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* SECTION 1: Identification of the substance/mixture and of the company/undertaking

- **1.1 Product identifier**

- **Trade name Kalilauge 50%**

- **Article number:** 1000408812000
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
For details on the identifiable uses according to EC-regulation No. 1907/2006 see annex of this safety data sheet.
- **Application of the substance / the mixture**
Industrial / Professional use
Basic chemical (without special defined application)

- **1.3 Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Stockmeier Chemie GmbH & Co. KG
Am Stadtholz 37
D - 33609 Bielefeld Tel.: +49/521/3037-0
- **Informing department:**
Product safety department. Tel.: 0049 / 521 / 3037-162, 3037-311 or 3037-328
E-mail: ehs-bielefeld@stockmeier.de
- **1.4 Emergency telephone number:**
Poison Control Center, Mainz
Tel. 00 49 / 61 31 / 19 240

* SECTION 2: Hazards identification

- **2.1 Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**

Acute Tox. 4	H302	Harmful if swallowed.
Skin Corr. 1A	H314	Causes severe skin burns and eye damage.
Eye Dam. 1	H318	Causes serious eye damage.

- **2.2 Label elements**
- **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.
- **Hazard pictograms**

GHS05 GHS07

- **Signal word** Danger

- **Hazard-determining components of labelling:**
potassium hydroxide
- **Hazard statements**
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
- **Precautionary statements**
P260 Do not breathe mist/vapours/spray.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P303+P361+P353 IF ON SKIN (or hair): 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.

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P310 *Immediately call a POISON CENTER/doctor.*
P406 *Store in corrosive resistant container with a resistant inner liner.*

- ***2.3 Other hazards***
- ***Results of PBT and vPvB assessment***
- ***PBT:*** *Not applicable.*
- ***vPvB:*** *Not applicable.*

* SECTION 3: Composition/information on ingredients

- ***3.2 Mixtures***
- ***Description:*** *Aqueous solution consisting of the following components.*

- ***Dangerous components:***

CAS: 1310-58-3 *EINECS: 215-181-3* *Reg.nr.: 01-2119487136-33*	*potassium hydroxide* *Met. Corr.1, H290; Skin Corr. 1A, H314; Eye Dam. 1, H318; Acute Tox. 4, H302*	*50%*

- ***Additional information*** *For the wording of the listed risk phrases refer to section 16.*

* SECTION 4: First aid measures

- ***4.1 Description of first aid measures***
- ***General advice:***
Instantly remove any clothing soiled by the product.
In case of unconsciousness bring patient into stable side position for transport.
- ***After inhalation***
In case of inhalation of aerosols provide with fresh air. Wash face with water. Seek medical advice if symptoms persist.
- ***After skin contact***
Instantly wash with water and soap and rinse thoroughly. If skin irritation persists, seek medical advice.
Cover wound with a sterile dressing.
- ***After eye contact*** *Rinse immediately opened eye for several minutes under running water. Then consult doctor.*
- ***After swallowing***
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; instantly call for medical help.
- ***4.2 Most important symptoms and effects, both acute and delayed***
Burning effect and pain to eyes, skin and mucous membranes. After swallowing serious irritation to oral cavity and throat as well as danger of perforation of the gullet.
- ***Information for doctor***
Wenn Spritzer in die Augen gelangen, sofort kräftig spülen und Augenarzt hinzuziehen. Behandlung der Verätzungen. Schockbekämpfung. Schmerzlinderung. Antibiotika-Prophylaxe. Cave Glottisödem, das mit Verzögerung auftreten kann. Nach Einatmen von Nebeln: Dexamethason-Spray (Auxiloson) einatmen lassen bis die Beschwerden sistieren.
In case of oral ingestion do not use sodium hydrogencarbonate (NaHCO3) or calcium carbonate (CaCO3)for neutralization, since developing carbon dioxide may cause perforation of the stomach. Drink suspension of magnesia in water.
Cleaning of the stomach should only be carried out with endotracheal intubation. Danger of aspiration. Renew lipid coating of the skin in order to protect against dermatitis. Symptomatic treatment.
- ***Danger***
The solution leads to the wetted parts of the body to severe deep burns. Especially the eyes are at risk. There is a risk of blindness. Inhalation of mist causes severe burns of the respiratory tract. Absorption through the mouth leads to extensive destruction of the walls of the digestive tract.

