

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

Version 12.0

Print Date 2021/02/11

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MSDS code: MCSS550

SECTION 1: Identification of the substance/mixture and of the company/undertaking**1.1. Product identifier**Trade name : CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**1.2. Relevant identified uses of the substance or mixture and uses advised against**

Use of the Substance/Mixture : Identified use: See table in front of appendix for a complete overview of identified uses.

Uses advised against : At this moment we have not identified any uses advised against

1.3. Details of the supplier of the safety data sheet

Company : Brenntag Chemicals Distribution
(Ireland) Limited
Unit 405, Grants Drive, Greenogue Business Park
IE DUBLIN 24 Rathcoole

Telephone : 00 353 (0)1 4013500
Telefax : 00 353 (0)1 4013501
E-mail address : msds@brenntag.ie

1.4. Emergency telephone numberEmergency telephone number : EMERGENCY ONLY TELEPHONE NUMBER:
00 32 (0) 3 575 55 55 (SGS Emergency Response Services -
24 hours)**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No 1272/2008**

REGULATION (EC) No 1272/2008			
Hazard class	Hazard category	Target Organs	Hazard statements
Corrosive to metals	Category 1	---	H290
Skin corrosion	Category 1A	---	H314
Serious eye damage	Category 1	---	H318


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For the full text of the H-Statements mentioned in this Section, see Section 16.

Most important adverse effects

Human Health	:	See section 11 for toxicological information.
Physical and chemical hazards	:	See section 9/10 for physicochemical information.
Potential environmental effects	:	See section 12 for environmental information.

2.2. Label elements**Labelling according to Regulation (EC) No 1272/2008**

Hazard symbols	:	
Signal word	:	Danger
Hazard statements	:	H290 May be corrosive to metals. H314 Causes severe skin burns and eye damage.
Precautionary statements	:	
Prevention	:	P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response	:	P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower. P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor. P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P390 Absorb spillage to prevent material damage.

Hazardous components which must be listed on the label:

- sodium hydroxide

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For Results of PBT and vPvB assessment see section 12.5.

SECTION 3: Composition/information on ingredients**3.2. Mixtures**

Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)	
		Hazard class / Hazard category	Hazard statements
sodium hydroxide			
Index-No. : 011-002-00-6	$\geq 5 - \leq 50$	Met. Corr.1	H290
CAS-No. : 1310-73-2		Skin Corr.1A	H314
EC-No. : 215-185-5		Eye Dam.1	H318
EU REACH-Reg. No. : 01-2119457892-27-xxxx			

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures**4.1. Description of first aid measures**

- General advice : Take off all contaminated clothing immediately.
- If inhaled : In case of accident by inhalation: remove casualty to fresh air and keep at rest. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.
- In case of skin contact : Call a physician immediately. Wash off immediately with soap and plenty of water.
- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.
- If swallowed : Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately.

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

- Symptoms : See Section 11 for more detailed information on health effects and symptoms.

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||| Effects : Extremely corrosive and destructive to tissue. If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach. See Section 11 for more detailed information on health effects and symptoms.

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

||| Treatment : Treat symptomatically.

SECTION 5: Firefighting measures**5.1. Extinguishing media**

||| Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
 ||| Unsuitable extinguishing media : High volume water jet

5.2. Special hazards arising from the substance or mixture

||| Specific hazards during firefighting : Incomplete combustion may form toxic pyrolysis products.
 ||| Hazardous combustion products : The formation of caustic fumes is possible.

5.3. Advice for firefighters

||| Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Wear appropriate body protection (full protective suit)
 ||| Specific extinguishing methods : Control smoke with water spray.
 ||| Further advice : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

||| Personal precautions : Keep away unprotected persons. Use personal protective equipment. Ensure adequate ventilation. Avoid contact with the skin and the eyes. Do not breathe vapours or spray mist.

6.2. Environmental precautions

||| Environmental precautions : Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. If material reaches soil inform authorities responsible for such cases.

6.3. Methods and materials for containment and cleaning up

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Methods and materials for containment and cleaning up : Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal.
: Use mechanical handling equipment. Keep in suitable, closed containers for disposal.

Further information : Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

See Section 1 for emergency contact information.
See Section 8 for information on personal protective equipment.
See Section 13 for waste treatment information.

