



## Material safety data sheet

According to EU Regulation 1907/2006 in the current version

### Sodium hydroxide flakes

#### 1. Identification of the substance/mixture and company

Trade name: Sodium hydroxide flakes  
Mono-constituent substance  
INCI Sodium hydroxide  
CAS No. : 1310-73-2  
EINESCS No. : 215-185-5  
REACH pre-registration No. : 01-2119457892-27-0065  
Utilization: Raw material for the production of soaps or professional use  
Supplier company identification: **Elemental SRL**, Piața Cazărmii no.15, 410188-Oradea, jud.Bihor, Romania  
Tel/Fax: +40259-436.755, www.elemental.eu  
Emergency: RO: număr național pentru cazuri de urgență: 021 3183606 Institutul de Sănătate Publică București.  
International emergency number: +49 180 2273-112

##### 1.1. Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Final use sector (US)	Preparation category (PC)	Process category (PROC)	Category of emissions in the environment (ERC)	Article category (AC)	Exposure scenarios
1	US 1-24 with the exception of 21, 22	Not applicable	PROC 1-4, 8-9	ERC 1	Not applicable	ES 1: Manufacturing of liquid NaOH
2	US 1-24 with the exception of 21, 22	Not applicable	PROC 1-4, 8-9	ERC 1	Not applicable	ES 2: Manufacturing of solid NaOH
3	US 1-24 with the exception of 21, 22	PC 0-40	PROC 1-27	ERC 1-7, 12	Not applicable	ES 3: Industrial and professional use of NaOH
4	US 1-24 with the exception of 21, 22	PC 0-40	PROC 1-27	ERC 2, 3, 8-11		
5	US 21	PC 0-40	Not applicable	ERC 8-11	Not applicable	ES 4: Use of Na OH by domestic consumers

Uses: Cellulose and paper industry, aluminum industry, detergents, household and industrial cleaning products, in the glass industry, in the textile industry, raw material for the manufacture of cellophane and viscose, pH regulator. The food industry - diluted solutions (2-3%) are used in the processes of washing / disinfection of equipment and installations for production, pipelines, storage tanks.

Uses advised against: Not applicable.

#### 2. Hazards Identification



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#### 2.1. Classification of the substance or mixture

##### 2.1.1 Classification according to Regulation (EC) 1272/2008

This mixture is classified as dangerous according to regulation (EC) 1272/2008 [GHS]

H314 – Skin corrosion/irritation 1A

H290 – Corrosive to metals 1A

##### 2.1.2 Additional information

Health and environmental hazards: Contact with eyes causes severe burns, even blindness. Contact with skin produces severe burns. Sodium hydroxide can be fatal if swallowed. Inhalation of dust irritates the oral mucosa, nose and respiratory tract. Exposure to high levels of pollution causes lung irritation, coughing that may be associated with even stopping breathing or, in the event of prolonged exposure, pulmonary edema.

**Highly soluble in water. In contact with water, an amount of heat is released.** No significant emissions into the air or exposure of the terrestrial environment are expected. The effect on the aquatic environment is caused by the change in pH due to the release of OH<sup>-</sup> ions, because the toxicity caused by Na<sup>+</sup> ions is insignificant compared to the effect caused by the change in pH.

#### 2.2. Label elements

This product is classified as dangerous according to the UN GHS guideline and labeling is required.

##### 2.2.1. Labeling according to Regulation (EC) 1272/2008

Warning word: **DANGER**

Hazard pictograms and symbols: GHS05: **corrosive**



Hazard Statements:

H314: Causes serious skin burns and eye damage

H290: May be corrosive to metals.

Specific concentration limits:

Skin corrosion 1A: H314  $C \geq 5\%$

Skin corrosion 1B: H314  $2\% \leq C < 5\%$

Skin irritant 2: H315  $0.5\% \leq C < 2\%$

Eye irritant 2: H319  $0.5\% \leq C < 2\%$

Precautionary statements:

P260: Do not breathe in dust.

P280: Wear protective gloves / protective clothing / eye protection equipment / face protection equipment.



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P303 + P361 + P353: IF ON SKIN (or hair): Remove all contaminated clothing immediately. Rinse skin with water / shower.

P305 + P351 + P338: IF IN EYES: Rinse carefully with water for several minutes. Remove contact lenses, if present and if this can be done easily. Keep rinsing.

P310: Call a POISON INFORMATION CENTER or doctor immediately.

#### 2.3. Other hazards

The substance does not meet the criteria for classification as PBT or vPvB in accordance with Annex XIII of Reg. 1907/2006. No other hazards were identified.

### 3. Declaration of ingredients

3.1 Chemical name: Sodium hydroxide

3.2 Chemical formula: NaOH

3.3 The product contains the following ingredients:

Substance	CAS	EINECS	Hazard symbols	Percent %
Sodium hydroxide	1310-73-2	215-185-5	H314, H290, H315, H319	min 98

Impurities: The product does not contain impurities that can influence the classification.

### 4. First aid measures

#### 4.1. Description of first aid measures

General tip: IF you have been exposed or if you are not feeling well: Call a poison center or a doctor. Show the doctor the material safety data sheet.

First aid measures in case of inhalation: Remove the exposed person to fresh air and keep them in a comfortable position for breathing. If the person is not breathing, provide them artificial ventilation and emergency medical care. If the victim has breathing disorders, oxygen is required.

First-aid measures in case of skin contact: Immediately remove contaminated clothing. Wash the affected area with continuous running water for at least 15 minutes. The equipment will be decontaminated before re-use. Medical assistance is provided.

First aid measures in case of eye contact: Do not allow the victim to rub or close their eyes. Gently lift the eyelids and immediately and abundantly wash with water jet for at least 15 minutes, after which the victim should be transported to the doctor.

First aid measures if swallowed: Vomiting will not be induced. If the person is aware, rinse mouth and lips with water. If vomiting occurs naturally, water administration will be repeated. Specialized medical care is provided.

#### 4.2. Most important symptoms and effects, both acute and delayed



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Symptoms: Sodium hydroxide is highly corrosive to the eyes, mucous membranes and exposed areas of the skin.

