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Safety Data Sheet

Potassium Hydroxide (flake)

I IDENTIFICATION

Synonyms	KOH, caustic potash, potassium hydrate, potash lye
CAS #	1310-58-3
Europe EC #	215-181-3
Material Use	inorganic synthesis, soft & liquid soaps, electrolyte (alkaline batteries & some fuel cells), inks, dyestuffs, electroplating, photogravure & many others

EMERGENCY INFORMATION

In the U.S.A.	Call CHEMTREC	(800) 424-9300
In Canada	Call CANUTEC (collect)	(613) 996-6666

II HAZARD IDENTIFICATION

GHS Class (Category)	<i>acute, oral</i> (3)	<i>acute, skin</i> (4)	<i>skin, eye, corrosive</i> (1A)
Signal Words	DANGER	WARNING	DANGER
Hazard Statements	<i>toxic if swallowed</i> (H301)	<i>harmful in contact with skin</i> (H312)	<i>causes severe skin burns & eye damage</i> (H314)



GHS Precautionary Statements for Labelling

P262, P264	Do not get in eyes, on skin or on clothing. Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear eye protection, protective gloves and clothing of butyl or neoprene (<i>never leather</i>).
P313 & P333	If skin irritation or rash occurs, get medical advice/attention.
P305, P351, P338	Rinse cautiously with water for several minutes. Remove contact lenses if present & easy to do. Continue rinsing.

III COMPOSITION

	CAS NUMBER	%	TLV ppm / mg/m ³	LD ₅₀ (mg/kg) ORAL	LD ₅₀ (mg/kg) SKIN	LC ₅₀ ppm INHALATION
Potassium Hydroxide	1310-58-3	100%	2	>205	>1260	not known

IV FIRST AID

SKIN:	Immediately , wash with plenty of water. Remove contaminated clothing and do not reuse until laundered. NOTE: Caustic burns may be painless . . . !!
EYES:	Immediately , wash eyes with plenty of water, holding eyelids open. Seek medical help promptly!
INHALATION:	Remove from contaminated area promptly. CAUTION: Rescuer must not endanger himself! If breathing stops, administer artificial respiration and seek medical aid promptly.
INGESTION:	Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly!

NOTE: Corrosive substance: apply first aid immediately! Inadvertent inhalation of vomited material may seriously damage the lungs. The stomach should only be emptied under medical supervision, after the installation of an airway to protect the lungs.

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V FLAMMABILITY & FIRE-FIGHTING

Flash Point	cannot burn
Autoignition Temperature	cannot burn
Combustion Products	potassium oxide
Firefighting Precautions	as for materials sustaining fire – but, do not use CO₂ ; apply water cautiously – <i>water reacts with solid potassium hydroxide producing sufficient heat to cause fire, also wet potassium hydroxide is more hazardous than the dry material</i> ; firefighters must wear SCBA
Static Discharge	cannot accumulate a static charge

VI ACCIDENTAL RELEASE MEASURES

Leak Precaution	not applicable – <i>solid material</i>
Handling Spill	shovel spilled material into closed containers for disposal; allow residue to self-neutralise with carbon dioxide in air; cover with dust-suppressing sweeping compound, sweep & shovel into closed containers

VII HANDLING & STORAGE

Deliquescent substance; store and use in a cool, dry environment, away from substances named in Part 10. **Do not handle this product without appropriate protective clothing** – water-proof gloves, eye protection, water-proof apron & boots (**never leather!**) as a minimum. If dissolving in water, water-proof long sleeves, apron, hat & a face shield must be worn as well.

Never add water to this product! To dissolve, add product to water gradually **with continuous agitation**. Ensure solution temperature remains well below the boiling point. **If dissolving in a plastic container, ensure the temperature remains well below the softening temperature of the plastic!**

Potassium hydroxide is deliquescent. Spilled product will absorb sufficient moisture from the air to dissolve. Do not touch puddles which may have formed in this manner! The spill will gradually neutralise itself with CO₂ from the air, forming a potassium carbonate solution. *Potassium carbonate is less corrosive than potassium hydroxide, but still corrosive to skin!* Avoid all contact with skin. Wash work clothes often. **An eye bath & safety shower must be available at workplace.**

NOTE: Detailed instructions for the safe handling of Potassium Hydroxide, solid & solutions, are available in Reference #2.

VIII EXPOSURE CONTROL & PERSONAL PROTECTION

ACGIH TLV-C	2mg/m ³	ACGIH STEL	not listed
OSHA PEL-C	2mg/m ³	OSHA STEL	not listed
Ventilation	probably not required – <i>dust tends not to form due to product's ability to absorb moisture rapidly from air</i>		
Hands	water-proof gloves (butyl, neoprene, PVC, "Viton") – <i>always confirm suitability with supplier</i>		
Eyes	safety glasses with side shields or chemical goggles – <i>always protect eyes!</i>		
Clothing	water-proof apron & boots recommended for handling dry material; more extensive protection (face shield, water-proof hat & long sleeves, required for handling solutions, which may splash		

IX PHYSICAL AND CHEMICAL PROPERTIES

NOTE: for Flash Point, Autoignition Temp, & Flammable Limits see Part 5.

