



SAFETY DATA SHEET

Caustic Soda Solution (Concentration 30-50%)

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Date issued: 21st December 2011

Revision: 1

1. Identification of the substance/preparation and of the company/undertaking

1.1. Product Identifiers

Trade name:	CAUSTIC SODA SOLUTION (50%), (Sodium Hydroxide Solution 50%)
REACH Registration number	01-2119457892-27-0006
CAS number	1310-73-2
EC index number	011-002-00-6
EINECS number	215-185-5
Molar mass	40.00 g/mol
Formula	NaOH

1.2. Product Identifiers

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

- Material for industrial applications
- Manufacture of liquid substance
- Manufacture of solid substance
- Industrial and professional use
- Consumer end use

1.3. Supplier's details

-Company:	Goulding Chemicals Ltd.
-Address:	Centre Park Road, Marina, Cork, Ireland
-Telephone:	+353(021)4911611
-Fax:	+353(021)4911660
-Contact Email	croninm@gouldings.ie

1.4. Emergency telephone number

-Emergency telephone number (outside of office hours): +353(021)4911619

2. Hazards identification

2.1. Classification of the substance or mixture

Classification (1272/2008/CE):

Skin Corrosion, Category 1A (H314)
Corrosive to metals, Category1 (H290)

Classification (2006/121/EC, 1999/45/EC):

Causes severe burns.

2.2 Label elements

Hazardous components which must be listed on the label Sodium hydroxide

Labelling (1272/2008/CE):



Danger

Hazard statements:

H314 Causes severe skin burns and eye damage.
H290 May be corrosive to metals.

2. Hazards identification continued

Precautionary statements:

P260	Do not breathe dust or mist.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P301+ P330+ p331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
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.
P308	IF exposed or concerned:
P310	Immediately call a POISON CENTER or a doctor/physician.

Labelling (2006/121/EC, 1999/45/EC):

Labelling and classification in accordance with the EC Dangerous Preparations Directive (1999/45/EC) and subsequent amendments

C	Corrosive
Contains:	sodium hydroxide
R-phrases(s):	R35 Causes severe burns.
S-phrases(s):	S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
	S37/39 Wear suitable gloves and eye/face protection.
	S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

3. Composition/information on ingredients

3.2 Type of product: Mixture

Hazardous components

Sodium hydroxide (caustic soda)

Concentration (%):	30-50
CAS-No.:	1310-73-2
EINECS-No.:	215-185-5
Index-No.:	011-002-00-6
Classification (1272/2008/CE):	Met.Corr.1 H290 Skin Corr.1A H314

Specific threshold concentration (GHS):

Skin Corr. 1A	H314	>=5%
Skin Corr. 1B	H314	2-<5%
Skin Irrit. 2	H315	0.5-<2%
Eye Irrit. 2	H319	0.5-<2%

Classification (37/548/EEC): C R35

Specific threshold concentration

Xi	R36/38	0.5-<2%
C	R34	2-<5%
C	R35	>=5%

4. First-aid measures

FIRST AID MEASURES

4.1 Description of first aid measures

General advice: Remove victims from the danger zone without endangering your own safety. Remove contaminated clothing (including underwear and shoes) immediately.

If inhaled: Bring accident victims out into the fresh air. If patient has difficulty in breathing, administer oxygen, keep the patient calm and warm. Call a physician immediately.

In case of skin contact: After contact with skin, wash immediately with plenty of water. Apply sterile protective bandage; consult GP.

In case of eye contact: Hold the eyes open and rinse with preferably lukewarm water for a sufficiently long period of time (at least 10 minutes). Contact a ophthalmologist.

If swallowed: If swallowed, rinse mouth with water (only if the person is conscious). DO NOT induce the patient to vomit, medical advice is required.

4.2 Most important symptoms and effects, both acute and delayed

Notes to physician: See Section 11 for information on toxicology.

4.3 Indication of any immediate medical attention and special treatment needed

Therapeutic measures: Basic first aid, decontamination, symptomatic treatment. Treat with a corticoid metered aerosol depending on the amount inhaled.

5. Fire-fighting measures

5.1 Suitable extinguishing media: Carbon dioxide (CO₂), foam, extinguishing powder, in cases of larger fires, water spray should be used.

Unsuitable extinguishing media: High volume water jet.

5.2 Special hazards arising from the substance or mixture:

Burning releases carbon monoxide, carbon dioxide, oxides of nitrogen and traces of hydrogen cyanide. In the event of fire and/or explosion do not breathe fumes.

5.3 Advice for fire-fighters:

During fire-fighting respirator with independent air-supply and airtight garment is required. Fight fire in early stages if safe to do so. Containers at risk of fire should be cooled with water and, if possible removed from the danger area. Do not allow contaminated extinguishing water to enter the soil, ground-water or surface waters.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:

Put on protective equipment (see Section 8). Ensure adequate ventilation/exhaust extraction. Keep unauthorized persons away.