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- ***4.3 Indication of any immediate medical attention and special treatment needed***
No further relevant information available.

* SECTION 5: Firefighting measures

- ***5.1 Extinguishing media***
- ***Suitable extinguishing agents*** *Product is non-flammable. Use fire fighting measure that suit the surroundings.*
- ***5.2 Special hazards arising from the substance or mixture***
Spilled material reacts with certain metals (eg. Ex. Lead, aluminum, zinc and magnesium) to form hydrogen gas.
Solution acts in contact Severely corrosive to the skin and eyes.
- ***5.3 Advice for firefighters***
- ***Protective equipment:*** *Wear full protective suit with self-contained breathing apparatus.*
- ***Additional information*** *Collect contaminated fire fighting water separately. It must not enter drains.*

* SECTION 6: Accidental release measures

- ***6.1 Personal precautions, protective equipment and emergency procedures***
Wear protective equipment and keep unprotected persons away.
Ensure adequate ventilation
Particular danger of slipping on leaked/spilled product.
When occurring caustic potash solution mists protective clothing including respiratory protection.
- ***6.2 Environmental precautions:***
Prevent material from reaching sewage system, holes and cellars.
Dilute with much water.
If large amounts are released, the authorities must be informed.
- ***6.3 Methods and material for containment and cleaning up:***
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Use neutralising agent.
Dispose of contaminated material as waste according to item 13.
- ***6.4 Reference to other sections***
See Section 8 for information on personal protection equipment.

* SECTION 7: Handling and storage

- ***7.1 Precautions for safe handling***
Keep containers tightly sealed.
Prevent formation of aerosols.
Avoid contact with eyes and skin.
When diluting, always stir the product into standing water.
Avoid contact with metals like aluminum, magnesium, zinc or lead (formation of hydrogen). Do not mix with acids.
- ***Information about protection against explosions and fires:***
The product is not flammable
Pay attention to general rules of internal fire prevention.
- ***7.2 Conditions for safe storage, including any incompatibilities***
- ***Storage***
Keep containers tightly closed. Store in cool, dry conditions.
Minimum storage temperature: 10 °C.
- ***Requirements to be met by storerooms and containers:***
Observe official regulations on storage and handling of water harzardous substances
Not to be kept in containers made of aluminium, zinc, tin or alloys of those metals.
Suitable material for containers and pipes: High-grade steel.

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- ***Information about storage in one common storage facility:*** *Store away from acids.*
- ***Storage class*** *8 B L (VCI - Konzept, 2007)*
- ***7.3 Specific end use(s)*** *No further relevant information available.*

* SECTION 8: Exposure controls/personal protection

- ***Additional information about design of technical systems:*** *No further data; see item 7.*

- ***8.1 Control parameters***
- ***Components with critical values that require monitoring at the workplace:***
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

- ***DNELs***		
1310-58-3 potassium hydroxide		
Inhalative	*DNEL (worker)*	*1 mg/m³ (Long-term - local effects)*
	DNEL (population)	*1 mg/m³ (Long-term - local effects)*

- ***PNECs***
The product does not cause acute or chronic toxicity to aquatic organisms. Therefore, neither the NOEC nor the PNEC values can be determined experimentally.
- ***Additional information:*** *The lists that were valid during the compilation were used as basis.*

