

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

## 1. IDENTIFICATION

### 1. Product Name

- 1) Product Name : POTASSIUM HYDROXIDE - LIQUID
- 2) Other Name : POTASSIUM HYDROXIDE, POTASSA, LYE, CAUSTIC LYE

### 2. Recommended Use and Restriction on Use

- 1) General use : Additive of food production, Organic Synthesis material
- 2) Restriction on Use : Not available

### 3. Manufacturer/Distributor Information :

Manufacturer	Address	Emergency Phone No. :	Division in charge
UNID Co., Ltd. Incheon Plant	115, Aam-daero 287beon-gil(Hakik-Dong), Nam-Ku, Incheon. Korea.	(TEL)+81-32-830-7777 (FAX)+81-32-832-4491	Environmental Safety Team

Home Page : [www.unid.co.kr](http://www.unid.co.kr)

## 2. HAZARD IDENTIFICATION

### 1. GHS Classification

Physical Hazards	Health Hazards	Environmental Hazards
Corrosive to metals Cat. 1	Acute toxicity Cat. 4(Oral) Skin corrosion/irritation Cat. 1	-

### 2. GHS label elements, including precautionary statements

#### 1) Hazard symbols



#### 2) Signal word : Danger

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

3) Hazard statement

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

4) Precautionary statement

Prevention	<ul style="list-style-type: none"> <li>- . P234 Keep only in original container.</li> <li>- . P264 Wash hands thoroughly after handling.</li> <li>- . P270 Do not eat, drink or smoke when using this product.</li> <li>- . P260 Do not breathe dust/fume/gas/mist/vapours/spray.</li> <li>- . P280 Wear protective gloves/protective clothing/eye protection/face protection.</li> </ul>
Response	<ul style="list-style-type: none"> <li>- . P390 Absorb spillage to prevent material damage.</li> <li>- . P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.</li> <li>- . P330 Rinse mouth.</li> <li>- . P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.</li> <li>- . P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.</li> <li>- . P363 Wash contaminated clothing before reuse.</li> <li>- . P304+P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.</li> <li>- . P310 Immediately call a POISON CENTER or doctor/physician.</li> <li>- . P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</li> </ul>
Storage	<ul style="list-style-type: none"> <li>- . P406 Store in corrosive resistant/container with a resistant inner liner.</li> <li>- . P405 Store locked up.</li> </ul>
Disposal	<ul style="list-style-type: none"> <li>- . P501 Dispose of contents/container in accordance with local/regional/national/international regulation.</li> </ul>

3. Other hazards which do not result in classification :

- . Carbon monoxide when reacting with carbohydrates, and hydrogen gas when reacting with aluminum, zinc and tin.
- . Skin exposure may cause serious damage.
- . Exposure to dust or mist may cause nasal septum disorder.
- . Eye contact may cause conjunctival edema and corneal destruction.
- . Inhalation may cause severe pain in the upper respiratory tract.
- . Ingestion may cause vomiting, diarrhea and burning pain in the throat and mouse.
- . Severe exposure may cause pneumonia, circulatory failure and peritonitis.
- . NFPA Grade (0~4 level) : Health-3, Flammability-0, Reactivity-1

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	Other name	CAS Number	Contents(%)
POTASSIUM HYDROXIDE	-	1310-58-3	20~52%
WATER	-	7732-18-5	48~80%

Chemical Name	CAS NO	KE NO	UN NO	EN NO
POTASSIUM HYDROXIDE	1310-58-3	KE-29139	1813	215-181-3

### 4. FIRST-AID MEASURES

#### 1. Eye Contact :

- Immediately hold eyelids apart and flush the eye continuously with running water for at least 15 minutes.
- Ensure irrigation under eyelids by occasionally lifting the upper and lower lids.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

#### 2. Skin Contact :

- Immediately flush the affected area with large amounts of water for at least 15 minutes.
- Remove contaminated clothing and shoes immediately.
- Transport to hospital, or doctor.

#### 3. Inhalation :

- Remove exposed person to fresh air.
- If not breathing, give artificial respiration.
- If breathing is difficult, give oxygen.
- Get medical attention immediately.

#### 4. Ingestion :

- Wash out mouth with water.
- If swallowed do NOT induce vomiting.
- Never give anything by mouth to an unconscious person.
- Give large amounts of water or 2-4 cups of milk if conscious.
- Lay the patient down as head would be lower than body for suffocation prevention if occur

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

vomiting.

