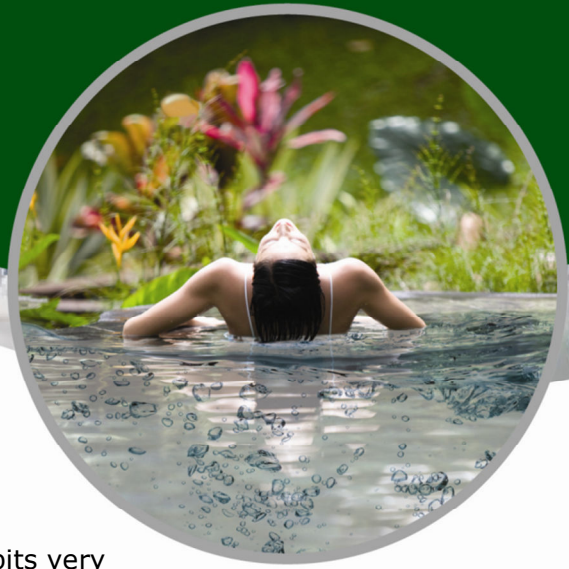


# Hydrogen Peroxide

## Questions and answers on use in hot tubs:



### 1. What is Hydrogen Peroxide?

Hydrogen Peroxide ( $H_2O_2$ ) is a liquid chemical compound that exhibits very powerful oxidizing, bleaching and disinfection properties. You may be familiar with it as a sterilizing agent for cuts and other types of wounds. The largest use for hydrogen peroxide is as a bleach in the pulp and paper industry and in the manufacturing of other compounds that go into laundry detergents. It is also used as an ingredient in hard surface cleaning and sterilizing products.

### 2. Can it be used to treat hot tub water?

Hydrogen Peroxide has excellent oxidizing and disinfecting properties which should make it a viable product for general water treatment. It is used for wastewater treatment due to its ability to oxidize organics. There are issues, however, with its use in hot tubs. Those issues are as follows;

- a. **Not a stable disinfectant.** Hot tub water requires ongoing sanitation to protect the health of bathers. Harmful bacteria, viruses, yeasts and other microorganisms can be introduced to hot tub water at any time and often come directly from bathers themselves. If a proven sanitizer is not present at the time of introduction, these harmful microorganisms can reproduce and potentially infect bathers. This is referred to as cross-infection. The issue with hydrogen peroxide is that it cannot be stabilized in a way that would allow it to remain in water for a prolonged period of time. Unlike chlorine or bromine, where a residual can be achieved and maintained, hydrogen peroxide is relatively short lived in the temperature and pH range usually found in hot tubs. This exposes bathers to the potential for infection if a minimum residual is not present when people are actually using the hot tub. The only effective way to use hydrogen peroxide in hot tub water for sanitation would be in a continuous feed application. This would ensure the chemical is constantly applied. An effective residual for bather safety would be in the range of 50 - 100 ppm throughout the duration of use.
- b. **Incompatible with bromine and chlorine.** Given the deficiencies that exist with hydrogen peroxide, it would be ideal if it could be used in conjunction with bromine or chlorine to provide an effective oxidation / sanitation system. Hydrogen peroxide, however, cannot co-exist with bromine or chlorine in water. Hydrogen peroxide is used as a chlorine neutralizer to remove chlorine from water. This is what happened to the dive pool at the 2016 Olympic Games in Rio de Janeiro when the water turned green with algae. Hydrogen peroxide was applied, neutralizing the chlorine residual from the pool water and allowing algae to grow.

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### **3. Why are hydrogen peroxide products available for hot tub water treatment?**

There are hydrogen peroxide based products available that have label instructions for use in hot tubs. The product labels claim the product is to be used as a Shock Treatment or Oxidizer. They make no claims for sanitation or disinfection. As we stated earlier, hydrogen peroxide is a powerful oxidizer so it will help keep water clear by breaking down organics and fine particulate. The issue, however, is what do you use with it to ensure proper sanitation and bather safety? Hydrogen peroxide was first introduced to the pool and hot tub industry to be used as the shock treatment for a unique sanitizing system based on biguanide chemistry. Biguanides are incompatible with chlorine so a shock was needed that could break down organics and hydrogen peroxide was chosen. Biguanides provided the sanitizing function, however. As biguanide chemistry is not registered for use in Canada, there is no viable sanitizer to use in conjunction with hydrogen peroxide.

### **4. Does Health Canada have a position on Hydrogen Peroxide for use in hot tubs?**

Health Canada, through the Pest Management Regulatory Agency (PMRA) website, does not provide any guidance as it relates to the use of hydrogen peroxide in hot tubs. The PMRA has not registered any hydrogen peroxide based products for use in hot tubs (or pools) as a sanitizer. Oxidizers do not require registration. Hydrogen peroxide is not able to be registered as a sanitizer for the reasons outlined in question #2 above. As well, there is an issue with product safety relative to hydrogen peroxide.

### **5. What is the issue with safety?**

Hydrogen peroxide is a powerful oxidizer. A typical product for the treatment of cuts and wounds would be in the 3 – 6% concentration range. Hot tub products are much stronger, usually in the 30% - 50% range. At these concentrations, hydrogen peroxide becomes far more dangerous. In transport, storage and handling, extreme care would need to be exercised. Hydrogen peroxide at these concentrations can produce severe burns, inhalation hazards and fire. A careful review of the Safety Data Sheet would be strongly recommended.

## **Summary:**

Although hydrogen peroxide is a strong oxidizer and has disinfection properties, it is not well suited for regular use to treat hot tub water. Hot tubs require a reliable sanitizer that is going to be present in the water when the tub is used by bathers. Hydrogen peroxide does not lend itself well to the role of reliable sanitation due to its unstable characteristic. Reliable sanitizers that are currently available (bromine and chlorine) would not be compatible with hydrogen peroxide so a system utilizing both is not practical. It is also a very hazardous chemical in the concentrations found in products labeled for hot tub use. Extreme care is required when transporting, storing and handling this chemical product.

Proven alternatives that have been designed specifically to handle the demands and needs of hot tubs and their users are readily available. Consult with your Dazzle professional for information and options that will work best for you.