Hazardous Materials: Sodium Hypochlorite Safe Handling Guideline

Department: Industrial Hygiene and Information Management
Program: Hazardous Materials
Owner: Program Manager
Authority: ES&H Manual, Chapter 40, Hazardous Materials[1]

Chemical Name/Class	Sodium hypochlorite

Synonyms

Hypochlorite, hypochlorous acid, chlorinated water

Reactivity and Physical Concerns

Incompatible with strong acids, amines, ammonia, ammonium salts, reducing agents, metals, aziridine, methanol, formic acid, phenylacetonitrile. When combined with an acid or ammonia may produce chlorine and chloramine gas. Decomposition of sodium hypochlorite takes place within a few seconds with the following salts: ammonium acetate, ammonium carbonate, ammonium nitrate, ammonium oxalate, and ammonium phosphate. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. **Releases chlorine gas when heated above 35ºC.** Anhydrous sodium hypochlorite is very explosive. Hypochlorites react with urea to form nitrogen trichloride, which explodes. Explosive reaction with formic acid (at 55ºC), phenylacetonitrile. Reacts to form explosive products with amines, ammonium salts, aziridine, and methanol.

Exposure Hazards

Routes of Exposure

Inhalation, ingestion, skin and/or eye contact

Sodium hypochlorite has a pronounced irritant effect and may cause severe burns to skin and eyes. Poisonous vapor (chlorine gas) is corrosive to respiratory passages and may cause irritation of mouth, nose and throat. If ingested sodium hypochlorite is poisonous, causes burns, abdominal cramps, nausea, vomiting, lowered blood pressure, diarrhea, shock, coma, shock, and death may occur.

Chronic Exposure

Repeated or prolonged contact with skin may cause dermatitis, coughing, runny nose, bronchopneumonia, headaches, breathing difficulty, pulmonary edema and lung injury. Caustic dusts are irritating to the upper respiratory system; prolonged exposure to high concentrations may cause discomfort and ulceration of nasal passages.

First Aid

If inhaled or ingested, move victim to fresh air. Call 911. Apply artificial respiration if victim is not breathing. **Do not use mouth-to-mouth method if victim ingested or inhaled the substance;** induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer

1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 40, "Hazardous Materials", http://www-group.slac.stanford.edu/esh/hazardous_substances/haz_materials/policies.htm

oxygen if breathing is difficult. Remove and isolate contaminated clothing and shoes. **In case of skin contact with substance,** immediately flush skin or eyes with running water for at least 20 minutes. For minor skin contact, avoid spreading material on unaffected skin. Keep victim warm and quiet. Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

Exposure Limits

- Permissible exposure limit: not established
- NIOSH recommended exposure limit: not established
- Immediately dangerous to life and health: not established

Exposure Controls

Engineering Controls

Local exhaust ventilation or breathing protection is required. Secondary containment of all storage and use is required.

Administrative Controls

Job hazard analysis and mitigation (JHAM) and procedures should be developed for the safe use and handling of sodium hypochlorite in all applications. ESH can provide information and guidance. Depending upon quantities, certain regulatory permits and/or registrations may be required. Personnel working with the materials must receive detailed training on the hazards, safe use, and emergency procedures

Personal Protective Equipment

Avoid bodily contact with the material. Contact lenses should not be worn while working with this substance. Prevent skin/eye contact through the use of impervious gloves, clothing, boots, apron, and eye goggles or full face shield. Avoid breathing vapors. If the airborne exposure limit may be exceeded and engineering controls are not feasible, wear a NIOSH-approved self-contained breathing apparatus with full face-piece operated in the pressure demand or other positive pressure mode.

Disposal

Material is regulated as a RCRA hazardous waste. Contact the Waste Management Group for specific disposal requirements and procedures. Containers and other materials that are contaminated must also be treated as hazardous waste.

Medical Monitoring (if applicable)

NA

Emergency Response

In the event of a significant release that poses a threat to employees and/or the environment, immediately evacuate the area and notify the emergency operator (911). The Palo Alto Fire Department will respond. Then call Incident Notification (ext. 5555) and notify your supervisor.

Small spills can be cleaned up with appropriate spill response supplies by trained employees who have this task authorized in their JHAM.

Standards/Regulations

- OSHA: PEL: 29 CFR 1910.1000, Table Z-1; Respiratory Protection: 29 CFR 1910.134
- EPA: Release: 40 CFR 355.40, 302, 116.4; Waste: 40 CFR 261.21–261.24
- *California Fire Code*: Chapters 27 through 41

Other References

- NLM, “TOXNET: Toxicology Data Network”, http://toxnet.nlm.nih.gov/

- NIOSH, International Chemical Safety Card: Sodium Hypochlorite (Solution, Active Chlorine >10%) (ICSC 1119), http://www.cdc.gov/niosh/ipcsneng/neng1119.html
- NIOSH, International Chemical Safety Card: Sodium Hypochlorite (Solution, Active Chlorine <10%) (ICSC 0482), http://www.cdc.gov/niosh/ipcsneng/neng0482.html