

# Sodium Hypochlorite and Its Properties



Disinfection Products

## General

Heightened concerns associated with chlorine gas storage and handling has resulted in a growing demand for sodium hypochlorite, as a safer alternative to gaseous chlorine. Sodium hypochlorite can be used for disinfection, chloramination, odor control, filamentous bulking control in activated sludge and ammonia removal.

Sodium hypochlorite (NaOCl) is available commercially as a solution at 12.5% to 15% available NaOCl by weight (household bleach is 5.25%wt), and contains 1.04 to 1.25 lbs available chlorine per gallon of solution. NaOCl is a highly reactive oxidizer. It is greenish-yellow in color with an odor similar to that of chlorine.

## Properties

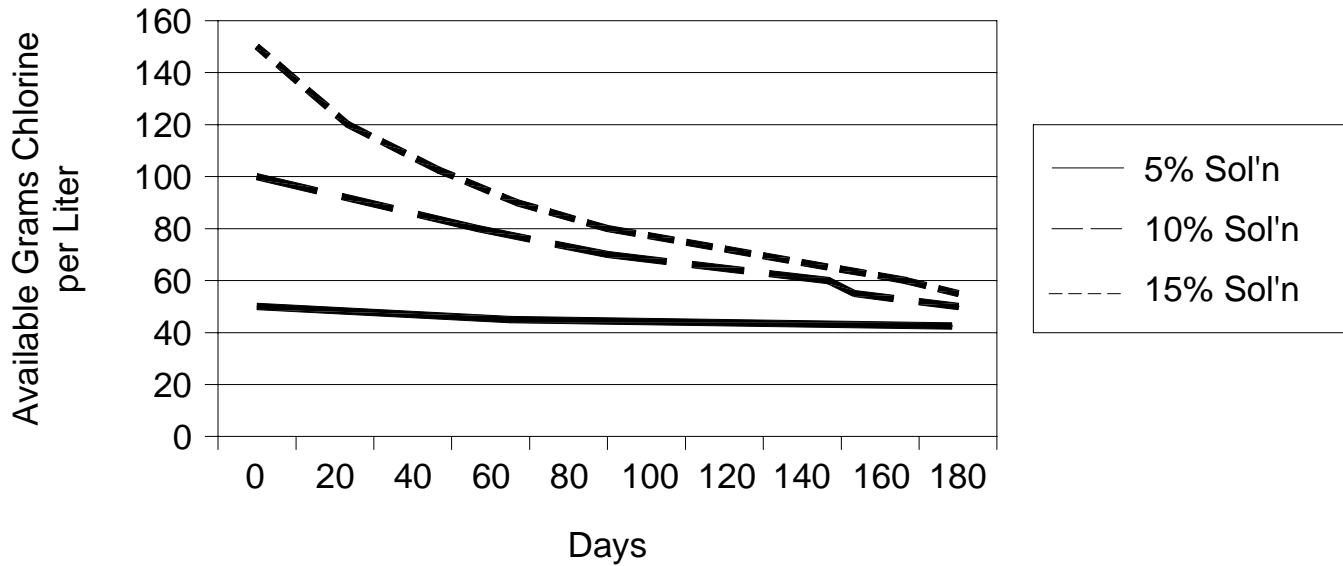
Although the commercial strength of NaOCl is 12.5% to 15%, the actual delivered product is usually weaker since hypochlorite is unstable and degrades as much as half every 100 days (at 70°F). In addition the pH of hypochlorite is high because sodium hydroxide is used in the manufacturing process. Dilution greatly reduces degradation, especially for solutions delivered in concentrations less than 7% to 8%.

NaOCl produces gas as a natural by-product of decomposition, as much as 1% per day at room temperature. This gas is usually oxygen, however chlorine gas can be released at lower pHs. The gas by-product of decomposition can be hazardous if not properly vented off or kept moving through the piping system. If the gas becomes trapped in a pipeline or in a pump liquid end, over time it can build up enough pressure to rupture the piping or pump head. Installing vent valves, keeping the liquid moving at high velocities and operating at cooler liquid and/or ambient temperatures can help reduce this problem.

Commercial strength hypochlorite is often diluted prior to being injected into a water stream, in order to provide proper mixing and disinfection. When an insufficient amount of dilution water is used the hypochlorite can cause the pH to rise. If the dilution water is hard water, the rise in pH will result in calcium carbonate precipitation which will coat the inside of piping, valves and pumps. This scale deposit will tend to be greatest in areas of high turbulence, such as pump heads, valves and rotometers. In order to prevent scaling use soft water. If soft water is not available use enough hard water to keep the pH below 9.

Sodium Hypochlorite Chemical Properties	
Chemical Formula	NaOCL
Concentration	12.5% to 15%
Specific Gravity	1.175 to 1.206 at 70°F (21°C)
Available Chemical	1.04 to 1.25 lb/gallon (125 to 150 gr/l)
pH	11.0 to 11.2

### Stability of Sodium Hypochlorite at Room Temperature



Design improvements may be made without notice.

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