SECTION 7: Handling and storage**7.1. Precautions for safe handling**

Advice on safe handling : Keep container tightly closed. Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Use respirator with appropriate filter if vapours or aerosol are released. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.

Hygiene measures : Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store in original container. Suitable materials for containers: Stainless steel; polyethylene; Polypropylene; Polyvinylchloride; Unsuitable materials for containers: Aluminium; Zinc; Copper

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Further information on storage conditions : Keep tightly closed in a dry and cool place. Keep in a well-ventilated place.

Advice on common storage : Keep away from food, drink and animal feedingstuffs.

Suitable packaging materials : Stainless steel, Polyethylene, Polypropylene, Polyvinylchloride

Unsuitable packaging materials : , Aluminium, Zinc, Copper

7.3. Specific end use(s)

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Specific use(s) : No information available.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Component:	sodium hydroxide	CAS-No. 1310-73-2
Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)		

DNEL	Workers, Long-term - local effects, Inhalation	: 1.0 mg/m3
DNEL	Consumers, Long-term - local effects, Inhalation	: 1.0 mg/m3

Predicted No Effect Concentration (PNEC)

No PNEC value was derived. :

Other Occupational Exposure Limit Values

UK. EH40 Workplace Exposure Limits (WELs), as amended, Short Term Exposure Limit (STEL):	2 mg/m3, (15 minutes)
ELV (IE), Short Term Exposure Limit (STEL):	2 mg/m3, (15 minutes)

8.2. Exposure controls

Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment

Respiratory protection

Advice : In case of brief exposure or low pollution use breathing filter apparatus.
Respiratory protection complying with EN 141.
In case of intensive or longer exposure use self-contained breathing apparatus.

Hand protection

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||| Advice : Wear suitable gloves.
The glove material has to be impermeable and resistant to the product / the substance / the preparation.
Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves should be replaced at first signs of wear.

||| Material : Natural Rubber
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

||| Material : polychloroprene
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

||| Material : Nitrile rubber
Break through time : ≥ 8 h
Glove thickness : 0.35 mm

||| Material : butyl-rubber
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

||| Material : Fluorinated rubber
Break through time : ≥ 8 h
Glove thickness : 0.4 mm

||| Material : Polyvinylchloride
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Eye protection

||| Advice : Safety goggles
Face-shield

Skin and body protection

||| Advice : Impervious clothing
Chemical resistant apron

Environmental exposure controls

||| General advice : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.
If the product contaminates rivers and lakes or drains inform respective authorities.
If material reaches soil inform authorities responsible for such

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cases.

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties**

	Form	:	liquid
	Colour	:	colourless
	Odour	:	odourless
	Odour Threshold	:	Not applicable
	pH	:	14 - 15 (100 %) ((calculated)) (formulated product)
	Melting point/range	:	12 °C 50% solution
	Boiling point/boiling range	:	145 °C 50% solution
	Flash point	:	Not applicable
	Evaporation rate	:	Not applicable
	Flammability (solid, gas)	:	Not applicable
	Upper explosion limit	:	Not applicable
	Lower explosion limit	:	Not applicable
	Vapour pressure	:	no data available
	Relative vapour density	:	no data available
	Density	:	ca. 1.525 g/cm ³ (20 °C) 50% solution
	Water solubility	:	1090 g/l (20 °C)
	Partition coefficient: n-octanol/water	:	no data available
	Auto-ignition temperature	:	no data available
	Thermal decomposition	:	no data available
	Viscosity, dynamic	:	79 mPa.s (20 °C) 50% solution
	Explosivity	:	Product is not explosive.
	Oxidizing properties	:	no data available

9.2. Other information

	Corrosion to metals	:	Corrosive to metals
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CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**SECTION 10: Stability and reactivity****10.1. Reactivity**

|| Advice : No decomposition if stored and applied as directed.

10.2. Chemical stability

|| Advice : Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

|| Hazardous reactions : Corrosive in contact with metals Gives off hydrogen by reaction with base metals (zinc, aluminium). Reacts exothermically with water. Reacts exothermic with acids.

