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Emergency Assistance
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Section 1: Product Identification

Synonyms: Caustic soda liquid 50%, Soda lye, Lye, Liquid Caustic, Sodium Hydrate
Chemical Name: Sodium hydroxide
Chemical Family: Alkali hydroxide
Chemical Formula: NaOH
CAS Reg. No.: 1310-73-2

Martin can not guarantee the technical analysis and exact chemical composition as it may vary depending on the chemical components of the raw material and are not reflected in this document. Consult analysis sheets for exact chemical composition.

Section 2: Hazard Identification

PHYSICAL STATE AND APPEARANCE: Clear to slightly colored (white), odorless, non-volatile liquid.

EMERGENCY OVERVIEW: Danger! Extremely corrosive. Causes severe burns and / or permanent damage to skin, eyes, and gastrointestinal tract. Aerosols can cause lung injury in which the effects may be delayed. Highly reactive. Can react violently with water and numerous commonly encountered materials, generating enough heat to ignite nearby combustible materials. Contact with many organic and inorganic chemicals may cause fire or explosion. Reacts with some metals to liberate hydrogen gas, which can form explosive mixtures with air. Will not burn. Harmful to aquatic life.

This product contains ingredients that are considered to be hazardous as defined by the OSHA Hazard Communication Standard 29 CFR 1910.1200, and is listed in the Toxic Substances Control Act (TSCA).

Routes of entry: Eye contact. Skin contact. Inhalation. Ingestion.

Potential acute health effects

EYE CONTACT: Immediate pain, severe burns and corneal damage, which may result in permanent blindness. The severity of injury increases with concentration, the duration of exposure, and the speed of penetration into the eye. Conditions which affect vision such as glaucoma and cataracts are possible late developments. Contact lenses should not be worn when handling this product.

SKIN CONTACT: Causes irritation and burns. May cause deep, penetrating ulcers of the skin. Can penetrate to deeper layers of skin and corrosion will continue until removed. The severity of injury depends on concentration and the duration of exposure. Burns may not be immediately painful; onset may be delayed minutes to hours.

INHALATION: Causes respiratory irritation (possibly severe coughing, sneezing, sore throat, runny nose), chemical burns, and pulmonary edema (severe life-threatening lung injury), which can be delayed up to 48 hours after exposure.

INGESTION: Causes irritation and / or severe pain; burning of the mouth, throat, and esophagus; vomiting; diarrhea; severe damage (possibly permanent) to digestive tract; collapse and possible death may result.

EXISTING MEDICAL CONDITIONS POSSIBLY AGGRAVATED BY EXPOSURE: Asthma, bronchitis, emphysema, and other lung diseases and chronic nose, sinus, or throat conditions. Skin irritation may be aggravated in individuals with existing skin disorders.

See Section 11 for Toxicological Data

Section 3: Composition / Information on Ingredients

Name	CAS #	% by weight
Sodium hydroxide	1310-73-2	49-51%
Water	7732-18-5	49-51%

Section 4: First Aid Measures

Corrosive effects on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain.

**SPEED IS ESSENTIAL. OBTAIN IMMEDIATE MEDICAL ATTENTION.
Have emergency eyewash station / safety shower available in work area.**

SKIN CONTACT: Immediately flush skin with running water for a **minimum** of 20 minutes. Start flushing while removing contaminated clothing. If irritation persists, repeat flushing. Obtain medical attention immediately. Do not transport victim unless the recommended flushing period is completed or flushing can be continued during transport.

Discard heavily contaminated clothing and shoes in a manner that limits further exposure.

EYE CONTACT: Immediately flush eyes with running water for a **minimum** of 20 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Obtain medical attention **IMMEDIATELY**. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.

INHALATION: Move victim to fresh air. Give artificial respiration **ONLY** if breathing has stopped. 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. Give Cardiopulmonary Resuscitation (CPR) if there is no pulse **AND** no breathing. Obtain medical attention **IMMEDIATELY**.