6.2.1 Environmental precautions: Do not flush into surface water or sanitary sewers system.

6.3 Methods and material for containment and cleaning up:

Take up with absorbent for chemicals or, if necessary with dry sand. Fill into labelled, sealable containers. Also place used cleaning materials into closable receptacles.

6.4 Reference to other sections: For further disposal measures see Section 13.

7. Handling and storage

7.1 Precautions for safe handling:

Handle and open container with care. Provide sufficient air exchange and/or exhaust in work rooms.

Organize work procedures so that workers are not exposed to the effects of the products. Vent waste air only via suitable separator or scrubbers.

Precautions should generally be taken against electrostatic charges according to the equipment used and the way the product is handled and packaged.

The precautions required in the handling of irritant or corrosive substances must be taken. Contact with skin and eyes and inhalation of vapors must be avoided under all circumstances.

Careful attention to industrial and personal hygiene is essential. Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at the end of work day. Keep working clothes separately. Change contaminated or soaked clothing immediately. If the suit becomes contaminated, first take a shower with the suit on.

Keep away from incompatible products and naked flames/heat. Do not discharge the waste into drains.

The general conditions of use are further specified in the exposure scenarios which may be found in the attached annex.

7.2 Conditions for safe storage, including any incompatibilities:

Store in a dry, well-ventilated, bunded area.

Keep in properly labelled closed containers.

Keep away from incompatible products and naked flames/heat.

Protect against frost.

Min.Storage temperature: 25°C for 50% solution, 20°C for 30% & 47% solutions.

Mild steel tanks must be stress relieved if storing material above 40°C for concentrations of 30% or more, or above 60°C for lower concentrations.

Keep away from: -combustible materials, -(strong) acids, -metals

Suitable packaging material:

- stainless steel
- polyethylene
- glass
- nickel
- polypropylene
- stoneware/porcelain

Non suitable packaging material:

- lead
- zinc
- aluminium
- bronze
- copper
- tin

7.3 Specific end use(s):

For further information contact the supplier.

8. Exposure Controls/Personal Protection

8.1 Control parameters

Components with workplace control parameters

Substance	CAS-No.	Basis	Type	Value	Ceiling Limit Value	Remarks
Sodium Hydroxide (Caustic Soda)	1310-73-2	EH40 WEL	STEL	2mg/m ³		

For technical protective measures to limit exposure see also Section 7 "Handling and storage". The general RMMs are further specified in the exposure scenarios which may be found in the attached annex..

8. Exposure Controls/Personal Protection continued

Derived No Effect Level (DNEL) or Derived Minimal Effect Level (DMEL):

Sodium hydroxide (caustic soda)

Worker (short-term)

DNEL Dermal - local effects: < 2 %

DNEL Inhalation - local effects: No data available

Worker (long-term)

DNEL Dermal - local effects: No data available

DNEL Inhalation - local effects: 1 mg/m³ air

Most sensitive endpoint: Irritation (respiratory tract)

Predicted No Effect Concentration (PNEC):

Sodium hydroxide (caustic soda)

Freshwater: Not applicable

Marine water: Not applicable

Sediment: Not relevant

Soil: Not relevant

STP (sewage-treatment plant): Not applicable

Oral: Not relevant

8.2 Exposure controls

Respiratory protection:

Recommendations regarding respiratory protection can be found in the individual exposure scenarios in the appendix.

Hand protection:

Suitable materials for safety gloves; EN 374:

Nitrile rubber- NBR: thickness \geq 0,35mm; breakthrough time \geq 480min.

Polyvinyl chloride- PVC: thickness \geq 0,5mm; breakthrough time \geq 480min.

Polychloroprene- CR: thickness \geq 0,5mm; breakthrough time \geq 480min.

Butyl rubber IIR: thickness \geq 0,5mm; breakthrough time \geq 480min.

Fluorinated rubber- FKM: thickness \geq 0,4mm; breakthrough time \geq 480min.

Recommendation: contaminated gloves should be disposed of.

Eye protection:

Wear eye/face protection.

Skin and body protection:

Impervious protective clothing. On possible contact with the product (sampling, product leakage): full protection or chemical protection clothing.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance: liquid

Colour: colourless

Odour: odourless

Odour Threshold: not established

pH: >14 at 100g/l at 20°C

Melting point/range: 12°C (50%), 8°C (47%), 1°C (30%)

Boiling point/range: 145°C (50%), 140°C (47%), 118°C (30%)

9. Physical and Chemical Properties continued

Flash point:	not applicable
Evaporation rate:	not established
Flammability(solid, gas):	not applicable
Burning number:	not applicable
Vapour pressure:	not established
Vapour density:	not established
Density:	30% 1.33 at 15.5°C 47% 1.50 at 15.5°C 50% 1.53 at 15.5°C
Surface tension:	not established
Partition coefficient (n-octanol/water):	not established
Autoignition temperature:	not applicable
Ignition temperature:	not applicable
Decomposition temperature:	not established
Viscosity, dynamic:	79 mPa.s at 20°C
Explosive properties:	not established
Dust explosion class:	not applicable
Oxidising properties:	not established

9.2 Other information

Miscibility with water: miscible

10. Stability and Reactivity

10.1 Reactivity:

Exothermic reaction with water.
Violent exothermic reaction with strong acids.
Reacts with some metals to release hydrogen.