Odour & Appearance	colourless, odourless flakes; deliquescent solid (<i>absorbs moisture from air to form a solution</i>)
Odour Threshold	not known – <i>odourless</i>
Vapour Pressure	0.0076mmHg / 0.001kPa (520°C / 968°F) – <i>no detectable pressure at ambient temperature</i>
Evaporation Rate (<i>Butyl Acetate = 1</i>)	not known – <i>not volatile</i>
Vapour Density (air = 1)	approx. 2 (<i>theoretical value only</i>)
Boiling Point	1327°C / 2421°F ¹
Melting Point	406°C / 763°F ¹
Specific Gravity	2.04 (20/20°C) ¹
Water Solubility	1.12kg/litre (25°C / 77°F) ¹ , also 1.21kg/litre (25°C / 77°F) ¹
- in other solvents	ethanol, methanol and other polar solvents
Log P _{ow} (Octanol/H ₂ O partition)	not known
pH	13.5 (0.5% solution) – highly alkaline, highly aggressive alkali
Molecular Weight	56grams/mole

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X REACTIVITY

Dangerously Reactive With	strong acids, acid anhydrides, acid chlorides, organohalogens, organic peroxides; creates flammable hydrogen with aluminum, tin, zinc; phosphorous producing flammable phosphine gas
Also Reactive With	corrodes copper & its alloys, tin, zinc, aluminium, and steel at elevated temperature; forms toxic carbon monoxide with reducing sugars (eg: fructose, lactose, maltose); attacks protein (eg: wool, leather, silk, skin); generates heat on contact with water;
Chemical Stability	stable; will not polymerize – <i>but causes polymerisation of acrylonitrile, acrolein, acetaldehyde</i> ;
Decomposes in Presence of	reacts with carbon dioxide in air to form potassium carbonate (<i>less hazardous than potassium hydroxide</i>)
Decomposition Products	apart from Hazardous Combustion Products, potassium carbonate
Mechanical Impact	not sensitive

XI TOXICITY INFORMATION**i. ACUTE EXPOSURE**

Skin Contact	highly corrosive to skin producing deep chemical burns with permanent scarring if not washed off promptly; NOTE: Burns may be painless giving little or no warning of the damage occurring!
Skin Absorption	not absorbed – <i>severe damage prevents absorption</i>
Eye Contact	corrosive if not removed promptly – likely leading to severe corneal scarring & possible blindness
Inhalation	of dust or solution mist severely corrosive to lung tissue; pulmonary oedema may occur, even death
Ingestion	severely corrosive to mouth, throat & stomach causing pain, vomiting, etc; may be fatal – <i>not a route of industrial exposure</i>
LD ₅₀ (oral)	273mg/kg (rat, male), 205, 214-329, 333 ¹ , 365 ¹ & 310-429mg/kg (rat)
LD ₅₀ (skin)	>1260mg/kg (rabbit)
LC ₅₀ (inhalation)	<i>no data available</i>

ii. CHRONIC EXPOSURE

General	prolonged or repeated exposure to small amounts or dilute solutions likely to cause dermatitis
Sensitising	not a sensitiser*
Carcinogen/Tumorigen	not known to be a tumorigen or a carcinogen in humans or animals*
Reproductive Effect	no known effect on humans or animals*
Mutagen	not known to be a mutagen or teratogen in humans or animals*
Synergistic With	not known*

* *Severe initial effect makes investigation of chronic effects difficult, perhaps impossible – and somewhat irrelevant!*

XII ECOLOGICAL INFORMATION

Bioaccumulation	cannot bioaccumulate
Biodegradation	inorganic substance cannot biodegrade
Abiotic Degradation	avidly absorbs moisture, forming a concentrated solution; this self-neutralises with atmospheric CO ₂ to the (<i>considerably less alkaline but still corrosive</i>) potassium carbonate
Mobility in soil, water	water soluble substance moves readily through soil and the water column
Ecotoxicity	toxic to the marine environment when concentrated; highly water soluble, it dilutes readily, becoming less toxic as it does so; self-neutralises with atmospheric carbon dioxide gradually reducing hazard
Aquatic Toxicity	
LC ₅₀ (Fish 24 hr)	80mg/litre (Gambusia affinis), 50mg/litre (Salvelinus fontinalis) ¹ , 56mg/litre (Lepomis macrochirus) ¹
EC ₅₀ (Crustacea, 48hr)	10mg/litre (Dreissena polymorpha zebra mussel)
EC ₅₀ (Algae)	not known
EC ₅₀ (Bacteria)	not known

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XIII DISPOSAL CONSIDERATIONS

Waste Disposal **do not flush to sewer**; a licensed waste disposal specialist will neutralise with acid waste & dispose of the result; *eg: dissolve slowly in water & neutralise with acetic acid – resulting sodium acetate is harmless*

Containers **Drums** should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.
Pails must be vented and thoroughly dried prior to crushing and recycling.
IBCs (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5 years). Steel containers must be inspected, pressure tested & recertified every 5 years.
Warning: never cut, drill, weld or grind on or near this container, even if empty.

