day or amount of sunlight hitting the pool.

Salt is mentioned because even if a pool or spa is not using a salt chlorine generation system, it is not unusual for salt concentrations in the pools using liquid chlorine to have high salt levels and salt can cause ORP to become unreliable, especially when a standard platinum sensor is used instead of a gold one. Even though a gold sensor is less susceptible to ORP drift, there are still problems that can arise.

(D) For Free chlorine PPM to be accurately measured in a swimming pool by chemical automation, there are 2 methods. These methods consist of automated DPD testing and solid state selective membrane sensors. ControlOMatic has chosen DPD testing because it is more economical and is the standard in testing for free chlorine in recreational water. A DPD reader is also used because equipment costs are minimized as the sensor doesn't wear out and the reagents are inexpensive. The PoolWarden is available as a two pool controller and the TrueDPD sensor option is also available in a two pool version which makes it much more affordable and easier to manage. This, along with the relative simplicity of an led/photovoltaic sensor make it much more affordable over time than changing sensor membranes and sensors themselves.

The TrueDPD sensor from ControlOMatic is unaffected by pH, cyanuric acid, turbid water and salt water chlorine generators and has mechanisms in place to automatically re-test in the event of an error reading.

(E) **LA County requirements for section 65523 - Operation Records.** Hotels, health clubs and municipalities require a daily manual test. Residential units (apartments & HOA's) with 25 or fewer units require 1 manual test as long as the pool or spa has an automated controller which can measure FREE Chlorine, pH & Temperature and display data at the push of a button so it can be transferred to the pool log. Properties with more than 25 units require 2 manual tests per week and the other readings can be transferred from the controller to the log also. **LA County does not accept calculated chlorine PPM. The controller must read FREE Chlorine.**

PoolWarden and MiniWarden Approval List

The MiniWarden and PoolWarden controllers with the TrueDPD added, are compliant with LA County's requirements as they will measure and adjust FREE Chlorine, pH and temperature plus save the data which can be retrieved at the touch of a button in order to be transferred to the pool log sheet. ControlOMatic also makes the SmarterPool which is a free chlorine and pH controller with no ORP support but is lacking NSF approval at this time.

All of the counties in California will interpret the Title 22 and enact their own rules. It is clear that some form of approval will be needed for each county on what form of automated measuring equipment can be used to meet the requirements.

Currently the PoolWarden and MiniWarden are approved in the following counties: LA, Orange and San Diego Counties. We will keep this list updated and if you would like to be on the list when we make updates or would like to have your county added to our efforts please send your email to lance@cotrolomatic.com.

ControlOMatic's data server can print out the last 7 days of noon time readings. These can be printed and slipped into the data folder in with the pools data. If the pool is inspected, daily readings may be required so this feature may not be of interest in your county. The following picture is what the printout looks like from a ControlOMatic test pool. The data is actual data and pool 1 is only on 1 hour per day (winter) and the SPA is controlled by the ControlOMatic SmarterChlor salt water chlorine generator and not controlled by the PoolWarden. To view this online visit <https://www.poolwarden.com> and the login is "demo" and the password "PoolWarden".

Real Pool/Spa (700100) Data

	Setpoints	PPM	ORP	pH
Main Pool	3.0	0		7.5
Private Spa	2.0	0		7.5

DOW	Date	Sensors Pool 1						Sensors Pool 2					
		Alarm	PPM	Orp	Ph	Temp	Flow	Alarm	PPM	Orp	Ph	Temp	Flow
Tuesday	01/19/16 12:00:00		1.7	651	6.8	43	Off		1.2	667	7.5	98	On
Monday	01/18/16 12:00:01		1.6	671	6.9	47	Off		1.3	569	7.5	98	On
Sunday	01/17/16 12:00:00		1.6	684	6.9	46	Off		1.3	723	7.2	98	On
Saturday	01/16/16 12:00:00		1.7	684	6.9	45	Off		0.0	671	7.5	98	On
Friday	01/15/16 12:00:00		2.2	694	6.9	43	Off		0.0	648	7.3	98	On
Thursday	01/14/16 12:00:00		1.8	679	6.7	39	Off		0.3	428	7.5	97	On
Wednesday	01/13/16 12:00:00		2.7	663	6.8	45	Off		1.4	641	7.5	97	On