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SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Chemical name:	Sodium Hydroxide
EC number:	215-185-5
CAS number:	1310-73-2
Index number:	011-002-00-6
Registration number:	01-2119457892-27-0066
Chemical characterisation:	Inorganic mono-constituent substance - in solution

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses:


In industry it can be used, for example, for adjusting pH, producing biodiesel from vegetable oils or cleaning bottles (food industry), for flotation deinking (pulp and paper industry), drying air, extracting alumina (aluminium industry) or mercerising cotton (textile industry), in leather tanning, for peeling vegetables, manufacturing chemical products (intermediate use), regenerating resins or softening water. Consumer uses include stripping paint or unblocking drains.

For more information see the corresponding Exposure Scenario attached to this SDS.

Uses advised against: There are no uses advised against

1.3 Details of the supplier of the safety data sheet

Company:	BONDALTI CHEMICALS, SA Rua do Amoníaco Português, nº 10 Quinta da Indústria, Beduído 3860-680 Estarreja - Portugal
Telephone:	+351 234 810 300
Fax:	+351 234 810 361
Web page:	www.bondalti.com
Contact:	Maria José Alves
E-mail:	fds@bondalti.com

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1.4 Emergency telephone number

BONDALTI CHEMICALS, SA Telephone: Fax:	+351 234 810 300 (24 hours/day - 7 days/week) +351 234 810 361
Portuguese emergency number	112
SOS – Poisons Centre	In Scotland: NHS 24 - dial 111 In North Ireland: Contact local GP or pharmacist during normal hours; In Republic of Ireland: 01 809 2166 United States of America: 1-800-222-1222.hours;

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture


Self-Classification of Sodium Hydroxide according to CLP regulation 1272/2008 criteria

Class of hazard	Hazard category	Hazard Statements
Skin corrosion	Skin Corr. 1A	H314: Causes severe skin burns and eye damage
Substance or mixture corrosive to metals	Met. Corr. 1	H290: May be corrosive to metals

Additional information

Specific concentration limits (CLP)

Concentration (%)	Classification
C ≥ 5%	Skin corrosion: Skin Corr. 1A; H314 - Causes severe skin burns and eye damage
2% ≤ C < 5%	Skin corrosion: Skin Corr. 1B; H314 - Causes severe skin burns and eye damage
0.5% ≤ C < 2%	Skin corrosion: Skin Corr. 2; H315 - Causes skin irritation
0.5% ≤ C < 2%	Eye irritation: Eye Irrit. 2; H319 - Causes serious eye irritation

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2.2 Label elements

Regulation (EC) No 1272/2008

Hazard pictogram:



GHS05: corrosion

Signal word:

Danger

Hazard Statements:

H314: Causes severe skin burns and eye damage

H290: May be corrosive to metals

Precautionary statements:

P260: Do not breathe dust/fume/gas/mist/vapours/spray.

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

P310: Immediately call a POISON CENTER or doctor/physician

P303+P361+P353: IF ON SKIN (OR HAIR): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.

P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Precautionary statements for end user:

P101: If medical advice is needed, have product container or label at hand

P102: Keep out of reach of children

P103: Read label before use

When the substance is sold to the general public at a concentration of 0.2% or above, the following is obligatory:

- The packaging must be fitted with child-resistant fastenings.
- The label must carry a tactile hazard warning.

The product packaging must have:

- A single seal fastener for opening.
- EC No.
- Indication of "EC Labelling".

2.3 Other hazards

The substance is not classified as PBT and vPvB.

Sodium Hydroxide

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Hazardous substances

Chemical name	CAS No.	EC No.	REACH No.	Concentration [%]
Sodium Hydroxide	1310-73-2	215-185-5	01-2119457892-27-0066	30% < C < 50%


SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures

If inhaled:	<ul style="list-style-type: none">- Remove the victims(s) into the fresh air.- If necessary, administer oxygen or artificial respiration.- Lay the victim in the recovery position and keep warm.- Immediately call for medical attention.
In case of skin contact:	<ul style="list-style-type: none">- Remove immediately contaminated clothing and shoes.- Rinse immediately with plenty of water.- Keep victim warm and in a calm place.- Call a physician or contact SOS POISONS immediately.- Wash contaminated clothing before using it again.
In case of eye contact:	<ul style="list-style-type: none">- Rinse immediately with plenty of water, including under the eyelids, for at least 15 minutes.- Call a physician or contact SOS POISONS immediately.- Take the victim to hospital immediately.
If swallowed:	<ul style="list-style-type: none">- Call a physician or contact SOS POISONS immediately.- Take the victim to hospital immediately.- If swallowed, rinse mouth out with water (only if victim is conscious).- DO NOT induce vomiting.- Artificial respiration and/or oxygen may be required.

Self-protection of rescuers

Respiratory protection:	<ul style="list-style-type: none">- In case of dust or aerosol formation use respirator with an approved filter.- Recommended filter type: P2.
Hand protection:	<ul style="list-style-type: none">- Impervious gloves.- Suitable material:- PVC, neoprene, natural rubber and butyl rubber, breakthrough time > 480min.- Unsuitable material: Leather.
Eye protection:	<ul style="list-style-type: none">- Chemically resistant goggles must be worn.

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4.2 Most important symptoms and effects, both acute and delayed

4.2.1 Inhalation

- Corrosive to respiratory system.
- Symptoms: Breathing difficulty, cough, chemical pneumonia and pulmonary oedema.

4.2.2 Skin contact

- Causes severe burns.
- Symptoms: Redness, tissue swelling and burning.

4.2.3 Eye contact

- Causes severe burns.
- Small amounts splashed into eyes may cause irreversible damage and blindness.
- Symptoms: redness, lacrimation, tissue swelling and burning.

4.2.4 Swallowing

- If swallowed, causes severe burns to the mouth and throat, as well as risk of perforating oesophagus and stomach.
- Symptoms: Nausea, abdominal pain, vomit with blood, diarrhoea, suffocation, cough and breathing difficulty.


4.3 Indication of any immediate medical attention and special treatment needed

- Eye contact: Rinse immediately with water for 15 minutes. In case of difficulty opening eyelids, administer analgesic collyrium (oxybuprocaine).
- Skin contact: Remove clothing and rinse with plenty of water.
- Swallowing: Rinse mouth out with water. Do not induce vomiting, give milk. Artificial respiration and/or oxygen may be required.

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media:	- Use extinguishing media suited to the local circumstances and surroundings (for example): Dry chemical powder and CO ₂ .
Unsuitable extinguishing media:	- Water may be ineffective.