Risks:

- by ingestion: causes severe burns of the digestive tract, with the risk of perforation of the digestive tract and can cause toxic shock.
- due to skin contact: very corrosive to the skin, causes severe burns, serious injuries, scars and dermatitis in case of repeated exposure.
- by contact with eyes: corrosive to the eyes, can cause severe injuries, with permanent effects if the eyes are not immediately rinsed with water, injuries to the eye tissue, with the risk of vision loss.
- by inhalation: corrosive to the respiratory tract. Causes hair loss, pulmonary edema.

#### 4.3. Indication of any immediate medical attention and special treatment needed

In cases where there is suspected ingestion of sodium hydroxide, endoscopy will be performed. In the case of severe esophageal burns, a therapeutic dose of steroids is recommended. There will be continuous monitoring of gas exchange, acid-base balance, electrolyte and liquid administration is required. If skin burns have occurred, burn treatment is applied immediately following the wound decontamination procedure.

## 5. Fire fighting measures

### 5.1. Extinguishing media

For fires use dry powders, carbon dioxide and foam extinguishers. **Avoid using water. Adding water over caustic solutions generates large amounts of heat.**

Extinguishing media advised against: **Avoid using water.**

### 5.2. Special hazards arising from the substance or mixture

NaOH is a non-combustible substance. Sodium hydroxide can react with certain metals, such as aluminum or zinc, with the generation of flammable gases. Contact with water can generate sufficient heat to ignite nearby flammable materials.

### 5.3. Advice for firefighters

Firefighters must be equipped with complete protective equipment and self-contained breathing apparatus. In the case of interventions in enclosures or areas with smoke or gas, the gas mask or self-contained breathing apparatus shall be used for respiratory protection.

## 6. Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

For personnel who are not involved in the emergency intervention:

- The dust will be kept to a minimum.
- It is forbidden to enter the affected area for persons not involved in the intervention operation.
- Avoid contact with skin, eyes and clothing - wear appropriate protective equipment (see section 8).
- Avoid inhalation of dust - ensure adequate ventilation of the area or wear a respiratory protective mask, wear appropriate protective equipment (see section 8). Avoid humidification.



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For the personnel responsible for carrying out the intervention operation:

- The dust will be kept to a minimum. Proper ventilation will be ensured.
- It is forbidden to enter the affected area for persons not involved in the intervention operation.
- Avoid contact with skin, eyes and clothing - wear appropriate protective equipment (see section 8).
- Avoid inhalation of dust - ensure adequate ventilation of the area or wear respiratory protective mask, wear appropriate protective equipment (see section 8). Avoid humidification.

#### 6.2. Environmental precautions

Leaks or uncontrolled discharges to watercourses must be IMMEDIATELY reported to the Environmental Protection Agency or other certified bodies. The leaked product will be collected in containers, these being properly sealed and sent to neutralization (destruction) in accordance with the regulations in force.

#### 6.3. Methods and material for containment and cleaning up

In the case of leaks, the product will be recovered, if possible, and placed in containers. The generation of dust will be avoided. Caustic residues will not be directed to the sewage. The spilled product will be diluted with water, neutralized with acids such as acetic acid or hydrochloric acid. The neutralized residues will be covered with soil, sand or other absorbent material, collecting all these residues in containers suitable for disposal (see section 13).

#### 6.4. Reference to other sections

Additional measures: see sections 8, 13

## 7. Handling and storage

#### 7.1. Precautions for safe handling

Protective measures: The handling of sodium hydroxide will be done with great care. All personnel must be properly trained for safe handling and application of first aid measures. To prevent contact of the product with the hands, skin and eyes, personnel must wear appropriate protective equipment, goggles, hard helmets and rubber gloves. Contact lenses will not be used. It is recommended to equip with individual eye washing equipment. Dust should be kept to a minimum. Dust generation should be minimized.

General occupational hygiene measures: Avoid inhalation or ingestion of the product, as well as contact with skin and eyes. In order to ensure safe handling, general occupational hygiene measures will be applied. These measures involve good manufacturing practices such as regular washing with cleaning devices; prohibiting the consumption of food, beverages and smoking at work, showering and changing clothes at the end of the shift. Contaminated clothing will not be worn to home.

#### 7.2. Conditions for safe storage, including any incompatibilities

The substance must be stored in dry conditions. All contact with air and humidity should be avoided. Sodium hydroxide packaged in its original packaging will be stored in an area free of moisture, heat-shielded, well ventilated, away from contact with other incompatible substances. Avoid physical damage to the containers.

Prohibited materials for storage: Will not be stored in aluminum, zinc, tin and lead containers.

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Incompatible materials: Do not store or mix with water, acids, flammable liquids, halogenated organic compounds, nitro methane.

**Water will never be added to a corrosive substance. The corrosive substance is always added to the water. Adding the corrosive substance to the water is easy, in small quantities. Cold water should be used to avoid excessive heat generation.**

#### 7.3. Specific end use(s)

Check the uses identified in Section 1.2.

For more information, see exposure scenarios provided in Annex I.

#### 8. Exposure controls / personal protection



##### 8.1. Control parameters

Occupational exposure limit (OEL), 8 h TWA: 2 mg / m<sup>3</sup> breathable sodium hydroxide powder, with a few exceptions (Czech Republic - 1.0 mg / m<sup>3</sup>; Poland - 0.5 mg / m<sup>3</sup>).

Short-term exposure limit (STEL), 15 min: 2 mg / m<sup>3</sup> breathable sodium hydroxide powder.

##### DN(M)JL

Exposure path	Workers				Consumers			
	Local acute effects	Systemic acute effects	Local chronic effects	Systemic chronic effects	Local acute effects	Systemic acute effects	Local chronic effects	Systemic chronic effects
Oral (mg/kg body/day)	unrelevant				unrelevant			
Inhalation (mg/m <sup>3</sup> )	1.0	unrelevant	1.0	unrelevant	1.0	unrelevant	unrelevant	unrelevant
Dermal (mg/kg/day)	unrelevant				unrelevant			

##### PNEC:

PNEC freshwater / seawater: not applicable

PNEC soil / groundwater: not applicable.

PNEC could not be calculated as buffering capacity, its pH and fluctuations are the specific elements for the ecosystem in question.

##### 8.2. Exposure controls

###### 8.2.1 Occupational exposure control



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Local exhaustion and general ventilation systems will be provided to maintain the concentration of the emissions within the allowed limits. Local ventilation with exhaust is preferable because it prevents dispersion of the contaminant into the working area. Corrosion-resistant ventilation equipment shall be used.