-. Get medical attention immediately.

5. Delayed and immediate effects and also chronic effects from short and long term exposure :

- . If inhalation may cause nose and throat pain.
- . May cause severe Eye, skin and respiratory irritation or burns.
- . If ingestion may cause nausea, vomiting and stomach burns.

6. First-aid treatment and note to physician :

- . Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- . Do not try to gastric lavage or induce vomiting.
- . Treatment may vary with condition of victim and specifics of incident.

## 5. FIRE-FIGHTING MEASURES

1. Suitable (Unsuitable) extinguishing media :

- . Extinguishing media : foam, Water, Dry chemical powder, CO2
- . If large fire, use regular extinguishing media or flood with fine water spray.
- . Unsuitable extinguishing media : Do not use water-jet.

2. Specific hazards arising from the chemical :

- . Hazardous combustion product :  
Thermal decomposition may produce toxic or/and corrosive fume of potassium oxide.
- . Fire & Explosion hazard: May be ignored.

3. Special protection actions and equipments for fire-fighting :

- . Firefighters should wear self contained breathing apparatus and protective clothing.
- . If safe to do so, remove containers from path of fire.
- . If removal is impossible, cool containers and surrounding area with water.
- . Cool containers with flooding quantities of water until well after fire is out.
- . Wear full body protective clothing with breathing apparatus.
- . Do not allow run-off from fire fighting to enter drains or water courses.
- . Do not approach the edges of the tank.
- . Avoid inhalation of vapor and keep upwind.

## 6. ACCIDENTAL RELEASE MEASURES

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		Page : 5/12

### 1. Personal precautions

- Wear appropriate personal protective equipment and avoid inhalation or contact with eyes and skin.
- Wear appropriate personal protective equipment(see section 8. EXPOSURE CONTROLS/PERSONAL PROTECTION).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Do not touch or walk through spilled material.
- Isolate the site as a leak area by providing a zone that has an appropriate width to all directions.
- Stop leak if you can do it without risk.
- Keep unnecessary people away.
- Isolate hazard area and deny entry.
- Ventilate leak areas.

### 2. Environmental precautions :

- Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.
- If large spills, advise emergency services.

### 3. Methods and materials for containment and cleaning up

#### 1) Small spills

- Absorb for use sand or other non-combustible material.
- Rinse residue with plenty of water and neutralize
- Collect spilled material in appropriate container for disposal.

#### 2) Large spills

- Contain spill with sand, earth or vermiculite.
- dike for later disposal. Isolate hazard area and deny entry.
- Prevent runoff into waterways, sewers, basements or confined spaces.
- Neutralise/decontaminate residue.
- Wash spill area with water

## 7. HANDLING AND STORAGE

### 1. Handling

- Avoid breathing dust and contact with the eyes, skin.
- Wear appropriate personal protective equipment(see section 8. EXPOSURE CONTROLS /PERSONAL PROTECTION).
- Use in a well-ventilated area.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.
- Avoid contact with heat, open flames, sparks and other source of ignition
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

re-use.

## 2. Storage Precautionary Statements

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Avoid contact with heat, open flames, sparks and other source of ignition
- Store away from water or moisture and store in dry area(strong hygroscopic property).
- Do not store in steel, copper, tin, aluminum or its alloy container.
- Store in room temperature to prevent freezing during the winter.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

### 1. Exposure Limits

- Exposure limit under ISHL(KOREA) : TWA (C2 mg/m<sup>3</sup>), STEL ( - )
- ACGIH limit : TLV 2 mg/m<sup>3</sup> Ceiling
- Biological exposure limits : Not applicable

### 2. Engineering Controls

- The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fume hood. Provide mechanical ventilation of confined spaces.

### 3. Personal Protective Equipment

#### 1) Respiratory Protection :

- Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
- Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
  - Dust, mist, fume-purifying respiratory protection
  - Any air-purifying respirator with a corpuscle filter of high efficiency
  - Any respiratory protection with a electromotion fan(for dust, mist, fume-purifying)
- For Unknown Concentration or Immediately Dangerous to Life or Health
  - Self-contained breathing apparatus(pressure-demand or other positive-pressure mode in combination)
  - Supplied-air respirator with full facepiece

#### 2) Eye protection :

- Wear primary eye protection such as splash resistant safety goggles with a secondary

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

protection faceshield.

