

## GPS Safety Summary

**Substance Name:**

**SODIUM HYDROXIDE**

### 1. General Statement

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Sodium hydroxide (or Caustic Soda) is a strong base soluble in water produced by the electrolysis of salt brine.

It is available on a wide industrial scale both in liquid (slightly viscous, clear, odorless and colorless liquid) or solid (white odorless pearls or micro-pearls) form.

### 2. Chemical Identity

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<b>Name:</b>	Sodium Hydroxide
<b>Brand names:</b>	Sodium Hydroxide, Caustic soda
<b>Chemical name (IUPAC):</b>	Sodium Hydroxide
<b>CAS number(s):</b>	1310-73-2
<b>ES number:</b>	215-185-5
<b>Molecular formula:</b>	NaOH
<b>Structure:</b>	



### 3. Use and applications

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Caustic Soda is a strongly alkaline product used as a chemical reactant, neutralization agent, ion exchanger, regenerating agent or cleaning agent in various industries such as pulp and paper, chemical, pharmaceutical, textile, soap and detergent manufacturing, metal or water treatment, environmental protection and foodstuffs.

### 4. Physical / Chemical properties

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Sodium hydroxide is available as a solid but also as a solution in water.

It is a strong alkaline substance that dissociates completely in water into the sodium ion (Na<sup>+</sup>) and hydroxyl ion (OH<sup>-</sup>). The dissolution/dissociation in water is strongly exothermic, so a vigorous reaction occurs when NaOH is added to water.

Property	Value
Form	Solid hygroscopic
Physical state (Liquid/solid/gaseous)	Solid at 20°C at 1013 hPa

Color	White
Odor	No specific odor
Density	2.13 kg/m <sup>3</sup> at 20°C
Melting / boiling point	Melting point: 323°C at 1013 hPa Boiling point: 1388°C at 1013 hPa
Flammability (optional)	Not flammable
Explosive properties	Not explosive
Self-ignition temperature	No relative self-ignition temperature
Oxidizing properties	Not oxidizing according to regulatory criteria
Vapor pressure	Not available
Mol weight	40.0 g/mol
Water solubility	Completely soluble in water
Flash point	No flash point
Octanol-water partition coefficient (LogKow)	Not applicable (the substance is hydrolytically unstable)

## 5. Health Effects

Solid sodium hydroxide is highly corrosive. It reacts with greases and fats which can lead to irreversible damage to any contact point with the body (for example skin or eyes). Depending on the concentration, solutions of sodium hydroxide in water are corrosive, irritating or non-irritating and they cause direct local effects at the contact point with the body.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Because of the corrosive properties of the substance, a high uptake via the mouth can be fatal. When a very large part of the skin is exposed to sodium hydroxide, it can also result in death.  No reliable studies are available.
Irritation / corrosion Skin / eye/ respiratory tract	Very corrosive to skin. Corrosive to the eyes Inhalation of mists and aerosols is corrosive to the respiratory system.
Sensitisation	Based on the available test data, not expected to cause allergic skin reaction.
Toxicity after repeated exposure Oral / inhalation / dermal	No reliable studies are available. The substance is not expected to be systemically available in the body under normal handling and use conditions when exposure is limited and therefore systemic effects of NaOH after repeated exposure are not expected to occur.
Genotoxicity / Mutagenicity	Based on the available test data, not expected to cause adverse genetic effects.
Carcinogenicity	Based on the available test data, not expected to cause cancer.
Toxicity for reproduction	Based on the available test data, does not cause adverse effects on reproduction or on the development of offspring.

## 6. Environmental Effects

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In water (including soil or sediment pore water), sodium hydroxide is present as the sodium ion (Na<sup>+</sup>) and hydroxide ion (OH<sup>-</sup>), as solid NaOH rapidly dissolves and subsequently dissociates in water. If emitted to the air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO<sub>2</sub>. Subsequently, the salts (e.g. sodium (bi)carbonate) will be washed out from the air. Thus atmospheric emissions will largely end up in soil and water. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH<sup>-</sup> will be neutralised in the soil pore water or the pH may increase.

Effect Assessment	Result
Aquatic Toxicity	No reliable studies were available for acute toxicity to aquatic organisms.

Fate and behavior	Result
Biodegradation	Not applicable as the substance is inorganic.
Bioaccumulation potential	Not applicable as the substance is inorganic.
PBT/vPvB conclusion	Not relevant.