- ***8.2 Exposure controls***
- ***Personal protective equipment***
- ***General protective and hygienic measures***
Keep away from food, beverages and fodder.
Instantly remove any soiled and impregnated garments.
Wash hands during breaks and at the end of the work.
Avoid contact with the eyes and skin.
Gases, fumes and aerosols should not be inhaled.
- ***Breathing equipment:***
In case of dizzling-dust breathing protection is required
In case of brief exposure or low pollution use breathing filter apparatus. In case of intensive or longer exposure use breathing apparatus that is independent of circulating air.
- ***Recommended filter device for short term use:***
Combination filter B-P2
Take care of limitations and rules for the use of breathing protection equipment (BGR 190).
- ***Protection of hands:***
Protective gloves.
Check protective gloves prior to each use for their proper condition.
Only use chemical-protective gloves with CE-labelling of category III.
- ***Material of gloves***
Butylrubber, BR, recommended thickness of the material: ≥ 0.5 mm, penetration time: ≥ 480 min.
Natural rubber, NR, recommended thickness: ≥ 0.5 mm, penetration time: ≥ 480 min.
Chloroprene rubber, CR, recommended thickness of the material: ≥ 0.5 mm, penetration time: ≥ 480 min.
Nitrile rubber, NBR, recommended thickness of the material: ≥ 0.4 mm, penetration time: ≥ 480 min.
Polyvinylchlorid (PVC), recommended thickness of the material: ≥ 0.5 mm, penetration time: ≥ 480 Min.
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
- ***Penetration time of glove material***
Note information regarding permeation rate, penetration times and the degradation supplied by the manufacturer of gloves just as workplace-specific conditions.
Change gloves if notice sign of disenchantment.

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- ***For the permanent contact gloves made of the following materials are suitable:***
Attention! Due to conditions (stressing, temperature) the practical usage of chemical protective gloves may be much shorter than the permeation time according to EN 374.
- ***Eye protection:*** *Tightly sealed safety glasses.*
- ***Body protection:***
Standard proctective clothing. Chemical resistant safety-shoes or boots. If skin contact is possible, wear inpenetrable protective clothing against this solvent.

SECTION 9: Physical and chemical properties

- ***9.1 Information on basic physical and chemical properties***	
- ***General Information***	
- ***Appearance:***	
Form:	*Fluid*
Colour:	*Colourless*
- ***Smell:***	*Odourless*
- ***Odour threshold:***	*Not determined.*
- ***pH-value (100 g/l) at 20 °C:***	*> 14*
- ***Change in condition***	
Melting point/Melting range:	*5 °C*
Boiling point/Boiling range:	*146 °C*
- ***Flash point:***	*Product is non-flammable nor potentially explosive*
- ***Inflammability (solid, gaseous)***	*Not applicable.*
- ***Ignition temperature:***	
Decomposition temperature:	*Not determined.*
- ***Self-inflammability:***	*Product is not selfigniting.*
- ***Danger of explosion:***	*Product is not potentially explosive*
- ***Critical values for explosion:***	
Lower:	*Not determined.*
Upper:	*Not determined.*
- ***Vapour pressure:***	*Not determined.*
- ***Density at 20 °C***	*1.51 g/cm3*
- ***Relative density***	*Not determined.*
- ***Vapour density***	*Not determined.*
- ***Evaporation rate***	*Not determined.*
- ***Solubility in / Miscibility with***	
Water:	*Fully miscible*
- ***Partition coefficient (n-octanol/water):***	*Not determined.*
- ***Viscosity:***	
dynamic at 20 °C:	*6.6 mPas*
kinematic:	*Not determined.*
- ***9.2 Other information***	*No further relevant information available.*

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SECTION 10: Stability and reactivity

- ***10.1 Reactivity*** *No further relevant information available.*
- ***10.2 Chemical stability***
- ***Thermal decomposition / conditions to be avoided:*** *No decomposition if used according to specifications.*
- ***10.3 Possibility of hazardous reactions***
  Reacts with base metals forming hydrogen
  Exothermic reactions with acids.
- ***10.4 Conditions to avoid*** *No further relevant information available.*
- ***10.5 Incompatible materials:*** *Base metals, acids, ammonium salts.*
- ***10.6 Hazardous decomposition products:*** *Formation of gaseous hydrogen in case of reaction with base metals-*
- ***Additional information:***
  The product reacts with airborne carbon dioxide forming potassium carbonate or sodium hydrogen carbonate.

*

SECTION 11: Toxicological information

- ***11.1 Information on toxicological effects***
- ***Acute toxicity***
  Harmful if swallowed.