10.2 Stability:

Stable under recommended storage conditions.
Hygroscopic.
Absorbs atmospheric CO₂.

10.3. Possibility of hazardous reactions

Reacts with (some) metals e.g. Aluminium, Magnesium, Zinc: release of highly flammable gases/vapours (hydrogen).
On heating: release of corrosive gases/vapours.
Reacts violently with Acids.

10.4 Conditions to avoid: -Over heating -Freezing -Direct sunlight -Moisture

10.5 Materials to avoid: -Combustible materials -Strong acids -Metals -Oxidising agents

10.6 Hazardous Decomposition Products:

Reacts with (some) metals: release of highly flammable gases/vapours (hydrogen).
On heating: release of corrosive gases/vapours.
No hazardous decomposition if stored and handled correctly.

11. Toxicological Information

Toxicological studies on the product are not yet available. Please find below the data available to us:

11.1 Information on toxicological effects

Acute toxicity, oral: sodium hydroxide (caustic soda) No valid data available.

Acute toxicity, dermal: sodium hydroxide (caustic soda) No valid data available.

Acute toxicity, inhalation: sodium hydroxide (caustic soda) No valid data available.

Primary skin irritation: sodium hydroxide (caustic soda) In vitro test system
 Classification: Causes severe burns. Result: Corrosive
 Method: In Vitro Membrane Barrier Test Method for Skin Corrosion - CORROSITEX

Primary mucosae irritation: sodium hydroxide (caustic soda) rabbit
 Classification: Causes severe burns. Result: Risk of serious damage to eyes.

Sensitisation: sodium hydroxide (caustic soda) No known sensitising effect

Subacute, subchronic and prolonged toxicity:
 sodium hydroxide (caustic soda) No valid data available.

Carcinogenicity: sodium hydroxide (caustic soda) No data available.

Reproductive toxicity/Fertility:
 sodium hydroxide (caustic soda) No data available.

Reproductive toxicity/Teratogenicity:
 sodium hydroxide (caustic soda) No data available.

Genotoxicity in vitro: sodium hydroxide (caustic soda)
 Test type: Salmonella/microsome test (Ames test) Result: No indication of mutagenic effects.
 Test type: Chromosome aberration test in vitro Result: negative

Genotoxicity in vivo: sodium hydroxide (caustic soda) No valid data available.

STOT evaluation – one-time exposure: sodium hydroxide (caustic soda)
 Based on available data, the classification criteria are not met.

STOT evaluation – repeated exposure: sodium hydroxide (caustic soda)
 Based on available data, the classification criteria are not met.

Aspiration toxicity: sodium hydroxide (caustic soda)
 Based on available data, the classification criteria are not met.

CMR Assessment: sodium hydroxide (caustic soda)
 Carcinogenicity: Based on available data, the classification criteria are not met.
 Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
 Teratogenicity: Based on available data, the classification criteria are not met.
 Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

Toxicology Assessment: sodium hydroxide (caustic soda)
 Acute effects: The product causes burns of eyes, skin and mucous membranes.

Additional information: sodium hydroxide (caustic soda)
 May cause caustic burns to the mouth, throat or stomach if swallowed. After swallowing danger of stomach perforation. On inhalation: Irritation of mucous membrane, coughing and shortness of breath.

12. Ecological Information

Do not allow to escape into waterways, wastewater or soil.

Ecotoxicological studies of the product are not available.

Please find below the data available to us:

12.1 Toxicity

Acute Fish toxicity:

sodium hydroxide (caustic soda)

LC50 35 - 189 mg/l

Species: Fish

Effect concentrations in the aquatic environment are attributable to a change in pH value.

Acute toxicity for daphnia:

sodium hydroxide (caustic soda)

EC50 40.4 mg/l

Species: Ceriodaphnia sp.

Exposure duration: 48 h

Effect concentrations in the aquatic environment are attributable to a change in pH value.

Acute toxicity for algae:

sodium hydroxide (caustic soda)

No data available.

Effect concentrations in the aquatic environment are attributable to a change in pH value.

Acute bacterial toxicity:

sodium hydroxide (caustic soda) No valid data available.

Effect concentrations in the aquatic environment are attributable to a change in pH value.

Ecotoxicology Assessment:

sodium hydroxide (caustic soda)

Neutralisation will reduce ecotoxic effects.

A chronic aquatic toxicity is not expected.

