



COUNTY OF RIVERSIDE

DEPARTMENT OF ENVIRONMENTAL HEALTH

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DISTRICT ENVIRONMENTAL SERVICES

POOL AND SPA MAINTENANCE INFORMATION

1. DEFINITIONS OF TERMS COMMONLY USED

- **ACID** - A granular or liquid product used to neutralize alkaline salts in water and lower the pH. (Note: Does not include cyanuric acid)
- **ACIDIC** - Condition when the amount of acid in the pool water causes the pH level to be less than 7.
- **ALKALINE** - Condition when the amount of alkaline or basic salts in the pool water causes the pH level to be greater than 7.
- **ALGAE** - Tiny plant growth in the water which may appear green, brown or black and may be spots on the shell or may appear as a green cloud suspended in the water.
- **ALGAECIDES** - Sanitizer particularly suitable to kill algae and prevent new algae growth.
- **BACTERIA** - Microscopic organisms which are continuously entering pool water via swimmers, dust, dirt, etc.
- **CHLORINE** - The most common disinfectant used in swimming pools to purify water and kill bacteria and algae. Common forms of chlorine used in swimming pools include sodium hypochlorite (liquid), calcium hypochlorite (granular or tablet), lithium hypochlorite or chlorinated isocyanurates. When any of these compounds contact water, they release hypochlorous acid (HOCl), the active sanitizing agent. Chlorinated isocyanurates, such as dichlor and trichlor combine chlorine with a stabilizer and are usually found in tablet form.
- **COMBINED CHLORINE (Chloramines)** - The portion of total chlorine in the water that has reacted and combined with ammonia, nitrogen-containing contaminants and other organics such as perspiration, urine and other swimmer waste. Chloramines can cause eye irritation and are the source of odors that people associate with chlorine.
- **CYANURIC ACID (AKA Stabilizer, Conditioner)** - Cyanuric acid can be purchased on its own or is included in many dry chlorine products to help slow the loss of chlorine in water due to the ultraviolet rays of the sun.
- **FREE CHLORINE** - The portion of the total chlorine remaining in chlorinated water that has not reacted with contaminants, and is "free" to go to work to kill bacteria and other contaminants. Test kits must be able to measure free chlorine and combined chlorine.
- **PPM** - Parts Per Million, the standard measure of concentration in swimming pools. An example is one penny in 1,000,000 or one penny in 10,000 dollars.
- **pH** - The reading on your test kit that indicates acidity or alkalinity level of water; readings above 7 are alkaline; readings below 7 are acidic; and 7 is neutral. California Code of Regulations, Title 22 requires pH of public swimming pools to be maintained between 7.2 and 7.8 as measured with a test kit.
- **SODA ASH** - A chemical which increases pH and total alkalinity. Used primarily to bring pH up when pool water is below 7.2.

- **STABILIZER** - Same as conditioner.
- **SUPER CHLORINATION** - (Shock Treatment) The practice of adding 5-10 times the normal daily chlorine dose to destroy algae, or to prevent problems after heavy bather loads or severe rains.
- **TOTAL ALKALINITY** - A measure primarily of the carbonates and hydroxides which, if kept around 100 PPM will help the pool water resist changes in pH. (ie: a buffer that stabilizes the pH)
- **TOTAL CHLORINE** - The total of both the free chlorine and combined chlorine levels.

2. COMMON POOL/SPA PROBLEMS AND SOLUTIONS

- **ALGAE** - Green, cloudy water and/or dark green or black spots on pool shell.

CAUSES

- Insufficient chlorine
- Not following routine pool maintenance, including testing and shock treating
- Plaster in bad shape (ie: etched or cracked)

REMEDIES

- Superchlorinate
- Adjust pH 7.2 - 7.6
- Brush spots with algae brush
- Use approved algaecide
- Refinish pool surface

- **CLOUDY WATER** - Water appears murky or cloudy looking

CAUSES

- Algae
- Inefficient recirculation and/or filtration
- Improper chemistry (pH and disinfection levels)
- Calcium particles coming out of solution

REMEDIES

- Inspect recirculation equipment for proper size and operation.
- Adjust pH 7.2 - 7.8
- Maintain proper chlorine levels
- Check water balance

- **SCALE** - White, gray or brownish deposits on tile, railings, and the pool shell.

