

MATERIAL SAFETY DATA SHEET

1. Chemical Product And Company Information

Chemical Name: Potassium Hydroxide Solution
Synonyms/Trade Names: Caustic Potash Solution, KOH, Potash Lye, Lye, Lye Solution
Chemical Family: Alkali metal hydroxide
Formula: KOH
Molecular Weight: 56.1
CAS No.: 1310-58-3
Uses: Saponification of fats, manufacture of biodiesel, electrolyte for batteries, manufacture of soft soaps, manufacture of fine chemicals, manufacture of fertilizers and other agricultural chemicals.

Manufacturer & Supplier:
ERCO Worldwide, a division of Superior Plus LP
302 The East Mall, Ste. 200
Toronto, Ontario Canada M9B 6C7
(416) 239-7111



ERCO Worldwide (USA) Inc.
101 Highway 73 South
Nekoosa, Wisconsin 54457
(715) 887-4000

Transportation Emergency Telephone Numbers :
USA: 1-800-424-9300
CHEMTREC
CANADA: (613) 996-6666
CANUTEC

Emergency Information:

Call toll-free 24 hours a day:
866-855-6947

Canadian WHMIS Classification (s):

<p>E - Corrosive</p> 	<p>D1B- Toxic</p> 
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2. Composition / Information On Ingredients

Name:	Conc. % By Weight	CAS No.
Potassium Hydroxide	50% or less	1310-58-3

3. Hazard Identification

Emergency Overview:

White to light grey, odorless, viscous liquid

DANGER Corrosive. Causes severe burns to skin, eyes and digestive tract.

Harmful if swallowed or inhaled.

Routes of Entry:

INHALATION

Breathing of mist is possible. Breathing this material is harmful and can cause death. Harmful effects include burns and permanent damage to the airways, including the nose, throat and lungs.

SKIN

Causes skin burns and permanent skin damage.

EYES

Causes burns and permanent injury to eye tissue. Can cause blindness.

INGESTION

Swallowing this material may be harmful or cause death. Harmful effects include burns and permanent damage to the digestive tract, including the mouth, throat, stomach and intestines. Symptoms may include severe abdominal pain and vomiting of blood. Blood loss through damaged tissue can lead to low blood pressure and shock.

Symptoms of Exposure:

Depending upon level and duration of exposure, other possible signs and symptoms from breathing, swallowing, and contact of this material with the skin may include: irritation of the nose, throat, airways, and lungs with cough, sneezing, perforation of the nasal septum, and blindness.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Preexisting disorders of the following organs or systems which may be aggravated by exposure to this material (or a component) include: respiratory system (including asthma and other breathing disorders), and eyes.

EFFECTS FOLLOWING REPEATED EXPOSURE

This material may cause the following effects: eye damage, blindness, respiratory tract damage (nose, throat, airways) lung damage, skin damage, and gastrointestinal tract damage.

4. First Aid Measures

Skin:

Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. Wash for at least 15 to 20 minutes. Get immediate medical attention. Wash clothing before reuse and throw away shoes which cannot be thoroughly cleaned.

Eyes:

Hold the eyelids apart and flush the eye gently with a large amount of water for at least 15 to 20 minutes. Get immediate medical attention. Washing eyes within several seconds of contact is necessary

Inhalation:

Remove individual to fresh air and get immediate medical attention. If breathing is difficult, give oxygen. If breathing stops, give artificial respiration.

Ingestion:

Have a conscious person drink a glass of water or milk immediately if able to swallow. Get medical attention immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.

NOTES TO PHYSICIAN

Probable mucosal damage may contraindicate the use of gastric lavage.

5. Fire-Fighting Measures

Conditions Of Flammability:

Not combustible, however the product can react with metals such as aluminum, tin, zinc to form flammable and explosive hydrogen gas (see Reactivity Section 10)

Means To Extinguish:

Potassium hydroxide does not burn or support combustion. Use extinguishing agents compatible with potassium hydroxide and appropriate for the surrounding fire. If water is used, care should be taken, since it can generate heat and cause spattering if applied directly to potassium hydroxide.

DO NOT use carbon dioxide as an extinguishing agent.

FIRE FIGHTING INSTRUCTIONS

Evacuate area and fight fire from a safe distance or a protected location. Approach fire from upwind to avoid toxic decomposition products.

Water must be used with extreme caution to extinguish a fire in an area where potassium hydroxide is stored and must not come into contact with the potassium hydroxide.