- ***LD/LC50 values that are relevant for classification:***		
1310-58-3 potassium hydroxide		
Oral	*LD50*	*273 mg/kg (rat)*

- ***Primary irritant effect:***
- ***Skin corrosion/irritation***
  Causes severe skin burns and eye damage.
- ***Serious eye damage/irritation***
  Danger of loss of sight is possible.
  Causes serious eye damage.
- ***Respiratory or skin sensitisation*** *Based on available data, the classification criteria are not met.*
- ***Other information (about experimental toxicology):***
  The toxikological numerical datas refer to the undilute 100 % substance.
- ***Subacute to chronic toxicity:***
- ***Germ cell mutagenicity:*** *Ames-Test: negativ*
- ***CMR effects (carcinogenity, mutagenicity and toxicity for reproduction)***
- ***Germ cell mutagenicity*** *Based on available data, the classification criteria are not met.*
- ***Carcinogenicity*** *Based on available data, the classification criteria are not met.*
- ***Reproductive toxicity*** *Based on available data, the classification criteria are not met.*
- ***STOT-single exposure*** *Based on available data, the classification criteria are not met.*
- ***STOT-repeated exposure*** *Based on available data, the classification criteria are not met.*
- ***Aspiration hazard*** *Based on available data, the classification criteria are not met.*

*

SECTION 12: Ecological information

- ***12.1 Toxicity***

- ***Aquatic toxicity:***	
1310-58-3 potassium hydroxide	
LC 50 / 96 h	*45.4 mg/l (Oncorhynchus mykiss)*
	80 mg/l (Gambusia affinis)
EC 50 / 48 h	*40 mg/l (Aquatic invertebrates)*

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	40.4 mg/l (Ceriodaphnia dubia)

- ***12.2 Persistence and degradability*** *No further relevant information available.*
- ***12.3 Bioaccumulative potential*** *No bioaccumulation*
- ***12.4 Mobility in soil*** *No further relevant information available.*
- ***Ecotoxical effects:***
- ***Remark:***
Datas refer to the undilute 100 % substance
The product causes an alteration of the pH-value within the testing system. The result refers to the non-neutralised sample.
- ***Behaviour in sewage processing plants:*** *No inhibition of bacterial activity after neutralisation.*
- ***Additional ecological information:***
Does not cause any biological oxygen consumption. After neutralization, the toxicity is reduced. Toxic effects refer to pH-values below pH<6 or above pH>9.
- ***General notes:***
Do not allow to enter drainage system, surface or ground water
Water hazard class 1 (Self-assessment): slightly hazardous for water.
Rinse off of bigger amounts into drains or the aquatic environment may lead to increased pH-values. A high pH-value harms aquatic organisms. In the dilution of the use-level the pH-value is considerably reduced, so that after the use of the product the aqueous waste, emptied into drains, is only low water-dangerous.
- ***12.5 Results of PBT and vPvB assessment***
- ***PBT:*** *Not applicable.*
- ***vPvB:*** *Not applicable.*
- ***12.6 Other adverse effects*** *No further relevant information available.*

*
SECTION 13: Disposal considerations

- ***13.1 Waste treatment methods***
The following advice is related to new material and not to any processed products. In case of a mixture with other products other disposal methods may become necessary. If in doubt seek advice from product supplier or from local authorities.
- ***Recommendation***
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
A used product should be recycled or used in other contexts, otherwise be handed over to an appropriate disposal, e.g. neutralisation.
Contaminated water to separate by separator and dispose off in line with administrative regulations.
- ***Waste disposal key number:***
Since 01/01/99 the waste code numbers have not only been product-related but are also essentially application-related. The valid waste code number of the application can be obtained from the European waste catalogue.