INGESTION: DO NOT INDUCE VOMITING. If victim is alert and not convulsing, rinse mouth and give ½ to 1 cup of water to dilute material. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. **IMMEDIATELY** contact local poison control center. Vomiting may need to be induced but should be directed by a physician or a poison control centre. **IMMEDIATELY** transport victim to an emergency facility.

While the patient is being transported to a medical facility apply compresses of iced water. If medical treatment must be delayed, immerse the affected area in iced water or apply compresses of iced water to affected areas. Do not freeze tissue.

Continued washing of the affected area with cold or iced water will be helpful in removing the last traces of sodium hydroxide. Creams or ointments should not be applied before or during the washing phase of treatment.

NOTE TO PHYSICIANS: Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the uses of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required.

Section 5: Fire Fighting Measures

Flammability of the product:	Non-flammable
Flash points:	Not applicable
Auto-ignition temperature:	Not applicable
Flammable limits:	Not applicable
Products of thermal decomposition:	Sodium oxide fumes

EXPLOSION HAZARDS:

Not flammable but is reactive. Reactions with water and a number of commonly encountered materials can generate sufficient heat to ignite nearby combustible materials. Sodium hydroxide can react with metals to liberate hydrogen gas which can form explosive mixtures with air. Hydrogen can accumulate to explosive concentrations. May ignite other combustible materials.

HAZARDOUS REACTIVITY

Instability: Stable, but reacts violently with water, acids, or incompatible materials which may result in the release of large amounts of heat.

Decomposition: Releases toxic fumes of sodium oxide.

Polymerization: Polymerization will not occur.

Materials to Avoid: Contact with water, acids, flammable liquids, and organic halogen compounds, especially trichloroethylene, may cause fires and explosions. Contact with metals such as aluminum, tin, and zinc and alloys containing these metals causes formation of flammable hydrogen gas. Violently polymerizes acetaldehyde, acrolein, or acrylonitrile.

FIRE-FIGHTING MEDIA AND INSTRUCTIONS:

Wear a NIOSH/MSHA approved self-contained breathing apparatus if vapors or mists are present and full protective clothing. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Use water with caution and in flooding amounts. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Contact with metals may evolve flammable hydrogen gas. Containers may explode when heated. Sodium hydroxide is non-combustible but may decompose upon heating to produce irritating, corrosive, and / or toxic fumes.

Do NOT get water inside containers. For small fires, use dry chemical, carbon dioxide, or water spray. For large fire, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after the fire is out.

Section 6: Accidental Release Measures

Small Spill:

Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Cover with DRY earth, sand or other non-combustible material or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Dilute the residue with water or neutralize with a dilute acid (sulfamic acid, acetic acid), then absorb, collect, and dispose of in accordance with applicable regulations.

Large Spill:

Stop leak if possible without risk. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Dike with DRY earth, sand or other non-combustible inert material. Prevent entry into sewers or waterways. Consider diluting the residue with water or neutralizing with dilute acid (sulfamic acid, acetic acid, etc.). Ensure adequate decontamination of tools and equipment following clean up. Comply with Federal, Provincial/State and local regulations on reporting releases. Dispose of waste material at an approved waste treatment/disposal facility, in accordance with applicable regulations. Do not dispose of waste with normal garbage or to sewer systems.

Section 7: Handling and Storage

Good general ventilation should be provided to keep vapor and mist concentrations below the exposure limits. Have available and wear as appropriate: Chemical splash goggles; full-length faceshield/chemical splash goggle combination; chemical resistant gauntlet gloves, apron, and boots; chemical resistant suit and hood; and appropriate NIOSH/MSHA respiratory protection. In case of emergency or where there is a strong possibility of considerable exposure, wear a complete chemical resistant suit with hood, boots and gloves. If vapor or mist is present and exposure limits may be exceeded, wear appropriate NIOSH/MSHA respiratory protection.