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5.2 Special hazards arising from the substance or mixture

- The product is neither inflammable nor combustible.
- Reacts exothermically with water.
- Gives off hydrogen upon reaction with metals.

5.3 Advice for firefighters

- In case of fire, use self-contained breathing apparatus.
- Use personal protective equipment.
- Wear chemically resistant suit.
- Cool the containers/tanks by spraying with water.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

- Prevent further leakage or spillage if safe to do so.
- Keep away from Incompatible products.

6.1.2 For emergency responders


- Wear suitable personal protective equipment (e.g.: chemical protection suit; goggles, protective footwear, gloves and suitable respiratory protective equipment)
- Evacuate **personnel** to safe areas.
- **Keep people away from and upwind of spill/leak.**
- Ventilate the area.

6.2 Environmental precautions

- Do not release into the environment.
- Do not flush into surface water or into sanitary sewer system.
- If the product contaminates rivers, lakes or **drains**, inform **respective** authorities.

6.3 Methods and material for containment and cleaning up

- #### 6.3.1
- Contain the spill with protective barriers.
 - Cover the sewer exits.

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6.3.2 - Use absorbent material.

- Gather the waste in suitable containers for this substance.
- Keep the waste in duly labelled containers.

6.3.3 - Never use water on spills of this product.

6.4 Reference to other sections

- See sections 7 and 8 for protective measures.
- See section 13 on waste treatment.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling

- To avoid thermal decomposition, do not overheat the substance.
- When diluting, add the product to water. Never add water to the product.
- Use the product in closed systems.
- Use only equipment and materials **which are** compatible with the product.
- Keep away from incompatible products, as acids.
- Preferably **transfer by** pump or gravity.
- **Not to eat, drink and smoke in work areas.**
- **Wash hands after use.**
- **Remove contaminated clothing and protective equipment before eating areas.**

7.2 Conditions for safe storage, including any incompatibilities

- Store in the original container.
- Store in a well-ventilated place.
- Keep in a dry place.
- Keep in **properly** labelled containers.
- Keep container closed.
- **Avoid dust formation.**
- Keep away from incompatible products (acids).
- **Suitable material:** Stainless steel and polyethylene.

7.3 Specific end use(s)

NaOH is used during the production phase of several cleaning products, though in most cases the amounts used in end products are limited.

Professional cleaning products with free NaOH after formulation are: floor strippers, oven and floor degreasers, drain unblockers, dishwashing products and polish removers.

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SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

8.1.1 Components with workplace control parameters

Components	CAS-No.	Control parameters	Value	Legal basis
Sodium Hydroxide	1310-73-2	2 mg/m ³	OEL-ST	EH40/2005 Workplace Exposure Limits
		2 mg/m ³	TLV-C	ACGIH (US)

8.1.2 DNEL/PNEC value(s)

DNEL value(s)

- DNEL for Sodium Hydroxide, long-term inhalation, [Local effects](#), workers = 1.0 mg/m³.
- DNEL for Sodium Hydroxide, long-term inhalation, [Local effects](#), general public = 1.0 mg/m³.

PNEC value(s)

PNEC (water)

The toxicity of NaOH can be ascribed to the pH increase due to the addition of OH⁻, as the sodium concentrations are too low to explain the effects observed in acute toxicity studies. A generic PNEC cannot be derived from single-species toxicity data for NaOH, as the pH of natural waters as well as the buffer capacity of natural waters show considerable differences and aquatic organisms/ecosystems are adapted to these specific natural conditions, resulting in different pH optima and pH ranges that are tolerated (EU RAR, 2007, section 3.2.1.1.4, page 30).

PNEC (sediment)

The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. In water (including soil or sediment pore water), NaOH is present as the sodium ion (Na⁺) and hydroxyl ion (OH⁻), as solid NaOH rapidly dissolves and subsequently dissociates in water (EU RAR, 2007, section 3.1.3, page 24). If emitted to surface water, sorption to particulate matter and sediment will be negligible and so it will not accumulate in living tissues.

If emitted to the soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase.

The toxicity of NaOH can be ascribed to the pH increase due to the addition of OH⁻, as the sodium concentrations are too low to explain the effects observed in acute toxicity studies. Because the buffer capacity, the pH and the fluctuation of the pH are very specific for a certain ecosystem it was not considered useful to derive a PNEC.

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PNEC (oral)

According to the EU RAR (2007) bioaccumulation in organisms is not relevant for NaOH. Based on this, there is no need to perform risk assessment for secondary poisoning.

PNEC (Soil)

The terrestrial compartment was not included in the targeted risk assessment (EU RAR, 2007; section 3.1.3.3, page 26), because it is not considered relevant for NaOH. If emitted to the soil, sorption to soil particles will be negligible.

PNEC (sewage treatment plant-STP)

The toxicity of NaOH can be ascribed to the pH increase due to the addition of OH⁻, as the sodium concentrations are too low to explain the effects observed in acute toxicity studies. No generic PNEC for STP effluent could be calculated (EU RAR, 2007; section 3.2.1.5.1, page 33).

8.2 Exposure controls

8.2.1 Appropriate **engineering** controls

- Ensure adequate ventilation.
- Apply technical measures **to comply with** the occupational exposure limits.

8.2.2 Individual protection measures, such as personal protective equipment

Respiratory protection:	- In case of dust or aerosol formation use respirator with an approved filter . - Recommended filter type: P2.
Hand protection:	- Impervious gloves . - Suitable material:- PVC, neoprene, natural rubber and butyl rubber, breakthrough time > 480min . - Unsuitable material: Leather.
Eye protection:	- Chemically resistant goggles must be worn.
Body and skin protection:	- Chemical resistant apron - Apron/boots of PVC, neoprene in case of dusts .
Hygiene measures:	- Eye wash bottles or eye wash stations in compliance with applicable standards - Take off contaminated clothing and shoes immediately. - Handle in accordance with good industrial health and safety practice.

8.2.3 Environmental exposure controls

Dispose of rinse water in accordance with applicable regulations:

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- 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council;
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives and other amendments;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 - replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance: Colour:	Viscous liquid Colorless
b) Odour:	Odourless
c) Odour threshold:	Data unavailable (*)
d) pH:	>13
e) Melting point/freezing point:	323°C at 101 325Pa
f) Initial boiling point and boiling range:	1 388°C at 101 325Pa
g) Flash point:	According to the REACH Regulation, the study does not need to be conducted if the substance is inorganic (Annex VII, column 2 adaptation).
h) Evaporation rate:	Data unavailable (*)
i) Flammability (solid, gas):	Inorganic oxides in which the inorganic element is in its highest possible oxidation state are incapable of further reaction with oxygen and can thus be designated as non-flammable (Endpoint Specific Guidance Chapter R.7A, page 123). Removing electrons from NaOH is not obvious and no information is found what stable molecule could be produced. The sodium and hydroxide ions are quite stable in solution
j) Upper/lower limits of flammability or explosivity:	The product is neither flammable nor explosive
k) Vapour pressure:	According to the REACH Regulation, the study does not need to be conducted if the melting point is above 300°C (Annex VII, column 2 adaptation).

