

Pool Chemicals and Personal Safety¹

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What Are Pool Chemicals?

Pool chemicals are among the most common household substances and are used to protect health in recreational waters. Pool chemicals containing chlorine safeguard against recreational-water illnesses caused by disease-causing pathogens, such as the diarrhea-causing *Cryptosporidium*. They also enhance disinfection by regulating water pH.

These tablet, granule, and/or liquid materials are regularly handled by homeowners, most of whom never realize that they are handling pesticides (Figure 1). These chemicals are specifically categorized as “antimicrobial pesticides” and contain calcium and sodium hypochlorite. Since they are considered pesticides, many pool chemicals are required to be registered (Figure 2) with the Environmental Protection Agency (EPA) and the Florida Department of Consumer Services (FDACS).



Figure 1. Pool chemicals, distributed through box stores, are classified as pesticides.

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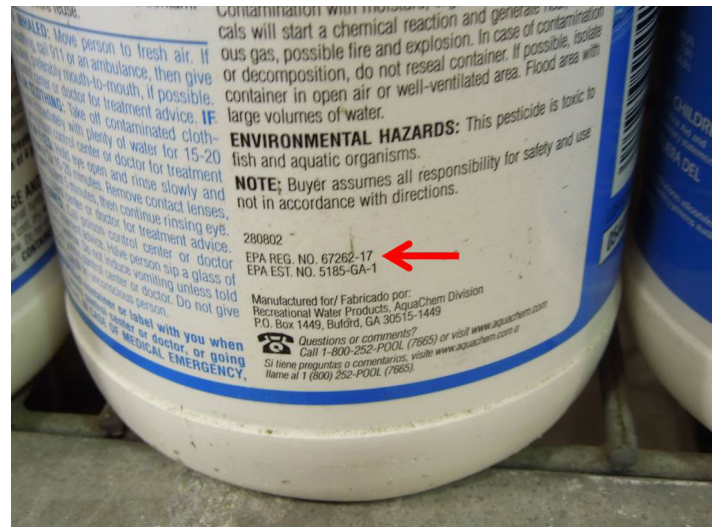


Figure 2. Look for the EPA registration number on the product's label to determine if a pool chemical is classified as a pesticide.

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Since They're Pesticides, Aren't They Harmful?

According to the EPA, a pesticide is a chemical used to prevent, destroy, or repel pests. As such, pesticides may contain chemicals that are harmful to humans, pets, or the environment. For this reason, the EPA's Office of Pesticide Programs regulates pesticides in the United States to protect public health and the environment. Like regular disinfectant cleaners used around the home, swimming pool chemicals can be very caustic. These chemicals can cause breathing problems and potentially burn the eyes and skin, but are particularly harmful if swallowed.

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As an analogy, some household cleaners contain two percent (2%) chlorine; liquid bleach has five percent (5%) chlorine. Chemicals for use in swimming pools can contain from 12 to 95 percent (12% to 95%) chlorine. Because pool chemicals are more highly concentrated, they are meant to be diluted or added to relatively large volumes of water, typical of most swimming pools.

Have There Been Documented Health-Related Incidents with Pool Chemicals?

According to the Centers for Disease Control and Prevention (CDC), pool chemical injuries account for as many as 5,200 emergency room visits each year. About half of these occur at private residences. CDC analyzed data for the period 2002–2008 from six states participating in the Sentinel Event Notification System for Occupational Risk (SENSOR) - Pesticides surveillance program and from the National Electronic Injury Surveillance System (NEISS). Based on estimates from the six sentinel states during this period, slightly more than 4,000 cases of acute illnesses and injuries associated with pool chemicals are reported annually, most to poison control centers. The most common contributing factors included mixing incompatible products, spills and splashes of chemicals, lack of appropriate personal protective equipment (PPE) use, and dust clouds or fumes generated by opening a chemical container.

Are There Safeguards for Handling Pool Chemicals?

The majority of illnesses and injuries that are reported are preventable by taking some common-sense precautions. The CDC recommends:

Before using pool chemicals:

- Get trained in pool chemical safety (enroll in an operator training course)
- Ask for help if you are not trained for specific tasks
- Read the entire product label or Safety Data Sheet (SDS) before using

While using pool chemicals:

- Dress for safety by wearing appropriate safety equipment (for example, safety goggles, gloves, and mask)

- Read the chemical product label before each use
 - Handle in a well-ventilated area
 - Open one product container at a time and close it before opening another
 - Minimize dust, fumes, and splashes
 - Measure carefully
- Never mix...
 - Chlorine products with acid; this could create toxic gas
 - Different pool chemicals (for example, different types of chlorine products) with each other or with any other substance
- Only pre-dissolve pool chemicals when directed by product label
 - If product label directs pre-dissolving, add pool chemical to water; NEVER add water to pool chemical because violent (potentially explosive) reactions can occur

Laminated safety posters may be ordered from the CDC at <http://wwwn.cdc.gov/pubs/CDCInfoOnDemand.aspx?ProgramID=93>

Since These Chemicals Can Cause Harm, How Do I Know if Their Concentrations in My Pool Are Safe?

