

*SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006***Caustic Soda 5 - 50% (11-106°TW)**

Version 7.0

Print Date 2013/07/26

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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 5 - 50% (11-106°TW)
Substance name : sodium hydroxide
Index-No. : 011-002-00-6
CAS-No. : 1310-73-2
EC-No. : 215-185-5
Registration number : 01-2119457892-27-xxxx

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 UK & Ireland
Albion House, Rawdon Park
GB LS19 7XX Leeds Yeadon
Telephone : +44 (0) 113 3879 200
Telefax : +44 (0) 113 3879 280
E-mail address : msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number : Emergency only telephone number (open 24 hours):
+44 (0) 1865 407333 (N.C.E.C. Culham)

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

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

Classification according to EU Directives 67/548/EEC or 1999/45/EC

Directive 67/548/EEC or 1999/45/EC	
Hazard symbol / Category of danger	Risk phrases
Corrosive (C)	R35


For the full text of the R-phrases 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 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): 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
P310 IF exposed or concerned: Immediately call a POISON CENTER or doctor/ physician.

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Hazardous components which must be listed on the label:

- sodium hydroxide

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

Section 3: Composition/information on ingredients

3.1. Substances

Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)		Classification (67/548/EEC)
		Hazard class / Hazard category	Hazard statements	
sodium hydroxide				
Index-No. : 011-002-00-6	>= 5 - <= 50	Met. Corr.1	H290	Corrosive; C; R35
CAS-No. : 1310-73-2		Skin Corr.1A	H314	
EC-No. : 215-185-5				
Registration : 01-2119457892-27-xxxx				

For the full text of the R-phrases mentioned in this Section, see Section 16.

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 : Wash off immediately with plenty of water for at least 15 minutes. Immediate medical treatment is necessary as untreated wounds from corrosion of the skin heal slowly and with difficulty.
- 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 : Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately. Rinse

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mouth with water.
Give small amounts of water to drink.

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

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

Effects : 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. No further information available.

Section 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : The product itself does not burn. 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 : Reacts exothermic with water, Gives off hydrogen by reaction with base metals (zinc, aluminium). Risk of explosion.

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)

Further information : 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 : Use personal protective equipment. Keep away unprotected persons. Danger of slipping if spilled. Avoid contact with skin and 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.

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. Use personal protective equipment. Provide sufficient air exchange and/or exhaust in work rooms. Avoid formation of aerosol. In case of mist, spray or aerosol exposure wear suitable personal respiratory protection and protective suit. Avoid contact with the skin and the eyes. Avoid inhalation of vapour or mist. 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 : Keep in an area equipped with alkali resistant flooring. Store in original container. Materials to avoid; Aluminium; Zinc; Tin; Suitable materials for containers: Stainless steel; carbon steel

Advice on protection against fire and explosion : The product is not flammable. Normal measures for preventive fire protection. Gives off hydrogen by reaction with base metals (zinc, aluminium). Risk of explosion.

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. Do not store together with acids and ammonium salts. Materials to avoid: Organic peroxides

German storage class : 8B: Non-combustible substances, corrosive

7.3. Specific end use(s)

Specific use(s) : Identified use: See table in front of appendix for a complete overview of identified uses.

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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

Other Occupational Exposure Limit Values

EH40 WEL, Short Term Exposure Limit (STEL):
2 mg/m³

ELV (IE), Short Term Exposure Limit (STEL):
2 mg/m³

8.2. Exposure controls

Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment

Respiratory protection

Advice : Use respirator with appropriate filter if vapours or aerosol are released.
Recommended Filter type:
Particle filter:P2
Particle filter:P3

Hand protection

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

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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 : Tightly fitting safety goggles

Skin and body protection

Advice : alkali resistant protective clothing

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 cases.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Form : liquid
 Colour : colourless
 Odour : odourless
 Odour Threshold : no data available
 pH : ca. 14 (20 °C)

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Melting point/range	: no data available
Boiling point/boiling range	: no data available
Flash point	: not applicable
Evaporation rate	: no data available
Flammability (solid, gas)	: does not ignite
Upper explosion limit	: not applicable
Lower explosion limit	: not applicable
Vapour pressure	: no data available
Relative vapour density	: no data available
Density	: no data available
Water solubility	: completely soluble
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: not applicable
Thermal decomposition	: no data available
Viscosity, dynamic	: no data available
Explosivity	: Product is not explosive.
Oxidizing properties	: no data available

9.2. Other information

Corrosion to metals	: Corrosive to metals
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Section 10: Stability and reactivity

10.1. Reactivity

Advice	: Gives off hydrogen by reaction with base metals (zinc, aluminium).
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10.2. Chemical stability

Advice	: No decomposition if stored and applied as directed.
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10.3. Possibility of hazardous reactions

Hazardous reactions	: Exothermic reaction with strong acids. Gives off hydrogen by
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reaction with base metals (zinc, aluminium). Risk of explosion.

