



Understanding & Addressing INDOOR Aquatic Illness

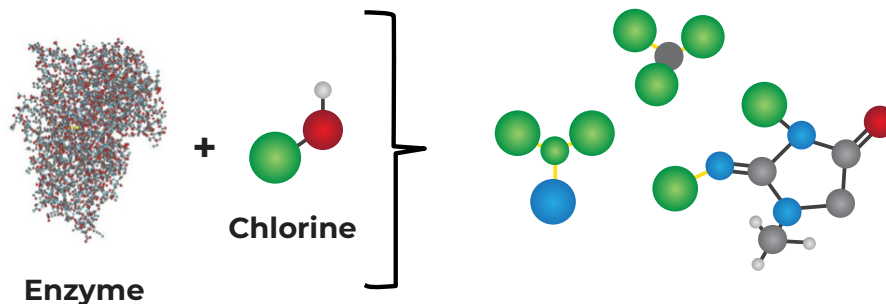
Between 2000 and 2014, the **Centers for Disease Control and Prevention (CDC)** reported 22 outbreaks and more than 1000 cases of **illness linked to pool chemistry** at public aquatic facilities. The culprits are likely the chemical compounds known as volatile disinfection byproducts (DBP), like **trichloramine**.

In 2017, a study published in the *International Journal of Environmental Health Research* found lifeguards who worked at indoor aquatic facilities more than 500 hours per year were much more likely to suffer from respiratory illnesses than lifeguards who worked fewer hours—clearly highlighting indoor pool environments can have adverse health effects on the respiratory system. [Reference Pool and Spa Marketing Article - copyrighted](#)

Researchers from a university recently conducted a study at an INDOOR aquatic facility by monitoring DBP in both the air and water. The study included monitoring the before and after effects of a new generation of pool water treatment called **Breathe EZ™**, and the results were striking.

Formation of DBP

Chlorine is a very effective disinfectant for the treatment of recreational water. However when chlorine reacts with organic based contaminants added to the pool water by swimmers (e.g. urea, enzymes in saliva etc.), undesirable reactions occur resulting in the formation of volatile chlorinated disinfection byproducts (DBP).



As the concentration of DBP increases, the air becomes fouled resulting in: respiratory discomfort; irritation of the sinus, nose and eyes; corrosion of equipment, and typically increased energy cost associated with excess outside air exchange.

Other Problems Resulting from DBP

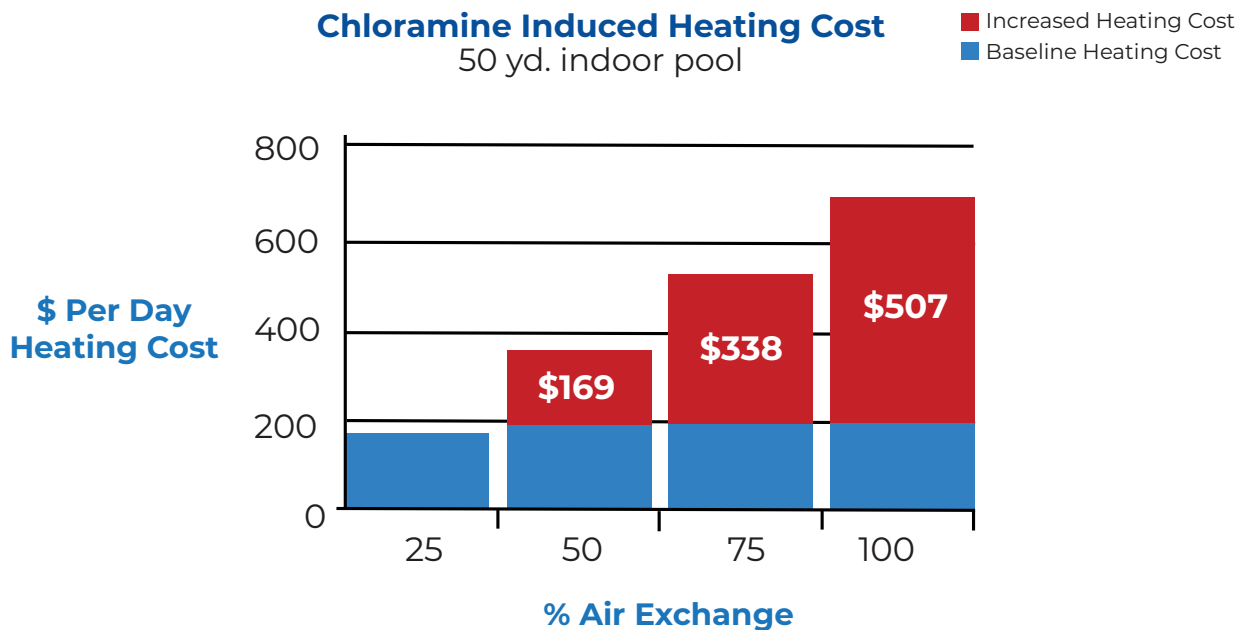


Corroded Air Handling System



Corroded Dehumidifier

Trichloramine and other disinfection byproducts induce corrosion of air-handling and dehumidification equipment as well as increase energy cost resulting from excess air exchange used to dilute the air within the Aquatic facility.



Energy losses Resulting from Excess Air-Exchange

Breathe EZ™ Technology

Breathe EZ™ is a new generation of **patented** technology designed specifically to mitigate and inhibit DBP at INDOOR Aquatic Facilities.

Breathe EZ™ utilizes Advanced Oxidation Technology to produce the same Free Radicals used to Remediate Ground Water contaminated with chlorinated solvents and fuel additives.