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l) Vapour density:	Data unavailable (*)
m) Relative density:	1,33 to 1,53
n) Solubility(ies):	Totally soluble in water at 25 °C
o) Partition coefficient n-octanol/water:	According to the REACH Regulation, the study does not need to be conducted if the substance is inorganic (Annex VII, column 2 adaptation).
p) Auto-ignition temperature:	According to the REACH Regulation, the study does not need to be conducted for solids if preliminary results exclude self-heating of the substance up to 400°C (Annex VII, column 2 adaptation).
q) Decomposition temperature:	No data (*)
r) Viscosity:	12 to 120 mPa.s, at 20 °C
s) Explosive properties:	Non-explosive
t) Oxidising properties:	Non-oxidising

(*) No reliable data source for this data

9.2 Other information

Dissociation constant: Sodium Hydroxide completely dissociates in water, Na^+ and OH^- .

NaOH is a strong base that dissociates in water, in the sodium ion (Na^+) and in the hydroxyl ion (OH^-).
Dissolution/disassociation in water is highly exothermal.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity


- Potential for exothermic hazard;
- May be corrosive to metals.

10.2 Chemical stability

- Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

- Gives off hydrogen upon reaction with metals.
- Exothermic reaction with strong acids.
- Risk of violent reaction.
- Risk of explosion.
- Reacts violently with water.

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10.4 Conditions to avoid

- Keep away from direct sunlight.
- To avoid thermal decomposition, do not overheat.
- Do not submit the product to low temperatures (risk of freezing).

10.5 Incompatible materials

- Metals, Acids, oxidising agents, aluminium, other light metals and their alloys

10.6 Hazardous decomposition products

- Hydrogen (through contact with metals).

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

The greatest hazard (and mode of action) that NaOH poses to human health is local irritation and/or corrosion. When human skin is exposed to low concentrations (non-irritant), absorption of NaOH should be relatively low due to low ion absorption. It is therefore likely that, in normal conditions of use and handling, assimilation of NaOH will be limited. In these conditions, the absorption of OH⁻, via exposure to NaOH, should not alter the pH of the blood. Furthermore, in these conditions, sodium absorption through exposure to NaOH is far less than the assimilation of sodium through food products. Consequently, it is unlikely that NaOH is systemically available in the body in normal conditions of use and handling (EU RAR, 2007).

Hazard Class	Dose descriptor	Method/reference
Acute toxicity:	No reliable studies are available for acute toxicity to NaOH. According to the REACH Regulation, acute toxicity testing does not generally need to be conducted if the substance is classified as corrosive to the skin (column 2 adaptation, Annex VIII). NaOH is a corrosive substance and for this reason there is no need for further acute toxicity testing.	Chemical Safety Report

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Hazard Class	Dose descriptor	Method/reference
Skin irritation/corrosion:	Irritant for 61% of the human volunteers (0.5% NaOH; for exposure up to 1 hour). <i>In vitro</i> study on skin tissue; Result: corrosive (500 µL of a formulation based on water with Sodium Hydroxide; rupture time of 13.16 min ± 0.06).	Coverage: fragment – 25 mm Hill Top chamber containing a Webril pad (closed exposure); York et al. 1996). Griffiths et al. (1997) Stobbe et al. (2003)
Serious eye damages/irritation	Rabbit (New Zealand; White): - Non-irritant (1% solution of NaOH) - Irritant (2% solution of NaOH)	Jacobs (1992)
Respiratory irritation:	NOEL (humans) = 1 mg/m ³ Sodium Hydroxide Mist (respiratory irritation).	Fritschi et al. (2001).
Skin sensitisation:	NaOH is not considered to be a skin sensitiser	Chemical Safety Report (EU RAR, 2007; section 4.1.2.4, page 70)
Germ cell mutagenicity:	<i>In vitro</i> and <i>In vivo</i> genetic toxicity tests indicated no evidence of mutagenic activity	Chemical Safety Report (EU RAR, 2007; section 4.1.2.6, page 72)
Carcinogenicity:	Lack of positive <i>in vitro</i> and <i>in vivo</i> mutagenicity data support no classification for carcinogenicity and support no additional animal testing to assess carcinogenicity	Chemical Safety Report
Reproductive toxicity:	Classification for reproductive or developmental toxicity is not necessary since NaOH is not expected to be systemically available in the body under normal handling and use conditions and the substance will not reach the foetus nor reach male and female reproductive organs	Chemical Safety Report (EU RAR, 2007; section 4.1.2.8, page 73)
STOT – SE:	No data.	Chemical Safety Report
STOT - RE:	No data.	Chemical Safety Report
Aspiration Hazard:	No data.	Chemical Safety Report

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SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Information on environmental effects

Its high solubility in water and very low vapour pressure indicate that NaOH will be found predominantly in water.

In water (including soil or sediment pore water), NaOH is present as sodium ion (Na^+) and hydroxyl ion (OH^-). As a solid, NaOH dissolves rapidly and subsequently dissociates in water (EU RAR, 2007).

If released into the air as an aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO_2 (or other acids), in the following way: $\text{NaOH} + \text{CO}_2 \rightarrow \text{HCO}_3^- + \text{Na}^+$. Subsequently, the salts (e.g. sodium (bi)carbonate) will be dissipated from the air (US EPA, 1989; OECD, 2002).

In this way, air releases of neutralised NaOH will mainly end up in the soil or water. If released into the soil, the absorption of soil particles will be insignificant (EU RAR, 2007). Depending on the buffering capacity of the soil the OH^- will be neutralised in water in the porous soil, or the pH may increase.

