

SAFETY DATA SHEET

ACCORDING TO EC-REGULATIONS 1907/2006 (REACH), 1272/2008 (CLP/GHS) & 453/2010

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

1.1	Product identifier	
	Product Name	Potassium Hydroxide Solution
	Chemical Name	Potassium Hydroxide
	Trade name	Potassium Hydroxide 44 – 52 % solution
	Alternative names	Caustic lye, Caustic potash, Caustic potash lye, Caustic potash solution, KOH-solution, Potassium hydrate, Potash lye, Potassium lye
	Formula	KOH
	EC No.	215-181-3
	REACH Registration No.	01-2119487136-33-0003
	CAS No.	1310-58-3
1.2	Relevant identified uses of the substance or mixture and uses advised against	
	Identified use(s)	PROC 1 Use in closed process, no likelihood of exposure PROC 2 Use in closed, continuous process with occasional controlled exposure (e.g. sampling) PROC 3 Use in closed batch process (synthesis or formulation) PROC 4 Use in batch and other process (synthesis) where opportunity for exposure arises
	Uses advised against	None
1.3	Details of the supplier of the Safety Data Sheet	
1.3.1	Manufacturer	«HaloPolymer Kirovo-Chepetsk», LLC per. Pozharny, 2, 613040, Kirovo-Chepetsk, Kirov Region, The Russian Federation.
	Telephone	+7-83361-9-4281
	Fax	+7-83361-9-3594
	Website	www.halopolymer.com
1.3.2	Only representative of a non-Community manufacturer	URALCHEM Assist GmbH Johannssenstrasse 10 30159, Hannover, Germany
	Telephone	+49-511/45 99 444
	Fax	+49-511/45 99 446
	E-mail	info@uralchem-assist.de
1.4	Emergency telephone number	
	Manufacturer/supplier: Emergency number	+7-83361-9-4250 [24 hours.]
	Europe	112
	Great Britain	+44 (0) 203 394 9870 (24/7)
	The USA	+1-877 271 7077 Consult the relevant national official advisory body if necessary

2. SECTION 2: HAZARDS IDENTIFICATION

Classification and labeling have been performed according to EU directives 1999/45/EC and 67/548/EEC as amended and adapted and to Regulation (EC) No 1272/2008 [CLP/GHS]

2.1	Classification of the substance	
2.1.1	Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]	Hazard class and category: Acute Tox; category 4 * Skin corrosive; category 1A Corrosive to metals; category 1 Hazard statement: H290: May be corrosive to metals H302 : Harmful if swallowed H314: Causes severe skin burns and eye damage
2.1.2	Classification according to Directive 67/548/EEC	C; R35 Xn; R22
2.1.3	Additional information	See Section 16 for full text of R-phrases and EC hazards

2.2 Label elements

Labeling according to Regulation (EC)
No 1272/2008 [CLP/GHS]
Hazard Pictogram:



GHS05,



GHS07

Signal word:

Dgr : Danger

Hazard statements:

H290: May be corrosive to metals
H302 : Harmful if swallowed
H314: Causes severe skin burns and eye damage

Precautionary Statements:

P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
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.
P310: Immediately call a POISON CENTER or doctor/physician.

2.3 Other hazards Health hazard:

Causes burns to the respiratory track, skin, eyes and gastrointestinal tract.
Medical conditions aggravated by exposure: asthma, respiratory disorders.

Physical hazards:

Mixing with water, acid or incompatible materials may cause splattering and release of heat.

Potential health hazards:

Target organs affected: respiratory system, skin. Eyes

Environmental effects:

Avoid ingress into water-supply sources and sewerage. The substance has alkaline character and can raise pH of surface water.

2.4 Additional Information

See Section 11

3. SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Product identifier type in accordance with Article 18(2) of Regulation (EC) No 1272/2008	Identifier number	Identification name	Weight % content (or range)		EC Number
Index number in CLP Annex VI	019-002-00-8	Potassium hydroxide	44-52	48	215-181-3
CAS number	7732-18-5	Water	48-56	52	231-91-2
Index number in CLP Annex VI	011-002-00-6	sodium hydroxide	Max 1.0		215-185-5
CAS number	584-08-7	dipotassium carbonate	Max 0.20		209-529-3

3.2 Mixtures

Not applicable.

3.3 Additional Information

None.

4. SECTION 4: FIRST AID MEASURES



4.1 Description of first aid measures

Inhalation	Consult a doctor/medical service if breathing problems develop. Remove the victim into fresh air. Unconscious: maintain adequate airway and respiration.
Skin Contact	Consult a doctor/medical service. Rinse immediately with plenty of water for 15 minutes. Do not apply neutralizing agents.
Eye Contact	Consult a doctor/medical service. Wash immediately with lots of water and soap for 15 minutes. Remove clothing while washing.
Ingestion	Consult a doctor/medical service if you feel unwell. Immediately give lots of water to drink. Never give water to an unconscious person . Do not induce vomiting.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation:	Exposure may cause coughing. Inhalation of mist or spray may injure the entire respiratory tract with painful and corrosive action on tissue. Irritancy expected to become noticeable at 2 mg/m ³ in air. Concentrations of 200 mg/m ³ are immediately dangerous - pulmonary edema (fatal at higher levels may occur).
Eyes contact :	Contact with solution rapidly causes severe damage. Permanent corneal damage almost inevitably results. Mist from solutions is extremely corrosive.
Skin contact:	May cause irritation (possibly severe) and chemical burns. Blistering may occur. Extent of damage depends on duration of contact.
Ingestion:	Severe and rapid corrosive burns of the mouth, gullet and gastrointestinal tract will result, if swallowed. Effects include severe pain, difficulty in breathing, vomiting, diarrhea and collapse. Some effects may be delayed. Estimated average fatal dose is 10g or 6,7 ml (human, adult).