-. Provide an emergency eye wash station and quick drench shower in the immediate work area.

3) Hand protection : Wear appropriate protective gloves.

4) Body protection : Wear appropriate protective cloth.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

1. Appearance : Liquid / Transparent ~ Opaque
2. Odor : No odor
3. Odor threshold : Not available
4. pH : 12.0 (0.1 M Solution)
5. Melting point / Freezing point : Refer to table
6. Initial Boiling Point / Boiling Ranges : Refer to table
7. Flash point : Not available (Nonflammable)
8. Evaporation Rate : Not available
9. Flammability (solid, gas) : Not applicable
10. Upper/Lower Flammability or explosive limits : Not available (Nonflammable)
11. Vapor pressure : Refer to table Refer to table
12. Solubility : 100g/90 ml at 25°C (water), soluble : ethanol, glycerin
13. Vapor density : (air=1) 0.62
14. Relative density : Refer to table
15. Partition coefficient of n-octanol/water : Not available
16. Autoignition Temp. : Not available (Not applicable)
17. Decomposition Temp. : Not available
18. Viscosity : Refer to table
19. Molecular weight : Not applicable

PROPERTIES \ WT%	20%	30%	45%	50%	52%
Boiling Point (°C)	104.94	112.8	133.0	143.0	148.8
Freezing point (°C)	-23.3	-58.9	-31.7	4.4	15.6
Vapor pressure (@20°C, mm Hg)	14.5	11.5	4.1	2.5	2.0
Relative density (15.6/15.6°C)	1.190	1.292	1.457	1.516	-
Viscosity (CP @15.6°C)	1.8	2.6	4.9	6.0	6.8

## 10. STABILITY AND REACTIVITY

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

#### 1. Stability

- This material is stable under recommended storage at normal temperature and pressure.
- When dissolved in the water, may produce dilution heat.

#### 2. Possibility of Hazardous Reaction

- Polymerization : Will not occur.

#### 3. Conditions to Avoid

- Keep away from heat, flame, sparks and source of ignition.

#### 4. Materials to Avoid

- Acid, Combustible materials, Metals, halocarbon compounds, oxidizer, metal salt, reductant, reducing agent materials

#### 5. Hazardous Decomposition Products :

- Thermal decomposition may produce toxic or/and corrosive fume of potassium oxide.
- Carbon monoxide when reacting with carbohydrates, and hydrogen gas when reacting with aluminum, zinc and tin.

## 11. TOXICOLOGICAL INFORMATION

#### 1. Information of Exposure route :

- 1) (Respiratory tract) : May cause respiratory irritation.
- 2) (Oral) : Harmful if swallowed
- 3) (Eye ·Skin) : Causes severe skin burns and eye damage

#### 2. Delayed and immediate effects and also chronic effects from short and long term exposure

##### 1) Acute Toxicity :

- Oral Toxicity : LD50 = 333mg/kg b.w.(Rat ; Sprague-Dawley.)
- Dermal Toxicity : Not available
- Inhalation Toxicity : Not available

##### 2) Skin corrosion/irritation :

- Application of KOH 10% during the 4hours in a rabbit Draize test, KOH was appeared as corrovie.

##### 3) Serious eye damage/irritation :

- Reporeted as cause irreversible damage in human and in a rabbit Draize test.



UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

- 4) Respiratory sensitization : Not available
- 5) Skin sensitization :
  - . In the intracutaneous skin sensitisation test with guinea pig, allergic skin reactions wasnot observed.
- 6) Carcinogenicity : Not applicable
- 7) Germ cell mutagenicity :
  - . KOH was not mutagen because negative results were obtained in bacterial reverse mutation assay and in a mouse bone micronucleus test.
- 8) Reproductive toxicity :
  - . No adverse effects were observed in the reproductive sturdy using mouse or rat.
- 9) Specific Target organ Toxicity(single exposure) :
  - . Inhalation of dust or mist may cause injury in nose and respiratory.
- 10) Specific Target organ Toxicity(repeated exposure) : Not available
- 11) Aspiration hazard : Not available