Hazard Class	Dose descriptor	Method/reference
Toxicity to fish (Short and Long-term)	No reliable studies are available for toxicity to fish	Chemical Safety Report
Short-term toxicity to aquatic invertebrates	EC_{50} (48 h): 40.4 mg/l (nominal) based on: Immobility (<i>Ceriodaphnia sp.</i>).	48-hour acute immobilisation test in accordance with the Environment Protection Authority; Warne et al. (1999).
Long-term toxicity to aquatic invertebrates	In water (including soil or sediment pore water), NaOH is present as the sodium ion (Na^+) and hydroxyl ion (OH^-), as solid NaOH rapidly dissolves and subsequently dissociates in water. Therefore, the only possible effect would result from the pH effect. However, pH will remain within environmentally expected ranges.	Chemical Safety Report (EU RAR, 2007; section 3.1.3, page 24).
Toxicity in algae/aquatic plants	There is no data for algae	Chemical Safety Report (EU RAR 2007; section 3.2.1.1.1, page 29)

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Hazard Class	Dose descriptor	Method/reference
Sediments Organisms	The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water. In water (including soil or sediment pore water), NaOH is present as the sodium ion (Na ⁺) and hydroxyl ion (OH ⁻), as solid NaOH rapidly dissolves and subsequently dissociates in water. If emitted to surface water, sorption to particulate matter and sediment will be negligible and so it will not accumulate in living tissues.	Chemical Safety Report (EU RAR, 2007; section 3.1.3, page 24)

12.2 Persistence and degradability

Biodegradability: According to the REACH Regulation, the study does not need to be conducted if the substance is inorganic (Annex VII, Column 2 adaption).

Abiotic Degradation: In water (including soil or sediment pore water), NaOH is present as the sodium ion (Na⁺) and hydroxyl ion (OH⁻), as solid NaOH rapidly dissolves and subsequently dissociates in water (EU RAR, 2007; section 3.1.3 page 24).

12.3 Bioaccumulative potential


The high water solubility and very low vapour pressure indicate that NaOH will be found predominantly in water (EU RAR, 2007; section 3.1.3, page 24). According to the EU RAR 2007, section 3.1.3.5, page 26, bioaccumulation in organisms is not relevant for NaOH.

12.4 Mobility in soil

No data.

12.5 Results of PBT and vPvB assessment

NaOH does not fulfil the criteria for 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

Not applicable.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Waste disposal procedures:

- It is not advisable to discharge caustic soda waste through the wastewater.
- Solutions with high pH must be neutralised with inorganic acids before being sent for disposal.
- EWC Code 06 02 04(*) – Sodium Hydroxide

Packaging treatment:

- Where possible recycling is preferred to disposal or incineration.
- Clean containers with water and neutralize the obtained water.
- Dispose of as unused product.
- EWC Code 15 01 10(*) – Packaging containing / contaminated by waste from hazardous substances.

Applicable regulations:

- 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council;
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives and other amendments;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 - replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives.

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SECTION 14: TRANSPORT INFORMATION

	ADR	IATA	IMDG	RID
14.1 UN number:	1824 (liquid)	1824 (liquid)	1824 (liquid)	1824 (liquid)
14.2 UN proper shipping name:	Sodium Hydroxide, Liquid	Sodium Hydroxide, Liquid	Sodium Hydroxide, Liquid	Sodium Hydroxide, Liquid
14.3 Transport hazard class(es):	8	8	8	8
Labels:	8	Corrosive (ICAO)	8 - Corrosive	8
Packing Instruction:	P001 IBC02		P001 IBC02	
Packing Instruction (cargo aircraft):		855/Max Liq Qty/Pkg: 30 L		
Packing Instruction (cargo passenger):		851/Max Liq Qty/Pkg: 1 L		
Packing Instruction (LQ):	1 L	Y840/Max. Liq Qty/Pkg: 0,5 L	1 L	
Packing Instruction (EQ):	E2	E2	E2	
14.4 Packing group:	II	II	II	II
14.5 Environmentally hazardous:	No	No	No	No
14.6 Special precautions for user:				
Tunnel restriction code:	(E)			
EmS:			F-A; S-B	
HI:	80			80
14.7 Transport in Bulk according to Annex II of Marpol and the IBC Code:				
Pollution Category:			Y	
Hazards:			S/P	
Ship Type:			3	


SECTION 15: REGULATORY INFORMATION

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

- Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC and other amendments;

- Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 and other amendments;;

- Council Directive 89/391/EEC of 12 June 1989 on the introduction of measures to encourage improvements in the safety and health of workers at work

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- Council Directive 98/24/EC of 7 April 1998 on the protection of the health and safety of workers from the risks related to chemical agents at work (fourteenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) and other amendments;
- 2014/955/EU: Commission Decision of 18 December 2014 amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council;
- Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives and other amendments;
- Commission Regulation (EU) No 1357/2014 of 18 December 2014 - replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives;
- Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008, on the inland transport of dangerous goods (ADR; RID and ADN) and other amendments;
- ACGIH 2006: Guide to Occupational Exposure Values;
- EH40/2005 Workplace exposure limits (The Health and Safety Executive);

15.2 Chemical safety assessment

A chemical safety report was made.

SECTION 16: OTHER INFORMATION

General:

- This information is to our best present knowledge, correct and complete and is given in good faith. The user shall ensure that the information is complete and appropriate for the uses given in the text. Other specific uses of the product not mentioned in the text remain the user's own responsibility.

Recommendations for occupational training:

- Provide the operators with suitable information, instruction and training on the product.


Sodium Hydroxide

Changes: Changes are in blue text.

DATE	REVISION	CHANGES MADE
27-08-2019	15	Section 1.2
		Sections 2.1 and 2.3
		Section 3.1
		Section 4.3
		Sections 6.1 and 6.2
		Sections 7.1 and 7.2
		Section 8.1.2
		Section 8.2
		Section 9
		Sections 10.2; 10.4 and 10.5
		Section 11
		Section 12
		Section 13
		Section 14
		Section 15.1
		Section 16
		Exposure Scenarios

Abbreviations mentioned on the Sheet:

AC - Article Category
 ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road.
 CAS no. – [World authority for chemical information](#)
 DNEL - Derived Non Effect Concentration
 EC No. – [European Community](#)
 EC₅₀ - Half of maximum effective concentration
 EQ - [Excepted quantities](#)
 ERC - Environmental Release Category
 ES - Exposure Scenario
 EWC - [European Waste Catalogue](#)
 Eye Irrit. 2 - [Serious eye damage/eye irritation, category 2](#)
 IATA - International Air Transport Association
 ICAO - International Civil Aviation Organisation
 IMDG - International Maritime Dangerous Goods
 LEV - [Local exhaust ventilation](#)
 LQ – [Limited Quantities](#)
 Met. Corr. 1 – [Substance corrosive to metals, category 1](#)
 NOEL – No Observed Effect Level
 OEL-ST - Occupational Exposure Limits- Short term
 PBT - Persistent, bioaccumulative and toxic.
 PC - Product Category
 PNEC – Predicted No-Effect Concentration

