GPS* Safety Summary for *Sodium Hydroxide*

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Names

Some common chemical identifiers, names and synonyms include:

- CAS No. 1310-73-2
- Aetznatron
- Ascarite
- Caustic soda
- Lye
- Sodium Hydroxide

Product Overview

- SABIC’s sodium hydroxide is a clear, colorless liquid. Sodium hydroxide solid reacts strongly with water, resulting in a splash hazard and the generation of heat capable of igniting combustible material. Concentrated solutions of sodium hydroxide will also produce heat when further diluted in water. For further details, see Product Description.

- Sodium hydroxide is sold commercially as a solid or as solutions with varying concentrations. Sodium hydroxide has many industrial uses. As a strong chemical base, sodium hydroxide is commonly used in the production of organic and inorganic chemicals, including the manufacture of pulp and paper, explosives, dyestuffs, petroleum products, soaps, detergents, and textiles. Sodium hydroxide is also used in water treatment and has wide dispersive uses for disinfection and cleaning purposes. For further details, see Product Uses.

- Products containing sodium hydroxide are widely available to the general public. Products containing sodium hydroxide as an ingredient in a formulation at a significant quantity (e.g. drain cleaners) may require the consumer to use specific protective measures, as described on product labels. In the workplace, adequate personal protective equipment should be used when handling the material due to the irritating or corrosive properties of sodium hydroxide. In any
situation where potential exposure is expected, the use of alkali-resistant protective equipment for eyes and skin, as well as respiratory protective equipment, is usually recommended. Workers that handle sodium hydroxide should be familiar with guidelines in the (Material) Safety Data Sheet. For further details, see Exposure Potential.

- The acute toxicity of sodium hydroxide depends on the physical form (solid or solution) and the concentration of sodium hydroxide, when in a solution. Exposure to concentrated solutions of sodium hydroxide can cause severe burns to the eyes, skin or gastrointestinal tract. For further details, see Health Information.

- Due to its high solubility, sodium hydroxide dissociates fully in water to sodium cations and hydroxide anions. As an inorganic chemical, sodium hydroxide is not considered as having a propensity for bioaccumulation. When released into waterways at significant concentrations, sodium hydroxide may be toxic to aquatic organisms due to the resulting increase in pH. For further details, see Environmental Information.

Manufacture of Product

Capacity – In North America, SABIC manufactures sodium hydroxide for use at its facilities in Burkville, Alabama and Mount Vernon, Indiana. Global production capacity for sodium hydroxide is above one million tons per year.

Process – Sodium hydroxide is a manufactured substance, which is produced via electrolysis of sodium chloride and is sold commercially as a solid and as a solution in water. SABIC uses sodium hydroxide as a reagent.
Exposure Potential
Sodium hydroxide has a wide range of uses, from closed systems in industrial settings to wide dispersive use resulting from its presence in consumer products. Sodium hydroxide is very corrosive as a solid or a liquid at high concentrations in water. Sodium hydroxide therefore has the potential to cause damage to all types of biological tissues in which it comes into contact.

**Consumer Exposure**- Sodium hydroxide is a manufactured chemical. It is present in several types of domestic cleaning products. Exposure to the solid or concentrated liquid can cause severe burns in the eyes, skin and gastrointestinal tract which may ultimately lead to death. Products containing sodium hydroxide should be stored out of the reach of children and cleaners containing sodium hydroxide should not be stored in containers that may appear attractive to children. Consumers should closely follow packaging precautions. In the event of contact with sodium hydroxide, medical attention should be sought immediately. See [Health Information](#).

**Workplace Exposure**- Exposure can occur either in a sodium hydroxide manufacturing facility or in the various industrial or manufacturing facilities that use sodium hydroxide. Worker exposure may occur through contact with skin or eyes and inhalation. Each manufacturing facility should have a thorough training program for employees and appropriate work processes established. Adequate general or local exhaust ventilation should be used to keep airborne concentrations below recommended health exposure limits. For any situation where potential exposure is expected, the use of base resistant protective equipment for eyes and skin, as well as relevant respiratory protective equipment, is usually recommended. See [Health Information](#).

**Environmental Release**- During manufacturing, sodium hydroxide should not be released into the environment in significant quantities, as it is acutely toxic to aquatic organisms due to the resulting increased pH level and it may alter the buffer capacity of the waterway. Accidental spills and releases need to be managed by trained professionals. In the event of a spill, the area should be evacuated promptly and the spill should be contained, if it is safe to do so, in order to minimize potential releases to the environment. Personal protective equipment and safe handling practices should be used. For facilities where sodium hydroxide is manufactured or large quantities are processed, a written Emergency Response Plan (ERP) should be developed for OSHA where required, the content of which would vary by facility size and proximity to populated areas.

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**Health Information**
Sodium hydroxide, as a solid or a concentrated solution, causes severe burns of the eyes, skin and gastrointestinal tract. Exposure to sodium hydroxide is not expected to impact the pH of the blood, which is regulated between narrow ranges to maintain homeostasis. At low doses that do not cause local irritation, exposure to sodium hydroxide may be evaluated in terms of the toxicological profile of sodium, which is a natural constituent of the diet and the human body.