Not expected to adsorb on soil.

Neutralization is normally necessary before waste water is discharged into water treatment plants.

12.2 Persistence and degradability

Biodegradability:

sodium hydroxide (caustic soda)

The methods for determining the biological degradability are not applicable to inorganic substances.

Stability in water:

sodium hydroxide (caustic soda)

Not applicable

Photodegradation:

sodium hydroxide (caustic soda)

No data available

Volatility (Henry's Law constant):

sodium hydroxide (caustic soda)

The substance has to be scored as non-volatile from water.

12. Ecological Information continued

12.3 Bioaccumulative potential

Bioaccumulation:

sodium hydroxide (caustic soda) An accumulation in aquatic organisms is not to be expected.

12.4 Mobility:

Distribution among environmental compartments:

sodium hydroxide (caustic soda)

Adsorption/Soil

Mobile in soils

Environmental distribution:

sodium hydroxide (caustic soda) The target compartement is water.

12.5 Results of PBT and vPvB assessment

sodium hydroxide (caustic soda)

This substance does not meet the criteria for classification as PBT or vPvB.

12.6 Other adverse effects:

sodium hydroxide (caustic soda)

Toxic effect on fish, plankton and on sedentary organisms, also through shifting of pH value.

Causes no biological oxygen consumption.

No inhibition of activity of waste bacteria after neutralization.

13. Disposal Considerations

Dispose in accordance with applicable international, national and local laws, ordinances and statutes.

For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

13.1 Waste treatment methods

After containers have been emptied as thoroughly as possible (e.g. by pouring, scraping or draining until "drip-dry"), they can be sent to an appropriate collection point set up within the framework of the existing take-back scheme of the chemical industry.

Containers must be recycled in compliance with national legislation and environmental regulations.

No disposal into surface or waste water.

14.Transport Information**ADR/RID**

UN Number: 1824
Description of the goods: Sodium Hydroxide Solution
Packaging group: II
Hazard identification No: 80
Hazard label: 8
Environmentally Hazardous: No
Limited quantity regulations applicable in accordance with chapter 3.4 ADR/RID in compliance with threshold value.

ADN

UN Number: 1824
Description of the goods: Sodium Hydroxide Solution
Packaging group: II
Hazard identification No: 80
Hazard label: 8
Environmentally Hazardous: No

ADNR_TS

UN Number: 1824
Description of the goods: Sodium Hydroxide Solution
Packaging group: II
Hazard label: 8 (N3)
Environmentally Hazardous: No

IATA

UN Number: 1824
Description of the goods: Sodium Hydroxide Solution
Class: 8
Packaging group: II
Hazard label: 8
Packing Instruction (cargo aircraft): 855
Packing Instruction (passenger aircraft): 851

IMDG

UN Number: 1824
Description of the goods: Sodium Hydroxide Solution
Class: 8
Packing Group: II
IMDG-Labels: 8
Marine Pollutant: No

Special precautions for user: Corrosive.
Keep away from foodstuffs, acids and alkalis.

15.Regulatory Information

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

Any existing national regulations on the handling of irritant or corrosive substances must be observed.

National provisions:

Relevant Statutory Instruments

- Carriage of Dangerous Goods by Road Regulations 2007, S.I. 288 of 2007
- Carriage of Dangerous Goods by Road (ADR miscellaneous provisions) Regulations 2007, S.I.289 of 2007
- Carriage of Dangerous Goods by Road Act 1998 (Appointment of Competent Authorities) Order 2007, S.I.290 of 2007
- Carriage of Dangerous Goods by Road Act 1998 (Fees) Regulations 2007, S.I. 291 of 2007
- Chemicals Act 2008, No. 13 of 2008
- ADR 2011
- Safety, Health and Welfare at Work (Chemical Agents) Regulation 2001, SI 619 of 2001

EU Legislation:

Classification (1272/2008/CE):

Classification and labelling according to Regulation (EC) No 1272/2008 – Annex VI and after evaluation of available test data

Skin Corrosion, Category 1A (H314)

Corrosive to metals, Category1 (H290)

Labelling (1272/2008/CE):



Danger

Hazard statements:

H314 Causes severe skin burns and eye damage.

H290 May be corrosive to metals.

