



# Aquatic Consulting Services

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## Pool Tip #2: BCDMH

Chlorine or some equivalent product or combination of products must be added to pool and spa water in order to kill bacteria and other harmful disease causing pathogens, and to remove unwanted organic waste products such as body oils and secretions, suntan lotions, cosmetics, hair care products, and deodorants, which bathers impart to the water.

Alternatives to using chlorine include bromine based products, potassium iodide, ozone, UV light, ionization of metals, and polymeric biguanides. Salt can also be purchased and used to generate chlorine on-site. Each of the chemicals or products has its advantages and disadvantages.

Bromine in the form of bromo-chloro-dimethylhydantoin (or BCDMH) is commonly used to sanitize and oxidize pool or spa water. BCDMH is actually a mixture of both bromine (66%) and chlorine (27%), sold in 1" or 3" white tablet form. The BCDMH is normally introduced into the water through erosion-soaker feeders called brominators. Automated chemical controllers should be attached to the feeders to constantly monitor the pH and need for more bromine, and signal the brominators to release bromine into the water as necessary.

Bromine is less irritating to bather eyes and mucous membranes than is chlorine. Less odor is produced (than with chloramines), but the odor produced is often described as an unpleasant "dead fish" smell. Bromamines form, but recombine with hypochlorous acid to regenerate hypobromous acid. However, there is no easy way for pool operators to distinguish between free and combined bromine. Bromine is more active at pH levels maintained in pools and may be considered a better sanitizer than chlorine. It is also more stable in heat and sunlight, without the use of stabilizers.

However, bromine is a poor oxidizing agent, and not anywhere near as effective as chlorine or ozone for oxidizing organic contaminants. Organic compounds build up in the water, resulting in cloudy pool water, and food for both algae and bacteria. BCDMH may impart a dark green tint to the water, and may stain pool walls and decks a manila color. A marmalade-colored scum line often forms at the water line.

High concentrations of dimethyl hydantoin (the DMH in BCDMH) are known to build up in pools treated with bromo-chloro-dimethylhydantoin, tying up bromine and reducing effectiveness. Problems similar to those that occur in chlorinated pools overstabilized with cyanuric acid result. Oxidation reduction potential (ORP) levels

plummet as the brominated pool water ages. The minimum 750 mV ORP levels often become difficult to reach.

In a study conducted by Olin Chemical of commercial pools using BCDMH (Technical Bulletin "Bromine Use in Swimming Pools: Exploding the Myths"), results showed that the concentration of organics was three times higher than that typically found in chlorinated pools, DMH levels were elevated, more than half the bromine measured by DPD total bromine test kits was bromamine rather than free bromine, and the pools reported continuing problems with cloudiness and bather skin irritation.

Sodium bromide levels also increase to undesirable levels within a very short period of time. This requires regular dilution, and monitoring (lab tests to confirm that sodium bromide levels stay below 20 ppm). The pool should be drained completely if sodium bromide levels exceed 50 ppm.

Just as chloroform is produced in chlorinated pools, the trihalomethane bromoform forms in brominated pools. Since bromoform is less volatile than chloroform, it tends to remain in the pool longer exposing bathers to a greater risk of exposure.

Some counties in New York are now requiring that Total Organic Carbon (TOC) be measured in brominated pools since elevated TOC levels in pools indicate nutrients are present that support the growth of pathogenic microorganisms, as well as nonpathogenic but undesirable organisms such as algae. According to the Suffolk County Bureau of Marine Resources "the incomplete oxidation of organic material introduced into pool water by bathers by bromine results in the formation of irritating organic-bromine compounds. Total organic bromine is not removed by filtration, nor is it rapidly broken down into its final by-product, bromoform, by the oxidative action of bromine. Therefore the only way to remove potentially hazardous offending organic-bromine compounds is to drain and refill the pool."

Halogen sanitizers like bromine make your skin less able to hold water. Regular or long term exposure to bromine (or chlorine) dissolves the protein layer and natural oils in skin causing skin to become dry, flaky, itchy, and easily sunburned. This problem is often aggravated by cold, dry, winter weather.

Just as with chlorinated pools (less than 5%), a small percentage (estimated by New York dermatologist Dr. Steve Kurtain to be as high as 17%) of patrons who regularly swim in brominated pools will develop a sensitivity to the chemical. Young children, older adults, and swimmers who spend a lot of time in the water seem to be more chemically sensitive and are more likely to develop a rash from swimming in treated pool water. According to Carol Reed, in the Water Quality Laboratory at the Centers for Disease Control and Prevention in Atlanta, the rash is not caused by the bromine itself, but rather from the sensitivity developed from exposure to any halogen chemical or mode of sanitation.

To help prevent your skin from itching after swimming, take a hot, soapy shower immediately after leaving the pool and before cooling down. Showering will help remove the odor from your skin, remove dead flaky skin, and prevent your pores from closing over bacteria which may be on your skin. Use mild soaps which do not further dry your skin. After showering remoisturize your skin with a moisturizing body lotion.