- ***Uncleaned packagings:*** *Disposal must be made according to official regulations.*
- ***Recommendation:***
After complete emptying and cleaning, send to be reconditioned or recycled.
Rented packaging: After optimal emptying, close immediately and return to the supplier without cleaning. Care should be taken that no other materials get into the packaging.
Other containers: After complete emptying and cleaning, send to be reconditioned or recycled.
- ***Recommended cleaning agent:*** *Water, if necessary with cleaning agent.*

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SECTION 14: Transport information

- 14.1 UN-Number	
- ADR, IMDG, IATA	UN1814
- 14.2 UN proper shipping name	
- IMDG, IATA	POTASSIUM HYDROXIDE SOLUTION
- 14.3 Transport hazard class(es)	
- ADR	
- Class	8 (C5) Corrosive substances.
- Label	8
- IMDG, IATA	
- Class	8 Corrosive substances.
- Label	8
- 14.4 Packing group	
- ADR, IMDG, IATA	II
- 14.5 Environmental hazards:	
- Marine pollutant:	no
- 14.6 Special precautions for user	Warning: Corrosive substances.
- Kemler Number:	80
- EMS Number:	F-A,S-B
- Segregation groups	Alkalis
- 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code	Not applicable.
- Transport/Additional information:	
- ADR	
- Limited quantities (LQ)	1L
- Excepted quantities (EQ)	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
- IMDG	
- Limited quantities (LQ)	1L
- Excepted quantities (EQ)	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
- UN "Model Regulation":	UN1814, POTASSIUM HYDROXIDE SOLUTION, 8, II

*
SECTION 15: Regulatory information

- 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
- National regulations
- Information about limitation of use: Employment restrictions concerning young persons must be observed.
- 15.2 Chemical safety assessment: A Chemical Safety Assessment has been carried out.

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* SECTION 16: Other information

These data are based on our present knowledge. However, they shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

- ***Relevant phrases***

H290 May be corrosive to metals.
H302 Harmful if swallowed.
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.

- ***Department issuing data specification sheet:*** *see item 1: Informing department*
- ***Abbreviations and acronyms:***

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organisation
LEV. Local Exhaust Ventilation
RPE: Respiratory Protective Equipment
RCR: Risk Characterisation Ratio (RCR= PEC/PNEC)
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
CLP: Classification, Labelling and Packaging (Regulation (EC) No. 1272/2008)
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
TRGS: Technische Regeln für Gefahrstoffe (Technical Rules for Dangerous Substances, BAuA, Germany)
DNEL: Derived No-Effect Level (REACH)
PNEC: Predicted No-Effect Concentration (REACH)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
Met. Corr.1: Corrosive to metals, Hazard Category 1
Acute Tox. 4: Acute toxicity, Hazard Category 4
Skin Corr. 1A: Skin corrosion/irritation, Hazard Category 1A
Eye Dam. 1: Serious eye damage/eye irritation, Hazard Category 1

- **** Data compared to the previous version altered.***
- ***ANNEX***

Exposure Scenarios:
Industrial and professional use
of solid and liquid KOH
Consumer end use of solid and liquid KOH (excl. batteries)
Consumer end use, service life and waste stage of KOH in batteries

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Annex: Exposure scenario 1

- ***Short title of the exposure scenario***
Industrial and professional use of solid and liquid KOH
- ***Sector of Use***
SU3 Industrial uses: Uses of substances as such or in preparations at industrial sites
SU22 Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Because potassium hydroxide has so many uses and is used so widely it can potentially be used in all sectors of end use (SU) described by the use descriptor system (SU 1-23). KOH is used for different purposes in a variety of industrial sectors.
- ***Product category***
PC9a Coatings and paints, thinners, paint removers
PC12 Fertilisers
PC19 Intermediate
PC20 Products such as ph-regulators, flocculants, precipitants, neutralisation agents
PC35 Washing and cleaning products (including solvent based products)
PC37 Water treatment chemicals
PC39 Cosmetics, personal care products
PC40 Extraction agents
However, it could potentially also be used in other chemical product categories (PC 0 – 40).
- ***Process category***
PROC1 Use in closed process, no likelihood of exposure
PROC2 Use in closed, continuous process with occasional controlled exposure
PROC3 Use in closed batch process (synthesis or formulation)
PROC4 Use in batch and other process (synthesis) where opportunity for exposure arises
PROC5 Mixing or blending in batch processes for formulation of preparations and articles (multistage and/or significant contact)
PROC7 Industrial spraying
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)
PROC10 Roller application or brushing
PROC11 Non industrial spraying
PROC13 Treatment of articles by dipping and pouring
PROC14 Production of preparations or articles by tabletting, compression, extrusion, pelletisation
PROC15 Use as laboratory reagent
PROC19 Hand-mixing with intimate contact and only PPE available
PROC23 Open processing and transfer operations with minerals/metals 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 categories mentioned above are assumed to be the most important ones but other categories could also be possible.
- ***Environmental release category***
ERC2 Formulation of preparations
ERC4 Industrial use of processing aids in processes and products, not becoming part of articles
ERC5 Industrial use resulting in inclusion into or onto a matrix
ERC6a Industrial use resulting in manufacture of another substance (use of intermediates)
ERC6b Industrial use of reactive processing aids
ERC7 Industrial use of substances in closed systems
ERC8a Wide dispersive indoor use of processing aids in open systems