Precautionary statements:

- | | |
|-------------------|--|
| P260 | Do not breathe dust or mist. |
| P280 | Wear protective gloves/protective clothing/eye protection/face protection. |
| P301+ P330+ p331 | IF SWALLOWED: rinse mouth. Do NOT induce vomiting. |
| 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. |
| P308 | IF exposed or concerned: |
| P310 | Immediately call a POISON CENTER or a doctor/physician. |

15. Regulatory Information continued

Classification Classification and labelling according with Directives 67/548/EEC and 1999/45/EC



Labelling (2006/121/EC, 1999/45/EC):

Labelling and classification in accordance with the EC Dangerous Preparations Directive (1999/45/EC) and subsequent amendments

C	Corrosive
Contains:	sodium hydroxide
R-phrases	35 Causes severe burns
S-phrases	(01/02) (Keep locked up and out of the reach of children)
26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
37/39	Wear suitable gloves and eye/face protection.
45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for: sodium hydroxide (caustic soda)

16. Other information

PBT-substances:	Persistent, bioaccumulative and toxic substances
DSD:	Dangerous Substance Directive
DPD:	Dangerous Preparation Directive
CLP (EU-GHS):	Classification, labelling and packaging (Globally Harmonised System in Europe)
Met. Corr.:	Substance or mixture corrosive to metals
Skin Corr.:	Skin corrosion

Note:

The information contained in this data sheet is copied from the safety data sheet provided by the manufacturer. The information is given in good faith and to the best of our knowledge but no guarantee, implied or otherwise, is made.

Annex - Exposure Scenario

- Manufacturing of liquid substance (ES1)
- Manufacturing of solid substance (ES2)
- Industrial and professional use (ES3)
- Consumer end use (ES4)

1. Short title of Exposure Scenario

- Manufacturing of liquid substance (ES1)

Sector of use : Industrial uses: Uses of substances as such or in preparations at industrial sites, Manufacture of bulk, large scale chemicals (including petroleum products) (SU 3, SU8)

Process category : Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9)

Environmental release category: Manufacture of substances (ERC1)

Substance: sodium hydroxide (caustic soda) (ES1)

2. Description of activities/process(es) covered in the Exposure Scenario

Only the uses defined in the short title and the use descriptors listed in chapter 1 above are regarded as safe/covered within this Exposure Scenario.
In case of mixtures the other chapters may also contain additional information about further uses that are not safe/covered within this scenario.

3. Operational conditions

Duration and frequency

Workers

Covers daily exposures up to 8 hours (unless stated differently).

Covers use up to: 200 days/year

Environment

Continuous exposure

4.1 Physical form

Liquid substance

4.2 Concentration of substance in the mixture

All concentrations covered.

4.3 Amount used per time or per activity

Not relevant

5. Other operational conditions

Human factors not influenced by risk management

None identified for this scenario.

Environmental factors not influenced by risk management

None identified for this scenario.

6. Risk Management Measures

6.1.1 Occupational measures

Organizational protective measures: Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of the substance and c) to follow the safety procedures instructed by the employer.

Technical protective measures: Replacing, where appropriate, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:

Use closed systems or covering of open containers (e.g. screens). Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.). Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head).

Local exhaust ventilation and/or general ventilation is good practice.

Personal protective measures: If vapors form, respirators must be used. In the event of vapors up to 0,5 % vol. percent, use a filtered respirator with DIN EN 141 B-P2 (color code grey/white) combination filter and with DIN 141 B-P3 combination filter up to 1 % vol. At higher concentrations or under uncertain conditions a respirator with independent air supply must be used. Wearing of permeation resistant gloves with suitable materials for safety gloves is required. Chemical resistant goggles must be worn. If splashes are likely to occur, wear tightly fitting safety goggles, faceshield. Wear suitable protective clothing, aprons, shield and suits. If splashes are likely to occur, wear: Rubber or plastic boots

6.1.2 Consumer related measures

No consumer uses identified.

6.2 Environment related measures

Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such 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 minimised. In general 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.

7. Waste related measures

Liquid waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

8. Prediction of exposure**8.1. Health****Short term exposure:****Workers (inhalation)**

Method: Provided in EU-RAR (2007)*

Short term stationary sample measurement : 0.33 mg/m³**Workers (dermal)**

For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to the substance was not quantified.

Long term exposure:**Workers (inhalation)**

Method: Provided in EU-RAR (2007)*

Stationary Air Sample measurement : 0.14 mg/m³**Workers (dermal)**

For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to the substance was not quantified.

8.2. Environment**PEC**

Air : Not relevant

Freshwater : Not relevant

Effects of NaOH to aquatic organisms are caused by possible pH changes related to OH-ions, as the toxicity of the Na⁺ ion is expected to be insignificant compared to the potential pH effect. If RMMs are implemented no exposure is expected.

Marine water : Not relevant

Sediment : Not relevant

Soil : Not relevant

STP (sewage-treatment plant) : Not relevant

Secondary poisoning : Not relevant

Humans via the environment : Not relevant

Based on the applied RMMs the risk towards humans and the environment is sufficiently controlled (RCR 1).

*EU RAR NaOH (2007). European Union Risk Assessment Report sodium hydroxide. Office for Official Publications of the European Union. Luxembourg. Available via:
http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf

9. Guidance to downstream user

Not relevant

1. Short title of Exposure Scenario**- Manufacturing of solid substance (ES2)**

Sector of use : Industrial uses: Uses of substances as such or in preparations at industrial sites, Manufacture of bulk, large scale chemicals (including petroleum products) (SU 3, SU8)

Process category : Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing) (PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9)

Environmental release category: Manufacture of substances (ERC1)

Substance: sodium hydroxide (caustic soda) (ES2)

2. Description of activities/process(es) covered in the Exposure Scenario

Only the uses defined in the short title and the use descriptors listed in chapter 1 above are regarded as safe/covered within this Exposure Scenario.