Potassium hydroxide does not burn and does not support combustion. However, closed containers may rupture violently when exposed to the heat of the fire. If possible, isolate materials not yet involved in the fire and move containers from the fire area if this can be done without risk and they have not been exposed to heat. Use extreme caution since decomposition may occur under fire conditions and heat may rupture containers. If it is not possible to move containers, apply water in flooding quantities from the side and from a safe distance, to keep fire-exposed containers, tanks or car/trailer loads cool and absorb heat to help prevent rupture, and protect personnel. If necessary, use unmanned monitors and hoseholders to keep cooling streams of water on fire-exposed tanks or containers until well after the fire is out. Water spray may also be used to knock down corrosive and toxic fumes and vapours which may be produced in a fire. Fire control or dilution water may be corrosive and/or toxic. Dike fire control water for appropriate disposal.

Withdraw immediately in case of rising sound from venting safety device or any discolouration of tank. ALWAYS stay away from the ends of tanks, but be aware that flying material (shrapnel) from ruptured tanks may travel in any direction. Tanks or drums should not be approached directly after they have been involved in a fire, until they have been completely cooled down.

Protection of Fire Fighters: Potassium hydroxide solid and solutions are very corrosive and at high temperatures decomposition occurs giving off strong, corrosive fumes of potassium oxide. Do not enter without wearing specialized equipment suitable for the situation. Firefighter's normal protective clothing (Bunker Gear) will not provide adequate protection. Chemical protective clothing (e.g. chemical splash suit) and positive pressure self-contained breathing apparatus (NIOSH approved or equivalent) may be necessary.

Hazardous Combustion Products :

None

Flash Point & Method: Not applicable
Upper Flammability Limit: Not applicable
Lower Flammability Limit: Not applicable
Auto-Ignition Temperature: Not applicable
Mechanical Impact Sensitivity: Not sensitive
Static Discharge Sensitivity: Not applicable

6. Accidental Release Measures

Leak Or Spill Procedures :

Cleanup personnel must wear proper protective equipment (refer to Section 8). Completely contain spilled material with dikes, sandbags, etc., and prevent run-off into ground or surface waters or sewers. Recover as much material as possible into containers for disposal. Remaining material may be neutralized with dilute hydrochloric or acetic acid. Neutralization products, both liquid and solid, must be recovered for disposal. Reportable Quantity (RQ) is 1000 lbs. Notify National Response Center (1-(800)-424-8802) of uncontained releases to the environment in excess of the RQ.

Waste Control Procedures :

All disposals of this material must be done in accordance with Federal, state and local regulations. Waste characterization and compliance with disposal regulations are the responsibilities of the waste generator.

SPILL RESIDUES

Recovered solids or liquids may be sent to a licensed reclaimer or disposed of in a permitted waste management facility. Consult Federal, state, or local disposal authorities for approved procedures. Do not dump into any sewers, on the ground, or into any body of water.

7. Handling Storage

Handling Procedures And Equipment :

Do not get in eyes, on skin or on clothing. Avoid breathing mist. Do not taste or swallow. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any protective clothing or shoes which become contaminated with caustic potash should be removed immediately and thoroughly laundered before any reuse.

Follow protective controls set forth in Section 8 when handling this product.

When diluting with water, slowly add caustic potash solution to cold water with mixing. Heat will be produced during dilution. Full protective clothing, goggles and faceshield should be worn. Do not add large quantities of water to caustic potash because excessive heat formation will cause boiling and spattering.

Storage:

Store in closed, properly labeled tanks or containers. Do not remove or deface labels or tags. Contact of caustic potash cleaning solutions with food and beverage products (in enclosed vessels or spaces) can produce lethal concentrations of carbon monoxide gas. Do not enter confined spaces such as tanks or pits without following proper entry procedures as required by U.S. OSHA 29 CFR 1910.146 or other local regulatory standard.

INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT

Aluminum equipment should not be used for storage and/or transfer.

8. Exposures Controls / Personal Protection

Protective Equipment:

EYE AND FACE PROTECTION

Wear chemical goggles. A face shield should be worn in addition to goggles where splashing or spraying is possible. A full face respirator, in place of goggles and a face shield, will also provide excellent face protection.

SKIN PROTECTION

Wear chemical resistant clothing, boots, and gloves, which are made of neoprene, PVC, or rubber. Always place pants legs over boots.

RESPIRATORY PROTECTION

Where concentrations exceed or are likely to exceed 2 mg/m³ use a NIOSH approved high-efficiency particulate filter with full face piece or self-contained breathing apparatus. Follow any applicable respirator use standards and regulations.

GENERAL

Safety shower and eyewash station must be provided in the immediate work area. Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations. For further information, contact the clothing or equipment manufacturer.

Engineering Controls:

VENTILATION

As necessary to maintain concentration in air below 2 mg/m³ at all times. To determine the exposure level(s), monitoring should be performed regularly.