#### 8.2.2. Personal protective equipment

Eye / face protection: Wear safety goggles and / or protective eyewear in accordance with EN 166, where there is danger of splashing or in the atmosphere where there is alkaline dust.

Contact lenses will not be worn. In the immediate vicinity of the areas with potential for exposure, points for washing the eyes should be provided.

Skin protection: Wear a full protective suit made of waterproof materials, boots, aprons to prevent contact with the skin, glasses or visors.

Hand protection: Protective gloves, tested in accordance with EN374-3, are recommended. It is forbidden to use natural leather gloves. Use the correct glove removal technique (without touching the outer surface of the gloves) to avoid skin contact with this product.

Recommended materials for protective gloves:

- material: butyl rubber, PVC, polychloroprene, material thickness: 0.5 mm, Penetration time: > 480 min
- material: nitrile rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, Penetration time: > 480 min

Additional indication: This recommendation only has an advisory role, and must be evaluated by a specialist in Employee Safety & Health Training, familiar with the specific situation of anticipated use, quality parameters as well as the specific conditions at the workplace. The exact penetration time must be learned from the manufacturer of the protective gloves and followed by the user.

Respiratory protection: In the case of aerosol or dust formation, mask with P2 type filter will be worn. For intervention operations or in special cases (cleaning of leaks, vessels or storage tanks) autonomous insulating respiratory devices will be worn. Attention! respiratory filters do not protect personnel in oxygen-deficient atmospheres.

Monitoring methods: In order to be within the limits of the occupational exposure and the adequate control of the exposure, it is necessary to monitor the concentration of the substance in the working area.

Exposure control of the environment: All ventilation systems must be fitted with filters before release into the atmosphere. Release is avoided in the environment. See Section 6 and the exposure scenarios (Annex I to the MSDS).

Encapsulation of the leaked product: If leakage occurs in large quantities in the watercourses, the Environmental Protection Agency or other certified bodies should be alerted. For details regarding the risk management measures related to environmental exposure, see the attached exposure scenarios.

Other preventive measures: In the work area there will be showers, places for washing the eyes and other washing facilities.

## 9. Physical and chemical properties

### 9.1 Information on physical and chemical properties



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Appearance: solid, flakes  
Color: white  
Odor: odorless  
Relative density at 25°C: 2.13 g/cm<sup>3</sup>  
Refractive index at 20°C: NA  
Optical rotation (°): NA  
Flash point: does not ignite  
Odor threshold: NA  
pH: highly alkaline  
Melting point / freezing point: 318°C  
Initial boiling point and boiling range: 1388°C at 1 atmosphere  
Evaporation rate: NA  
Flammability (solid, gas): not flammable  
Upper / lower flammability or explosive limits: NA  
Vapor tension: NA  
Vapor density: NA  
Solubility in water: Soluble, completely soluble in alcohol and glycerin  
Partition coefficient: n-octanol / water NA  
Auto-ignition temperature: will not self-ignite  
Decomposition temperature: NA  
Viscosity: NA  
Explosive properties: non explosive  
Oxidizing properties: non oxidizing

## 10. Stability and reactivity

### 10.1. Reactivity

Contact with halogenated acids and organic compounds, especially with trichlorethylene, can cause violent reactions. Sodium hydroxide is strongly corrosive to certain metals and alloys: zinc, aluminum, tin, copper, lead, bronze, brass. Sodium hydroxide destroys leather, removes paint and attacks certain plastics and rubber. Contact with nitromethane and other nitro-compounds results in the formation of shock-sensitive salts.

### 10.2. Chemical stability

Stable under normal pressure and temperature conditions in sealed tanks / containers. It easily absorbs carbon dioxide from the air (forms sodium carbonate).

### 10.3. Possibility of hazardous reactions

Sodium hydroxide is a stable product; however, it presents certain risks in the presence of:

- explosive materials such as nitrous compounds - reaction by releasing enough heat to detonate the explosive materials
- vinyl chloride - the formation of chloroacetylene
- tetrahydrofuran - contact exposure
- sodium tetrahydroborate – explosive release of hydrogen
- pentachlorophenol- explosion and formation of toxic vapors
- tetrachlorobenzene- explosion caused by pressure increase
- maleic anhydride - explosive decomposition



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10.4. Conditions to avoid

Avoid: water, acids, zinc, aluminum, copper, alkali metals, acetaldehyde, acrolein, acrylonitrile, allyl alcohols, halon, maleic anhydride, bromide, nitroparaffins, nitroaromatics, oleum, tetrahydrofuran. To avoid degradation, exposure to air and moisture will be minimized. Avoid contact with incompatible substances.

10.5. Incompatible materials

Avoid certain metals and alloys like: zinc, aluminum, tin, copper, bronze, brass. Sodium hydroxide destroys leather, removes paint and attacks certain plastics and rubber. When in contact with water, large quantities of heat are released.

10.6. Hazardous decomposition products

Flammable hydrogen is produced upon contact with metals.

**11. Toxicological information**

11.1. Information on toxicological effects

	Conclusions
<b>Absorbtion</b>	Based on results of studies - it has no bioaccumulation potential.
<b>Acute toxicity</b>	Sodium hydroxide is a corrosive substance and therefore no toxicity tests are required (EU RAR, 2007; section 4.1.2.2.3, p. 65).
<b>Irritation / Corrosion</b>	Based on experimental results and in accordance with Regulation no. 1272/2008 Annex VI Table 3.1, sodium hydroxide is a product of category 1A, corrosive to the skin, at concentrations $\geq 5\%$ (H314: Causes severe skin burns and eye damage). The concentration range for eye / skin irritation is $0.5\% \leq C < 2\%$
<b>Sensitivity</b>	Existing data does not show that NaOH is a skin sensitizing product.
<b>Repetead dose toxicity</b>	There are no studies available. However, following repeated exposure, under normal handling and use conditions, systemic effects are not expected to occur.
<b>Mutagenicity</b>	In vivo and in vitro toxicity tests did not reveal mutagenic activity.
<b>Carcinogenicity</b>	NaOH does not have carcinogenic effects.
<b>Reprotoxicity</b>	NaOH is not toxic to reproduction.