In the swimming pool water, the Free Radicals are produced 24/7 at ppb levels effectively removing DBP and the organic contaminants that produce them. The Free Radicals produced generate 2700mV of Oxidation Potential resulting in the rapid destruction of DBP as well as the organic contaminants as they are being introduced to the pool water.

With the destruction of Chlorinated Disinfection Byproducts, free chlorine is liberated from the DBP and released back into the water. The ORP (Oxidation Reduction Potential) is sustained with reduced concentrations of free chlorine.

Breathe EZ™ Benefits Include:

- Virtually eliminates DBP
- Eliminates need for Breakpoint Chlorination
- Dramatically improves Water and Air Quality
- Typically reduces Chemical Cost
- Low cost to implement
- Easy to Implement and Maintain (Test Kit)
- Reduced Energy Cost (Reduced Outside Air Exchange)
- Reduced Maintenance (Equipment Replacement)

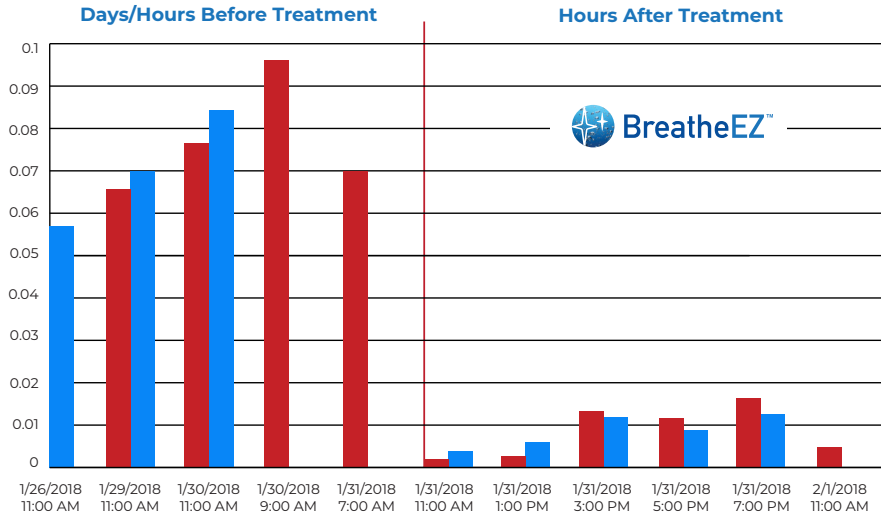
Breathe EZ™ Performance

Researchers from a university conducted a study in support of the **Centers for Disease Control and Prevention's (CDC's) Model Aquatic Health Code** to provide guidance on the proper design and operation of indoor pools for acceptable air quality (MAHC).

The study evaluated various mechanical as well as chemical treatments while monitoring chlorinated disinfection byproducts and organic contaminants in both the swimming pool water and air. Monitoring equipment was positioned above the pool deck while water samples were monitored before and after the filter.

University Study Trichloramine

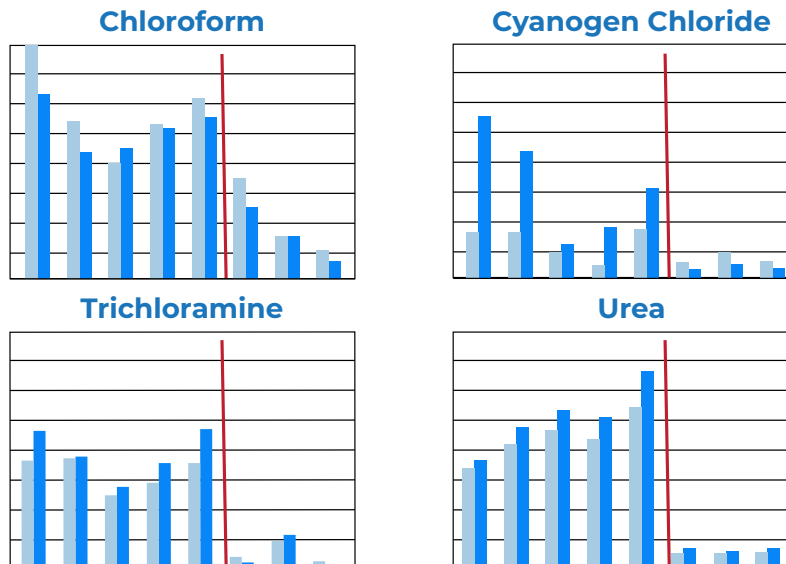
■ Before Filter
■ After Filter



The graph illustrates the before and after affect of Breathe EZ on trichloramine concentration. **NOTE on 1/31 at 7am the still elevated trichloramine concentration from the prior days. After addition of the Breathe EZ treatment, by 11am of the SAME DAY, the trichloramine concentration was virtually eliminated. In fact comparing trichloramine concentration at the same time of day (i.e. likely same bather loading) the 1/31 at 11am concentration is 10x lower than the 1/30 at 11am measurements.**

Data Before & After Breathe EZ

■ Before Filter
■ After Filter



Other DBP and precursors (i.e. Urea) the following days (right of RED line) after implementation of Breathe EZ™.

Breathe EZ™ Implementation

1. Install the **Breathe EZ™** Oxidizer feed system (i.e. Mixing tank with Chemical Pump).
2. Apply the **Breathe EZ™** Activator to achieve between 0.2 to 0.5ppm Truox® Activator.
3. Feed **Breathe EZ™** Oxidizer to apply 4-6 lbs/day or based on bather loading.
4. Maintain **Breathe EZ™** Activator as needed based on water losses (i.e. filter backwash). Monitor every 2-4 weeks using the Truox® Activator test kit.