9. Physical And Chemical Properties

State: Viscous liquid
Odour: Odorless
Odour Threshold: Not applicable
Boiling Point: 45% Solution: ~270°F (132°C)
50% Solution: ~290°F (143°C)
Melting Point:
Freezing Point: 45% Solution: -22°F (-30°C)
50 % Solution: +39°F (+4°C)
pH: ≥14 (at high alkali concentration in water pH scale is not applicable)
Coefficient Of Water/Oil Distribution: Not available
Appearance: Clear to white/light gray
Specific Gravity: 45% Solution: 1.457 @ 60/60°F
50% Solution: 1.516 @ 60/60°F
Vapour Pressure: 45% Solution: 39 mm Hg at 140°F (60°C) 50% Solution: 27 mm Hg at 140°F (60°C)
Vapour Density: N/A
Evaporation Rate: Not available
Solubility In Water: Product is water solution and can be diluted at any ratio
Bulk Density: Not applicable

10. Stability And Reactivity

Chemical Stability:

Normally stable if kept dry. Rapidly absorbs moisture and carbon dioxide from the air forming potassium carbonate.

Reactivity Conditions:

Mixing with water, acid or incompatible materials can cause splattering and release of large amounts of heat (Refer to Section 8). Will react with some metals, such as aluminum, tin and zinc, forming flammable hydrogen gas.

Incompatible Substances:

Reacts vigorously or violently with many organic and inorganic chemicals such as: acids, acrolein, acrylonitrile, chlorinated hydrocarbons (e.g. 1,2 dichloroethylene, trichloroethylene), chlorine dioxide, maleic anhydride, nitroethane, nitroparaffins, 2-nitrophenol, nitropropane, phosphorus, potassium persulfate, and tetrahydrofuran (containing peroxides). Will react with aluminum, tin, zinc or sodium borohydride forming hydrogen.

Corrosivity to Metals:

Potassium hydroxide is very corrosive to all aluminum alloys at any concentration and any temperature. Potassium hydroxide is corrosive to brass (unspecified) (30-100% solutions), cartridge brass (40-100%), admiralty brass (100% solution), naval brass and yellow brass (all concentrations), bronze (unspecified) (50-100%), aluminum bronze (25%), silicon bronze (25%), tantalum (10-100%) and zinc (all concentrations) at room temperature. Potassium hydroxide solutions of all concentrations are not corrosive at room temperature to stainless steel (e.g. types 301, 303, 304, 305, 316, 347, 17-4PH, 400-series), carbon steel (types 1010 and 1020), ductile cast iron, nickel (types 200 and 201) and nickel-base alloys, Monel 400, Hastelloy C and Hastelloy C-276 and zirconium. Concentrations of 50-100% are not corrosive at room temperature to aluminum bronze and silicon bronze. Concentrations up to 70% are not corrosive at room temperature to Carpenter 20Cb-3, Inconel 600 and copper-nickel 70-30. Concentrations up to 50% are not corrosive at room temperature to Incoloy 800 and 825, copper and titanium.

Corrosivity to Non-Metals:

Potassium hydroxide attacks plastics, such as polyethylene terephthalate, polybutylene terephthalate, thermoset polyesters (bisphenol-A fumarate (50-100%), isophthalic acid and general purpose), polyamide-imide (Torlon), polyurethane (rigid) and thermoset chlorinated polyester; elastomers, such as styrene-butadiene (SBR), polyacrylate, polyurethane, fluorosilicone, silicone, chlorinated polyethylene and soft rubber; and coatings, such as polyester and vinyls (5-100%) and epoxy (general purpose and chemical resistant epoxy) (50-100%) at room temperature.

Potassium hydroxide does not attack plastics, such as Teflon and other fluorocarbons, like ethylene tetrafluoroethylene (ETFE; Tefzel), ethylene chlorotrifluoroethylene (ECTFE; Halar), chlorotrifluoroethylene (CTFE; Kel-F) and polyvinylidene fluoride (PVDF; Kynar), polyvinylidene chloride (Saran), chlorinated polyvinyl chloride (CPVC), polyvinyl chloride (PVC), polypropylene, nylon 6, nylon 89, nylon 11, nylon 12, acrylonitrile-butadiene-styrene (ABS), styrene-acrylonitrile (SAN), polyetherether ketone (Peek), chlorinated polyether (Penton), thermoset bisphenol-A fumarate polyester (up to 50%), high density polyethylene (HDPE), ultra high molecular weight polyethylene (UHMPE), crosslinked polyethylene (XPE), polyphenylene oxide (Noryl), thermoset vinyl ester, thermoset epoxy and ethylene vinyl acetate elastomers, such as nitrile rubber (NBR; nitrile Buna N), Viton A and other fluorocarbons, like Chemraz, Kalrez and Teflon, ethylene propylene (EP), ethylene propylene diene (EPDM), chloroprene (neoprene); butyl rubber (isobutylene isoprene; IIR), natural rubber, synthetic isoprene, chlorosulfonated polyethylene (Hypalon; CSM), low density polyethylene (LDPE), nylon 11, nylon 12, flexible polyvinyl chloride (PVC) and ethylene vinyl acetate (EVA) (34,37); and coatings, such as coal tar epoxy and epoxy polyamide (5-50%), epoxy (general purpose and chemical resistant) and phenolic (5-27%) at room temperature.