10.4. Conditions to avoid

|| Conditions to avoid : Heat, flames and sparks.
 || Thermal decomposition : no data available

10.5. Incompatible materials

|| Materials to avoid : Materials to avoid: Acids, Light metals, Alcohols, Halogenated hydrocarbon

10.6. Hazardous decomposition products

|| Hazardous decomposition products : hydrogen

SECTION 11: Toxicological information**11.1. Information on toxicological effects****Data for the product****Acute toxicity****Oral**

no data available

Inhalation

no data available

Dermal

|| For this mixture is no data available.
 Please find this information in the listing of the component/components below in this section.

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**Irritation****Skin**

no data available

Eyes

no data available

Sensitisation

no data available

CMR effects**CMR Properties**

Carcinogenicity : no data available

Mutagenicity : no data available

Reproductive toxicity : no data available

Specific Target Organ Toxicity**Single exposure**

no data available

Repeated exposure

no data available

Other toxic properties**Repeated dose toxicity**

no data available

Aspiration hazard

no data available

Component:**sodium hydroxide****CAS-No. 1310-73-2****Acute toxicity****Oral****||**

No valid data available.

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**Inhalation**

|| No valid data available.

Dermal

|| No valid data available.

Dermal

|| No valid data available.

Irritation**Skin**

|| Result : Very corrosive (Rabbit) (No guideline followed)
Corrosive

Eyes

|| Result : corrosive effects (Rabbit; Test substance: 10% solution) (OECD Test Guideline 405) Equivalent or similar to OECD Guideline

Sensitisation

|| Result : not sensitizing (human) (No guideline followed) Patch test on human volunteers did not demonstrate sensitisation properties.

CMR effects**CMR Properties**

|| Carcinogenicity : No experimental references for cancerogenity available.
|| Mutagenicity : In vitro tests did not show mutagenic effects
In vivo tests did not show mutagenic effects
|| Teratogenicity : no data available
|| Reproductive toxicity : Not expected to impair fertility.

Specific Target Organ Toxicity**Single exposure**

|| Remarks : The substance or mixture is not classified as specific target organ toxicant, single exposure.

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**Repeated exposure**

|| Remarks : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Other toxic properties**Aspiration hazard**

|| Not applicable,

SECTION 12: Ecological information**12.1. Toxicity****Data for the product****Acute toxicity****Short-term (acute) aquatic hazard**

Result : The product is not classified as dangerous for the environment.

Component: sodium hydroxide CAS-No. 1310-73-2

Acute toxicity**Fish**

|| LC50 : 125 mg/l (Gambusia affinis; 96 h) (No guideline followed)
 || LC50 : 145 mg/l (Poecilia reticulata; 24 h) (No guideline followed)

Toxicity to daphnia and other aquatic invertebrates

|| EC50 : 40.4 mg/l (Ceriodaphnia (water flea); 48 h) (No guideline followed)

algae

|| : no data available

Bacteria

|| EC50 : 22 mg/l (Photobacterium phosphoreum; 15 min) (EPS 1/RM/24)

12.2. Persistence and degradability

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Component:	sodium hydroxide	CAS-No. 1310-73-2
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Persistence and degradability**Persistence**

|||Result : no data available

Biodegradability

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

12.3. Bioaccumulative potential

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Bioaccumulation

|||Result : Does not bioaccumulate.

12.4. Mobility in soil

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Mobility

|| Water : The product is mobile in water environment.

12.5. Results of PBT and vPvB assessment

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Results of PBT and vPvB assessment

|||Result : The PBT or vPvB criteria of Annex XIII to the REACH Regulation does not apply to inorganic substances.

12.6. Other adverse effects

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Additional ecological information

|||Result : Harmful effects to aquatic organisms due to pH-shift. Neutralization is normally necessary before waste water is discharged into water treatment plants. Do not flush into surface water or sanitary sewer system.