4.3 Indication of immediate medical attention and special treatment needed

No specific requirements

5. SECTION 5: FIRE-FIGHTING MEASURES

5.1 Extinguishing Media

Suitable Extinguishing Media	The product is non-combustible. Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable Extinguishing Media	Water may be ineffective.

5.2 Special hazards arising from the substance or mixture

Corrosive liquid.- Not combustible.
Gives off hydrogen by reaction with metals.

5.3 Advice for fire-fighters

Use fire fighting water moderately and contain it.
Use water spray to cool tanks/containers exposed to heat / remove them into safety.
Wear self contained breathing apparatus in case of fire.
Wear corrosion proof suit.

6. SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1	Personal precautions, protective equipment and emergency procedures	<p>Isolate the area. Evacuate personnel to safe areas. Approach from upwind. Ventilate the area. Keep away from incompatible products (see Section 10).</p> <p>Wear chemical resistant personal protective equipment. Prevent further leakage or spillage if safe to do so. Abundant running water should be available for emergency use. Refer to protective measures listed in sections 7 and 8.</p>
6.2	Environmental precautions	<p>Should not be released into the environment. Do not flush into surface water or sanitary sewer system. Dam up the liquid spill. Contain leaking substance, pump over in suitable containers. Notify environmental personnel.</p>
6.3	Methods and material for containment and cleaning up	<p>Take up liquid spill with inert absorbent material. Scoop absorbed substance into closing containers. Carefully collect spill / leftovers. Equipment must be corrosion resistant. Flush contaminated areas with large amounts of water and direct rinsings to chemical sewer or collect for treatment.</p>
6.4	Reference to other sections	See Sections 7, 8 and 13
6.5	Additional Information	None

7. SECTION 7: HANDLING AND STORAGE

7.1	Precautions for safe handling	<p>Observe strict hygiene - avoid eye and skin contact. Avoid splashing of material. Safety showers should be readily available in handling and storage areas. Eye wash fountains should be located in the work areas and should be immediately accessible for emergency use. Remove contaminated clothing immediately. When diluting, always add the product to water. Never add water to the product. Keep away from incompatible products (see Section 10).</p>
7.2	Conditions for safe storage, including any incompatibilities	<p>Store in a well-ventilated area. Store at ambient temperature. Keep container tightly closed. Keep away from : heat sources, highly flammable materials, incompatible products. Packaging material Suitable: stainless steel, synthetic material / polyethylene, glass To avoid: lead, aluminum, copper, tin, zinc, bronze</p>
7.3	Specific end use(s)	<p>KOH has mainly industrial uses. On a global level the main uses are : production of potassium carbonate (26 %), chemical manufacturing (16 %), production of potassium chemicals (12 %), production of fertilizers (11 %), production of phosphates (9 %), production of detergents (8 %), production of agricultural chemicals (7 %), production of alkaline batteries (6 %), all other (5 %)</p>

8. SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters 8.1.1 Occupational Exposure Limits

Substance	Potassium hydroxide			
CAS No.	1310-58-3			
	Limit value - Eight hours		Limit value - Short term*	
Country	ppm	mg/m ³	ppm	mg/m ³
Austria	-	2 inhalable aerosol	-	-
Belgium	-	-	-	2
Canada - Québec	-	-	-	2 (1)
Denmark	-	2	-	2
France	-	-	-	2
Hungary	-	2	-	2
Poland	-	0,5	-	1
Spain	-	2	-	-
Sweden	-	1	-	(2)
Switzerland	-	2 inhalable aerosol	-	-
USA - NIOSH	-	-	-	2 (1)
United Kingdom	-	-	-	2

Remarks

Canada - Québec (1) Ceiling value
USA - NIOSH (1) ceiling limit value

8.1.2 PNECs and DNELs PNECs:

Based on the facts that KOH dissociates completely in water to K⁺ and OH⁻, possesses high water solubility and low vapor pressure, PNEC derivation for soil and sediments, as well as PNEC oral for potassium hydroxide is not considered useful because potassium hydroxide will be found predominantly in aquatic environment. Based on the available data it is not considered useful to derive a PNEC for potassium hydroxide in fresh water because the natural pH can vary significantly between several aquatic ecosystems and also the sensitivity to a change of the pH can vary significantly between aquatic ecosystems.

DNELs:

Acute - short-term exposure - local effects (dermal):
According to the CLP Regulation No 1272/2008 Annex VI Table 3.1, the concentration limit for corrosivity of KOH is considered to be 2%.
Long-term exposure - local effects (dermal DNEL in mg/kg bw):
No DNEL long-term exposure - local effects could be derived as no reliable dose descriptors were available for that route of exposure.
Long-term exposure - local effects (inhalation DNEL in mg/m³):
the DNEL for potassium hydroxide for long-term inhalation for workers is 1.0 mg/m³.
the DNEL for long-term inhalation, general population = 1.0 mg/m³.