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ERC8b Wide dispersive indoor use of reactive substances in open systems
ERC8c Wide dispersive indoor use resulting in inclusion into or onto a matrix
ERC8d Wide dispersive outdoor use of processing aids in open systems
ERC8e Wide dispersive outdoor use of reactive substances in open systems
ERC8f Wide dispersive outdoor use resulting in inclusion into or onto a matrix
The categories mentioned above are assumed to be the most important ones but other categories could also be possible.

- ***Conditions of use***
- ***Duration and frequency***
8 h (full working shift).
200 days/year
- ***Environment*** *Continuous release.*
- ***Physical parameters***
- ***Physical state***
Solid.
(low dustiness)
Fluid
- ***Concentration of the substance in the mixture*** *Covers concentrations up to: 100%*
- ***Other operational conditions***
- ***Other operational conditions affecting worker exposure***
Assumes a good basic standard of occupational hygiene is implemented

- ***Risk management measures***
- ***Worker protection***
- ***Organisational protective measures***
Keep good industrial hygiene.
Workers in the risky process/areas identified should be trained
a) to avoid to work without respiratory protection and
b) to understand the corrosive properties and, especially, the respiratory inhalation effects of the substance and
c) to follow the safety procedures instructed by the employer.
The employer must ensure that the necessary personal protective Devices are available and will be applied according to the instructions.
- ***Technical protective measures***
Replacing, where appropriate, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes:
- Use closed systems or covering of open containers (e.g. screens).
- Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.).
- Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one’s head).
- Local exhaust ventilation and/or general ventilation is good practice.
Avoid splashes.
- ***Personal protective measures***
Respiratory protection necessary at exposure limit excess or at formation of dust, vapours or aerosols. Use suitable filter apparatus or surrounding-air undependent breathing apparatus.
Use suitable filter apparatus or surrounding-air undependent breathing apparatus.
Protective gloves.
Butyl rubber, BR
Fluorocarbon rubber (Viton)
Nitrile rubber, NBR
Natural rubber, NR
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

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Tightly sealed safety glasses.
Standard protective working clothes, chemical resistant safety-shoes or wellingtons. If skin contact is possible, wear impenetrable protective clothing.
Alkaline resistant protective clothing
For more information on "Personal protective equipment" see section 8 of the MSDS

- ***Environmental protection measures***
- ***Water***

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. 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.

- ***Notes***

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.

- ***Disposal measures***

Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
A used product should be recycled or used in other contexts, otherwise be handed over to an appropriate disposal site.

- ***Exposure estimation***
- ***Worker (dermal)***

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

- ***Worker (inhalation)***

The exposure estimation was carried out in accordance with ECETOC TRA.
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	description Liquid (mg/m3)	Solid (mg/m3)
PROC 1	0.23	0.01
PROC 2	0.23	0.01
PROC 3	0.23	0.1
PROC 4	0.23	0.2 (mit LEV)
PROC 5	0.23	0.2 (mit LEV)
PROC 7	0.23	Nicht anwendbar
PROC 8a/b	0.23	0.5
PROC 9	0.23	0.5
PROC10	0.23	0.5
PROC11	0.23	0.2 (mit LEV)
PROC13	0.23	0.5
PROC14	0.23	0.2 (mit LEV)
PROC15	0.23	0.1
PROC19	0.23	0.5
PROC23	0.23	0.4 (mit LEV und RPE(90 %))
PROC24	0.23	0,5 (mit LEV und RPE(90 %))

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

- ***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 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.