SECTION 13: Disposal considerations

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**13.1. Waste treatment methods**

Product	: Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.
Contaminated packaging	: Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. If recycling is not practicable, dispose of in compliance with local regulations.
European Waste Catalogue Number	: No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: Transport information**14.1. UN number**

1824

14.2. UN proper shipping name

ADR	: SODIUM HYDROXIDE SOLUTION
RID	: SODIUM HYDROXIDE SOLUTION
IMDG	: SODIUM HYDROXIDE SOLUTION

14.3. Transport hazard class(es)

ADR-Class (Labels; Classification Code; Hazard Identification Number; Tunnel restriction code)	: 8 8; C5; 80; (E)
RID-Class (Labels; Classification Code; Hazard Identification Number)	: 8 8; C5; 80
IMDG-Class (Labels; EmS)	: 8 8; F-A, S-B

14.4. Packaging group

ADR	: II
RID	: II
IMDG	: II

14.5. Environmental hazards

Environmentally hazardous according to ADR	: no
Environmentally hazardous according to RID	: no

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|| Marine Pollutant according to IMDG-Code : no

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****Data for the product**

|| EU. REACH, Annex XVII, : Point Nos.: , 3; Listed
Marketing and Use
Restrictions (Regulation
1907/2006/EC)

|| EU. Directive : ; The substance/mixture does not fall under this legislation.
2012/18/EU (SEVESO
III) Annex I

Other regulations : Occupational restrictions: Take note of Dir 92/85/EEC on the safety and health of pregnant workers at work and of Dir 94/33/EC on the protection of young people at work.

Component:	sodium hydroxide	CAS-No. 1310-73-2
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|| EU. Regulation EU No. : ; The substance/mixture does not fall under this legislation.
649/2012 concerning the
export and import of
dangerous chemicals

EU. REACH, Annex XVII, : ; The substance/mixture does not fall under this legislation.
Marketing and Use
Restrictions (Regulation
1907/2006/EC)

|| EU. Regulation No : EC Number: , 215-185-5; Listed
1451/2007 [Biocides],
Annex I, OJ (L 325)

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EU. Regulation No. 1223/2009 on cosmetic products, Annex III: List of Restricted Substances in Cosmetic Products : Maximum concentration in ready for use preparation: 2 %; Hair straightener: General use; See the text of the regulation for applicable exceptions or provisions.

pH < 12,7.; pH adjuster for depilatories; See the text of the regulation for applicable exceptions or provisions.

Maximum concentration in ready for use preparation: 4.5 %; Hair straightener: Professional use; See the text of the regulation for applicable exceptions or provisions.

pH < 11.; Uses as pH adjuster other than for depilatories; See the text of the regulation for applicable exceptions or provisions.

Maximum concentration in ready for use preparation: 5 %; Nail cuticle solvent; See the text of the regulation for applicable exceptions or provisions.

Notification status sodium hydroxide:

Regulatory List

AICS

DSL

EINECS

ENCS (JP)

IECSC

ISHL (JP)

KECI (KR)

KECI (KR)

NZIOC

PICCS (PH)

TSCA

Notification

YES

YES

YES

YES

YES

YES

YES

YES

YES

YES

YES

Notification number

215-185-5

(1)-410

(1)-410

97-1-136

KE-31487

HSR001547

15.2. Chemical safety assessment

|| A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information**Full text of H-Statements referred to under sections 2 and 3.**

H290

May be corrosive to metals.

H314

Causes severe skin burns and eye damage.

H318

Causes serious eye damage.

Abbreviations and Acronyms**BCF**

bioconcentration factor

BOD

biochemical oxygen demand

CAS

Chemical Abstracts Service

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CLP	Classification, Labelling and Packaging
CMR	carcinogenic, mutagenic or toxic to reproduction
COD	chemical oxygen demand
DNEL	derived no-effect level
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
PBT	persistent, bioaccumulative and toxic
REACH Auth. No.:	REACH Authorisation Number
REACH AuthAppC. No.	REACH Authorisation Application Consultation Number
PNEC	predicted no-effect concentration
STOT	specific target organ toxicity
SVHC	substance of very high concern
UVCB	substance of unknown or variable composition, complex reaction products or biological materials
vPvB	very persistent and very bioaccumulative

Further information

- Key literature references and sources for data : Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet.
- Methods used for product classification : The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.
- Hints for trainings : The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.

|| Other information : || The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with

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|| regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship.

The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

|| Indicates updated section.

