

Product Stewardship Summary Sodium Chlorite

Summary

Sodium chlorite is commercially available in two different physical forms, either as a dry flake material or as an aqueous solution. Unlike most chemicals, some of the hazards associated with this chemical may differ depending on the form of the product. Liquid sodium chlorite solutions are clear to slightly yellow in appearance and have a slight chlorine odor and are classified as corrosive. Dry sodium chlorite is a white flake product with a slight chlorine odor and is a strong oxidizer. Sodium chlorite, like many oxidizing agents, should be protected from inadvertent contamination by organic materials to avoid the formation of an explosive mixture.

The primary application for sodium chlorite is the generation of chlorine dioxide for bleaching and stripping of textiles, pulp, and paper. Another important use is in the disinfection and purification of water.

1. Chemical Identity

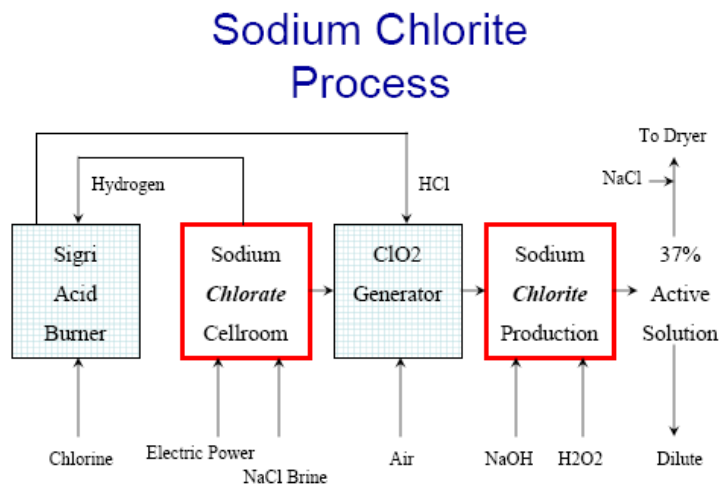
Name: Sodium Chlorite

Synonyms: Chlorous Acid, Sodium Salt

Chemical Abstracts Service (CAS) number: 7758-19-2

2. Production

Technical grade sodium chlorite is about 80% sodium chlorite, with the balance being a stabilizing material, usually sodium chloride. Sodium chlorite is derived indirectly from sodium chlorate, NaClO₃. First, chlorine dioxide [ClO₂] is produced by reducing sodium chlorate in a strong acid solution (e.g. hydrochloric acid (HCl)). The chlorine dioxide is then absorbed into an alkaline solution (NaOH) and reduced with hydrogen peroxide, H₂O₂, yielding 37% sodium chlorite.



3. Uses

Sodium chlorite is used for a variety of applications. It is used as a disinfectant and purification chemical for water. It is also employed as a textile-bleaching and water anti-fouling agent. Additionally, it is used in the paper and electronics manufacturing industries as a bleaching agent.

When mixed with a reactant such as chlorine or an acidic solution, sodium chlorite converts into chlorine dioxide. Chlorine dioxide is added to a municipal water supply to help control undesirable tastes and odors, removal of ions like iron and manganese, and the control of trihalomethanes in drinking water.

As a textile-bleaching agent, sodium chlorite is effective with various fibers. It can be used on natural as well as man-made fibers. It has an oxidizing effect on many of the natural waxes and pectins found in cellulose fibers, which helps solubilize them and makes the fiber more even and workable. It has the added benefit of destroying natural color matter without attacking the fibers themselves. This makes it useful for making permanent white fabrics without compromising tensile strength.

Sodium chlorite is also used for various industrial applications. It controls microbial contamination in industrial cooling systems and towers. Since it is an oxidizer, it is often a part of flue gas scrubber systems. Food-processing companies use it for washing fruits and vegetables because of its fungicidal properties. Meat and poultry are also washed with a solution of sodium chlorite, as is food processing equipment. Finally, it is an anti-mildew agent in detergent compositions.

4. Physical and Chemical Properties

Sodium chlorite in its dry form is a strong oxidizer. An oxidizer is a compound that initiates or promotes combustion in other materials. This means that if sodium chlorite comes into contact with combustible materials, it can react rapidly and ignite. However, sodium chlorite will not normally burn by itself. Examples of combustible materials are oil or grease (such as from a forklift), wood (such as pallets), leather, cloth, paints, organics, and in some cases dirt. It is important to keep these materials away from dry sodium chlorite. Dry sodium chlorite can be explosive in contact with chlorine, acids or acid materials such as alum. Contamination by these materials may start a chemical reaction, causing the generation of heat and emission of chlorine dioxide, a poisonous and potentially explosive gas.

Sodium chlorite solution becomes a fire or explosion hazard if allowed to dry and can ignite on contact with combustible material. As with the dry product, sodium chlorite solutions are incompatible with materials such as organics, oxidizers, reducing agents, soap products, acids, paint products, combustible materials, and in some cases, dirt. Contamination may start a chemical reaction with generation of heat, liberation of chlorine dioxide (a poisonous, explosive gas), and possible fire and explosion.