8.2 Exposure controls 8.2.1 Appropriate engineering controls

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

8.2.2 Personal protection equipment Eye/face protection

Wear chemical resistant goggles
Face shield if risk on splashes



Skin protection



Respiratory protection



Hygiene measures

Impervious gloves- Suitable material: PVC, Neoprene, Natural rubber, Butyl rubber
Unsuitable material: Leather

In the case of dust or aerosol formation use respirator with an approved filter
Recommended Filter type: P2

Eye wash bottles or eye wash stations in compliance with applicable standards
Take off contaminated clothing and shoes immediately
Handle in accordance with good industrial hygiene and safety practice

8.2.3 Environmental Exposure Controls

Dispose of rinse water in accordance with local and national regulations.

9. SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state at 20°C and 101.3 kPa	solid
Colour	white
Odour	Odorless
pH (Value)	13.5 @ 25°C
Melting Point (°C) / Freezing Point (°C)	406
Boiling point	1327 @ 1013 hPa
Flash Point (°C)	Not applicable
Flammability (solid, gas)	Not applicable
Explosive limit ranges.	Not applicable
Vapour Pressure (mm Hg)	Not applicable
Surface tension	Not applicable
Relative density (g/ml) @ 20°C	2.044
Solubility (Water)	121g/100g water at 25°C
Stability in organic solvents and identity of relevant degradation products	Not applicable
Partition Coefficient (n-Octanol/water)	Not applicable
Self-ignition temperature (°C)	Not applicable
Viscosity (mPa.s)	Not applicable
Explosive properties	Not applicable
Oxidising properties	Not applicable

9.2 Other information

None

10. SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity	Potential for exothermic hazard. May be corrosive to metals.
10.2 Chemical stability	Stable under recommended storage conditions
10.3 Possibility of hazardous reactions	Gives off hydrogen by reaction with metals. Exothermic reaction with strong acids. Reacts violently with water.
10.4 Conditions to avoid	Unstable on exposure to air. Freezing.
10.5 Incompatible materials	Keep away from: heat sources, oxidizing agents, acids, highly flammable materials, halogens, organic materials. Keep away from: lead, aluminium, copper, tin, zinc, bronze.
10.6 Hazardous Decomposition Product(s)	Absorbs the atmospheric CO ₂ . Hydrogen : reacts with (some) metals and their compounds: release of highly flammable gas.

11. SECTION 11: TOXICOLOGICAL INFORMATION

11.1	Information on toxicological effects	
11.1.1	Acute toxicity	
	Ingestion	LD ₅₀ (oral): 333 mg/kg bw KOH ingestion can cause gastrointestinal burns. The mechanism of injury is one of liquefactive necrosis. Thrombosis of local blood vessels contributes to tissue damage.
	Inhalation / Skin Contact / Eye Contact	According to the REACH Regulation, acute toxicity testing does not generally need to be conducted if the substance is classified as corrosive to the skin (column 2 adaptation, Annex VIII). Potassium hydroxide is a corrosive substance at concentrations of about 2% and higher.
11.1.2	Skin corrosion/irritation	Potassium hydroxide is a corrosive substance at concentrations of about 2% and higher. Skin irritation / corrosion: corrosive
11.1.3	Serious eye damage/irritation	KOH (1%) is irritating to the eyes (5 min exposure). KOH (5%) is extremely irritating and corrosive for the eyes (5 min exposure). Eye irritation / corrosion: corrosive
11.1.4	Respiratory or skin sensitization	Not classified
11.1.5	Mutagenicity	Negative mutagenicity tests support no classification
11.1.6	Carcinogenicity	Lack of positive in vitro and in vivo mutagenicity data support no classification for carcinogenicity and support no additional animal testing to assess carcinogenicity.
11.1.7	Reproductive toxicity	Potassium hydroxide is not classified since it is not expected to be systemically available in the body under normal handling and use conditions. For this reason it can be stated that the substance will neither reach the foetus nor male and female reproductive organs in effective toxic concentrations (OECD SIAR, 2002).
11.1.8	STOT - single exposure	The only real effects of KOH ingestion are gastrointestinal burns. The mechanism of injury is one of liquefactive necrosis. Thrombosis of local blood vessels contributes to tissue damage. Tran mural necrosis can occur with frightening rapidity and injury often extrudes through the oesophagus to involve adjacent mediastinal and peritoneal structures. When alkali enters the stomach, there may be some neutralization by gastric acid, which can limit the injury to this organ. Perforation of the stomach can occur with peritonitis and caustic injury to the contiguous organs including the colon, pancreas, liver and spleen. If sufficient quantities of alkali pass through the pylorus, there may be substantial duodenal damage including perforation. Lye constitutes a greater danger than solid granules, which tend to adhere on contact to mucous membranes without travelling further. The severity of damage depends on concentration of the agent, but also on the quantity swallowed. Aspiration of the alkali into the airway can result in live-threatening injuries to the larynx, the tracheobronchial passages, and the lungs.
11.1.9	STOT - repeated exposure	KOH in aqueous solutions is completely dissociated into K ⁺ and OH ⁻ ions. Due to the neutralization of OH ⁻ by gastric HCl and the quick and efficient blood pH regulation mechanisms (buffer capacity of extra cellular body fluids, respiratory and renal compensation mechanisms), an alkalosis due to the OH ⁻ ions after KOH oral dosage in non-irritating conditions is prevented. Therefore, a possible systemic toxicity of KOH would be related to the K ⁺ ion and studies with potassium salts in which the anion does not contribute significantly to toxicity could be used for KOH as well.
11.1.10	Aspiration hazard	Not classified
11.2	Other information	None