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No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance - liquid	3	8	NA	1, 2, 3, 4, 8a, 8b, 9	1	NA	ES035
2	Manufacture of substance - solid	3	8	NA	1, 2, 3, 4, 8a, 8b, 9	1	NA	ES057
3	Industrial use	3	10	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 15, 19, 23, 24	2, 4, 6a, 6b, 7	NA	ES065
4	Professional use	22	10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 19, 23, 24	8a, 8b, 8d, 9a	NA	ES067
5	Consumer use	21	NA	20, 35, 39	NA	8a, 8b, 8d, 9a	NA	ES075

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1. Short title of Exposure Scenario 1: Manufacture of substance - liquid

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	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.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	200 days/year
	Frequency of use	8 hours/day
Technical conditions and measures to control dispersion	Application Area	Industrial use
	Use closed systems or covering of open containers (e.g. screens)	

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from source towards the worker	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)	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Industrial use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. 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 and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min wear tightly fitting safety goggles, face-shield Wear suitable protective clothing, aprons, shield and suits If splashes are likely to occur: Rubber or plastic boots	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to 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. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9	Modeled exposure data, very low vapour pressure, Without Local Exhaust Ventilation, without respiratory protection	Inhalation worker exposure	0.17mg/m ³	0.17
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b,	Measured exposure data, worst-case	Worker - inhalative, short-term - local	0.33mg/m ³	0.33

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

PROC9				
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9	Measured exposure data, worst-case	Worker - inhalative, long-term - local	0.14mg/m ³	0.14

This substance is corrosive. 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. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA. Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

1. Short title of Exposure Scenario 2: Manufacture of substance - solid

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	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.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	200 days/year
	Frequency of use	8 hours/day
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
	<p>Use closed systems or covering of open containers (e.g. screens)</p> <p>Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)</p> <p>Use of pliers, grip arms with long handles with manual use to avoid direct</p>	

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

	contact and exposure by splashes (no working over one's head)	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Industrial use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. 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 and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min wear tightly fitting safety goggles, face-shield Wear suitable protective clothing, aprons, shield and suits If splashes are likely to occur: Rubber or plastic boots	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to 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. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC9: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.01mg/m ³	0.01
PROC3, PROC9	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.1mg/m ³	0.1
PROC4, PROC8a	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.5mg/m ³	0.5
PROC9	Measured exposure data,	Worker - inhalative,	0.26mg/m ³	0.26

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

worst-case

short-term - local

This substance is corrosive. 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. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA.

Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

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1. Short title of Exposure Scenario 3: Industrial use

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC15: Use as laboratory reagent</p> <p>PROC19: Hand-mixing with intimate contact and only PPE available</p> <p>PROC23: Open processing and transfer operations with minerals/ metals at elevated temperature</p> <p>PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles</p>
Environmental Release Categories	<p>ERC2: Formulation of preparations</p> <p>ERC4: Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)</p> <p>ERC6b: Industrial use of reactive processing aids</p> <p>ERC7: Industrial use of substances in closed systems</p>
Activity	Because sodium hydroxide has so many uses so widely it can potentially be used in all sectors of end use described by the use descriptor system (SU1-24), NaOH is used for different purposes in a variety of industrial sectors

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC6a, ERC6b, ERC7

Activity	The environmental release categories mentioned above are assumed to be the most important ones but industrial environmental release categories could also be possible (ERC 1-12).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and	Application Area	Industrial use
	Water	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

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releases to soil Organizational measures to prevent/limit release from the site		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.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC22, PROC23, PROC24		
Activity	The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC1 -27).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Concentration of the Substance in Mixture/Article	Concentration of substance in product: > 2%
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	200 days/year
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
	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)	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Industrial use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. 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 and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: 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, face-shield Wear suitable protective clothing, aprons, shield and suits Rubber or plastic boots	

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/MWTPs. If emitted to 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. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24	liquid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.17mg/m ³	---
PROC1, PROC2	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.01mg/m ³	---
PROC3, PROC15	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.1mg/m ³	---
PROC4, PROC5, PROC14	solid, no respiratory protection (RPE), With Local Exhaust Ventilation	Worker - inhalative, short-term - local	0.2mg/m ³	---
PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC19	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.5mg/m ³	---
PROC23	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.4mg/m ³	---
PROC24	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.5mg/m ³	---

This substance is corrosive. 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. Dermal exposure