**12. Ecological information**

12.1. Toxicity

Aquatic toxicity	Acute toxicity (short term)	Fish: LC50 / 96h / fish = 35 - 189 mg /l
		Aquatic invertebrates Ceriodaphnia sp: EC50 / 48h / fresh water = 40.4 mg /l, LC50 / 72h / algae = scientifically unjustified study
		Aquatic plants (algae): scientifically unjustified study
	Long-term toxicity	Fish: There are no long-term toxicity studies for fish. Despite this, all



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		available tests have resulted in very low toxicity values (chronic toxicity test: $\geq 25\text{mg /l}$ ) and there is sufficient data on pH values that are tolerated by major taxonomic groups (EURAR, 2007; section 3.2. 1.1.4, page 30).
		Aquatic invertebrates: scientifically unjustified study
		Justification: NaOH is present in water (including soil or sediment), in the form of sodium ions ( $\text{Na}^+$ ) and hydroxyl ions ( $\text{OH}^-$ ), because solid NaOH dissolves rapidly and dissociates in water (EURAR, 2007; section 3.1.3, p. 24). As a result, the only possible effect is change in pH. However, the pH will remain within the agreed value range for the environment.
		Algae and aquatic plants: scientifically unjustified study.
Toxicity to soil macro-organisms		Soil behavior was not included in the risk assessment (EU RAR, 2007, section 3.1.3.3, page 26), because it is not relevant for NaOH, because if it penetrates into the soil, the absorption of particles in the soil is negligible.
		Toxicity to terrestrial plants: There is no direct exposure of soil to the action of NaOH.
		Toxicity to terrestrial plants: There is no direct exposure of soil to the action of NaOH.
		Toxicity to birds: Exposure to birds is not foreseen.

PNEC does not apply. According to EU RAR (2007; section 3.1.3.5, page 26), the bioaccumulation of NaOH is not relevant. Therefore, it is not necessary to increase the risk for secondary poisoning.

#### 12.2. Persistence and degradability:

NaOH will dissolve and dissociate rapidly in water. Therefore, NaOH does not meet criterion P (EURAR, 2007; section 3.3.1.2, page 34).

#### 12.3. Bioaccumulative potential

Sodium hydroxide does not have a relevant bioaccumulative potential, which is why NaOH does not meet criterion B within the PBT criteria (EURAR, 2007; section 3.3.1.2., Page 34).

#### 12.4. Mobility in soil

The very high solubility indicates that NaOH will predominantly be found in the aquatic environment. When moving through the soil, ion exchange occurs. Some sodium hydroxide may remain in the aqueous phase and will move through the soil in the direction of groundwater flow. NaOH does not produce oxygen deficiency.

#### 12.5. Results of PBT and vPvB assessment

NaOH does not meet the criteria of persistence, bioaccumulation and toxicity. Therefore, NaOH is not considered a PBT or vPvB substance (EU RAR, 2007; section 3.3.1.2, page 34).



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#### 12.6. Other adverse effects

None known.

## 13. Disposal considerations

### 13.1. Waste treatment methods

#### Waste treatment of sodium hydroxide:

When it cannot be recovered and recycled, the waste should be considered as hazardous waste and sent to an authorized waste disposal facility. The method of destruction applied must be in accordance with national legislation and regulations. It will not be dumped in sewers, on land or in watercourses.

Waste code: 06 02 04 \* - Sodium and potassium hydroxide, according to Annex No. 2 to GD 856/2002: List of waste, including hazardous waste.

\*Note: This code may vary, in order to establish the correct code the specific use will be taken into account and also the composition of the resulting waste.

Packaging treatment: Empty packaging must be destroyed in accordance with local, regional and national regulations.

### 13.2 Relevant provisions of harmonized national legislation and EU legislation regarding waste and packaging management and packaging waste:

#### National legislation:

Legea 265/2006 - Legea protecției mediului. Legea 211/2011 privind regimul deșeurilor.

Legea 249/2015 - privind modalitatea de gestionare a ambalajelor și a deșeurilor de ambalaje.

HG 856/2002 – privind evidența gestiunii deșeurilor și aprobarea listei cuprinzând deșeurile inclusiv deșeurile periculoase cu completările și modificările ulterioare (Hotărârea 210/2007).

Hotărârea nr.1061/2008 - privind transportul deșeurilor periculoase și nepericuloase pe teritoriul României.

#### EU legislation:

Directive 2008/98/EC on waste with subsequent amendments and completions.

Commission Decision 2000/532/EC regarding the records of the waste management and the approval of the list containing the wastes including the hazardous wastes with subsequent completions and modifications.

European Directive 94/62/EC on packaging and packaging waste with subsequent modifications and completions.

European Directive 91/689/EEC on hazardous waste, with subsequent amendments and completions.

Regulation 1013/2006 regarding waste transfers, with subsequent amendments and completions.

## 14. Transport information

Sodium hydroxide can be transported according to the transport regulations for dangerous goods, hazard class 8, corrosive substance.

Transport labeling: **corrosive product**





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<b>ADR / RID</b>	UN number 1823
	UN shipping name Solid sodium hydroxide
	Danger class 8
	Packing group II
	Classification code C6
	Danger Panel 80/1823 (Hazard Identification No. 80)

<b>IMDG</b>	UN number 1823
	UN shipping name Solid sodium hydroxide
	Danger class 8
	Packing group II
	EmS number F-A, S-B
	Marine pollutant Not classified as marine pollutant.

<b>IATA</b>	UN number 1823
	UN shipping name Solid sodium hydroxide
	Danger class 8
	Packing group II
	IATA label Corrosive
	Maximum quantity for passengers 15kg
	Maximum quantity for cargo 60kg

## 15. Regulatory information

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

#### Relevant information on national legislation:

Law 319/2006 on occupational safety and health, Government Decision no. 1425/2006 approving the methodological norm for applying the provisions of the Law on occupational safety and health no. 319/2006 with subsequent amendments and completions and GD. no. 355/2007 regarding the supervision of the workers' health.

Law 265/2006 for the approval of GEO 195/2005 on environmental protection.

Law no. 278/2013 on industrial emissions.

#### Relevant information on EU legislation:

Regulation (EC) No. 1907/2006 of the European Parliament and of the Council on registration, evaluation, licensing of chemical substances (REACH).

Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on the classification, labeling and packaging of substances and mixtures.