Public pools. The Florida Department of Health (DOH) is responsible under Chapter 514 of the Florida Statutes for the routine surveillance of water quality and safety at all public swimming pools. To protect public health, the DOH has adopted sanitation and safety standards for public pools in Chapter 64E-9 Florida Administrative Code. The standards for chemicals used in controlling the quality of pool water are established by the National Sanitation Foundation. For example, the standards specify the acceptable concentration ranges for chlorine and water pH. Permitting and inspections are done by the Environmental Health Section of the DOH in each county. Inspection data are updated on a regular basis for public pools in every Florida county and are available at <http://www.floridahealth.gov/statistics-and-data/eh-tracking-and-reporting/swimming-pools.html>. Public searches may be sorted by county, city, and zip code.

Private pools. A pool water test kit will indicate how much of each chemical is needed based on the size of the pool. Many of these do-it-yourself kits, available from pool

supply stores, are simple-to-use color-coded strips. The colors displayed on the strip will indicate the levels of chlorine and other water quality components based on comparison to the standards on the product container or included with the kit (Figure 3). Other kits are available that include a hand-held digital reader that provides test results following the insertion of strips. After a few seconds the water quality values are displayed numerically on its screen. Other more elaborate and expensive kits display water quality results from direct sampling without using strips. Regardless of the type of test kit, follow the test kit's use instructions, including frequency of testing, as water chemistry can change quickly.

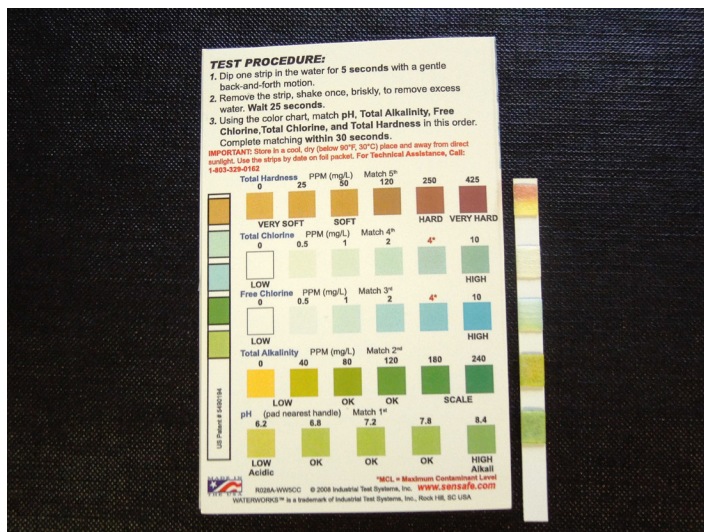


Figure 3. Water quality results based on a test strip.
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Do the Benefits of Using Pool Chemicals Outweigh the Risks?

Pesticides, which include pool chemicals, reduce water-borne transmitted diseases. Over the years, pool chemicals have been the primary defense against the transmission of recreational-water illnesses. According to the CDC, there are approximately twice as many cases of illness attributed solely to cryptosporidiosis (a fecal parasite that is transmitted in water) as to injury or illness due to pool chemicals. That does not account for other recreational water illnesses caused by other germs. Safely handling pool chemicals, including reading and following all label directions as with any pesticide, will provide a safeguard against these illnesses (Figure 4).

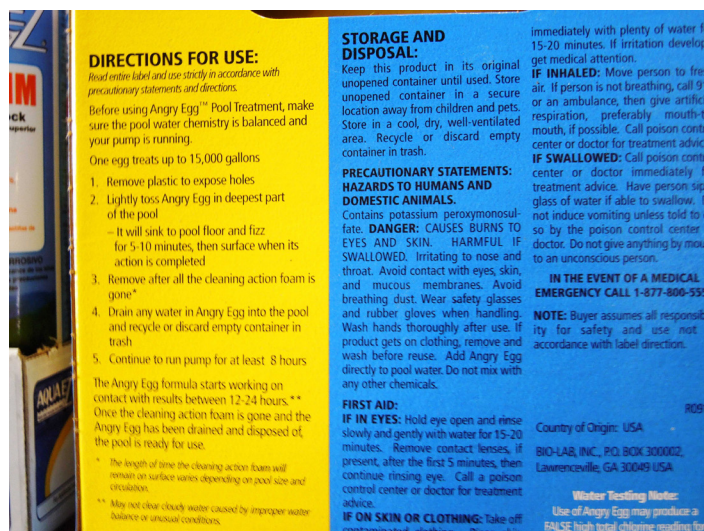


Figure 4. Thoroughly read the product's label directions to determine a pool chemical's safe and effective use.
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Additional Information

Centers for Disease Control and Prevention. <http://www.cdc.gov/>.

Fishel, F. M. 2006. Homeowner's guide to pesticide safety. UF/IFAS EDIS Publication PI-174, <https://edis.ifas.ufl.edu/pi051>.

Fishel, F. M. 2005. Understanding safety data sheet language. UF/IFAS EDIS Publication PI-35, <https://edis.ifas.ufl.edu/pi072>.

Florida Department of Agriculture and Consumer Services Bureau of Licensing and Enforcement, 3125 Conner Drive, Bldg. 8, L-29, Tallahassee, FL 32399-1650, Phone: 850-617-7997. <http://www.freshfromflorida.com/Divisions-Offices/Agricultural-Environmental-Services/Bureaus-and-Sections2/Bureau-of-Licensing-and-Enforcement>.

Florida Department of Health. <http://www.floridahealth.gov/>.

United States Environmental Protection Agency Office of Pesticide Programs. <http://www.epa.gov/pesticides/>.