10.4. Conditions to avoid

Conditions to avoid : No information available.
Thermal decomposition : no data available

10.5. Incompatible materials

Materials to avoid : Materials to avoid: Acids, Light metals, Aluminium, Zinc, Organic peroxides

10.6. Hazardous decomposition products

Hazardous decomposition products : No information available.

Section 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity

Inhalation

Inhalation may cause pain in respiratory system, sneezing, coughing and difficulty in breathing. Risk for pulmonary edema by high concentration.

Irritation

Eyes

Result : Very corrosive (rabbit)
Risk of serious damage to eyes.

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

Acute toxicity

Inhalation

no data available

Section 12: Ecological information

12.1. Toxicity

Component:	sodium hydroxide	CAS-No.
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Acute toxicity

Fish

LC50 : 125 mg/l (Gambusia affinis; 96 h)

LC50 : 145 mg/l (Poecilia reticulata; 24 h)

Toxicity to daphnia and other aquatic invertebrates

EC50 : 76 mg/l (Daphnia magna; 24 h)

Bacteria

EC50 : 22 mg/l (Photobacterium phosphoreum; 15 min)

12.2. Persistence and degradability

Persistence and degradability

Biodegradability

Result : The methods for determining biodegradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Bioaccumulation

Result : Does not bioaccumulate.

12.4. Mobility in soil

Mobility

Result : The product is mobile in water environment.

12.5. Results of PBT and vPvB assessment

12.6. Other adverse effects

Section 13: Disposal considerations

13.1. Waste treatment methods

Product : Eliminate waste in conditions authorized by the regulations.

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Store waste in containers provided for this purpose. Do not dump in drains, water sheets or the ground.

Contaminated packaging : Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. Packagings that cannot be cleaned are to be disposed of in the same manner as the product.

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 : 8
(Labels; Classification Code; Hazard identification No; Tunnel restriction code) 8; C5; 80; (E)
RID-Class : 8
(Labels; Classification Code; Hazard identification No) 8; C5; 80
IMDG-Class : 8
(Labels; EmS) 8; F-A, S-B

14.4. Packaging group

ADR : II
RID : II
IMDG : II

14.5. Environmental hazards

Labeling according to 5.2.1.8 ADR : no
Labeling according to 5.2.1.8 RID : no
Labeling according to 5.2.1.6.3 IMDG : no
Classification as environmentally hazardous according to 2.9.3 IMDG : no
Classified as "P" according to 2.10 IMDG : no

14.6. Special precautions for user

Not applicable.

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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

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.

|| sodium hydroxide

EU. Regulation No 1451/2007 [Biocides], Annex I, Active substances identified as existing (OJ (L 325)
Listed EC Number: 215-185-5

15.2. Chemical Safety Assessment

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

Section 16: Other information

Full text of R-phrases referred to under sections 2 and 3.

R35 Causes severe burns.

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.

Further information

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 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	NA	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 15	2, 4, 6a, 6b, 7	NA	ES065
4	Professional use	22	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15	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	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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 (source) 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 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.)	

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	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 Used ECETOC TRA model.

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,	Measured exposure data, worst-case	Worker - inhalative, short-term - local	0.33mg/m ³	0.33

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PROC8b, 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

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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	PROC1: Use in closed process, no likelihood of exposure PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
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 % (unless stated differently).
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level (source) 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 % (unless stated differently).
	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
	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	Application Area	Industrial use

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

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 Used ECETOC TRA model.

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, worst-case	Worker - inhalative, short-term - local	0.26mg/m ³	0.26

Caustic Soda 5 - 50% (11-106°TW)

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 5 - 50% (11-106°TW)

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
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</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>
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>

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

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level (source) 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, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC15

Product characteristics	Concentration of the Substance in	Covers percentage substance in the product up to 100 % (unless stated differently).
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Caustic Soda 5 - 50% (11-106°TW)

	Mixture/Article	
	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	

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

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
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Caustic Soda 5 - 50% (11-106°TW)

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)	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

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 5 - 50% (11-106°TW)

1. Short title of Exposure Scenario 4: Professional use

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	<p>PROC1: Use in closed process, no likelihood of exposure</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Use in closed batch process (synthesis or formulation)</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>
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

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level (source) 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.
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, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid

Caustic Soda 5 - 50% (11-106°TW)

	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 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

Used ECETOC TRA model.

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4,	liquid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.17mg/m ³	---

Caustic Soda 5 - 50% (11-106°TW)

PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24				
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

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 5 - 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 (including solvent based 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

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

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
Technical conditions and measures at process level (source) 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

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 % (unless stated differently).
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer 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.
	Consumer Measures	In case of dust or aerosol formation: use respiratory protection with approved filter (P2)

3. Exposure estimation and reference to its source

Environment

Caustic Soda 5 - 50% (11-106°TW)

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

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 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).