ADR / RID / IMDG- the editions in force.



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EU Regulation no. 1907/2006 (REACH) Annex XIV - List of substances subject to authorization: it is not classified as CMR, it is not listed on Annex XIV, and as a result it is not subject to the authorization procedure.

EU Regulation no. 1907/2006 (REACH) Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous chemicals, preparations and articles. Restrictions on use: It has no restrictions on use.

#### Other EU regulations:

Regulation (EC) No 1005/2009 on substances that deplete the ozone layer - does not affect the ozone layer.

Regulation (EC) No 850/2004 on persistent organic pollutants - is not an organic pollutant.

Regulation (EC) No 649/2012 on the export and import of hazardous chemicals - sodium hydroxide is not covered by this regulation.

Directive 2012/18 / EU (SEVESO III) - is not a SEVESO substance.

WGK (Germany): WGK 1 mildly dangerous for water.

#### 15.2. Chemical safety assessment

For this substance, a chemical safety assessment was performed and a CSR was prepared. The relevant chapters of this report (CSR) - exposure scenarios and risk management measures- are presented in Annex 1.

## 16. Additional information

The data presented are last minute information, but it does not constitute a guarantee for the product's characteristics and do not represent a validation of the contractual commitments.

#### 16.1. Full text of H phases

H290 May be corrosive to metals.

H314 Causes severe skin burns and eye damage.

H315 Causes skin irritation.

H319 Causes severe eye irritation.

#### 16.2 Abbreviations:

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road.

CAS: Chemical Abstracts Service (division of the American Chemical Society).

CLP: Classification, Labeling, Packaging.

DNEL: Derived No Effect Level.

EINECS: European Inventory of Existing Commercial Chemical Substances.

GHS: Globally Harmonized System of Classification and Labeling of Chemicals.

IATA: International Air Transport Association.

IATA-DGR: Dangerous Goods Regulation by the "International Air Transport Association" (IATA).

ICAO: International Civil Aviation Organization.

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO).

IMDG: International Maritime Code for Dangerous Goods.

INCI: International Nomenclature of Cosmetic Ingredients.

LTE: Long-term exposure.

PNEC: Predicted No Effect Concentration.

RID: Regulation Concerning the International Transport of Dangerous Goods by Rail.

STE: Short-term exposure.

STEL: Short Term Exposure limit.



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STOT: Specific Target Organ Toxicity.

#### 16.3. Literature references

The information provided in the MSDS is in accordance with the information provided in the CSR. CSR contains a complete reference list for all data used. The non-confidential information in the REACH registration dossier is published by ECHA, see: <https://echa.europa.eu/information-on-chemicals/registered-substances>, <http://echa.europa.eu/clp/c l inventory en.asp> <http://chelist.jrc.ec.europa.eu> <http://www.dguv.de> (GESTIS Substance Database)

## ANNEX 1 - EXPOSURE SCENARIOS

### Exposure scenario 1: Manufacturing of sodium hydroxide solution

**Sector of use (US):** SU 3, 8 Manufacture of bulk substances on a large scale:

**Product category (PC):** not applicable

**Process Category (PROC):**

PROC1 Used in closed process, with no probability of exposure

PROC2 Used in closed, continuous process with occasional controlled exposure (eg sampling)

PROC3 Used in discontinuous closed process (synthesis or formulations)

PROC4 Used in batch process and other processes (synthesis) in which the opportunity for exposure increases

PROC8 a / b Transfer of the substance or preparation (loading / unloading) from / into vessels / large containers to non-specialized / specialized installations

PROC9 Transfer of the substance or preparation into small containers (specialized filling line, including weighing)

Article categories (AC): not applicable

**Environmental emissions category (ERC):** ERC1 Substance manufacture

#### **Risk assessment in the EU**

The risk assessment in the EU was made on the basis of the regulation for existing substances (Council Regulation 793/93). A comprehensive risk assessment report was made in 2007 and is available online:

<https://echa.europa.eu/documents/10162/0ded9c53-4082-405b-b09a-e16e57e158af>

#### **Contributing scenarios for controlling environmental exposure**

Product features: NaOH liquid, all concentrations

Frequency and duration of use: Continuous

#### **Technical conditions on site and measures to reduce or limit leakage in water, air emissions and release into soil**

Environmental risk management measures are aimed at preventing the discharge of NaOH solutions into municipal wastewater or surface water, if it is estimated that these discharges can cause significant pH changes. Normally, when unloading in open water, it is necessary to control the pH value. In general, discharges should be made so that the pH change of the receiving waters is minimal. In general, most aquatic organisms can tolerate pH values in the 6-9 range. This is also reflected in the description of testing of aquatic organisms in accordance with OECD standards.

#### **Conditions and measures regarding the treatment or recovery of residues:**

Liquid NaOH residues must be reused or discharged into industrial wastewater for further neutralization if necessary

#### **Contributing scenarios for controlling worker exposure**

**Product features:** NaOH liquid, all concentrations

**Frequency and duration of use / exposure:** 8 hours / day, 200 days / year

**Technical conditions and measures at process (source) level to prevent emissions:**

Replacement, where possible, of manual processes with automatic and / or closed processes. In this way, the



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formation of the irritating mist, sprays and sprinkling can be avoided:

- Using closed systems or covering open containers
- Transport through pipes, filling / emptying barrels with automatic systems (vacuum pumps, etc.)
- Use of pliers, long grip arms for manual manipulation to avoid direct contact or exposure by splashing

#### **Technical conditions and measures to control the dispersion from the source to workers**

- Local ventilation with exhaust / general ventilation

Organizational measures for the prevention / limitation of emissions, dispersion and exposure:

- Personnel operating in identified risk areas must be trained a) avoid work without respiratory protection and b) to know the corrosive properties of the substance, in particular, the effects produced by inhalation of NaOH and c) follow the safety procedures established by the EMPLOYER.

- The employer must provide the necessary protective equipment and verify that it is used properly.

Conditions and measures for personal protection, hygiene and health assessment:

- Respiratory protection: In the case of dust and aerosol formation (eg spray): respiratory protection with appropriate filter is used (P2)
- Hand protection: waterproof gloves, resistant to chemical action, material: butyl rubber, PVC, polychloroprene lined with natural latex, material thickness: 0.5 mm, piercing threshold: > 480 min, material: butadiene-nitrile rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breaking threshold: > 480 min
- if there is possibility of spraying / splashing, wear protective goggles, resistant to chemical action, fixed on the face or a face mask.
- if there is possibility of the product splashing, wear appropriate protective equipment, aprons, face masks, rubber or plastic boots.