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PPE – Personal Protective Equipment
 PROC - Process Category
[REACH - Registration, Evaluation, Authorization and Restriction of Chemicals](#)
[RPE - Respiratory protection](#)
 RID - International Rule for Transport of Dangerous Substances by Railway
 SDS - Safety Data Sheet
 Skin Corr. 1A - Skin corrosion, category 1A
 Skin Corr. 1B - Skin corrosion, category 1B
 Skin Irrit. 2 - Skin irritation, category 2
 STOT – SE - Specific Target Organ Toxicant - Single Exposure
 STOT- RE - Specific Target Organ Toxicant - Repeated Exposure
[STP – Sewage treatment plant](#)
 SU - Sector of Use
 TLV-C - Threshold Limit Value – Ceiling
 UNO – United Nations Organisation
 vPvB - Very persistent and very bioaccumulative.
 WTP - Water Treatment Plant
 WWTP - Wastewater Treatment Plant

References:

CHEMICAL SAFETY REPORT- 29-07-2010

Annexes:

- **Annex 1:** [Manufacturing](#) of liquid NaOH - Exposure Scenario 1
- **Annex 2:** [Manufacturing](#) of solid NaOH – Exposure Scenario 2
- **Annex 3:** Industrial and [professional](#) use of NaOH – Exposure Scenario 3
- **Annex 4:** Consumer use of NaOH – Exposure Scenario 4

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Annex 1

Manufacturing of liquid NaOH - Exposure Scenario 1

Exposure Scenario 1: Manufacturing of liquid NaOH
<p><i>List of all use descriptors</i></p> <p>Sector of use (SU): - SU 3, 8 Manufacture of bulk, large scale chemicals.</p> <p>Product category (PC): - Not applicable.</p> <p>Process category (PROC):</p> <ul style="list-style-type: none"> PROC1 - Use in closed process, no likelihood of exposure. PROC2 - Use in closed, continuous process with occasional controlled exposure. PROC3 - Use in closed batch process (synthesis or formulation). PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises. PROC8a/b – Transfer of chemicals from/to vessels/large containers at (non) dedicated facilities. PROC9 – Transfer of chemicals into small containers (dedicated filling line). <p>Article category (AC): Not applicable.</p> <p>Environmental Release:</p> <p style="padding-left: 40px;">Category (ERC): - ERC1 Manufacture of substances.</p>
<p><i>EU Risk Assessment</i></p> <p>A risk assessment was undertaken by the EU based on Regulation of Existing Substances (<i>Council Regulation 793/93</i>). In 2007 a global risk assessment report was finalised and is available on the internet: http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf </p>
Contributing exposure scenario controlling environmental exposure
Product characteristic
<p>Liquid NaOH, all concentrations.</p>
Frequency and duration of use
<p>Continuous.</p>
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
<p>The purpose of the risk management measures related to the environment is to avoid discharge of NaOH solutions into municipal wastewaters or surface waters, since they could significantly alter the pH.</p> <p>The pH values must be monitored regularly during release into surface waters. Generally discharges must be made so that changes in the pH of surface water are kept to a minimum.</p> <p>Generically most aquatic organisms can tolerate pH values of 6-9. This is also mentioned in the OECD standard tests with aquatic organisms.</p>
Conditions and measures related to external treatment or recovery of waste for disposal
<p>Liquid NaOH waste must be reused or discharged into industrial wastewater and then neutralised, if necessary.</p>
Contributing exposure scenario controlling worker exposure
Product characteristic
<p>Liquid NaOH, all concentrations.</p>

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Frequency and duration of use/exposure

8 hours/day, 200 days/year.

Technical conditions and measures at process level (source) to prevent release

Where possible, substitute manual processes with automated and/or closed processes. Irritating mists, sprays and potential splashes will therefore be avoided:

- Use closed systems or cover the open containers (for example with canvas);
- Transport in pipelines, technical filling/emptying of drums with automatic systems (suction pumps, etc.);
- Use long-handled tongs for manual use "to avoid direct contact and exposure to splashes".

Technical conditions and measures to control dispersion from sources towards the worker

Local and/or general ventilation is a good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

- Workers who act in risk processes/areas must be trained to:
 - a) Avoid working without respiratory protection.
 - b) Understand the corrosive properties and particularly the effects of inhaling sodium hydroxide.
 - c) Follow the safest procedures indicated by the employer.
- The employer must also certify that the necessary PPE is in good condition and is used according to instructions.

Conditions and measures related to personal protection, hygiene and health evaluation

- **Respiratory protection:** - In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- **Hand protection:** - Waterproof and chemically resistant protective gloves
 - Material: butyl rubber, PVC, polychloroprene with natural latex lining, thickness of the material: 0.5 mm, rupture time: > 480 min
 - Material: nitrile rubber, fluorine rubber, thickness of the material: 0.35-0.4 mm, rupture time: > 480 min
- **Eye protection:** - Chemically resistant protective goggles must be worn. If splashes are likely, wear well-fitting safety goggles with facial protection.
- **Body protection:** Wear suitable protective clothing, aprons, shield and suits, if splashes are likely.
- **Leg protection:** Wear rubber or plastic boots.

Exposure estimate and reference to its source

Worker exposure:

NaOH is a corrosive substance.

When handling substances and formulations, immediate skin contact may only occasionally occur and it is assumed that daily repeated exposure will be negligible. Skin exposure to NaOH was therefore not quantified.

NaOH is unlikely to be present systemically in the organism in normal conditions of handling and use, which is why systemic effects of NaOH after inhalation or thermal exposure should not occur.

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Based on NaOH measurements and in accordance with the proposed risk management measures for controlling worker exposure, the worst reasonable scenario for inhalation exposure of 0.33 mg/m³ (the typical value is 0.14 mg/m³) is below the DNEL of 1 mg/m.

Environmental exposure:

The aquatic effect and risk assessment only deal with the effects in organisms/ecosystems due to possible alterations in the pH related to OH⁻ discharges, since the toxicity of the ion Na⁺ should be insignificant compared to the (potential) effect of the pH. Its high solubility in water and the very low pressure indicate that NaOH will be found mainly in water.

When risk management measures related to the environment are implemented, there is no exposure to the sludge activated from a sewage treatment plant and no exposure to the water that receives it on the surface.


Sediment partitioning is not considered since it is not relevant for NaOH. If released to the aquatic compartment, the absorption of sediment particles will be negligible.