CAUSES

- Calcium deposits caused by excessively hard water
- Accumulation of dissolved solids (particles left as water evaporates)

REMEDIES

- Adjust pH to 7.2 - 7.8
- Use Scale of Iron Remover with a brush to remove scale deposits on plaster and tile
- Check water balance

- **EYEBURN AND CHLORINE-LIKE ODORS**

CAUSES

- A. Improper pH
- B. Combined chlorine

REMEDIES

- A. Shock treat
- B. Adjust pH to proper 7.2 - 7.8 range
- C. Maintain proper levels of pH, total alkalinity, and free chlorine residual

3. TESTING THE CHEMICALS IN THE WATER

Testing your pool water is a key step in keeping your pool water clean, safe and sparkling blue. This Department recommends and uses the DPD Test Kits.

- Take samples about 18" below the surface of the water and away from return lines and swimmers.
- Perform tests out of direct sunlight.
- Store your kit out of direct sunlight in a dry, cool dark place.
- Fresh test kit reagents ensure accurate test results.

Replace your test chemicals at the beginning of each season. Your PROFESSIONAL POOL DEALER carries the complete line of replacement agents.

4. MAINTAINING THE PROPER pH LEVELS

The pH of your pool water should always be between 7.2 and 7.8. If it is lower or higher, the chlorine in your water won't work properly. The right pH is also important to your comfort in water. The eye irritation that most people blame on chlorine is really caused by the wrong pH balance. Low pH also causes etching of the plaster and corrosion of the metal portions of the recirculation system; high pH can turn pool water cloudy. To balance the pH, apply pH Plus (Soda Ash) or pH Minus (Acid) according to the manufacturer's directions.

5. MAINTAINING THE PROPER FREE-CHLORINE LEVEL

Chlorine is used to kill bacteria and algae and will keep your pool water clear and clean. Chlorine is important for maintaining the overall health of the individuals in the pool/spa as well as maintaining the life of the pool/spa itself. There are different ways to chlorinate a pool/spa. Some offer a built-in stabilizer and more convenience, but all adequately keep your pool water sanitary. To adjust chlorine levels, refer to the manufacturers guidelines on the chemicals used to chlorinate your pool/spa.

The minimum and maximum concentrations of disinfectant residuals in public pool water are as follows:

	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	--
Public Spas, Wading Pools, and Spray Grounds	3.0 ppm	10.0 ppm	3.0 ppm	10.0 ppm	4.0 ppm	--

CYA = cyanuric acid; Min = minimum; Max= maximum; ppm= parts per million.

6. MAINTAINING THE PROPER COMBINED CHLORINE LEVELS

High combined chlorine is the portion of chlorine in the water that has reacted and combined with ammonia, nitrogen-containing contaminants and other organics such as perspiration, urine and other swimmer waste. High combined chlorine (chloramines) results in reduced sanitizer efficacy. Take remedial action to reduce combined chlorine such as super chlorination (shock treatment). Other signs of combined chlorine includes sharp chlorine-like odor and eye irritation.

7. MAINTAINING THE PROPER CYANURIC ACID LEVELS

Cyanuric acid is a chlorine stabilizer that is present in many granulated chlorine products. The level of cyanuric acid in the water should be tested periodically and should never exceed 100 PPM. If it does, the pool must be partially drained and refilled to lower the levels. Excessive levels can interfere with the effectiveness of the chlorine.

8. SPRAY GROUNDS AND WATER FEATURES WITH UV DISINFECTION

In addition to disinfectant residuals, spray grounds are required to have ultra violet light disinfection systems. The UV light must operate continuously at a minimum of 40 mJ/cm² while the spray ground features are in use.

*Document available in an alternate format upon request