#### **Exposure estimation and sources of exposure**

##### **Exposure of Personnel:**

NaOH is a corrosive substance. When handling corrosive substances or mixtures, skin contact can occur only occasionally and it is estimated that daily exposure through skin contact can be considered negligible. Therefore, exposure to NaOH through skin contact cannot be quantified.

Under normal conditions of handling and use, it is expected that NaOH is not present, systemically, in the body and as a result systemic effects, by exposure through contact or inhalation, cannot occur.

Based on measurements and as a result of the exposure of workers by controlling the risk management measures, the worst case of exposure, namely 0.33 mg/m<sup>3</sup> (the typical value is 0.14 mg/m<sup>3</sup>) is below the DNEL value of 1 mg/m<sup>3</sup>.

##### **Exposure of the Environment:**

The effect on the aquatic environment and exposure assessment apply only to organisms / ecosystems only in terms of pH modification, by the effect of OH<sup>-</sup> ions, because the toxicity of Na<sup>+</sup> ions is insignificant on this factor (pH value). The high water solubility and low vapor pressure indicate that NaOH will be predominantly found in water. When the environmental risk management measures are implemented, there is no exposure to activated sludge from wastewater treatment plants and no exposure to surface water.

The effect on the sediments is not considerable, because it is not relevant for NaOH, the absorption in the sediment particles is negligible.

Due to the low vapor pressure, it is not expected to produce significant emissions into the air. If airborne, like aerosols in water, NaOH will be rapidly neutralized by reaction with CO<sub>2</sub> (or other acids).

No significant releases are expected in the terrestrial environment either. Exposure by applying sludge to agricultural soil is not relevant, the absorption in soil particles is negligible.

Bioaccumulation does not occur.

#### **Exposure scenario 2: Manufacturing of solid sodium hydroxide**

**Sector of use (SU):** SU 3, 8 Manufacture of bulk substances on a large scale



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**Product category (PC):** not applicable

**Process category (PROC):**

PROC1 Used in closed process, without the probability of exposure

PROC2 Used in closed process, continuous with occasional controlled exposure

PROC3 Used in discontinuous closed process (synthesis or formulation)

PROC4 Used in batch process or other types (synthesis) where possibility of exposure appears

PROC8 a / b of the substance or preparation (loading / unloading) from / into vessels / large containers in non-dedicated / dedicated installations

PROC9 Transfer of the substance or preparation into small containers (dedicated filling lines, including weighing)

**Product Category (PA):** does not apply

**Category of emissions to the environment (ERC):** ERC1 Manufacture of substances

#### **Risk assessment in the EU**

The risk assessment in the EU was made on the basis of the regulation for existing substances (Council Regulation 793/93). A comprehensive risk assessment report was prepared in 2007 and is available online:

<https://echa.europa.eu/documents/10162/0ded9c534082405bb09ae16e57e158af>

#### **Contributing scenario for controlling environmental exposure**

**Product characteristics:** NaOH solid

**Frequency and duration of use:** Continuous

**Technical on site conditions and measures to reduce or limit discharges, air emissions and releases to soil:**

Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or surface water, in such cases discharges are expected to cause significant pH changes. Regular control of the pH value during introduction into open waters is required. In general discharges should be carried out such that pH changes in receiving surface waters are minimized. Generally most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.

**Conditions and measures related to external treatment or recovery of waste for disposal:**

There is no solid waste of NaOH. Liquid NaOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

#### **Contributing exposure scenario controlling worker exposure**

**Product features:** Solid NaOH, all concentrations

**Frequency and duration of use / exposure:** 8 hours / day, 200 days / year

**Technical conditions and measures at the process level (source) for emissions prevention:**

Replacement, where appropriate, of manual processes with automatic and / or closed processes. In this way the formation of irritating mist, the production of sprays or splashes can be avoided:

- The use of closed systems or covered open containers (eg screens)
- Transport through pipes, filling / emptying barrels with automatic systems (vacuum pumps, etc.)
- Use of pliers, long grip arms for manual manipulation to avoid direct contact or exposure by spraying

**Technical conditions and measures to control the dispersion from the source to the workers:**

- Local ventilation with exhaust / general ventilation

**Organizational measures for the prevention / limitation of emissions, dispersion and exposure:**

- Personnel operating in identified risk areas must be trained a) to avoid working without respiratory protection and b) to know the corrosive properties of the substance, in particular, the effects produced by inhalation of NaOH and c) to follow the safety procedures established by the EMPLOYER.

- The employer must provide the necessary protective equipment and verify that it is used properly.

**Conditions and measures for personal protection, hygiene and health assessment:**

- Respiratory protection: In the case of dust and aerosol formation (eg spray): respiratory protection with appropriate filter is used (P2).

- Hand protection: waterproof gloves, resistant to chemical action, material: butyl rubber, PVC, polychloroprene lined



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with natural latex, material thickness: 0.5 mm, piercing threshold: > 480 min, material: butadiene-nitrile rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breaking threshold: > 480 min  
- if there is possibility of spraying / splashing, wear protective glasses, resist to chemical action, fastened to the face or face protection masks  
- if there is possibility of spraying / splashing of material, wear suitable protective equipment, aprons, face masks, rubber or plastic boots.

#### Exposure estimation and sources of exposure

##### **Personnel Exposure:**

NaOH is a corrosive substance. When handling corrosive substances or mixtures, skin contact can occur only occasionally and it is estimated that daily exposure through skin contact can be considered negligible. Therefore, exposure to NaOH through skin contact cannot be quantified.

Under normal conditions of handling and use, it is expected that NaOH is not systemically present in the body and therefore systemic effects, by exposure through contact with the skin or by inhalation, may not occur.

Based on the measurements and as a result of the exposure of workers by controlling the risk management measures, the worst case of exposure, namely  $0.26 \text{ mg} / \text{m}^3$  (measured at the place of packaging) is below the DNEL value of  $1 \text{ mg} / \text{m}^3$ .