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to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA. Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

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1. Short title of Exposure Scenario 4: Professional use

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC11: Non industrial spraying</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC15: Use as laboratory reagent</p> <p>PROC19: Hand-mixing with intimate contact and only PPE available</p> <p>PROC23: Open processing and transfer operations with minerals/ metals at elevated temperature</p> <p>PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles</p>
Environmental Release Categories	<p>ERC8a: Wide dispersive indoor use of processing aids in open systems</p> <p>ERC8b: Wide dispersive indoor use of reactive substances in open systems</p> <p>ERC8d: Wide dispersive outdoor use of processing aids in open systems</p> <p>ERC9a: Wide dispersive indoor use of substances in closed systems</p>

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC9a

Activity	The environmental release categories mentioned above are assumed to be the most important ones but industrial environmental release categories could also be possible (ERC 1-12).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Professional use
	Water	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.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.

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Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC22, PROC23, PROC24		
Activity	The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC1 -27).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Concentration of the Substance in Mixture/Article	Concentration of substance in product: > 2%
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	200 days/year
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Professional use
	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) Where possible use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Professional use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. 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 and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Professional use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: 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, face-shield Wear suitable protective clothing, aprons, shield and suits Rubber or plastic boots	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to 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. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24	liquid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.17mg/m ³	---
PROC1, PROC2	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.01mg/m ³	---
PROC3, PROC15	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.1mg/m ³	---
PROC4, PROC5, PROC11, PROC14	solid, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.2mg/m ³	---
PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC19	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.5mg/m ³	---
PROC23	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.4mg/m ³	---
PROC24	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.5mg/m ³	---

This substance is corrosive. 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. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

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The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA. Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**1. Short title of Exposure Scenario 5: Consumer use**

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC20: Products such as pH-regulators, flocculants, precipitants, neutralization agents PC35: Washing and cleaning products PC39: Cosmetics, personal care products
Environmental Release Categories	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
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC9a

NaOH is used by consumer at home for drain and pipe cleaning, wood treatment and it also used to make soap at home, NaOH is also used in batteries and oven-cleaner pads.

Activity	The environmental release categories mentioned above are assumed to be the most important ones but other wide dispersive environmental release categories could also be possible (ERC8 - 11b).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	There are no specific risk management measures related to environment.	
Conditions and measures related to external treatment of waste for disposal	Disposal methods	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 of the substance from alkaline batteries includes emptying the electrolyte, collection and neutralization.

2.2 Contributing scenario controlling consumer exposure for: PC20, PC35, PC39

Activity	Sodium hydroxide can be used in many different chemical product categories(PC): PC20, 35, 39 (neutralization agents, cleaning products, cosmetics, personal care products)., NaOH can also be used in other PCs in low concentrations e.g. PC3 (up to 0.01%). PC8 (up to 0.1%).PC28 and PC31 (up to 0.002%) but it can be used also in the remaining product categories (PC 0-40)., The other PCs are not explicitly considered in this exposure scenario.	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Conditions and measures related		It is required to use resistant labelling-package to

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	<p>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.</p> <p>It is advisable to deliver only in very viscous preparations.</p> <p>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.</p> <p>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.</p> <p>Do not apply product into ventilator openings or slots.</p> <p>Keep out of the reach of children.</p>
	Consumer Measures	<p>In case of dust or aerosol formation: use respiratory protection with approved filter (P2)</p> <p>Wear impervious chemical resistant protective gloves.</p> <p>If splashes are likely to occur: wear tightly fitting safety goggles, face-shield</p>

3. Exposure estimation and reference to its source

Environment

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

Consumers

PC39, PC20, PC35: ConsExpo and SrayExpo

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC20, PC35, PC39	Assessed only for the most critical use, (use of the substance in a spray oven cleaner)	consumer inhalation, acute - local	0.3 - 1.6mg/m ³	< 1

The calculated short-term exposure is slightly higher than the long term DNEL for inhalation, but smaller than the short term occupational exposure limit. The substance will be rapidly neutralised as a result of its reaction with CO₂ (or other acids). Consumer exposure to the substance in batteries is zero because batteries are sealed articles with a long service life maintenance.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in

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question are covered by the PCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ConsEXpo software.

Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).