12. SECTION 12: ECOLOGICAL INFORMATION

12.1	Toxicity	The effects of KOH on the aquatic compartment are expected to be comparable to the effects of NaOH. Available data on NaOH indicate that concentrations of 20-40 mg/L may be acutely toxic to fish and invertebrates (single species tests). Data on pH increases due to the addition of these amounts of NaOH in the used test waters are lacking. In waters with a relatively low buffering capacity, NaOH concentrations of 20-40 mg/L may result in a pH increase with one to several pH units
12.2	Persistence and degradability	Potassium hydroxide is a strong alkaline substance that dissociates completely in water to K ⁺ and OH ⁻ . Considering its high water solubility, potassium hydroxide is not expected to bioconcentrate in organisms. Log Pow is not applicable for an inorganic compound that dissociates.
12.3	Bioaccumulative potential	Considering its high water solubility, potassium hydroxide is not expected to bioconcentrate in organisms. Log Pow is not applicable for an inorganic compound which dissociates
12.4	Mobility in soil	Potassium hydroxide is a strong alkaline substance that dissociates completely in water to K ⁺ and OH ⁻ . High water solubility and low vapour pressure indicate that potassium hydroxide will be found predominantly in aqueous environments. KOH will not adsorb on particulate matter or surfaces and will not accumulate in living substances
12.5	Results of PBT and VpVB assessment	KOH does not fulfill the criteria for persistence, bioaccumulation and toxicity. Therefore, KOH is not considered a PBT or a vPvB substance
12.6	Other adverse effects	None anticipated

13. SECTION 13: DISPOSAL CONSIDERATIONS

13.1	Waste treatment methods	Dilute with plenty of water. Remove for physico-chemical treatment : neutralisation with pH control. In accordance with local and national regulations.
13.2	Additional Information	
13.2.1	Waste code	Waste material code (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 06 02 04 (sodium and potassium hydroxide). Waste material code (Flanders): 302. Hazardous waste (91/689/EEC).
13.2.2	Contaminated packaging:	Where possible recycling is preferred to disposal or incineration. Clean container with water. In accordance with local and national regulations.
13.2.3	Packaging/Container	Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances).

14. SECTION 14: TRANSPORT INFORMATION

14.1	Land transport (ADR/RID):	
	UN-No.:	1814
	Proper shipping name	POTASSIUM HYDROXIDE, LIQUID
	Class	8
	Packing group:	II
	Hazard label(s):	DANGER LABEL TANKS : 8 DANGER LABEL PACKAGES : 8
14.2	Inland water ways transport (ADN):	
	UN-No.:	1814
	Proper Shipping Name:	POTASSIUM HYDROXIDE, LIQUID
	Class:	8

	Packing group:	II
	Hazard Label(s):	DANGER LABEL TANKS : 8 DANGER LABEL PACKAGES : 8
14.3	Marine transport (IMDG)	
	UN-No.:	1814
	Proper Shipping Name:	POTASSIUM HYDROXIDE, LIQUID
	Class(es):	8
	Packing group:	II
	EmS number	8-06
	Labels	8 CORROSIVE EMS: F-A, S-B
	Marine Pollutant:	no
14.4	Air transport (ICAO-TI/IATA-DGR):	
	UN-No.:	1814
	Proper Shipping Name:	POTASSIUM HYDROXIDE, LIQUID
	Class(es)	2
	Packing group:	II
	Labels	CORROSIVE
	Special provisions	PACKING INSTRUCTIONS PASSENGER AIRCRAFT : 809/Y809 PACKING INSTRUCTIONS CARGO AIRCRAFT : 813
14.5	Additional information:	Limited quantities (LQ) : When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, only the following prescriptions shall be complied with: each package shall display a diamond-shaped figure with the following inscription: - 'UN 1814' or, in the case of different goods with different identification numbers within a single package: - the letters 'LQ'

15. SECTION 15: REGULATORY INFORMATION

15.1	Safety, health and environmental regulations/legislation specific for the substance or mixture	
15.1.1	EU regulations	Potassium hydroxide is a food additive, listed as E525 in Annex 1 of Directive 95/2/EU. This means that KOH is a general food additive to be used following the "quantum satis" principle: as much as necessary according to GMP. The concentration of potassium is limited under the EU Directive on Drinking Water Quality 80/778/EEC. The potassium guide level is 10 mg/l and the maximum allowable concentration is 12 mg/l
	Authorizations and/or restrictions on use	Not applicable
15.1.2	National regulations	Hazard classification - In accordance with: State Standard of Russian Federation (GOST 12.1.007). Label elements - In accordance with: State Standard of Russian Federation (GOST 31340-07).
15.2	Chemical Safety Assessment	Chemical Safety Report is available

16. SECTION 16: OTHER INFORMATION

16.1	Classification of the substance	
16.1.1	Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]	Hazard class and category: Acute Tox; category 4 * Skin corrosive; category 1A Corrosive to metals; category 1 Hazard statement: H290: May be corrosive to metals H302 : Harmful if swallowed H314: Causes severe skin burns and eye damage

Label elements

Hazard Pictogram:



GHS05,



GHS07

Signal word:

Dgr : Danger

Hazard statements:

H290: May be corrosive to metals
H302 : Harmful if swallowed
H314: Causes severe skin burns and eye damage

Precautionary Statements

P260: Do not breathe dust/fume/gas/mist/vapours/spray.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
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.
P310: Immediately call a POISON CENTER or doctor/physician.