HANDLING: Wear appropriate Personal Protection Equipment. Wash thoroughly after handling. Use smallest possible amounts in designated areas with adequate ventilation. Keep containers closed when not in use. Empty containers may contain hazardous residues. Avoid generating mists. Transfer solutions using equipment which is corrosion resistant. Cautiously transfer into sturdy containers made of compatible materials. Never return contaminated material to its original container. Considerable heat is generated when diluted with water. Proper handling procedures must be followed to prevent vigorous boiling, splattering, or violent eruption of the diluted solution. Never add water to sodium hydroxide solution. **ALWAYS ADD SODIUM HYDROXIDE TO WATER** and provide agitation. When mixing with water, stir small amounts in slowly. Use cold water to prevent excessive heat generation.

STORAGE: Store in tightly sealed containers in a cool, dry, well-ventilated area away from incompatible substances. Keep away from strong acids, metals, flammable liquids, and organic halogens.

Section 8: Exposure Control / Personal Protection

Engineering controls

Use process enclosures, local exhaust ventilation or other engineering controls to keep airborne levels below recommended exposure limits. The most effective measures are the total enclosure of processes and the mechanization of handling procedures to prevent all personal contact with sodium hydroxide. Safety showers and eyewash stations should be installed in storage and handling areas.

Personal protection

Eyes: Chemical splash goggles and face shield. Contact lenses should not be worn when handling sodium hydroxide.

Skin: Where there is a danger of spilling or splashing, chemical resistant aprons or suits should be worn. Trouser legs should be worn outside (not tucked in) rubber boots.

Hands: Chemical-resistant, impervious gloves (i.e. neoprene) should be worn when handling sodium hydroxide.

Respiratory: Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. A NIOSH/MSHA approved air-purifying full-face respirator equipped with high-efficiency particulate filter(s) for concentrations up to 10 mg/m³. An air-supplied respirator with eye protection operated in continuous-flow mode if concentrations are higher or unknown. A respiratory protection program that meets 29 CFR 1910.134 must be followed whenever workplace conditions warrant use of a respirator.

NOTE: Personal protection information shown in Section 8 is based upon general information as to normal uses and conditions. Where special or unusual uses or conditions exist, it is suggested that the expert assistance of an industrial hygienist or other qualified professional be sought.

Component	Exposure limits
Sodium hydroxide:	ACGIH TLV-C 2 mg/m ³
	OSHA PEL 1 mg/m ³
	NIOSH IDLH 10mg/ m ³
	NIOSH REL 1 mg/m ³

Section 9: Physical and Chemical Properties

Appearance and Odor: Clear to slightly colored (white), odorless liquid.

Physical State: Liquid

Molecular Weight: 40.01

Odor Threshold: Not applicable

Boiling Point: 50%: 140°C (284°F)

Melting/Freezing Point: 12°C (53.6°F)

Vapor Pressure at 20°C (68°F): 0.2 kPa (1.5mm Hg) (50% solution)

Specific Gravity at 15.5°C (60°F): 1.53 (50% solution)

Vapor Density: (Air=1): Not applicable

Evaporation Rate: Not applicable

Solubility: Easily soluble in cold water (with liberation of much heat.)
100% water solubility.

pH: 14.0 (strong alkali)

Section 10: Stability and Reactivity

Stability: Stable at room temperature.

Conditions to Avoid: Mixing with water, acid or incompatible materials may cause splattering and release of large amounts of heat. Will react with some metals forming flammable hydrogen gas. Carbon monoxide gas may form upon contact with reducing sugars, food and beverage products in enclosed spaces. Keep from extreme temperatures.

Materials to Avoid: Acids, Halogenated compounds, Prolonged contact with aluminum, brass, bronze, copper, lead, tin, zinc or other alkali sensitive metals or alloys.

Hazardous Decomposition or Combustion Products: Toxic fumes of sodium oxide or sodium peroxide may be released when sodium hydroxide decomposes.

Hazardous Polymerization: Will Not Occur.

Corrosivity: Extremely corrosive in presence of aluminum, tin, copper, and most alloys in which they are present including brass and bronze. Highly corrosive in presence of steel at elevated temperatures above 40°C (140°F).