No significant release to the air should occur due to the very low vapour pressure of NaOH. If released to the air in the form of aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).

Significant releases to land environment are not expected. The sludge application route is not relevant to releases into farming soil since particles will not be absorbed into the WTPs and WWTPs. If released to soil the absorption to the particles from the soil will be negligible.

Depending on the buffering capacity of the soil the OH⁻ will be neutralised in the water of the soil pores or the pH may increase.

No bioaccumulation will occur.

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Annex 2

Manufacturing of solid NaOH – Exposure Scenario 2

Exposure Scenario 2: Manufacturing of solid NaOH
<p><i>List of all use descriptors</i></p> <p>Sector of use (SU): - SU 3, 8 - Manufacture of bulk, large scale substances</p> <p>Product category (PC): - Not applicable</p> <p>Process category (PROC):</p> <ul style="list-style-type: none"> PROC1 - Use in closed process, no likelihood of exposure PROC2 - Use in closed, continuous process with occasional controlled exposure PROC3 - Use in closed batch process (synthesis or formulation) PROC4 - Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a/b – Transfer of chemicals from/to vessels/large containers at (non) dedicated facilities PROC9 – Transfer of chemicals into small containers (dedicated filling line) <p>Article category (AC): - Not applicable.</p> <p>Environmental Release</p> <p>Category (ERC): - ERC1 Manufacture of substances.</p>
<p><i>EU Risk Assessment</i></p> <p>A risk assessment was undertaken by the EU based on Regulation of Existing Substances (<i>Council Regulation 793/93</i>). In 2007 a global risk assessment report was finalised and is available on the internet:</p> <p>http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf</p>
Contributing exposure scenario controlling environmental exposure
<p>Product characteristic</p>
<p>Solid NaOH.</p>
<p>Frequency and duration of use</p>
<p>Continuous.</p>
<p>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</p>
<p>The purpose of the risk management measures related to the environment is to avoid discharge of NaOH solutions into municipal wastewaters or surface waters, since they could significantly alter the pH.</p> <p>The pH values must be monitored regularly during release into surface waters.</p> <p>Generally discharges must be made so that changes in the pH of surface water are kept to a minimum.</p> <p>Generically most aquatic organisms can tolerate pH values of 6-9. This is also mentioned in the OECD standard tests with aquatic organisms.</p>
<p>Conditions and measures related to external treatment or recovery of waste for disposal</p>
<p>There is no solid NaOH waste. Liquid NaOH waste must be reused or discharged into industrial wastewater and</p>

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then neutralised, if necessary.

Contributing exposure scenario controlling worker exposure

Product characteristics

Solid NaOH, all concentrations.

Frequency and duration of use/exposure

8 hours/day, 200 days/year.

Technical conditions and measures at process level (source) to prevent release

Where possible, substitute manual processes with automated and/or closed processes. Irritating mists, sprays and potential splashes will therefore be avoided:

- Use closed systems or cover the open containers (for example with canvas).
- Transport in pipelines, technical filling/emptying of drums with automatic systems (suction pumps, etc.).
- Use long-handled tongs for manual use "to avoid direct contact and exposure to splashes".

Technical conditions and measures to control dispersion from sources towards the worker

Local and/or general ventilation is a good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

- Workers who act in risk processes/areas must be trained to:
 - Avoid working without respiratory protection.
 - Understand the corrosive properties and particularly the effects of inhaling sodium hydroxide.
 - Follow the safest procedures indicated by the employer.
- The employer must also certify that the necessary PPE is in good condition and is used according to instructions.

Conditions and measures related to personal protection, hygiene and health evaluation

- **Respiratory protection:** In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- **Hand protection:** Waterproof and chemically resistant protective gloves
 - Material: butyl rubber, PVC, polychloroprene with natural latex lining, thickness of the material: 0.5 mm, rupture time: > 480 min.
 - Material: nitrile rubber, fluorine rubber, thickness of the material: 0.35-0.4 mm, rupture time: > 480 min.
- **Eye protection:** chemically resistant protective goggles must be worn. If splashes are likely, wear well-fitting safety goggles with facial protection.
- **Body protection:** Wear suitable protective clothing, aprons, shield and suits, if splashes are likely, wear: *rubber or plastic boots.*

Exposure estimate and reference to its source

Worker exposure:

NaOH is a corrosive substance.

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When handling substances and formulations, immediate skin contact may only occasionally occur and it is assumed that daily repeated exposure will be negligible. Skin exposure to NaOH was therefore not quantified.

NaOH is unlikely to be present systemically in the organism in normal conditions of handling and use, which is why systemic effects of NaOH after inhalation or thermal exposure should not occur.

Based on NaOH measurements and in accordance with the proposed risk management measures for controlling worker exposure, the worst reasonable scenario for inhalation exposure of 0.33 mg/m^3 (the typical value is 0.14 mg/m^3) is below the DNEL of 1 mg/m^3 .

Environmental exposure:

The aquatic effect and risk assessment only deal with the effects in organisms/ecosystems due to possible alterations in the pH related to OH^- discharges, since the toxicity of the ion Na^+ should be insignificant compared to the (potential) effect of the pH.

Its high solubility in water and the very low pressure indicate that NaOH will be found mainly in water.

When risk management measures related to the environment are implemented, there is no exposure to the sludge activated from a sewage treatment plant and no exposure to the water that receives it on the surface.

Sediment partitioning is not considered since it is not relevant for NaOH. If released to the aquatic compartment, the absorption of sediment particles will be negligible.

No significant release to the air should occur due to the very low vapour pressure of NaOH. If released to the air in the form of aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO_2 (or other acids).

Significant releases to land environment are not expected. The sludge application route is not relevant to releases into farming soil since particles will not be absorbed into the WTPs and WWTPs.

If released to soil the absorption to the particles from the soil will be negligible.

Depending on the buffering capacity of the soil the OH^- will be neutralised in the water of the soil pores or the pH may increase.

No bioaccumulation will occur.

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Annex 3

Industrial and Professional use of NaOH – Exposure Scenario 3

Exposure Scenario 3 – Industrial and professional use of NaOH

List of all use descriptors

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

Since Sodium Hydroxide is so widely used and for so many different purposes, it can potentially be used in all sectors of use (SU) described by the use descriptor system (SU 1-24). NaOH is used for different purposes in a variety of industrial sectors.

Product category (PC): - PC 0-40

Sodium Hydroxide can be used in many different categories of chemical products (PC). It may be used, for example, as an absorbent (PC2), metal surface treatment product (PC14), non-metal surface treatment product (PC15), intermediate (PC19), pH-regulator (PC20), laboratory chemical (PC21), cleaning product (PC35), water softener (PC36), water treatment chemical (PC37) or extraction agent. However, it may also potentially be used in the other chemical product categories (PC 0 – 40).