16.1.2 Classification according to Directive 67/548/EEC

Indication of danger: Xn – harmful, C – corrosive
R-phrase: R22 - Harmful if swallowed
R35 - Causes severe burns

Label elements

Indication of danger:



C –(агрессивное вещество)

R-phrases:

R22 - Harmful if swallowed
R35 - Causes severe burns

S-phrases:

(S1/2 - keep locked up and out of reach of children)
S26 - in case of contact with eyes, rinse immediately with plenty of water and seek medical advice
S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.
S45 - in case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

16.2 LEGEND

STOT
DNEL
PNEC
PBT

Specific Target Organ Toxicity
Derived No Effect Level
Predicted No Effect Concentration
PBT: Persistent, Bioaccumulative and Toxic

Information contained in this publication or as otherwise supplied to Users is believed to be accurate and is given in good faith, but it is for the Users to satisfy themselves of the suitability of the product for their own particular purpose. HaloPolymer Kirovo-Chepetsk LLC gives no warranty as to the fitness of the product for any particular purpose and any implied warranty or condition (statutory or otherwise) is excluded except to the extent that exclusion is prevented by law. HaloPolymer Kirovo-Chepetsk LLC accepts no liability for loss or damage (other than that arising from death or personal injury caused by defective product, if proved), resulting from reliance on this information. Freedom under Patents, Copyright and Designs cannot be assumed.

You should not use the product with the purposes other than those specified, without consultation with us.

It is the Customer's responsibility to make an assessment of this product and use it observing safety precautions and requirements of relevant laws and legal norms.

The Buyer of the product intended for a third party's usage is obliged to take all reasonable steps to afford access to all information contained in this SDS for any person making use of this product.

An Employer must inform employees and other persons of the dangers they can be incurred and precautionary measures they should apply.

Annex 1 to the extended Safety Data Sheet (eSDS)
Exposure Scenarios

Exposure Scenario 1: Manufacturing of liquid KOH	
<i>List of all use descriptors</i>	
Sector of use (SU):	SU 3, 8 Manufacture of bulk, large-scale substances
Product category (PC):	not applicable
Process category (PROC):	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a/b Transfer of chemicals from/to vessels/large containers at (non)dedicated facilities PROC9 Transfer of chemicals into small containers (dedicated filling line)
Article category (AC):	not applicable
Environmental Release	
Category (ERC):	ERC1 Manufacture of substances
Contributing exposure scenario controlling environmental exposure	
Product characteristics	
Liquid KOH, all concentrations	
Frequency and duration of use	
Continuous	
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	
Risk management measures related to the environment aim to avoid discharging KOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant and undesired pH changes. Adequate 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. Most aquatic organisms can tolerate pH values in the range of 6-9, this is also reflected in the description of standard OECD tests with aquatic organisms.	
Conditions and measures related to external treatment or recovery of waste for disposal	
Liquid KOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.	
Contributing exposure scenario controlling worker exposure	
Product characteristic	
Liquid KOH, all concentrations	
Frequency and duration of use/exposure	
8 hours/day, 200 days/year	
Technical conditions and measures at process level (source) to prevent release	
Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes: <ul style="list-style-type: none"> • 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)" 	
Technical conditions and measures to control dispersion from source towards the worker	
Local exhaust ventilation and/or general ventilation is good practice	

Organisational measures to prevent /limit releases, dispersion and exposure

- Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and c) to follow the safer procedures instructed by the employer.
- The employer has also to ascertain that the required PPE is available and used according to instructions

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

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective 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
- Eye protection: chemical resistant goggles must be worn. If splashes are likely to occur, wear tightly fitting safety goggles, face – shield
- Wear suitable protective clothing, aprons, shield and suits, if splashes are likely to occur, wear: rubber or plastic boots, rubber or plastic boots

Exposure estimation and reference to its source
Worker exposure:

KOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore according to the NaOH EU RAR (2007), dermal exposure to >2% KOH formulations is not quantitatively assessed.

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

For drumming liquid KOH the modelled data are underestimated by ECETOC TRA in comparison with the measured surrogate data of KOH. Because there is a relatively large number of measured surrogate data, these will be used for risk characterisation. The value 0.33 mg/m^3 is taken as reasonable worst case level and 0.14 mg/m^3 is taken as typical exposure level.

Environmental exposure:

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 K^+ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that KOH 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 not exposure of the receiving surface water.

The sediment compartment is not considered, because it is not considered relevant for KOH. 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 KOH). If emitted to air as an aerosol in water, KOH will be rapidly neutralised as a result of its reaction with CO_2 (or other acids).

Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of KOH 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.

