Cal Hypo: The Facts

SOME THINGS YOU KNOW AND SOME YOU DON'T ABOUT THE SANITIZING STALWART

By the APSP Recreational Water Quality Committee (RWQC)

Calcium Hypochlorite, or cal hypo, is just about the most common, run-of-the-mill pool product you can think of, a staple of chlorine water sanitizing for decades and decades. However, that familiarity often breeds benign ignorance of cal hypo's particular features compared to other forms of chlorine and how these characteristics can affect water quality.

Cal hypo is a concentrated source of chlorine in solid form and provides an easy method of delivering chlorine to the water. It serves a variety of needs — you can use it as a sanitizer, algaecide and/or a shock product depending on circumstances and the way you add it to a pool.

A FEW CAL HYPO FACTS:

Cal hypo provides excellent water clarity while destroying contaminants in pool and spa water such as those found in sweat, urine and windblown debris.

- ➔ Cal hypo does not contain stabilizer (cyanuric acid), though it can be stabilized toward sunlight in recreational water through the use of cyanuric acid.
- ➔ You can buy it in slow dissolving tablet forms, or more rapidly dissolving granular forms, depending on your needs.
- ➔ When cal hypo is added to a pool, pH, alkalinity and hardness of treated water may drift upward.
- ➔ Cal hypo is a strong oxidizer that requires proper attention to the manufacturer's instructions for application, storage and handling.

Various Forms and Concentrations

Calcium hypochlorite comes in varying strengths — while commercially available in dry mixtures containing up to 80 percent calcium hypochlorite, 65 to 75 percent is more common, with lower concentration formulations also available. High-strength calcium hypochlorite (65 percent) has been widely used as a disinfecting agent in swimming pools and municipal water treatment since 1928.

It is a convenient source of available chlorine, one of the most widely used chemicals for disinfecting swimming pool water. You can find it in granular, tablet or briquette product forms labeled as an EPA-registered pesticide, for use in home, semiprivate, and commercial (public) pools.

Calcium hypochlorite is soluble (18 percent or 1.5 lb/gallon) in water, forming hypochlorous acid and hypochlorite ion or free available chlorine (FAC). Hypochlorous acid is more effective as a biocide than hypochlorite ion.

The relative amounts of hypochlorous acid and hypochlorite will depend on pH. Therefore, always maintain the pH between the recommended values of 7.2 and 7.8. The biocidal properties of calcium hypochlorite are due principally to hypochlorous acid which kills bacteria, algae and other microorganisms. Because a residual level of FAC can be maintained with the use of calcium hypochlorite, it is classified as a primary sanitizer.

In addition to its use as a primary sanitizer, calcium hypochlorite can perform additional water treatment functions to control algae, contaminants and chloramines. If the proper concentration of free chlorine (1 to 4 ppm) is maintained in the pool with calcium hypochlorite, the swimming pool water will be properly sanitized, that is, the bacteria will be killed fast enough to control their populations in the pool water.

The free chlorine concentration for spas should be 2 to 5 ppm. The free chlorine generated from calcium hypochlorite helps provide clear water by killing algae and by destroying organic matter that will cloud the water if allowed to build up. Chloramines, the most common cause of unpleasant odors, are also eliminated by the action of free chlorine.

As the name suggests, calcium hypochlorite contains calcium. When calcium hypochlorite is used, 0.8 ppm of calcium hardness is added to the water for each ppm of available chlorine added. A certain amount of calcium hardness (usually within the range of 150 ppm – 1,000 ppm) is necessary to protect pool and spa surfaces and equipment from attack by the water, but if high amounts of hardness and alkalinity are combined, high concentrations of calcium carbonate may result in scale formation or cloudy water. The first step in correcting this situation is to balance the water using the Langelier Saturation Index.

Ancillary products can be used to minimize scale formation and cloudy water. If additional measures are necessary, partially drain the pool and refill with fresh water where possible (providing the fill water has a lower calcium hardness level). Draining has the advantage of removing contaminants that have built up through use of the pool or spa. Draining is recommended as a periodic practice for all pools and spas to control the total dissolved solids.

CAUTION:

IF MISHANDLED, IMPROPERLY STORED OR CONTAMINATED, CALCIUM HYPOCHLORITE PRODUCTS CAN BECOME UNSTABLE AND DANGEROUS.

How to use it

The amount of product to be used or dispensed depends upon the specific application and the volume of water being treated. For example, in routine sanitizing use, the objective is to maintain a residual available chlorine concentration of 1 to 4 ppm for pools and 2 to 5 ppm for spas.

The label use instructions will explain how to determine a typical dosage for the water volume to be treated. Label use instructions will similarly define dosage requirements for other product applications such as oxidation, shock treatment or superchlorination.

The requirements for pool water testing in the application of calcium hypochlorite products should be indicated on the product label. The primary parameter to be tested is the level of FAC in the water. The choice of testing methods will vary depending on the type of pool (residential or commercial) and local regulations and standards. The product label should recommend that the pool water quality be properly balanced. This requires testing of the pool water balance parameters of pH, alkalinity, calcium hardness and stabilizer (i.e., cyanuric acid).

Precautions

Calcium hypochlorite has strong oxidizing properties — that means it readily yields oxygen or readily reacts to oxidize combustible materials, so you have to be careful with how you store and handle it.

It is stable when stored in a cool, dry, ventilated area and not contaminated by other chemicals such as acids or easily oxidizable materials. Calcium hypochlorite, in the solid form, shall not be mixed with other pool chemicals including other chlorinating agents. Partially empty packages must not be consolidated, as this could result in dangerous mixing with incompatible dry chlorinating agents having a similar appearance.

CAUTION: If mishandled, improperly stored or contaminated, calcium hypochlorite products can become unstable and dangerous, as is the case in general with chlorinating agents. Fire, explosion and/or evolution of toxic gasses could result, depending on the nature and amount of the contaminant.

As with any oxidizer, calcium hypochlorite can oxidize metals, which may produce contaminants that can stain pool and spa surfaces. ~

REFERENCES

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2. Appendix A, ANSI/APSP-1, ANSI/APSP-2, ANSI/APSP-3, ANSI/APSP-4, ANSI/APSP/ICC-5, ANSI/APSP-6 standards, Association of Pool and Spa Professionals, 2111 Eisenhower Ave., Alexandria, Virginia 22314.

National Fire Protection Association, NFPA 400 Hazardous Materials Code, 2010 Edition, Annex G

"Safe Storage and Handling of Swimming Pool Chemicals", EPA 550-F-01-003, United States Environmental Protection Agency (EPA), Office of Waste and Emergency Response, March 2001. http://www.epa.gov/oem/docs/chem/spalert.pdf