In case of mixtures the other chapters may also contain additional information about further uses that are not safe/covered within this scenario.

3. Operational conditions**Duration and frequency****Workers**

Covers daily exposures up to 8 hours (unless stated differently).

Covers use up to: 200 days/year

Environment

Continuous exposure

4.1 Physical form

Solid substance

4.2 Concentration of substance in the mixture

All concentrations covered.

4.3 Amount used per time or per activity

Not relevant

5. Other operational conditions**Human factors not influenced by risk management**

None identified for this scenario.

Environmental factors not influenced by risk management

None identified for this scenario.

6. Risk Management Measures

6.1.1 Occupational measures

Organizational protective measures: Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of the substance and c) to follow the safety procedures instructed by the employer.

Technical protective measures: Replacing, where appropriate, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:

Use closed systems or covering of open containers (e.g. screens). Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.). Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head).

Local exhaust ventilation and/or general ventilation is good practice.

Personal protective measures: If product dust is present, wear an anti-dust mask with at least a P2 filter. Wearing of permeation resistant gloves with suitable materials for safety gloves is required. Chemical resistant goggles must be worn. If splashes are likely to occur, wear tightly fitting safety goggles, faceshield. Wear suitable protective clothing, aprons, shield and suits. If splashes are likely to occur, wear: Rubber or plastic boots

6.1.2 Consumer related measures

No consumer uses identified.

6.2 Environment related measures

Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such 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 minimised. In general 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.

7. Waste related measures

No solid waste occurs. Liquid waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

8. Prediction of exposure

8.1. Health

Short term exposure:

Workers (inhalation)

Method: Provided in EU-RAR (2007)*

Personal air sample measurement: 0.27 mg/m³

Workers (dermal)

For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected.

Therefore, dermal exposure to the substance was not quantified.

Long term exposure:

Workers (inhalation)

Method: Provided in EU-RAR (2007)*

Personal air sample measurement: 0.27 mg/m³

Workers (dermal)

For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected.

Therefore, dermal exposure to the substance was not quantified.

8.2. Environment**PEC**

Air : Not relevant

Freshwater : Not relevant

Effects of NaOH to aquatic organisms are caused by possible pH changes related to OH-ions, as the toxicity of the Na+ ion is expected to be insignificant compared to the potential pH effect. If RMMs are implemented no exposure is expected.

Marine water : 0 Not relevant

Sediment : Not relevant

Soil : Not relevant

STP (sewage-treatment plant) : Not relevant

Secondary poisoning : Not relevant

Humans via the environment : Not relevant

Based on the applied RMMs the risk towards humans and the environment is sufficiently controlled (RCR 1).

*EU RAR NaOH (2007). European Union Risk Assessment Report sodium hydroxide. Office for Official Publications of the European Union. Luxembourg. Available via:

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

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

9. Guidance to downstream user

Not relevant

1. Short title of Exposure Scenario**- Industrial and professional use (ES3)**

Sector of use :	Used for different purposes in a variety of sectors and categories. (SU 1-24)
Product category :	Used for different purposes in a variety of sectors and categories. (PC 0-40)
Process category :	Use in closed process, no likelihood of exposure, Use in closed, continuous process with occasional controlled exposure, Use in closed batch process (synthesis or formulation), Use in batch and other process (synthesis) where opportunity for exposure arises, Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact), Industrial spraying, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities, Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities, Transfer of substance or preparation into small containers (dedicated filling line, including weighing), Roller application or brushing, Non industrial spraying, Treatment of articles by dipping and pouring, Production of preparations or articles by tableting, compression, extrusion, pelletisation, Use as laboratory reagent, Hand-mixing with intimate contact and only PPE available, Open processing and transfer operations with minerals/ metals at elevated temperature, High (mechanical) energy work-up of substances bound in materials and/ or articles, The categories mentioned above are assumed to be the most important ones but other categories could also be possible. (PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24, -)

Environmental release category:

Manufacture of substances, Formulation of preparations, Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use resulting in manufacture of another substance (use of intermediates), Industrial use of reactive processing aids, Industrial use of substances in closed systems, Wide dispersive indoor use of processing aids in open systems, Wide dispersive indoor use of reactive substances in open systems, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive indoor use of substances in closed systems, The categories mentioned above are assumed to be the most important ones but other categories could also be possible. (ERC1, ERC2, ERC4, ERC6a, ERC6b, ERC7, ERC8a, ERC8b, ERC8d, ERC9a, -)

Substance: sodium hydroxide (caustic soda) (ES3)

2. Description of activities/process(es) covered in the Exposure Scenario

Only the uses defined in the short title and the use descriptors listed in chapter 1 above are regarded as safe/covered within this Exposure Scenario. In case of mixtures the other chapters may also contain additional information about further uses that are not safe/covered within this scenario.