Exposure Scenario 2: Manufacturing of solid KOH
List of all use descriptors

Sector of use (SU):	SU 3, 8 Manufacture of bulk, large-scale substances
Product category (PC):	not applicable
Process category (PROC):	PROC1 Use in closed process, no likelihood of exposure PROC2 Use in closed, continuous process with occasional controlled exposure PROC3 Use in closed batch process (synthesis or formulation) PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises PROC8a/b Transfer of chemicals from/to vessels/large containers at (non)dedicated facilities PROC9 Transfer of chemicals into small containers (dedicated filling line)
Article category (AC):	not applicable
Environmental Release	
Category (ERC):	ERC1 Manufacture of substances

Contributing exposure scenario controlling environmental exposure
Product characteristics

Solid KOH

Frequency and duration of use

Continuous

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

Risk management measures related to the environment aim to avoid discharging KOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant and undesired pH changes. Adequate 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. Most aquatic organisms can tolerate pH values in the range of 6-9, this is also reflected in the description of standard OECD tests with aquatic organisms.

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

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

Contributing exposure scenario controlling worker exposure
Product characteristic

Solid KOH, all concentrations

Frequency and duration of use/exposure

8 hours/day, 200 days/year

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

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

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

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

Local exhaust ventilation and/or general ventilation is good practice

Organisational measures to prevent /limit releases, dispersion and exposure

- Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to

understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and c) to follow the safer procedures instructed by the employer.

- The employer has also to ascertain that the required PPE is available and used according to instructions

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

- Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2)
- Hand protection: impervious chemical resistant protective 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
- Eye protection: chemical resistant goggles must be worn. If splashes are likely to occur, wear tightly fitting safety goggles, face – shield
- Wear suitable protective clothing, aprons, shield and suits, if splashes are likely to occur, wear: rubber or plastic boots, rubber or plastic boots

Exposure estimation and reference to its source

Worker exposure:

KOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore according to the NaOH EU RAR (2007), dermal exposure to >2% KOH formulations is not quantitatively assessed.

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

Based on KOH measurements and following the proposed risk management measures controlling worker exposure, the reasonable worst-case inhalation exposure of 0.2 mg/m^3 (measured at the drumming/bagging place) is below the DNEL of 1 mg/m^3 .

Environmental exposure:

Potassium hydroxide will rapidly dissolve and dissociate in water when released to water. The environmental exposure assessment for solid potassium hydroxide is consequently the same as for liquid potassium hydroxide.

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 K^+ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that KOH 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 not exposure of the receiving surface water.

The sediment compartment is not considered, because it is not considered relevant for KOH. 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 KOH. If emitted to air as an aerosol in water, KOH will be rapidly neutralised as a result of its reaction with CO_2 (or other acids).

Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of KOH 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.

Exposure Scenario 3: Industrial and Professional Use of KOH

List of all use descriptors

Sector of use (SU): SU 1-23

Because potassium hydroxide has so many uses and is used so widely it can potentially be used in all sectors of use (SU) described by the use descriptor system (SU 1-23).

Product category (PC): PC 0-40

Potassium hydroxide can be used in many different chemical product categories (PC): Coatings and Paints, Fillers, Putties, Thinners (PC 9), Fertilizers (PC12), Intermediate (PC19), Products such as pH-regulators, flocculants, precipitants, neutralization agents (PC20), Washing and Cleaning Products (PC35), Water treatment chemicals (PC37), Cosmetics (PC39), Extraction agents (PC40). However, it could potentially also be used in other chemical product categories (PC 0 – 40).

Process category (PROC):

PROC1	Use in closed process, no likelihood of exposure
PROC2	Use in closed, continuous process with occasional controlled exposure (e.g. sampling)
PROC3	Use in closed batch process (synthesis or formulation)
PROC4	Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5	Mixing or blending in batch processes for formulation of preparations and articles
PROC7	Spraying in industrial settings and applications
PROC8a/b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
PROC10	Roller application or brushing of adhesive and other coating
PROC11	Spraying outside industrial settings or applications
PROC13	Treatment of articles by dipping and pouring
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelettisation
PROC15	Use a laboratory reagent
PROC19	Hand-mixing with intimate contact and only PPE available
PROC23	Open processing and transfer operations (with minerals) at elevated temperature
PROC24	High (mechanical) energy work-up of substances bound in materials and/or articles
PROC26	Handling of solid inorganic substances at ambient temperature

The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC 1 – 27).

Article category (AC): not applicable

The article categories (AC) are not applicable for potassium hydroxide in this exposure scenario.

Environmental Release

Category (ERC):

ERC2	Formulation of preparations
ERC4	Industrial use of processing aids
ERC5	Industrial use resulting in inclusion into or onto a matrix
ERC6	Industrial use of intermediates and reactive processing aids
ERC7	Industrial use of substances in closed systems
ERC8	Wide dispersive indoor and outdoor use of reactive substances, processing aids in open systems

The environmental release categories mentioned above are assumed to be the most important ones but other environmental release categories could also be possible (ERC 1 – 11b).