## 7. Exposure

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### 7.1 Human health

#### **Consumers**

Consumers come into contact with the substance through use as a household products for drain and pipe cleaning, floor strip products, wood treatment, oven cleaners, hair straightening agents. Some consumer formulations include a spray bottle, which can form weak sodium hydroxide aerosols.

The exposure has been assessed as safe if the substance is used as directed on the label, in particular by avoiding splashes onto skin and into eyes.

#### **Workers**

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 (Chapter 8 and exposure scenario).

### 7.2 Environment

The high water solubility and very low vapor pressure indicate that NaOH will be found predominantly in water. Significant emissions or exposure to air are not expected due to the very low vapor pressure of sodium hydroxide. Significant emissions or exposure to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as sorption of NaOH to particulate matter will not occur in STPs/WWTPs.

The exposure assessment for the aquatic environment will only deal with the possible pH changes in STP effluent and surface water related to the OH- discharges at the local scale.

Based on the risk assessment, the use of sodium hydroxide is safe under conditions recommended in the extended safety data sheet (Chapter 8 and exposure scenario).

## 8. Risk Management recommendations

<b>Human health measures</b>									
<b>Organizational</b>	A basic standard of occupational hygiene is recommended. Ensure operatives are well informed of the hazards and trained to minimise exposures. Ensure regular inspection and maintenance of equipments and machines. Handle and store according to the indications of the Safety Data Sheet.								
<b>Protection</b>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="background-color: #e0f7fa;"><b>Eye/Face protection:</b></td> <td>Safety glasses/goggle and face mask</td> </tr> <tr> <td style="background-color: #e0f7fa;"><b>Skin protection:</b></td> <td>At the workplace: safety shoes, combination with delayed penetration Intervention at incident: boots, overalls with hood, multi layered polyethylene.</td> </tr> <tr> <td style="background-color: #e0f7fa;"><b>Hand protection:</b></td> <td>Splash contact, intermittent and prolonged PVC or other plastic material gloves. Glove thickness: 1.2 mm</td> </tr> <tr> <td style="background-color: #e0f7fa;"><b>Respiratory protection:</b></td> <td>In case of insufficient ventilation, wear suitable respiratory equipment (filter type P2).</td> </tr> </table>	<b>Eye/Face protection:</b>	Safety glasses/goggle and face mask	<b>Skin protection:</b>	At the workplace: safety shoes, combination with delayed penetration Intervention at incident: boots, overalls with hood, multi layered polyethylene.	<b>Hand protection:</b>	Splash contact, intermittent and prolonged PVC or other plastic material gloves. Glove thickness: 1.2 mm	<b>Respiratory protection:</b>	In case of insufficient ventilation, wear suitable respiratory equipment (filter type P2).
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<b>Respiratory protection:</b>	In case of insufficient ventilation, wear suitable respiratory equipment (filter type P2).								
<b>Engineering controls</b>	Provide appropriate local exhaust ventilation at points of emission. Minimize manual phases. Avoid frequent and direct contact with substance. Should be handled in well ventilated areas. Ensure that eyewash stations and safety showers are close to workstation locations. Provide water supplies near the point of use. Ensure that self-contained breathing apparatus are located nearby.								
<b>Environment protective measures</b>									
Product must not be released into water without pre-treatment. Prevent discharge of undissolved substance or recover it from onsite wastewater.									

## 9. Regulatory Information / Classification and Labelling


### 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 labelling

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: <ul style="list-style-type: none"><li>– Corrosive to metals; Category 1; May be corrosive to metals</li><li>– Skin corrosion: Category 1A; Causes severe burns and eye damage</li><li>– Serious eye damage: Category 1; Cause serious eye damage</li></ul>	
Signal Word	
Danger	
Pictogram	
– GHS05: Corrosion	
Hazard statement	
<ul style="list-style-type: none"><li>– H290: May be corrosive to metals</li><li>– H314: Causes severe skin burns and eye damage</li></ul>	

## 10. Contact Information within Company

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For further information on this substance or product safety summary in general, please contact:

- ICCA portal where the GPS Safety Summary is posted:  
<http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/>

## 11. Date of Issues / Revision

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- Date of issue: 10/02/2013
- Date of revision:

## 12. Disclaimer

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The information contained in this paper is intended as advice only and whilst the information is provided in utmost good faith and has been based on the best information currently available, is to be relied upon at the user's own risk.

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