XIV TRANSPORT INFORMATION**USA 49 CFR & Canada TDG**

Product Identification Number

Shipping Name

Classification

Marine Pollution**ERAP Required****Reportable Quantity (RQ)**

UN – 1813

**potassium hydroxide, solid
Class 8; Packing Group II
not a marine pollutant**

No

1000lbs (454kg)**XV REGULATIONS**

Canada DSL

on inventory

U.S.A. TSCA

ACTIVE

Europe EINECS

on inventory***This very common substance is on most national chemical inventories.*****U.S.A. Regulations:**

Allowable Tolerances: Residues of potassium hydroxide are exempted from the requirement of a tolerance when used as a neutralizer in accordance with good agricultural practices as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest. Potassium hydroxide meeting Food Chemicals Codex specifications is exempted from the requirement of a tolerance when used as a neutralizer in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to animals.

OSHA Standards: Vacated 1989 OSHA PEL TWA 2 mg/cu m is still enforced in some states.

NIOSH Recommendations: Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 2 mg/cu m.

Threshold Limit Values: Ceiling Limit: 2 mg/cu m.

Clean Water Act Requirements: Designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance.

CERCLA Reportable Quantities: Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 1000 lb or 454 kg. The toll free number of the NRC is (800) 424-8802; In the Washington D.C. metropolitan area (202) 426-2675. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV, D.3.b).

FIFRA Requirements: Residues of potassium hydroxide are exempted from the requirement of a tolerance when used as a neutralizer in accordance with good agricultural practices as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest. Potassium hydroxide meeting Food Chemicals Codex specifications is exempted from the requirement of a tolerance when used as a neutralizer in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to animals. As the federal pesticide law FIFRA directs, EPA is conducting a comprehensive review of older pesticides to consider their health and environmental effects and make decisions about their future use. Under this pesticide reregistration program, EPA examines health and safety data for pesticide active ingredients initially registered before November 1, 1984, and determines whether they are eligible for reregistration. In addition, all pesticides must meet the new safety standard of the Food Quality Protection Act of 1996. Pesticides for which EPA had not issued Registration Standards prior to the effective date of FIFRA, as amended in 1988, were divided into three lists based upon their potential for human exposure and other factors, with List B containing pesticides of greater concern and List D pesticides of less concern. Potassium hydroxide is found on List D. Case No: 4065; Pesticide type: fungicide, herbicide, antimicrobial; Case Status: RED Approved 09/92; OPP has made a decision that some/all uses of the pesticide are eligible for reregistration, as reflected in a Reregistration Eligibility Decision (RED) document.; Active ingredient (AI): Potassium hydroxide; AI Status: The active ingredient is no longer contained in any registered pesticide products ... "cancelled."

FDA Requirements: Substance added directly to human food affirmed as generally recognized as safe (GRAS) ... when used in food at levels not to exceed current good manufacturing practice. Potassium hydroxide used as a general purpose food additive in animal drugs, feeds, and related products is generally recognized as safe when used in accordance with good manufacturing or feeding practice.

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SARA

Physical Hazards

- Explosive
 Flammable
 Oxidizer (liquid, solid or gas)
 Self-reactive
 Pyrophoric (liquid or solid)
 Pyrophoric Gas
 Self-heating
 Organic peroxide
 Corrosive to metal
 Gas under pressure (compressed gas)
 In contact with water emits flammable gas
 Combustible Dust
 Hazard Not Otherwise Classified

Chemical Hazards

- Acute toxicity (any route of exposure)
 Skin corrosion or irritation
 Serious eye damage or eye irritation
 Respiratory or skin sensitization
 Germ cell mutagenicity
 Carcinogenicity
 Reproductive toxicity
 Specific target organ toxicity (single or repeated ex.)
 Aspiration hazard
 Simple Asphyxiant
 Hazard Not Otherwise Classified

XVI OTHER INFORMATION**Date of Preparation****September 2008****Date of Revision****December 2017, March 2016, September 2011, February 2019 (D. Moreno)**Prepared for Rierden Chemical & Trading Company, by **Peter Bursztyn**

With data from Registry of Toxic Effects of Chemical Substances (RTECS - USA), Hazardous Substance Data Base (HSDB - USA), Cheminfo (CCOHS - Canada), OSHA website, European Chemicals Agency (EChA) dossiers & other sources (below if used), as required/available.

(1) European Chemicals Agency (EChA) dossier for potassium hydroxide:

<http://echa.europa.eu/registration-dossier/-/registered-dossier/15804>

(2) Caustic Potash Handbook – Occidental Chemical Corporation:

<http://www.oxy.com/ourbusinesses/chemicals/products/documents/causticpotash/kohhandb.pdf>

last page of SDS**PLEASE ENSURE THAT THIS SDS IS GIVEN TO, AND EXPLAINED TO PEOPLE USING THIS PRODUCT.****EMERGENCY INFORMATION:****Call CHEMTREC****(800) 424-9300**