3. Operational conditions

Duration and frequency

Workers

Covers daily exposures up to 8 hours (unless stated differently).

Covers use up to: 200 days/year

Environment

Continuous exposure

4.1 Physical form

Solid and liquid applications, Dustiness: Low

4.2 Concentration of substance in the mixture

All concentrations covered.

4.3 Amount used per time or per activity

Not relevant

5. Other operational conditions

Human factors not influenced by risk management

None identified for this scenario.

Environmental factors not influenced by risk management

None identified for this scenario.

6. Risk Management Measures

6.1.1 Occupational measures

Contributing Scenario

Worker (Industrial) - For products containing the solid or liquid substance at concentrations > 2%:

Organizational protective measures: Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of the substance and c) to follow the safety procedures instructed by the employer.

Technical protective measures: Replacing, where appropriate, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:

Use closed systems or covering of open containers (e.g. screens). Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.). Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head).

Local exhaust ventilation and/or general ventilation is good practice.

Personal protective measures: If product dust is present, wear an anti-dust mask with at least a P2 filter. If vapors form, respirators must be used. At higher concentrations or under uncertain conditions a respirator with independent air supply must be used. Wearing of permeation resistant gloves with suitable materials for safety gloves is required. If splashes are likely to occur, wear tightly fitting safety goggles, faceshield. Wear suitable protective clothing, aprons, shield and suits. If splashes are likely to occur, wear: Rubber or plastic boots

Contributing Scenario

Worker (Professional) - For products containing the solid or liquid substance at concentrations > 2%:

Organizational protective measures: Where possible for professional use, use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.

Personal protective measures: If product dust is present, wear an anti-dust mask with at least a P2 filter. If vapors form, respirators must be used. At higher concentrations or under uncertain conditions a respirator with independent air supply must be used. Wearing of permeation resistant gloves with suitable materials for safety gloves is required. These are butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: > 480 min OR nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min.

If splashes are likely to occur, wear tightly fitting safety goggles, faceshield. Wear suitable protective clothing, aprons, shield and suits. If splashes are likely to occur, wear: Rubber or plastic boots

6.1.2 Consumer related measures

No consumer uses identified.

6.2 Environment related measures

Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such 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 minimised. In general 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.

7. Waste related measures

No solid waste occurs.

Liquid waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

8. Prediction of exposure

8.1. Health

Short term exposure:

Workers (inhalation)

Method: Provided in EU-RAR (2007)*

Based on measurements in the pulp and paper industry, de-inking waste paper, aluminium, textile and chemical industry and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL of 1 mg/m³.

Workers (dermal)

For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to the substance was not quantified.

Long term exposure:**Workers (inhalation)**

Method: Provided in EU-RAR (2007)*

Based on measurements in the pulp and paper industry, de-inking waste paper, aluminium, textile and chemical industry and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL of 1 mg/m³.

Method: In addition to the measured exposure data the ECETOC TRA tool has been used to estimate the inhalation exposure.

Liquid substance

PROC 1 : 0.17 mg/m³

PROC 2 : 0.17 mg/m³

PROC 3 : 0.17 mg/m³

PROC 4 : 0.17 mg/m³

PROC 5 : 0.17 mg/m³

PROC 7 : 0.17 mg/m³

PROC 8a : 0.17 mg/m³

PROC 8b : 0.17 mg/m³

PROC 9 : 0.17 mg/m³

PROC 10 : 0.17 mg/m³

PROC 11 : 0.17 mg/m³

PROC 13 : 0.17 mg/m³

PROC 14 : 0.17 mg/m³

PROC 15 : 0.17 mg/m³

PROC 19 : 0.17 mg/m³

PROC 23 : 0.17 mg/m³

PROC 24 : 0.17 mg/m³

Solid substance

PROC 1 : 0.01 mg/m³

PROC 2 : 0.01 mg/m³

PROC 3 : 0.1 mg/m³

PROC 4 : 0.2 mg/m³

(with LEV (90% efficiency))

PROC 5 : 0.2 mg/m³

(with LEV (90% efficiency))

PROC 8a : 0.5 mg/m³

PROC 8b : 0.5 mg/m³

PROC 9 : 0.5 mg/m³

PROC 10 : 0.5 mg/m³

PROC 11 : 0.2 mg/m³

(with LEV (90% efficiency))

PROC 13 : 0.5 mg/m³

PROC 14 : 0.2 mg/m³

(with LEV (90% efficiency))

PROC 15 : 0.1 mg/m³

PROC 19 : 0.5 mg/m³

PROC 23 : 0.4 mg/m³

(with LEV (90% efficiency) and RPE (90% efficiency))

PROC 24 : 0.5 mg/m³

(with LEV (90% efficiency) and RPE (90% efficiency))

Workers (dermal)

For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore, dermal exposure to the substance was not quantified.