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Annex: Exposure scenario 2

- ***Short title of the exposure scenario***
Consumer end use
of solid and liquid KOH (excl. batteries)
- ***Sector of Use*** *SU21 Consumer uses: Private households / general public / consumers*
- ***Product category***
PC4 Anti-Freeze and de-icing products
PC9a Coatings and paints, thinners, paint removers
PC9b Fillers, putties, plasters, modelling clay
PC12 Fertilisers
PC20 Products such as ph-regulators, flocculants, precipitants, neutralisation agents
PC28 Perfumes, fragrances
PC35 Washing and cleaning products (including solvent based products)
PC39 Cosmetics, personal care products
However, it could potentially also be used in other chemical product categories (PC 0 – 40).
- ***Process category*** *Not applicable*
- ***Article category*** *Not applicable*
- ***Environmental release category***
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
ERC8e Wide dispersive outdoor use of reactive substances in open systems
ERC9a Wide dispersive indoor use of substances in closed systems
ERC9b Wide dispersive outdoor use of substances in closed systems
ERC10a Wide dispersive outdoor use of long-life articles and materials with low release
ERC10b Wide dispersive outdoor use of long-life articles and materials with high or intended release (including abrasive processing)
ERC11a Wide dispersive indoor use of long-life articles and materials with low release
ERC11b Wide dispersive indoor use of long-life articles and materials with high or intended release (including abrasive processing)
The categories mentioned above are assumed to be the most important ones but other categories could also be possible.

- ***Conditions of use***
- ***Physical parameters***
- ***Physical state***
Solid.
(low dustiness)
Fluid
- ***Concentration of the substance in the mixture***
Covers concentrations up to: 100%
Practically no KOH is left in the final consumer product as the amounts used will interact with other ingredients in acid-base reactions. 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.
- ***Other operational conditions***
- ***Other operational conditions affecting consumer exposure***
- ***Other operational conditions affecting consumer exposure (continuation)***
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 potential sensitive groups. To prevent improper use of potassium hydroxide, instructions for use should contain a warning against dangerous mixtures.

- ***Risk management measures*** *Do not apply product into ventilator openings or slots.*

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- ***Worker protection***
- ***Personal protective measures***

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: use impervious chemical resistant protective gloves
· If splashes are likely to occur, wear tightly fitting goggles, face–shield

- ***Measures for consumer protection***

Keep out of reach of children.
- 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 advisable to deliver only in very viscous preparations
- It is advisable to delivery only in small amounts

- ***Environmental protection measures*** *No special measures required.*

- ***Exposure estimation***
- ***Environment***

Exposure is considered negligible.
If the recommended RMMs are respected, local exposure through inhalation will not be higher compared to inhalation exposures in ES1. Therefore, the consumer exposure through inhalation was not further quantified.

- ***Consumer***

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

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Annex: Exposure scenario 3

- ***Short title of the exposure scenario*** *Consumer end use*
- ***Sector of Use*** *SU21 Consumer uses: Private households / general public / consumers*
- ***Product category*** *Not applicable*
- ***Process category*** *Not applicable*
- ***Article category*** *AC3 Electrical batteries and accumulators*
- ***Environmental release category***
  ERC9a Wide dispersive indoor use of substances in closed systems
  ERC9b Wide dispersive outdoor use of substances in closed systems

- ***Conditions of use***
- ***Physical parameters***
- ***Physical state*** *Fluid*

- ***Risk management measures***
- ***Environmental protection measures*** *No special measures required.*

- ***Exposure estimation***
- ***Environment*** *Exposure is considered negligible.*