Further explanations

KOH has mainly industrial uses. On a global level the main uses are: production of potassium carbonate (26 %), chemical manufacturing (16 %), production of potassium chemicals (12 %), production of fertilizers (11 %), production of phosphates (9 %), production of detergents (8 %), production of agricultural chemicals (7 %), production of alkaline batteries (6 %), all other (5 %)

Contributing exposure scenario controlling environmental exposure

Product characteristics

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

Frequency and duration of use
Continuous
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil
<p>Risk management measures related to the environment aim to avoid discharging KOH solutions into municipal wastewater or to surface water, in case such discharges are expected to cause significant and undesired pH changes. Adequate 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. 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.</p> <p>There are additionally some specific environmental risk management measures related to fertilizers containing up to 20% of KOH in the end product. Direct releases to adjacent surface waters should be avoided. Drift should be minimized. And in line with the requirements for good agricultural practice, agricultural soil should be analysed prior to application of the fertiliser and the application rate should be adjusted according to the results of the analysis.</p>
Conditions and measures related to external treatment or recovery of waste for disposal
Liquid KOH waste should be reused or discharged to the industrial wastewater and further neutralized if needed.
Contributing exposure scenario controlling worker exposure
Product characteristic
Solid or liquid KOH, all concentrations (0-100%), if solid: low dustiness class
Frequency and duration of use/exposure
8 hours/day, 200 days/year
Technical conditions and measures at process level (source) to prevent release
<p>For worker, both solid and liquid KOH containing products at concentration > 2%:</p> <p>Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:</p> <ul style="list-style-type: none"> • 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)"
Technical conditions and measures to control dispersion from source towards the worker
<p>For worker, both solid and liquid KOH containing products at concentration > 2%:</p> <p>Local exhaust ventilation and/or general ventilation is good practice</p>
Organisational measures to prevent /limit releases, dispersion and exposure
<p>For worker, both solid and liquid KOH containing products at concentration > 2%:</p> <ul style="list-style-type: none"> • Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects of sodium hydroxide and c) to follow the safer procedures instructed by the employer. • The employer has also to ascertain that the required PPE is available and used according to instructions • Where possible for professional use, use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.
Conditions and measures related to personal protection, hygiene and health evaluation
<p>For worker and professional, both solid and liquid KOH containing products at concentration > 2%:</p> <ul style="list-style-type: none"> • Respiratory protection: In case of dust or aerosol formation (e.g. spraying): use respiratory protection with approved filter (P2) • Hand protection: impervious chemical resistant protective gloves <ul style="list-style-type: none"> ○ 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 chemical resistant safety goggles, face –shield • If splashes are likely to occur, wear suitable protective clothing, aprons, shield and suits, rubber or plastic boots, rubber or plastic boots

Exposure estimation and reference to its source
Worker/professional exposure:

KOH is a corrosive substance. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Therefore according to the NaOH EU RAR (2007), dermal exposure to >2% KOH formulations is not quantitatively assessed.

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

The estimated inhalation concentrations are larger than the measured value available. These will be used for risk characterisation. The maximum estimated inhalation concentration is 0.23 mg/m³ for liquid and 0.5 mg/m³ for solid.

In addition to the measured exposure data the ECETOC TRA tool has been used to estimate the inhalation exposure (see Table below). It was assumed that there is no local exhaust ventilation and no respiratory protection unless specified otherwise. The duration of exposure was set at more than 4 hours per day as a worst-case assumption and professional use was specified where relevant as a worst-case assumption. For the solid, the low dustiness class was selected because KOH is very hygroscopic. Only the most relevant PROCs were considered in the assessment.

PROC	PROC description	Liquid (mg/m ³)	Solid (mg/m ³)
PROC 1	Use in closed process, no likelihood of exposure	0.23	0.01
PROC 2	Use in closed, continuous process with occasional controlled exposure (e.g. sampling)	0.23	0.01
PROC 3	Use in closed batch process (synthesis or formulation)	0.23	0.1
PROC 4	Use in batch and other process (synthesis) where opportunity for exposure arises	0.23	0.2 (with LEV)
PROC 5	Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)	0.23	0.2 (with LEV)
PROC 7	Spraying in industrial settings and applications	0.23	Not applicable
PROC 8a/b	Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non dedicated or dedicated facilities	0.23	0.5
PROC 9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	0.23	0.5
PROC10	Roller application or brushing of adhesive and other coating	0.23	0.5
PROC11	Spraying outside industrial settings or applications	0.23	0.2 (with LEV)
PROC13	Treatment of articles by dipping and pouring	0.23	0.5
PROC14	Production of preparations or articles by tableting, compression, extrusion, pelettisation	0.23	0.2 (with LEV)
PROC15	Use a laboratory reagent	0.23	0.1
PROC19	Hand-mixing with intimate contact and only PPE available.	0.23	0.5
PROC23	Open processing and transfer operations (with minerals) at elevated temperature	0.23	0.4 (with LEV and RPE(90%))
PROC24	High (mechanical) energy work-up of substances bound in materials and/or articles	0.23	0.5 (with LEV and RPE(90%))

PROC 26 was considered to mainly applicable to metals industry. Handling of inorganic substances is assumed to be included in the existing PROCs assessed.

Environmental exposure:

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 K⁺ ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicate that KOH 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 not exposure of the receiving surface water.

The sediment compartment is not considered, because it is not considered relevant for KOH. 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 KOH. If emitted to air as an aerosol in water, KOH will be rapidly neutralised as a result of its reaction with CO₂ (or other acids).