##### **Exposure of the Environment:**

The effect on the aquatic environment and exposure assessment apply only to organisms / ecosystems only in terms of pH modification, by the effect of OH<sup>-</sup> ions, because the toxicity of Na<sup>+</sup> ions is insignificant on this factor (pH value). The high water solubility and low vapor pressure indicate that NaOH will be predominantly found in water. When the environmental risk management measures are implemented, there is no exposure to activated sludge from wastewater treatment plants and no exposure to surface water.

The effect on the sediments is not considerable, because it is not relevant for NaOH, the absorption in the sediment particles is negligible.

Due to the low vapor pressure, it is not expected to produce significant emissions into the air. If airborne, like aerosols in water, NaOH will be rapidly neutralized by reaction with CO<sub>2</sub> (or other acids).

No significant releases are expected in the terrestrial environment either. Exposure by applying sludge to agricultural soil is not relevant, the absorption in soil particles is negligible.

Bioaccumulation does not occur.

#### **Exposure scenario 3: Industrial and professional use of NaOH**

##### **Sector of use (SU):** SU 1-24

Because sodium hydroxide has many uses, for a diverse range of domains, it can be used in all end-use sectors described in the use descriptor system (SU 1-24). NaOH is used for different purposes, in various industrial sectors.

##### **Product category (PC):** PC 0-40

Sodium hydroxide can be used in many different product categories (PC). Sodium hydroxide can be used as an absorbent (PC2), for the surface treatment of metal products (PC14), for the surface treatment of non-metallic products (PC 15), intermediate product (PC 19), pH regulator (PC 20), laboratory substance (PC 21), cleaning products (PC 35), water softener (PC 36), chemical treatment agent (PC 37) or extraction agent. It is possible for the product to be used according to other product categories (PC 0 - 40).

##### **Process Categories (PROC):**

PROC1 Used in closed process, without probability of exposure

PROC2 Used in closed, continuous process with occasional controlled exposure

PROC3 Used in discontinuous closed process (synthesis or formulations)

PROC4 Used in batch or other process (synthesis) in which the possibility of exposure appears

PROC5 Mixing in batch processes for formulation of preparations and items (multi-phase contact and / or significant



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contact)

PROC8a Transfer of the substance or preparation (loading / unloading) from / containers / large containers to non-dedicated installations

PROC8b Transfer of the substance or preparation (loading / unloading) from / into vessels / large containers in dedicated installations

PROC9 Transfer of substance or preparation to small containers (dedicated filling lines, including weighing)

PROC10 Application by rolling or brushing

PROC11 Non-industrial spraying

PROC13 Treatment of items by soaking and pouring

PROC15 Used as laboratory reagent

The process categories mentioned above are considered to be the most important, but other process categories are possible (PROC 1-27).

**Article Categories (AC):** Not applicable

Although sodium hydroxide may be used in the manufacturing process of items, it is expected that the substance will not be present in the respective items. Article categories (AC) do not apply to NaOH.

**Emissions in Environmental Categories (ERC):**

ERC1 Manufacture of substances

ERC2 Formulation of preparations

ERC4 Industrial use of technological aids, but which do not become part of the items

ERC6A Industrial use resulting in the production of other substances (used as an intermediate)

ERC6B Industrial use of technological reagents

ERC7 Industrial use of substances, in a closed system

ERC8A Used inside, with a high degree of dispersion, of technological aids in open systems

ERC8B Used inside, with a high degree of dispersion, of the reactants in open systems

ERC8D External use, with high degree of dispersion, of process aids in open systems

ERC9A Used inside, with a high degree of dispersion, of substances in closed systems

The emission categories mentioned above are the most important, but other industrial emission categories are possible (ERC 1-12). The wide dispersive uses are analyzed in Exposure Scenario 4.

#### Explanations

Typical uses include: production of organic and inorganic substances, formulation of chemical substances, production and bleaching of paper pulp, production of aluminum and other metals, food industry, water treatment, textile production, professional use of formulated products and other industrial uses.

#### Risk assessment in the EU

The risk assessment in the EU was made on the basis of the regulation for existing substances (Council Regulation 793/93). A comprehensive risk assessment report was made in 2007 and is available online:

<https://echa.europa.eu/documents/10162/0ded9c53-4082-405b-b09a-e16e57e158af>

#### Contributing scenario for controlling environmental exposure

**Product features:** Liquid or solid NaOH, with concentrations (0-100%), if solid: low dusting degree

**Frequency and duration of use:** continuous

Technical conditions on site and measures to reduce or limit leakage in water, air emissions and release into soil:

Environmental risk management measures are aimed at preventing the discharge of NaOH solutions into municipal wastewater or surface water, if it is estimated that these discharges can cause significant pH changes. Normally, when unloading in open water, it is necessary to control the pH value. In general, discharges should be made so that the pH change of the receiving waters is minimal. In general, most aquatic organisms can tolerate pH values in the 6-9 range. This is also reflected in the description of testing of aquatic organisms in accordance with OECD standards.

**Conditions and measures regarding the treatment or recovery of residues:**

There are no solid residues of NaOH. The liquid residues of NaOH must be reused or discharged into industrial waste



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water, in order to neutralize it if necessary.

#### **Contributing scenarios for controlling worker exposure**

**Product features:** Liquid or solid NaOH, with concentrations (0-100%), if solid: low dusting degree

**Frequency and duration of use / exposure:** 8 hours / day, 200 days / year

#### **Technical conditions and measures at the process (source) level to prevent emissions:**

For workers, both solid and liquid products containing NaOH at concentrations > 2%:

- Replacement, where possible, of manual processes with automatic processes and / or closed processes thus avoiding the formation of the irritating mist, spraying and splashing potential.
- Using closed systems or covering open containers (eg screens)
- Pipeline transport, filling and emptying barrels using automatic systems (vacuum pumps, etc.)
- The use of pliers, clamps with long arms for manual manipulation to avoid direct contact and product exposure

#### **Technical conditions and measures for controlling the dispersion from the source to the worker:**

For workers, both solid and liquid products containing NaOH at concentrations > 2%:

- Local exhaust ventilation and / or general ventilation is a condition of good practice

#### **Organizational measures to prevent / limit emissions, dispersion and exposure:**

For workers, both solid and liquid products containing NaOH at concentrations > 2%:

- Workers in the areas / processes with identified risk must be trained a) to avoid working without respiratory protection mask b) to know the corrosive properties and, in particular, the respiratory effects of inhalation of NaOH and c) to follow the safety procedures implemented by the employer.
- The employer must ensure that the required personal protective equipment is available and used according to the instructions
- For professional uses, when possible, specific dispensers and special pumps will be used designed to prevent spillage / leakage / exposure.

