

ClorTec™

The Benefits of On-site Sodium Hypochlorite Generation in Aquatic Applications

Transporting bulk chlorine on crowded highways and into residential areas has become a major safety concern. Federal and local authorities have recognized this problem and are dictating better solutions. More stringent regulation of toxic gases and accidental releases of chlorine have required industry professionals to seek alternative methods of disinfection.

Pressurized chlorine gas, the industry standard for decades, has become regulated to the point where many facilities have evaluated the alternatives and found on-site generation of sodium hypochlorite to be their best available technology for disinfection.

How long has on-site generation of sodium hypochlorite been available as an alternative to pressurized chlorine gas?

On-site generation of sodium hypochlorite has been a key process in water treatment for municipal and industrial applications for more than 30 years. ClorTec™ systems have been designed, manufactured, installed and operated since 1988.

What are the benefits of on-site generation?

On-site hypochlorite is a dilute form of disinfectant compared to chlorine gas or concentrated commercial hypochlorite. As a result, handling, transportation and containment are easier and safer. The benefits of the process over chlorine gas and bulk hypochlorite include:

- Eliminating the bulk storage of chemicals
- Reducing risk to plant personnel because of drastically reduced hazardous material storage and handling requirements
- Eliminating transportation liabilities
- Reducing the threat to public safety
- Reducing disinfection byproducts
- Creating a consistent solution concentration and increasing water quality
- Reducing overall disinfection costs
- Reducing the cost of pH adjustment

On-site generation also eliminates OSHA process safety management training, risk management planning and purchasing and transportation of HazMat chemicals that are required when dealing with pressurized chlorine gas.



ClorTec units are NSF Standard 50 Approved





How does on-site generation work?

The operation of the ClorTec system is very straightforward:

- Salt (NaCl) is dissolved in a tank to form a concentrated (30%) brine solution.
- The brine solution is reduced in concentration with demineralized water to 3%.
- The diluted brine solution is pumped through an electrolytic cell. The cell consists of numerous titanium plates packed into an equal number of plates acting as anodes and cathodes. DC power is applied to the cell from a rectifier. Chemically, chlorine is evolved at the anode surface, while hydrogen is evolved at the cathode surface. The secondary reaction of chlorine, sodium and the hydroxyl ion results in sodium hypochlorite at a 0.8% solution.
- The 0.8% hypochlorite solution flows into a storage tank.
- A metering pump delivers the disinfectant to an ejection point in the return line to the pool.

How safe is the system?

The ClorTec system is designed from the ground up to provide safe generation of sodium hypochlorite. As a comparison, household bleach typically is delivered in a 3-6% concentration. By generating a much weaker 0.8% hypochlorite solution, there is greatly reduced risk to the operator through accidental exposure.

The system also is designed with a four-tier safety interlock, preventing the system from operating unless all system components are positively shown to be operating properly. And ClorTec's unique design

addresses the problem of hydrogen formation by diluting the gas through the addition of forced air before venting to the atmosphere. This design maintains hydrogen concentrations at less than 25% of the 4% LEL (Lower Explosive Limit).

How do the costs of on-site hypochlorite generation compare to purchasing commercial hypochlorite?

The only costs for on-site generation are electricity, salt and water. Savings vary depending on energy costs, but the typical user of a ClorTec system realizes savings of 30 - 60% in operating costs compared to commercially purchased sodium hypochlorite, in most areas.

What are the maintenance requirements for the ClorTec system?

Maintaining ClorTec on-site generators is simple and inexpensive. A regular check of the system is necessary to insure proper performance and operating conditions (i.e., cell condition, voltage, amperage and hour meter reading). Cell descaling is necessary on a periodic basis dependent upon the water hardness.

Inspection and adjustment of the metering pump and water testing may also be required. All systems can be provided in a SCADA-compatible configuration enabling integration and adjustment with existing process control.



Electrode replacement is the only major repair cost. During the selection process, consideration should be given to determine the potential cost and frequency of replacement cells. D.S.A. (dimensionally stable) titanium electrodes are coated with a proprietary blend of rare earth oxides. With proper care, these electrodes typically last eight to 12 years.