Process category (PROC):

- PROC1** - Use in closed process, no likelihood of exposure.
- PROC2** - Use in closed, continuous process with occasional controlled exposure.
- PROC3** - Use in closed batch process (synthesis or formulation).
- PROC4** - Use in batch and other process (synthesis) where opportunity for exposure arises.
- PROC5** - Mixing or blending in batch processes (multistage and/or significant contact).
- PROC8a/b** – Transfer of chemicals from/to vessels/large containers at (non) dedicated facilities.
- PROC9** – Transfer of chemicals into small containers (dedicated filling line).
- PROC10** – Roller application or brushing.
- PROC11** - Non industrial spraying.
- PROC13** – Treatment of articles by dipping and pouring.
- PROC15** – Use of laboratory reagent in small scale laboratories.

The aforementioned process categories are considered the most important, but other categories may be possible (PROC 1 – 27).

Article category (AC): - Not applicable.

Although Sodium Hydroxide may be used in the manufacturing process of articles, the substance is not expected to be present in the article. The article categories (AC) do not seem to be applicable to Sodium Hydroxide.

Environmental Release Category (ERC):

- ERC1** – Manufacture of substances.
- ERC2** – Formulation of preparations.
- ERC4** – Industrial use of processing aids in processes and products, not becoming part of articles.

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ERC6A – Industrial use resulting in manufacture of another substance (use of intermediates).

ERC6B – Industrial use of reactive processing aids.

ERC7 – Industrial use of substances in closed systems.

ERC8A – Wide dispersive indoor use of processing aids in open systems.

ERC8B – Wide dispersive indoor use of reactive substances in open systems.

ERC8D – Wide dispersive outdoor use of processing aids in open systems.

ERC9A – Wide dispersive indoor use of substances in closed systems.

The environmental release categories mentioned above are assumed to be the most important ones but other industrial environmental release categories could also be possible (ERC 1 – 12).

Other explanations: Typical uses include: manufacture of organic and inorganic chemical products, formulation of chemical products, pulp manufacture and bleaching, manufacture of aluminium and other metals, food industry, water treatment, textile production, occupational end use of formulated products and other industrial uses.

EU Risk Assessment

A risk assessment was undertaken by the EU based on Regulation of Existing Substances (Council Regulation 793/93). In 2007 a global risk assessment report was finalised and is available on the internet:

http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf

Contributing exposure scenario controlling environmental exposure

Product characteristic

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dustiness class.

Frequency and duration of use

Continuous.

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil

The purpose of the risk management measures related to the environment is to avoid discharge of NaOH solutions into municipal wastewaters or surface waters, since they could significantly alter the pH.

The pH values must be monitored regularly during release into surface waters.

Generally discharges must be made so that changes in the pH of surface water are kept to a minimum.

Generically most aquatic organisms can tolerate pH values of 6-9. This is also mentioned in the OECD standard tests with aquatic organisms.

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

There is no solid NaOH waste. Liquid NaOH waste must be reused or discharged into industrial wastewater and then neutralised, if necessary.

Contributing exposure scenario controlling worker exposure

Product characteristic

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dust formation class.

Frequency and duration of use/exposure

8 hours/day, 200 days/year.

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Technical conditions and measures at process level (source) to prevent release

For the worker, both solid and liquid NaOH which contain products at a concentration of **> 2%**:

Where possible, substitute manual processes with automated and/or closed processes. Irritating mists, sprays and potential splashes will therefore be avoided:

- Use closed systems or cover the open containers (for example with canvas).
- Transport in pipelines, technical filling/emptying of drums with automatic systems (suction pumps, etc.).
- Use long-handled tongs for manual use "to avoid direct contact and exposure to splashes".

Technical conditions and measures to control dispersion from sources towards the worker

For the worker, both solid and liquid NaOH which contain products at a concentration of **> 2%**:

- Local and/or general ventilation is a good practice.

Organisational measures to prevent/limit releases, dispersion and exposure

For the worker, both solid and liquid NaOH which contain products at a concentration of **> 2%**:

- Workers who act in risk processes/areas must be trained to:
 - Avoid working without respiratory protection.
 - Understand the corrosive properties and particularly the effects of inhaling sodium hydroxide.
 - Follow the safest procedures indicated by the employer.
- The employer must also certify that the necessary PPE is in good condition and is used according to instructions. Where possible and for occupational use, specific distributors and specially designed pumps should be used to prevent splashes/spills/exposure.

Conditions and measures related to personal protection, hygiene and health evaluation

For the worker and professional, both solid and liquid NaOH which contain products at a concentration of **> 2%**:

- **Respiratory protection:** In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2).
- **Hand protection:** waterproof and chemically resistant gloves:
 - Material: butyl rubber, PVC, polychloroprene with natural latex lining, thickness of the material: 0.5 mm, rupture time: > 480 min.
 - Material: nitrile rubber, fluorine rubber, thickness of the material: 0.35-0.4 mm, rupture time: > 480 min.
- **Eye protection:** chemically resistant protective goggles must be worn. If splashes are likely, wear well-fitting safety goggles with facial protection.
- **Body protection:** Wear suitable protective clothing, aprons, shield and suits, if splashes are likely, wear: *rubber or plastic boots.*

Exposure estimate and reference to its source

Worker exposure:

NaOH is a corrosive substance. When handling substances and formulations, immediate skin contact may only

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occasionally occur and it is assumed that daily repeated exposure will be negligible. Skin exposure to NaOH was therefore not quantified.

NaOH is unlikely to accumulate systemically in the body in normal conditions of use and handling and therefore no systemic effects of NaOH are expected after inhalation or skin exposure.

Based on NaOH measurements in the pulp, paper and bleached recycled paper industries, aluminium and chemical industries and in accordance with the proposed risk management measures for controlling occupational and worker exposure, inhalation exposure is below the DNEL of 1 mg/m³.

In addition to the exposure data measured, the ECETOC TRA tool was used to measure inhalation exposure (see table below). It was assumed that there was no local air extraction or respiratory protection, unless otherwise specified. The duration of exposure was assumed to be 4 hours a day in the worst case scenario, and an occupational use was indicated when this was relevant for indicating the worst case scenario. In solid format, the low dust formation class was selected because NaOH is highly hygroscopic. Only the most relevant PROC were considered in the analysis.