Section 11: Toxicological Information

Toxicity Data

Oral LD₅₀ (rabbit) = 400 mg/kg

Dermal LD₅₀ (rabbit) = 1350 mg/kg

Carcinogenicity Data: Ingestion of massive doses of sodium hydroxide has led to the development of tumors of the esophagus. The relevance of these findings to cancer is unknown due to repeated tissue destruction and scar formation as a result of the corrosivity of sodium hydroxide. Not listed by ACGIH, NTP, or CA Prop 65.

Reproductive Effects: No information found.

Mutagenicity Data: There is no evidence of mutagenic potential.

Teratogenicity Data: No information available.

Synergistic Materials: No information available.

Special Remarks on other Toxic Effects on Humans:

Skin: Causes severe skin irritation and burns.

Eye: Causes severe eye irritation and burns. May cause irreversible eye injury.

Ingestion: Ingestion may produce severe burns to the esophageal tissue, which may progress to stricture formation. Should ingestion occur, severe pain, burning of the mouth, throat and esophagus, vomiting.
Sodium Hydroxide Solution, 50%

diarrhea, collapse, and possible death may result. Ingestion causes swallowing to become painful and difficult almost immediately.

Inhalation: May cause severe irritation of the respiratory tract and mucous membranes with sore throat, coughing, shortness of breath, and delayed lung edema. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.

Chronic Potential Health Effects:

Skin: Prolonged or repeated skin contact may cause dermatitis, an allergic skin reaction.

Section 12: Ecological Information

AQUATIC TOXICITY: This material has exhibited moderate toxicity to aquatic organisms. Data provided are for sodium hydroxide.

Freshwater Fish Data: LC50 brook trout: 25 ppm/24 hr LC50 king salmon: 48 ppm

Invertebrate Toxicity Data: EC50 daphnia magna: 100 ppm EC50 shrimp: 33 100 ppm/48 hr

EC50 cockle: 330 1000 ppm/48 hr

BIODEGRADATION: This material is inorganic and not subject to biodegradation.

PERSISTENCE: This material is alkaline and may raise the pH of surface waters with low buffering capacity. This material is believed to exist in the disassociated state in the environment.

BIOCONCENTRATION: This material is not expected to bioconcentrate in organisms.

ADDITIONAL ECOLOGICAL INFORMATION: This material has exhibited slight toxicity to terrestrial organisms.

Section 13: Disposal Considerations

Waste disposal: The generation of waste should be avoided or minimized wherever possible. Cleaned up material may be a hazardous waste as defined by Resource Conservation and Recovery Act (RCRA) on disposal due to the corrosivity characteristic. Disposal of this product and any by-products must comply with all local, state, and federal requirements. Consult your local and/or regional authorities.

Section 14: Transport Information

Shipping Description:	Sodium hydroxide solution
Shipping Description:	UN 1824, Sodium hydroxide solution, 8, PG II
Sodium Hydroxide Solution, 50%	7

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Packaging References:

49CFR, Sections 172.504, 173.154, 173.202, 172.242

Section 15: Regulatory Information

U.S. Federal regulations:

TSCA 8(b) inventory: Yes

SARA 302/304/311/312 extremely hazardous substances: Yes

SARA 313 toxic chemical notification and release reporting: No

CERCLA: Hazardous Substances: Sodium hydroxide: 1000 lbs. (454 kg)

Reportable Quantity (RQ) under U.S. EPA CERCLA: RQ=1000 lb / 454 kg

Section 16: Other Information

Hazardous Material Information System (HMIS) National Fire Protection Association (NFPA)

HEALTH	3
FLAMMABILITY	0
REACTIVITY	1
PPE	*



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References: 29 CFR Part 1910.1200 OSHA MSDS Requirements.
49 CFR 172.101 Table of Hazardous Materials
ANSI Z400.1, MSDS Standard, 2004.
Hawley's Condensed Chemical Dictionary, 14th Edition
The Merck Index, 12th Edition

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