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# PUBLIC POOL DISINFECTION AND pH

## DISINFECTION

Pool disinfectants, such as chlorine and bromine, react with and kill or inactivate microorganisms and oxidize organic contaminants. Disease causing microorganisms, also known as pathogens, include bacteria, fungi, viruses, and protozoan parasites. Organic contaminants include those introduced to the water by the bather (e.g., hair gels, deodorant, suntan lotion, body oils, perspiration, etc.) and the environment (e.g., pollen and dirt). In addition, disinfectants are effective at killing algae. Besides the ability to kill pathogens and oxidize contaminants, a disinfectant must also maintain a concentration in the water for extended periods of time (a residual). The disinfectant residual inactivates or kills microorganisms and oxidize contaminants as they enter the water to protect users from pathogens brought into the water by people or from the environment.

The chart below contains the **minimum and maximum disinfection residuals[1]** required at all California public pools:

| | 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 | -- |

[1]California Code of Regulations (Title 22), Chapter 20, Section 65529 CYA = cyanuric acid

**A public pool operating with less than the minimum disinfection residual or more than the maximum disinfection residual is considered unsafe and will be closed by the Department of Environmental Health.**

## pH

pH is a measure of the degree of acidity or alkalinity of a solution. A pH below 7.0 is considered acid and a pH above 7.0 is considered alkaline. Control of pH is important for the comfort of pool users, the efficiency of the disinfectant, and the protection of the pool system components. Pool water with a low pH (acid) produces corrosive water which can cause eye/ skin irritation, etching of the pool surface, corrosion of metals and staining of surface walls. Pool water with a high pH (alkaline) produces scaling water which can cause eye/ skin irritation, clouds water, plugs filter and creates white film/ crusty deposits. High pH also lessens chlorine's effectiveness (e.g., at pH 8.0, the efficacy of chlorine disinfection is reduced by 80% and at pH 8.5, the efficacy of chlorine disinfection is reduced by 90%).

The chart below contains the **minimum and maximum pH levels[2]** required at all California public pools:

| | Minimum | Maximum |
|---|---|---|
| pH | 7.2 | 7.8 |

[2] California Code of Regulations (Title 22), Chapter 20, Section 65530

**A public pool operating at less than the minimum required pH or above the maximum allowable pH is considered unsafe and will be closed by the Department of Environmental Health.**