PROC	PROC description	Liquid (mg/m ³)	Solid (mg/m ³)
PROC 1	Use in closed process, no likelihood of exposure	0,17	0,01
PROC 2	Use in closed, continuous process with occasional controlled exposure (e.g. sampling)	0,17	0,01
PROC 3	Use in closed batch process (synthesis or formulation)	0,17	0,1
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	0,17	0.2 (with LEV)
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	0,17	0.2 (with LEV)
PROC 7	Industrial spraying	0,17	Not applicable
PROC 8a/b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at (non-) dedicated facilities.	0,17	0,5
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0,17	0,5
PROC10	Roller application or brushing	0,17	0,5
PROC11	Non industrial spraying	0,17	0.2 (with LEV)
PROC13	Treatment of articles by dipping and pouring	0,17	0,5
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelletisation	0,17	0.2 (with LEV)
PROC15	Use as laboratory reagent	0,17	0,1

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PROC19	Hand-mixing with intimate contact and only PPE available	0,17	0,5
PROC23	Open processing and transfer operations with minerals/metals at elevated temperature	0,17	0.4 (with LEV and RPE (90%))
PROC24	High (mechanical) energy work-up of substances bound in materials and/or articles	0,17	0.5 (with LEV and RPE (90%))

Environmental exposure:


The aquatic effect and risk assessment only deal with the effects in organisms/ecosystems due to possible alterations in the pH related to OH⁻ discharges, since the toxicity of the ion Na⁺ should be insignificant compared to the (potential) effect of the pH. Its high solubility in water and the very low pressure indicate that NaOH will be found mainly in water. When risk management measures related to the environment are implemented, there is no exposure to the sludge activated from a sewage treatment plant and no exposure to the water that receives it on the surface.

Sediment partitioning is not considered since it is not relevant for NaOH. If released to the aquatic compartment, the absorption of sediment particles will be negligible.

No significant release to the air should occur due to the very low vapour pressure of NaOH. If released to the air in the form of aerosol in water, NaOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).

Significant releases to land environment are not expected. The sludge application route is not relevant to releases into farming soil since particles will not be absorbed into the WTPs and WWTPs. If released to soil the absorption to the particles from the soil will be negligible. Depending on the buffering capacity of the soil the OH⁻ will be neutralised in the water of the soil pores or the pH may increase.

No bioaccumulation will occur.

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Annex 4

Consumer use of NaOH – Exposure Scenario 4

Exposure Scenario 4 – Consumer use of NaOH

List of all use descriptors

Sector of use (SU): - **SU 21** – Private households

Product category (PC): - PC 0-40

Sodium Hydroxide can be used in many different chemical products categories (PC): PC 20, 35, 39 (neutralisation agents, cleaning products, cosmetics, personal care products). Other PCs are not explicitly considered in this Exposure Scenario. However, NaOH can also be used in other low concentration PCs, e.g. PC3 (up to 0.01%), PC8 (up to 0.1%), PC28 and PC31 (up to 0.002%) and can also be used in the other product categories (PC 0-40).

Process category (PROC): - Not applicable.

Article category (AC): Not applicable.

Environmental Release Category - Category (ERC):

ERC8A – Wide dispersive indoor use of processing aids in open systems.

ERC8B – Wide dispersive indoor use of reactive substances in open systems.

ERC8D – Wide dispersive outdoor use of processing aids in open systems.

ERC9A – Wide dispersive indoor use of substances in closed systems.

The environmental release categories **mentioned above** are **assumed to be** the most important **ones** but other wide dispersive environmental categories **could** also be possible (ERC 8 – 11b).

Futher explanations

NaOH (up to 100%) is also used by consumers. It is used **fat home for drain and pipe** cleaning, wood **treatment** and it is also used to make soap at home.

NaOH is also used in batteries and **oven-cleaner pads**.

EU Risk Assessment

A risk assessment was undertaken by the EU based on Regulation of Existing Substances (*Council Regulation 793/93*). In 2007 a global risk assessment report was finalised and is available on the internet:

http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf

Contributing exposure scenario controlling environmental exposure

Product characteristic

Solid or liquid NaOH, all concentrations (0-100%), if solid: low **dustiness** class.

Conditions and measures related to external treatment of waste for disposal

This product and its packaging must be discarded safely (e.g. by taking to a public recycling facility). If the container is empty, treat as normal municipal waste.

Batteries must be recycled as far as possible (e.g. by taking them to a public recycling facility). The recovery of NaOH from alkaline batteries included electrolyte creep, collection and neutralisation with sulphuric acid and carbon dioxide.

Sodium Hydroxide

Contributing exposure scenario controlling worker exposure

Product characteristic

Solid or liquid NaOH, all concentrations (0-100%), if solid: low dust formation class.

Typical concentrations: floor strippers (<10%), hair straighteners (<2%), oven cleaners (<5%), [drain openers](#) (liquid: 30%, solid: <100%), cleaning products (<1.1%).

Technical conditions and measures related to product presentation

- It is required to use resistant labelling-package to avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions.
- It is required that household chemicals, containing sodium hydroxide for more than 2%, which may be accessible to children should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society.
- It is advisable to deliver only in very viscous preparations
- It is advisable to delivery only in small amounts
- For use in batteries, it is required to use completely sealed articles with a long service life maintenance.

Conditions and measures related to the information and recommendations for consumer behaviour

It is required that improved use instructions, and product information should always be provided to the consumers. This clearly can efficiently reduce the risk of misuse. For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups. To prevent improper use of sodium hydroxide, instructions for use should contain a warning against dangerous mixtures.

Instructions addressed to consumers:

- Keep out of reach of children.
- Do not apply product into ventilator openings or slots.

Conditions and measures related to personal protection and health


For consumer, both solid and liquid NaOH containing products at a concentration of > 2%:

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2).
- Hand protection: [Impervious](#) chemical resistant protective gloves.
- Eye protection: If splashes are likely [to occur](#), wear [tightly](#) fitting [chemical resistant](#) safety goggles, [face-shield](#).

Exposure estimate and reference to its source

Consumer exposure:

- Acute/Short term exposure was assessed only [for the](#) most critical use: use of NaOH [in a](#) spray oven cleaner.
- The calculated short-term exposure of 0.3 – 1.6 mg/m³ is slightly higher than the long-term DNEL for an

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inhalation of 1 mg/m³ but **smaller** than the short term occupational exposure limit of 2 mg/m³.
Furthermore, NaOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).

Environmental Exposure:

Consumer use refers to already diluted products which will **further** be neutralised **quickly** in the sewer, **well** before reaching a WWTP or surface water.