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PHOSPHATE EFFECTS AND CONTROL IN RECREATIONAL WATER

The presence of phosphates (as ortho-phosphate) in recreational waters has been long recognized as a nutrient source for algae growth in and fouling of these systems. In general, the applied solutions to algae have been elevated chlorine and certain regulated algaecides. More recently, it has been shown that phosphate concentrations at any level will react with free chlorine (hypochlorous acid) to form an inactive chloride compound. At commonly found concentrations of 500 – 3,000 ppb, available free chlorine can and will be reduced by 90% or more, leading directly to inadequately sanitized water and accelerated algae growth.

Phosphate contamination of recreational waters comes from various sources. Possibly the most predominant of these has been from the use of phosphonic acid based calcium carbonate scale and metal stain control products. When applied at typical concentrations to water with a chlorine oxidizing environment, phosphonic acid compounds rapidly hydrolyze to form ortho-phosphates, frequently at levels of 1,000 – 3,000 ppb. These levels can also be reached from other phosphate sources, including but not limited to polyphosphate corrosion inhibitor application to potable water by municipal water authorities, fertilizer blow-in, wash-in from vegetation, and fertilizer contamination of ground waters.

Orenda Technologies, Inc. has, during the past two years, repeatedly demonstrated that initial removal of phosphates to less than 100 ppb will immediately return free chlorine to design concentrations and eliminate algae growth. The most cost-effective commercially available product for initial treatment of pool and spa waters is Orenda's PR-3000 Phosphate Remover. Routine maintenance of low phosphates is easily accommodated by weekly application of Orenda's CV-700 Catalytic Enzyme and Phosphate Remover blend, which not only provides the benefits of highly active enzyme entities for organic residue control, but provides the capability of routinely removing up to 500 ppb phosphates on a weekly basis.

It is of some importance to quantitatively measure the phosphate concentration in water to be treated, to enable proper and sensible dosing of a phosphate remover. Numerous "wet" test kits are available, essentially all employing the same reliable analytical chemistries. We strongly recommend that test "strip" methods not be used as they are consistently inaccurate and unreliable (in spite of vendor claims to the contrary). Most wet chemistry procedures available for pool and spa use have an upper limit of phosphate detection of 1,000 ppb. When a water sample is found to contain this concentration, it is necessary to rerun the test with a 1:1 dilution of the original sample with a phosphate-free water such as bottled drinking water or distilled water, adjusting the resultant data upward by a factor of two to obtain the actual phosphate level present. Higher sample dilutions may be required to accommodate higher phosphate levels, with data adjustment commensurate with the dilution ratios.

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