## 12. ECOLOGICAL INFORMATION

1. Ecotoxicity :
  - . Toxicity to fish : LC50=80mg/L, 96hr, Gambusia affinis(non-GLP)
  - . Toxicity to daphnia magna : EC50=660mg/L, 48hr, Daphnia magna(non-GLP)
  - . Toxicity to algal : EC50=1337mg/L, 120hr, Nitscheria linearis(non-GLP)
2. Persistence and degradability :
  - . Persistence : log Kow -3.88
3. Bioaccumulation :
  - . Bioaccumulation : BCF 3.162
  - . Biodegration : Ready biodegration(BiOWin 5)
4. Mobility in soil : Not available
5. Other adverse effects : Not available

## 13. DISPOSAL CONSIDERATIONS

1. Disposal methods :

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

- The user of this product must properly characterize the waste/container generated from the use of this product in accordance with all applicable federal, state and/or local laws and regulations in order to determine the proper disposal of the waste in accordance with all applicable federal, state and/or local laws and regulations.

2. Special precautions for disposal

- The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.
- Dispose of waste in accordance with local regulation.

## 14. TRANSPORT INDORMATION

1. UN Number : UN 1814
2. UN Proper Shipping name : POTASSIUM HYDROXIDE, LIQUID
3. Transport hazard class(es) : 8
4. Packing group : 2
5. Sea pollutants : Not applicable
6. Special precautions for user related to transport or transportation measures :
  - EmS FIRE SCHEDULE : F-A
  - EmS SPILLAGE SCHEDULE : S-B

## 15. REGULATORY INFORMATION

1. ISHL(The industrial Safety and Health Law in Korea)
  - ; Environment monitoring required substances
  - Korea occupational exposure limits
  - Hazardous Substances Requiring Management
2. Chemical Control Act in Korea(CCA in Korea)
  - ; Toxic Chemical [POTASSIUM HYDROXIDE and its compounds: Contents > 5 %]
3. Dangerous goods Safety Management Law in Korea : Not applicable
4. Waste Management Law in Korea : Designated waste
5. Other regulations
  - 1) POPs Management Law : Not applicable
  - 2) Information of EU Classification :
    - Classification :
    - Xn (Harmful) : R22

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

C (Corrosive) : R35

-. Symbol(s) and Indication(s) of Danger :

R22 : Harmful if swallowed.

R35 : Causes severe burns.

-. Risk and Safety 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).

3) US REGULATIONS :

-. CERCLA section 103 (40 CFR 302.4) : POTASSIUM HYDROXIDE 1000 LBS RQ

-. SARA section 302 (40 CFR 355.30) : Not regulated

-. SARA section 304 (40 CFR 355.40) : Not regulated

-. SARA Hazard Categories, SARA section 311/312 (40 CFR 370.21)

ACUTE: YES

CHRONIC: NO

FIRE: NO

REACTIVE : YES

SUDDEN RELEASE : NO

-. SARA section 313 (40 CFR 372.65) : Not regulated

-. OSHA regulation (29 CFR 1910.119) : Not regulated

-. US STATE REGULATIONS :

CALIFORNIA PROPOSITION 65 (Safe Drinking Water and Toxic Enforcement Act)

: Not regulated

4) Chemical inventory status:

-. US inventory (TSCA): listed.

-. TSCA 12(b) Export Notifications : Not listed.

5) Others

-. Rotterdam Convention on Harmful Chemicals & Pesticides : Not applicable

-. Stockholm Convention on Persistent Organic Pollutants : Not applicable

-. Montreal Protocol on Substances That Deplete the Ozone Layer : Not applicable

## 16. OTHER INFORMATION

UNID Co., Ltd. Incheon Plant	MATERIAL SAFETY DATA SHEET (MSDS-GHS)	Issue date : 2010.3.12
	POTASSIUM HYDROXIDE-LIQUID	Revised date:2015.8.6.
MSDS-Prod-003(R2)		

1. Reference

- 1) The Korea Occupational Safety and Health Agency ; KOSHA MSDS
- 2) Korea regulations
  - : Industrial Safety and Health Law, Waste Management Law, Chemical Control Act in Korea, Enforcement Decree of The Water Quality and Ecosystem Conservation Act.
2. Issue date : 2010. 03. 12 (Full revision according to the GHS harmonized criteria)
3. Revision number and Last date revised : 2015. 8. 6
4. Written Authority : UNID Co., Ltd. (<http://www.unid.co.kr> Tel. 032-830-7777)