5. Health Effects

Dry sodium chlorite may cause irritation or burns to the skin and eyes. Sodium chlorite solutions are corrosive and cause skin and eye irritation or burns. Both forms are harmful if swallowed.

Sodium chlorite is not classified as a carcinogen by the National Toxicology Program (NTP), the International Agency for Research on Cancer (IARC), or the Occupational Safety and Health Administration (OSHA).

6. Environmental Effects

Sodium chlorite may adversely affect aquatic life. This material reacts with organic matter in the aquatic system, eventually degrading to sodium chloride. This material is believed not to bioconcentrate and is inorganic and not subject to biodegradation. In addition, this material is believed not to bioaccumulate.

7. Exposure

Sodium chlorite is corrosive and may cause severe irritation or burns to the skin and eyes. Inhalation of dusts, vapors or mists may cause irritation of the mucous membranes and respiratory tract. In addition, sodium chlorite may be harmful if swallowed. The most likely ways exposures could occur are:

- Worker exposure – Exposure could occur in the manufacturing facility or in industrial facilities that use sodium chlorite. When exposures occur, they are typically inhalation. Exposure to skin or eye causing severe irritation could also occur. Good industrial hygiene practices and personal protective equipment minimize the risk of exposure.
- Consumer exposure – Occidental Chemical Corporation does not sell sodium chlorite directly into the retail market; however, sodium chlorite is sold to service companies providing chlorine dioxide and equipment to markets in municipal water management. Safety precautions are provided by the marketers of these products.
- Releases – If a spill occurs, emergency personnel should wear protective equipment to minimize exposures.

8. Recommended Risk Management Measures

Prior to using sodium chlorite, carefully read and comprehend the Material Safety Data Sheet. The following are some risk management measures that are effective against the hazards of sodium chlorite:

- Use only in well-ventilated areas. Provide local exhaust ventilation where vapors mist or aerosols may be generated.
- Where sodium chlorite dust may be present, ventilation of the work area should be accomplished as necessary to maintain concentrations in air below 1 mg/m³. If exposures exceed accepted limits or if respiratory discomfort is experienced, use a NIOSH approved air purifying respirator with high efficiency particulate air (HEPA) filters.
- Good housekeeping practices are important where sodium chlorite is used. All spills should be contained and immediately recovered or flushed with water into a chemical sewer or a segregated holding tank or pond provided for the specific purpose of neutralization. Never flush to a sanitary sewer or other outlet connecting to waterways, rivers, or streams.
- Wear chemical safety goggles with a faceshield to protect against eye and skin contact when appropriate. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.
- Wear chemical resistant gloves made of neoprene to prevent skin contact.
- Wear chemical resistant clothing to prevent contact with the body.

9. Regulatory Compliance Information

The following is a summary of regulations and guidelines that may pertain to Sodium chlorite (additional regulations and guidelines may apply):

- Some of our sodium chlorite products may be regulated by Food and Drug Administration, 21 CFR Part 173, if used as a direct food additive permitted in food for human consumption.
- Some of our sodium chlorite products may be regulated as a pesticide under Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) (40 CFR 152) if used as an antimicrobial product.
- Spill residues may be a hazardous waste, as defined in 40 CFR 261, and as a hazardous waste will be subject to the Land Disposal Restrictions under 40 CFR 268.
- Sodium chlorite is regulated by the U.S. Department of Transportation (DOT).
- There are no established exposure levels for sodium chlorite; however, OxyChem has established an Internal Occupational Exposure Level for dust of 1 mg/m³ averaged over an 8 hour period.

10. Sources for Additional Information

- American Chemistry Council website:
http://www.americanchemistry.com/s_chlorine/science_sec.asp?CID=1265&DID=4745&CTYPEID=113
- Hazardous Substances Data Bank (HSDB), HSDB Number 733, Last revision date: January 5, 2009.
- OxyChem Technical Data Sheet: Sodium Chlorite Health and Safety:
http://www.oxy.com/Our_Businesses/chemicals/Documents/sodium_chlorite/technicalData/Sodium%20Chlorite%20Health%20and%20Safety.pdf
- OxyChem Material Safety Data Sheet web site:
http://www.oxy.com/Our_Businesses/chemicals/Pages/chem_products_msds_search.aspx
- Registry of Toxic Effects of Chemical Substances (RTECS), RTECS Number VZ4800000, Review Date: May 2008.

11. Contact Information: For additional information, call 1-800-752-5151 or 1-972-404-3700.

12. Preparation Date: December 2, 2009

This Product Stewardship Summary is intended to give general information about the product discussed above. It is not intended to provide an in-depth discussion of all health and safety information about the product or to replace any required regulatory communications.

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