8.2. Environment**PEC**

Air : Not relevant

Freshwater : Not relevant

Effects of NaOH to aquatic organisms are caused by possible pH changes related to OH-ions, as the toxicity of the Na+ ion is expected to be insignificant compared to the potential pH effect. If RMMs are implemented no exposure is expected.

Marine water : Not relevant

Sediment : Not relevant

Soil : Not relevant

STP (sewage-treatment plant) : Not relevant

Secondary poisoning : Not relevant

Humans via the environment : Not relevant

Based on the applied RMMs the risk towards humans and the environment is sufficiently controlled (RCR 1).

*EU RAR NaOH (2007). European Union Risk Assessment Report sodium hydroxide. Office for Official Publications of the European Union. Luxembourg. Available via:
http://ecb.jrc.ec.europa.eu/DOCUMENTS/Existing-Chemicals/RISK_ASSESSMENT/REPORT/sodiumhydroxidereport416.pdf

9. Guidance to downstream user

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in sections 1-8. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

1. Short title of Exposure Scenario**- Consumer end use (ES4)**

Sector of use : Consumer uses: Private households (= general public = consumers) (SU 21)

Product category : Used for different purposes in a variety of sectors and categories. (PC 0-40)

Environmental release

category

: Wide dispersive indoor use of processing aids in open systems, Wide dispersive indoor use of reactive substances in open systems, Wide dispersive outdoor use of processing aids in open systems, Wide dispersive indoor use of substances in closed systems, The categories mentioned above are assumed to be the most important ones but other categories could also be possible. (ERC8a, ERC8b, ERC8d, ERC9a, -)

Substance: sodium hydroxide (caustic soda) (ES4)

2. Description of activities/process(es) covered in the Exposure Scenario

Only the uses defined in the short title and the use descriptors listed in chapter 1 above are regarded as safe/covered within this Exposure Scenario. In case of mixtures the other chapters may also contain additional information about further uses that are not safe/covered within this scenario.

3. Operational conditions**Duration and frequency****Consumers**

5 minutes/event

Covers use up to: 1 event(s)/day

Environment

Continuous exposure

4.1 Physical form

Solid and liquid applications, Dustiness: Low

4.2 Concentration of substance in the mixture

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

4.3 Amount used per time or per activity

Covers use up to 120 g/activity

5. Other operational conditions**Human factors not influenced by risk management**

None identified for this scenario.

Environmental factors not influenced by risk management

None identified for this scenario.

6. Risk Management Measures**6.1.1 Occupational measures**

Not applicable.

6.1.2 Consumer related measures

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 the substance 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.

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, it should be advisable to use these products in the absence of children or other potential sensitive groups. To prevent improper use of the substance, instructions for use should contain a warning against dangerous mixtures.

Do not apply product into ventilator openings or slots. For products containing the solid or liquid substance at concentrations > 2%: If product dust is present, wear an anti-dust mask with at least a P2 filter. If vapors form, respirators must be used. Wearing of permeation resistant gloves with suitable materials for safety gloves is required. If splashes are likely to occur, wear tightly fitting safety goggles, faceshield.

6.2 Environment related measures

Risk management measures related to the environment aim to avoid discharging NaOH solutions into municipal wastewater or to surface water, in case such 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 minimised. In general 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.

7. Waste related measures

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, trash as regular municipal waste. Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility). Recovery from alkaline batteries includes emptying the electrolyte, collection and neutralisation with sulphuric acid and carbon dioxide.

8. Prediction of exposure**8.1. Health****Short term exposure:****Workers (inhalation)**

Method: The Consexpo model has been used to estimate consumer exposures unless otherwise indicated.

Most critical use (spray oven cleaner) : < 1.6 mg/m³

Workers (dermal)

Not applicable.

Long term exposure:

The substance is not expected to be systemically available in the body under normal handling and use conditions and therefore systemic effects after dermal or inhalation exposure are not expected to occur.

8.2. Environment**PEC**

Air : Not relevant

Freshwater : Not relevant

Consumer uses are related to already diluted products which will further be neutralized quickly in the sewer, well before reaching a STP or surface water.

Marine water : Not relevant

Sediment : Not relevant

Soil : Not relevant

STP (sewage-treatment plant) : Not relevant

Secondary poisoning : Not relevant

Humans via the environment : Not relevant

Based on the applied RMMs the risk towards humans and the environment is sufficiently controlled (RCR 1).

9. Guidance to downstream user

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in sections 1-8. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA

Revision History

Changes	Responsible	Date
Rev.1: Sections 1,7,8,10,11,12,14,&15 updated. Exposure Scenarios added.	M.Cronin	21 st Dec.11