**Eye Contact**- Eye contact may cause pain and mild to severe irritation with a risk of serious damage to the eye. Redness, tearing and swelling of ocular tissue and in severe cases, contact with sodium hydroxide may result in clouding of the eye, corneal damage and permanent loss of vision. Small amounts of sodium hydroxide splashed into eyes can cause irreversible tissue damage and blindness.

**Skin Contact**- Skin contact with sodium hydroxide can cause severe burns with deep ulcerations. Pain and irritation are evident within three minutes, but contact with dilute solutions may not
cause symptoms for several hours. Redness and swelling of dermal tissue may occur. Shock symptoms may develop including rapid pulse, sweating and collapse.

**Inhalation** - Inhalation of low levels of sodium hydroxide as dusts, mists or aerosols may cause irritation of the nose, throat and respiratory airways manifesting in difficulty breathing and coughing. Inhalation of higher levels can produce breathing difficulties manifesting in swelling or spasms of the upper airway leading to obstruction of the airway and loss of measurable pulse. Inflammation of the lungs and accumulation of fluid in the lungs may also occur.

**Ingestion** - Ingestion of solid or concentrated liquid sodium hydroxide can cause spontaneous vomiting, chest and abdominal pain and difficulty swallowing. Corrosive injury to the mouth, throat, esophagus and stomach is very rapid and may result in perforation, hemorrhage and narrowing of the gastrointestinal tract and/or perforation of the stomach. Case reports indicate that death results from shock, infection of the corroded tissues, swelling of the throat to the point of suffocation, lung damage or loss of measurable pulse. Symptoms of over-exposure include salivation, nausea, bloody vomiting, abdominal pain, diarrhea and severe coughing.

**Repeated Exposure** - No reliable studies examining repeated dose toxicity in animals are available. Prolonged or repeated exposure of sodium hydroxide is expected to result in local effects evident from cases of acute exposure.

**Reproductive and Developmental Toxicity** - Specific investigations on the reproductive or developmental toxicity potential of sodium hydroxide are not available due to the low potential for repeated exposures to sodium hydroxide at significant concentrations.

**Cancer Information** - Sodium hydroxide has not been evaluated in lifetime bioassays in animals. Expert assessment of *in vitro* and *in vivo* studies concludes that sodium hydroxide is not genotoxic.

**Environmental Information**

Sodium hydroxide released into the environment is primarily a concern for aquatic ecosystems, and is toxic to aquatic organisms due to the resulting increase in the pH level. Sodium hydroxide is a strong alkaline substance that dissociates completely in water to sodium and hydroxide ions. The resulting increase in the pH of the water will depend on the amount and concentration of the sodium hydroxide released, the size of the water body, and the assimilative capacity of the local media. For instance, small-scale releases to drains from household cleaning products subject to large dilutions and the buffering capacity of natural waters are not expected to harm the environment. Sodium hydroxide released into dry soil will be removed by rainfall and will dissociate into sodium and hydroxide ions in moist soil. Sodium hydroxide is generally expected to be rapidly neutralized by carbon dioxide in the air or washed out by rain.

**Physical Hazard Information**

Sodium hydroxide is stable at room temperature in closed containers under normal storage and handling conditions. When dissolved in water or neutralized with acid it liberates substantial heat, which may be sufficient to ignite combustible materials. Sodium hydroxide should be kept away from direct sunlight, should not be overheated and not exposed to moisture or freezing temperatures. Sparks, open flames, hot surfaces, other ignition sources, static build-up and elevated
temperatures should be avoided. Contact with metals, oxidizing agents, water, acids, aluminum and other light metals and their alloys should be avoided.

**Regulatory Information**

Regulations exist that govern the manufacture, sale, transportation, use, and/or physical disposal of sodium hydroxide. These regulations may vary by city, state, country or geographic region. For additional information on the regulatory status of this substance, please refer to the regional (Material) Safety Data Sheet.

**Classification and Labeling** - Substances may be classified according to their physical, health and environmental hazards. Identified hazards may then be communicated via specific labels on the product packaging and the Safety Data Sheet, as well as for transport. Under the initiative of the Globally Harmonized System (GHS), hazard classification and labeling is standardized across countries so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. Information on the classification and labeling of this substance is available in the regional (Material) Safety Data Sheet. See Additional Information.

**Additional Information**

In the USA, a Safety Data Sheet can be made available by contacting the SABIC Customer Service Center at 1-800-845-0600.

General information on Global Product Strategy (GPS) safety summaries is available via the International Council of Chemical Associations (ICCA):


IMPORTANT: As part of its Responsible Care goals, SABIC has committed to make publicly available safety assessments for its products globally. This Global Product Strategy (GPS) Safety Summary is intended to give general information about the chemical (or categories of chemicals) addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the relevant Safety Data Sheet, which should be consulted before use of the chemical. This Safety Summary does not replace required communication documents such as the Safety Data Sheet.

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