#### **Conditions and measures for personal protection, hygiene and health assessment:**

For workers, both solid and liquid products containing NaOH at concentrations > 2%:

- Respiratory protection: in the case of dust or aerosol formation (eg sprays): use respiratory protection mask with appropriate filter (P2)
- Hand protection: waterproof gloves, resistant to chemical action, material: butyl rubber, PVC, polychloroprene lined with natural latex, material thickness: 0.5 mm, breaking threshold: > 480 min, material: butadiene-nitrile rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breaking threshold: > 480 min
- if there is possibility of spraying / splashing, wear protective goggles, resistant to chemical action, fastened to the face or a face mask
- if there is possibility of spraying / splashing with the material, wear suitable protective equipment, aprons, masks for the face, rubber or plastic boots.

#### Exposure scenario 4: Domestic consumers of NaOH

**Utilization sector (US):** US 21 Private households

**Product category (PC):** PC 0-40

PC 20, 35, 39 (neutralizing agents, cleaning products, cosmetics, personal care products).

Other PCs are not explicitly considered for this exposure scenario. However, NaOH can also be used in other product categories, for lower concentrations, for example PC3 (up to 0.01%), PC8 (up to 0.1%), PC28 and PC31 (up to 0.002%), but can be used in other remaining product categories (PC 0-40).

**Process categories (PROC):** not applicable

**Product Categories (PC):** Not applicable

#### **Category of emissions in the environment (ERC):**

ERC8A The internal use, with wide dispersion, of the technological adjuvants in open systems

ERC8B The wide dispersive use of reactants in open systems indoors



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ERC8D External use, with wide dispersion, of process aids in open systems  
ERC9A Indoor use of substances in closed systems  
The above mentioned categories of emissions in the environment are the most important, but other categories are possible (ERC 8-11b).

#### **Explanations**

NaOH (up to 100%) is also used by consumers. It can be used at home for cleaning drainage pipes, for treating wood and for making soap in households. NaOH is also used in batteries and as oven cleaning products.

#### **Risk assessment in EU**

The risk assessment in the EU was made on the basis of the regulation for existing substances (Council Regulation 793/93). A comprehensive risk assessment report was prepared in 2007 and is available online:  
<https://echa.europa.eu/documents/10162/0ded9c53-4082-405b-b09a-e16e57e158af>

#### **Contributing scenario for controlling environmental exposure**

**Product features:** Liquid or solid NaOH, with concentrations (0-100%), if solid: low dusting degree

#### **Conditions and measures for the treatment or recovery of residues:**

This material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility). If container is empty, dispose as regular municipal waste.

Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility). Recovery of NaOH from alkaline batteries includes emptying the electrolyte, collection and neutralization with sulfuric acid and carbon dioxide.

#### **Contributing scenario for controlling worker exposure**

**Product features:** Solid and liquid NaOH, at all concentrations (0-100%), if solid: low dusting degree

Typical concentrations: reconditioned floor products (<10%), hair straightening products (<2%), oven cleaners (<5%), products for cleaning pipes (liquid: 30%, solid: <100%), cleaning products (<1.1%)

#### **Conditions and measures regarding product design:**

- It is necessary to use resistant packaging and labels to avoid self-destruction and loss of label integrity, under normal conditions of use and storage of the product. Low quality packaging causes the physical loss of hazard information and instructions for using the product.

- Domestic products, which contain more than 2% NaOH and which are accessible to children, are required to be provided with protection at the opening for children (Adaptation to Technical Progress – Directive 1999/45 / EC, Annex IV, Part A and Article 15 (2) of Directive 67/548 if dangerous preparations and substances are intended for domestic use). This avoids accidents caused by children or other sensitive categories.

- Delivery is recommended only in the form of viscous preparations

- Delivery in small quantities is recommended only in the case of batteries, it is recommended to use completely sealed items, with a long usage life.

#### **Conditions and measures regarding consumer information and training**

It is necessary to make information regarding the product and instructions for its use available to consumers. This reduces the risk of improper use. To reduce the number of accidents involving children or the elderly, it is recommended that these products should not be left in the hands of these categories of persons. In order to prevent the inappropriate use of NaOH, the instructions for use should contain the warning about the formation of dangerous mixtures with other substances.

#### **Instructions for home consumers:**

- Keep out of the reach of children.

- Do not apply the product to vent holes.

#### **Conditions and measures for personal protection and hygiene:**

For the consumer, both solid and liquid products containing NaOH at lower concentrations > 2%:

- Respiratory protection: In the case of dust or aerosol formation (eg spray): use of respiratory protection with



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appropriate filter (P2)

- Hand protection: waterproof gloves resistant to chemical action

- If there is possibility of spraying / splashing, chemically resistant glasses, face protection masks will be used.

#### **Exposure estimation and references about its sources**

##### **Consumer exposure:**

The acute / short term exposure was evaluated only for the most critical use: the use of NaOH in oven cleaning products. For estimating the exposure, Consexpo and SprayExpo were used. The calculated short-term exposure of 0.3 - 1.6 mg / m<sup>3</sup> is slightly higher than the long-term DNEL for inhalation of 1 mg / m<sup>3</sup>, but lower than the short term occupational exposure limit - 2 mg / m<sup>3</sup>. In addition, NaOH will be rapidly neutralized by reaction with CO<sub>2</sub> (or other acids).

##### **Exposure of the environment:**

Domestic consumers use already diluted products that will be quickly neutralized in domestic wastewater treatment plants, even before they reach wastewater treatment plants or surface waters.

#### **Disclaimer:**

This material safety data sheet does not constitute a guarantee of the properties of the product and is not a contractual legal report. The information is given in good faith on the basis of our best knowledge of the product at the indicated time. However, we cannot accept responsibility or liability for any consequences arising from its use, no warranty for correctness and completeness is given. We caution the users against the incurred possible risks when the product is used at other ends than the use for which it was initially planned. It is the user's responsibility during handling, storage and product use to consult the main regulatory texts in force regarding workers and environment protection.