Hazardous Decomposition Products:

Will not decompose.

11. Toxicological Information

Skin Contact: Major potential hazard - contact with the skin can cause severe burns with deep ulcerations. Contact with solution or mist can cause multiple burns with temporary loss of hair at burn site. Solutions may not cause immediate pain or irritation upon skin contact. Prolonged or repeated contact with dilute solutions may cause drying and cracking of skin and possible skin damage.

Skin Absorption: It can penetrate to deeper layers of skin and corrosion will continue until removed. The severity of injury depends on the concentration and the duration of exposure.

Eye Contact: Major potential hazard – Liquid in the eye can cause severe destruction and blindness. These effects can occur rapidly affecting all parts of the eye. Mist or dust can cause irritation with high concentrations causing destructive burns.

Inhalation: By analogy with sodium hydroxide, inhalation of solution mist is expected to cause mild irritation at 2 mg/m³. More severe burns and tissue damage in the upper respiratory tract can occur at higher concentrations. Pneumonitis can result from severe exposures.

Ingestion: Ingestion of potassium hydroxide can cause severe burning and pain in lips, mouth, tongue, throat and stomach. Severe scarring of the throat can occur after swallowing. Death can result from ingestion. There is one reported case of of biaural hearing loss (!) after accidental ingestion of potassium hydroxide.

LD₅₀: there are several different numbers published:
205 mg/kg (rat oral) (1975)
365 mg/kg (rat oral) (1975)
273 mg/kg (male rat oral) (1987)
273 mg/kg (rat oral) (1996)

LC₅₀: n/a

Exposure Limits: PEL TWA (OSHA) 1989 is vacated.
Ceiling Exposure Limit (ACGIH 2005): 2 mg/m³
NIOSH Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 2 mg/m³

Irritancy: A study with a 10% solution showed severe tissue damage when applied to skin for 4 hours.

Sensitization: Not available

Carcinogenicity: One study was identified relative to potassium hydroxide and carcinogenicity. Mice painted with a 3 to 6% aqueous potassium hydroxide solution for 46 weeks developed skin tumors. This study was conducted in 1925 and the adequacy of the test and its design are unknown. No conclusions can be drawn from this study
Potassium hydroxide is not listed on the IARC, OSHA or NTP carcinogen lists.

Teratogenicity & Mutagenicity: Not available

Reproductive Toxicology: Not available

Toxicological Synergism: Not available

12. Ecological Information

Ecological Information:

No data available

Biodegradability:

Not biodegradable (Biodegradability term pertains to an organic material capable of decomposition as a result of attack by microorganisms). However, potassium hydroxide will be neutralized by acidity present in natural environment.

Aquatic Toxicity:

May cause shifts in water pH outside the range of pH 5 -10. This change may be toxic to aquatic organisms.

LC50: (24 Hours, static) for fresh water Mosquito Fish: 80.0 mg/L

(24 Hours, static) for Guppy: 165 mg/L

13. Disposal Considerations

Disposal Considerations:

Consider recycle or re-use where possible. Do not discharge to sewers or any body of water. Disposal must be in compliance with Federal, State/Provincial and local regulations.

14. Transportation Information

Shipping Name (TDGR)	UN Number	Hazard Class	Packing Group
Potassium Hydroxide, Solution	UN 1814	8	II

15. Regulatory Information

This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR .

Safety:

U S FEDERAL REGULATIONS

OSHA Hazard Communication Evaluation :

Meets criteria for hazardous material, as defined by 29 CFR 1910.1200.

CANADA

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) CLASSIFICATION

WHMIS Classifications applicable to this product:

WHMIS Classification :

D1B - Poisonous and infectious material - Immediate and serious effects - Toxic

E - Corrosive material

HAZARDOUS PRODUCTS ACT

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR).

Environmental:

U S FEDERAL REGULATIONS

REPORTABLE QUANTITY (RQ)

Reportable Quantity (RQ) is 1000 lbs.

TOXIC SUBSTANCES CONTROL ACT

Listed on TSCA Inventory

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III

Components identified with an asterisk (*) in Section 2 are subject to the reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372.

CANADA

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

All components of this product are on the Domestic Substances List (DSL).

Transportation:

Refer to Section 14.

ERG Number 154

16. Other Information

NFPA RATINGS

Health 3, Flammability 0, Instability 1

Prepared By:

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Summary of Changes Made in this Revision :

An error in freezing point of potassium hydroxide solutions was corrected.

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