

GPS SAFETY SUMMARY

Caustic Soda Lye & Flakes

1. General Statement

Caustic soda is an essential ingredient in many industrial and commercial applications. It is a strong, colorless alkali. Caustic soda is manufactured through the electrolysis of sodium chloride (salt brine) by ion exchange membrane cell.

2. Chemical Identity

Synonyms	: Sodium Hydroxide
Chemical Formula	: NaOH
Molecular Weight	: 40
Description	: Caustic soda solutions are colorless and strongly alkaline.
CAS number(s)	: 1310-73-2

3. Use and applications

- **Chemical Production** - The chemical industry consumes nearly 40% of the caustic soda produced as a basic reagent for a multitude of general industrial applications.
- **Pulp and Paper** - Both sulfate and sulfite pulps are purified by removing lignin compounds in the caustic extraction stages of multistage bleach plants. In some kraft mills, caustic soda is also used as a makeup chemical. It is also used as the initial treatment in deinking secondary fibers.
- **Rayon and Cellophane** - Fiber production by the viscose process requires caustic soda at two main stages. Cellulose is treated with caustic soda solution to mercerize it and form alkali cellulose, which is then dissolved in caustic soda solution to form viscose prior to extruding rayon fibers and cellophane films.
- **Alumina Extraction** - Caustic soda is used to digest bauxite ore, precipitating alumina (aluminum oxide). It is also used as an etchant in the finishing and chemical milling of aluminum products.
- **Soap making** - Caustic soda saponifies fats into water soluble sodium soaps.
- **Textiles** - Used in scouring, bleaching, desizing, lustering and mercerizing.

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- **Petroleum Production and Refining** - Caustic soda is used as an absorbent for carbon dioxide in light petroleum fractions; as an absorbent for sulfides in the purification of various fractions; and with chlorine for hypochlorite sweetening, a treatment step in the removal of various sulfur compounds.
- **Soda Ash Replacement** - Caustic soda can be used interchangeably for many applications in glass, paper, pulp, phosphates and silicates industries.
- **Renewable Fuels** - Caustic soda is used for pH adjustment and formation of in situ sodium methylate in bioethanol and biodiesel processing.

4. Physical / Chemical properties

Caustic soda lye is an odorless and colorless liquid. In all forms, caustic soda is highly corrosive and reactive. It is highly soluble in water, with a lower solubility in polar solvents such as ethanol and methanol. NaOH is insoluble in ether and other non-polar solvents. Caustic soda reacts readily with metals such as aluminum, magnesium, zinc, tin, chromium, bronze, brass, copper, and alloys containing these metals.

Properties of Liquid Caustic Soda Caustic Soda	31%-32%	Flakes
Boiling Point	288°F (142°C)	372°F (189°C)
Melting Point (Crystallization Started)	50-55°F (10-13°C)	140-144°F (60-62°C)
Solidification Point	41°F (5°C)	140°F (60°C)
Specific Gravity@30°C	1.332 – 1.343	2.13

5. Health Effects

Inhalation: Not expected to be an inhalation hazard unless it becomes an airborne dust or mist. Can cause severe irritation of the nose and throat.

Skin Contact: NaOH Contact can cause pain, redness, burns, and blistering. Permanent scarring can result. A severe exposure can cause death. Burns may not be immediately painful; onset of pain may be delayed minutes to hours.

Eye Contact: Contact causes severe burns with redness, swelling, pain and blurred vision. Permanent damage including blindness can result.

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Ingestion: Can burn the lips, tongue, throat and stomach. Symptoms may include nausea, vomiting, stomach cramps and diarrhea. Can cause death.

Effects of Long-Term (Chronic) Exposure: Conclusions cannot be drawn from the limited studies available. Can cause dry, red, cracked skin (dermatitis) following skin contact.

Carcinogenicity: Not known to cause cancer.

6. Environmental Effects

Caustic soda is very toxic to aquatic life and should be kept out of lakes, streams, ponds, or other water sources. Caustic soda does not bio accumulate due to its high solubility in water. A high concentration in water will result in toxic effects for aquatic organisms e.g. Flora & Fauna.

7. Exposure

While handling of caustic soda, refer to the Material Safety Data Sheet and Product Emergency Label and follow all instructions and warnings. Based on the expected uses for caustic soda, exposure could be through:

- **Workplace exposure** - Exposure can occur either in a caustic soda manufacturing facility or in the various industrial facilities that use caustic soda. Sodium hydroxide is manufactured in a closed process, which minimizes the employee exposure potential. Workers who might accidentally come into contact with the undiluted substance should follow the safety measures recommended in the extended safety data sheet.
- The substance has been assessed as safe for professional and industrial use, when the provisions laid down in the extended safety data sheet are followed carefully. Additionally, most processes using caustic soda is used in closed tanks and vessels.
- **Environmental releases** - In the event of a spill, the focus is on containing the spill to prevent contaminated soil, surface or ground water. Caustic soda can significantly increase the pH of soil and/or water. Industrial spills (releases to soil or water) are infrequent; however, when they do occur, they are controlled by workplace spill programs which include containment around loading and unloading operations and storage tanks and employee training. Refer to the material Safety Data Sheet for instructions to contain and clean up a spill to minimize exposure.
- **Consumer exposure** - Caustic soda is not sold directly to community consumers; however it is an ingredient in some consumer products. Keep all chemical products out of the reach of children.

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8. Risk Management recommendations

Human health measures		
Organizational	A basic standard of occupational hygiene is recommended. Ensure operatives are well informed of the hazards and trained to minimize exposures. Ensure regular inspection and maintenance of equipments and machines. Handle and store according to the indications of the Safety Data Sheet.	
Protection	Eye/Face protection:	Safety glasses. In case of spattering: safety glasses, face-shield.
	Skin protection:	At the workplace: safety shoes, combination with delayed penetration Intervention at incident: complete chemical protection suit.
	Hand protection:	Neoprene gloves.
	Respiratory protection:	High concentration or prolonged activity: self contained breathing apparatus. In the case of vapor formation: use a respirator with an approved filter (recommended cartridge: P2 type).
Engineering controls	Handle and open container with care. Provide sufficient air exchange and/or exhaust in work rooms. . Provide sufficient air exchange and/or exhaust in work rooms. Frequently monitor and control the working atmosphere. Ensure that eyewash stations and safety showers are close to workstation locations. Ensure that self-contained breathing apparatus are located nearby.	
Environment protective measures		
Product must not be released into water without pre-treatment. Neutralize wastewater before release.		

9. Regulatory Information / Classification and Labelling

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The caustic soda Material Safety Data Sheet contains regulatory information, including Global Chemical Inventory Status information.

9.1 Regulatory Information.


This substance is currently assessed or has been registered under:

EU Regulation EC 1907/2006 (REACH)

EU Regulation EC 793/93 (European Priority Lists and Risk Assessment)

9.2 Classification and labeling

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the eSDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according CLP (EC) 1272/2008, implementation of the GHS in the European Union.

Classification	
According to REGULATION (EC) no 1272/2008: – Corrosive to metals; Category 1; May be corrosive to metals – Skin corrosion: Category 1A; Causes severe burns and eye damage – Serious eye damage: Category 1; Cause serious eye damage	
Signal Word	
Danger	
Pictogram	
– GHS05: Corrosion	
Hazard statement	
– H290: May be corrosive to metals – H314: Causes severe skin burns and eye damage	

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