Significant emissions to the terrestrial environment are not expected either. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of KOH 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.

Exposure Scenario 4: Consumer use of solid and liquid KOH (excl. batteries)
List of all use descriptors

Sector of use (SU): SU 21 Private households

Product category (PC): PC 0-40

PC 9 Coatings and Paints, Fillers, Putties, Thinners

PC12 Fertilizers

PC20 Products such as pH-regulators, flocculants, precipitants, neutralization agents, other

PC28 Perfumes, fragrances

PC35 Washing and Cleaning Products (including solvent based products)

PC39 Cosmetics

However, it could potentially also be used in other chemical product categories (PC 0 – 40).

Process category (PROC): not applicable

Article category (AC): not applicable

Environmental Release

Category (ERC): ERC8A Wide dispersive indoor use of processing aids in open systems

ERC8B Wide dispersive indoor use of reactive substances in open systems

ERC8D Wide dispersive outdoor use of processing aids in open systems

ERC9A Wide dispersive indoor use of substances in closed systems

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

Contributing exposure scenario controlling environmental exposure
Product characteristics

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

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

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.

Contributing exposure scenario controlling worker exposure
Product characteristic

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

The amounts used will interact with other ingredients in acid-base reactions and thus practically no KOH is left in the final consumer product. However, some cleaning products may contain 0.25-0.45% of KOH in the final formulation. Some toilet cleaners may contain up to 1.1% and certain soaps contain up to 0.5% of KOH in the final formulation

Conditions and measures related to the design of the product

- It is required to use resistant labelling-package to avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions.
- It is required that household chemicals, containing potassium hydroxide for more than 2%, which may be accessible to children should be provided with a child-resistant fastening (currently applied) and a tactile warning of danger (Adaptation to Technical Progress of the Directive 1999/45/EC, annex IV, Part A and Article 15(2) of Directive 67/548 in the case of, respectively, dangerous preparations and substances intended for domestic use). This would prevent accidents by children and other sensitive groups of society.
- It is required that appropriate use instructions, and product information should always be provided to consumers. This clearly can reduce the risk of misuse. For reducing the number of accidents, it is advisable to use these products in the absence of children or other sensitive groups. To prevent improper use of potassium hydroxide, instructions for use should contain a warning against dangerous mixtures

- It is advisable to deliver only in very viscous preparations
- It is advisable to deliver only in small amounts

Conditions and measures related to information and behavioural advice to consumers

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

Instructions addressed to consumers:

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

Conditions and measures related to personal protection and hygiene

For consumer, both solid and liquid KOH containing products at concentration > 2%:

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

Exposure estimation and reference to its source
Consumer exposure:

For consumer exposure it is important to stress that potassium hydroxide exposure is an external exposure. Contact with tissue and water will give potassium and hydroxide ions which are abundantly present in the body.

If the recommended RMMs are respected, local exposure through inhalation will not be higher compared to inhalation exposures in ES3. Therefore, the consumer exposure through inhalation is not further quantitatively assessed.

Potassium hydroxide is a food additive, listed as E525 in Annex 1 of Directive 95/2/EU. This means that KOH is a general food additive to be used following the “quantum satis” principle: as much as necessary according to GMP.

The concentration of potassium is limited under the EU Directive on Drinking Water Quality 80/778/EEC. The potassium guide level is 10 mg/l and the maximum allowable concentration is 12 mg/l. The taste threshold of KOH in water is reported to be 1 to 50 mg/l.

Environmental exposure:

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

Exposure Scenario 5: Consumer use, service life and waste stage of KOH in batteries
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<i>List of all use descriptors</i>	
Sector of use (SU):	SU 21 Private households
Product category (PC):	not applicable
Process category (PROC):	not applicable
Article category (AC):	AC 3: Electrical batteries and accumulators
Environmental Release	
Category (ERC):	ERC9A Wide dispersive indoor use of substances in closed systems ERC9B Wide dispersive outdoor use of substances in closed systems
The environmental release categories mentioned above are assumed to be the most important ones but other wide dispersive environmental release categories could also be possible (ERC 8 – 11b).	

Contributing exposure scenario controlling environmental exposure
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Product characteristics
Liquid KOH, all concentrations
Conditions and measures related to external treatment or recovery of waste for disposal
Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility). Recovery of KOH from alkaline batteries includes removing the electrolyte, collection and neutralization with sulphuric acid and carbon dioxide. The occupational exposure related to these steps are considered in the exposure scenario on industrial and professional use of KOH.

Contributing exposure scenario controlling worker exposure

Product characteristic
Liquid KOH, all concentrations
Conditions and measures related to the design of the product
Conditions and measures related to information and behavioural advice to consumers
It is required to use completely sealed articles with a long service life maintenance
Conditions and measures related to personal protection and hygiene
Batteries are sealed articles and during normal use its contents, including KOH, will not be directly released and emission from KOH in these life-cycle stages should be minimal.

Exposure estimation and reference to its source
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Consumer exposure:
Consumer exposure is negligible because batteries are sealed articles with a long service life maintenance.
Environmental exposure:
The environmental release from the consumer use during service life is negligible because batteries are sealed articles with a long service life. After use, batteries normally are recycled and even in case it is disposed as municipal waste, KOH is not expected to cause a significant (pH) effect to the environment when incinerated or landfilled.