



CHIN CHA-ROEN INTERCHEM CO.,LTD.

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## MATERIAL SAFETY DATA SHEET

### 1. Information about the Chemical Product and the Company

#### Product(Synonym, Trade name)

- ☐ CAUSTIC POTASH
- ☐ POTASSIUM HYDROXIDE
- ☐ KOH

#### General features

- ☐ As a colorless and odorless solid having deliquescence. it easily absorbs moisture and carbon dioxide in the air.

#### Harmful classification

- ☐ Corrosive substance

#### Use

- ☐ Additive of food, raw materials for an organic compound

#### Manufacturer detail

- ☐ Unid Co., Ltd. Incheon Factory
- ☐ 587-84 Hagik 1-dong, Nam-gu, Incheon
- ☐ TEL(032-830-7777) / FAX(032-832-4491)

#### Supplier detail

- ☐ Firm name :
- ☐ Address :
- ☐ Tel :

#### Preparation dept. & date

- ☐ Unid Co., Ltd. Incheon Factory Safe Environment Team
- ☐ Date of preparation : July 02, 1996

#### Revised date & details

- ☐ Revised date : Aug. 31, 2007
- ☐ Revision : the 4<sup>th</sup> (R4)

### 2. Name and Composition of Components

#### Chemical name(Contents %)

- ☐ POTASSIUM HYDROXIDE : 90~95%

#### Another name(Contents %)

- ☐ Caustic potash

#### Identification number

- ☒ CAS number (1310-58-3) / ☐ EC classification NUMBER ( - ) / ☐ UN Number (1813) / ☐ OSHA ( - )
- ☐ RTECS (TT2100000)

### 3. Hazard · Harmfulness

#### NFPA Grade(0~4 level)

- ☐ Health : 3
- ☐ Fire : 0
- ☐ Reactivity : 1

#### EU Classification

- ☐ C Corrosive substance
- ☐ R35 : Causes severe burns

#### Imminent Hazard · Harmfulness Info.

- ☐ Physical state : White and odorless solid of a flake type.
- ☐ If swallowed, it is harmful and causes a burn to a mucous membrane, a respiratory organ, the skin and the eyes.
- ☐ Reacts to water
- ☐ Do not inhale steam or dust
- ☐ Do not bring it into contact with the eyes, the skin and clothing
- ☐ Wash thoroughly after handling.
- ☐ Use under proper ventilation.
- ☐ The container should be completely destroyed after use.

#### Effect on eyes

- Short term exposure
  - ▷ Causes a burn
  - ▷ Additionally causes damage to an eye
  - ▷ Direct exposure to a solid or liquid may cause severe pain and burns
  - ▷ Damage degree differs according to concentration and the exposure time
  - ▷ Causes edema, destruction of epithelial cell, turbidity of the cornea and iritis
  - ▷ If the damage is not serious, the patient gradually recover.
  - ▷ In case of a severe burn, damage degree immediately appears.
  - ▷ As a complication, edema, vascularization, corneal cicatrix, loss of sight, staphyloma, a cataract, symblepharon appear.
- Long term exposure : Same as the reported effect on short-term exposure
  - ▷ Damage degree differs according to concentration and the exposure time
  - ▷ Repetitive and continuous exposure to steam or dust causes conjunctivitis or short-term exposure symptoms.



### Effect on the skin

#### ● Short term exposure : Burns

- ▷ Causes severe pain, burns and a brown scar.
- ▷ The decayed region becomes smooth and necrotized like gelatin, and damage to the skin may be severe.

#### ● Long term exposure : Same as the effect reported on short term exposure

- ▷ Shows the same symptoms as those according to dermatitis and direct exposure.
- ▷ Dermatitis was induced when the skin of a mouse was in frequent contact with 3-6% of potassium hydroxide for 46 weeks.

### When inhaled

#### ● Short term exposure

- ▷ Causes burns
- ▷ Additionally causes difficulty in breathing, low blood pressure, sleepiness, cyanoderma, and pulmonary congestion
- ▷ Inhaling dust and mist induces a cough, obstruction of the airway, a pain in the nose, mouth and neck, diseases of the nasal cavity diaphragm and burns of a mucous membrane.
- ▷ If enough amount is inhaled, this causes lung edema after the latent period of 5-72 hours.
- ▷ Symptoms such as pressure of the chest, difficulty in breathing, cyanoderma, sleepiness, and so forth appear.
- ▷ Symptoms may develop into a fast and a slow pulse, low blood pressure, blood concentration, wet rale.

#### ● Long term exposure

- ▷ In addition to short-term effects, causes indigestion.
- ▷ Continuous and repetitive exposure according to exposure degree and continuous time cause an inflammation and an ulcer of the mouth, and a disease of the bronchus and gastrointestinal tract.

### When swallowed

#### ● Short term exposure

- ▷ If swallowed, it is harmful and causes burns
- ▷ Additionally causes vomiting, diarrhea and a stomachache.
- ▷ Fatal dose of a rat is 273 mg/kg.
- ▷ Shows severe pains, vomiting, diarrhea and a symptom of collapse
- ▷ If a patient would not die within 24 hours, he recovers for 2-4 days and suffers torture from a sudden stomachache indicating perforation of the stomach and esophagus, abdominal tetany and reduction of blood pressure.

● Long term exposure

- ▷ May show the same symptom as short-term exposure by a swallow.
- ▷ A repetitive swallow which depends on concentration is similar to an acute symptom.

Chronic sign & symptom

- ☐ N/A

Tumorigenicity

- ☐ Industrial Safety & Health Act : No regulation
- ☐ OSHA(Occupational Safety Health Administration) : No regulation
- ☐ NTP(National Toxicology Program) : No regulation
- ☐ IARC(International Agency for Research on Cancer) : No regulation

4. First-aid Treatment

When put in eyes

- ☐ Wash immediately with large amount of water for at least 15 ~20 minutes while holding eyelids open till it is evident that chemical substance is washed away.
- ☐ Wash continuously with water or physiological saline for about 30~60 minutes until you get a help with a doctor.
- ☐ Apply a sterilized bandage.
- ☐ Take medical treatment right away.
- ☐ If you wear contact lenses, remove them before starting any work.

When in contact with the skin

- ☐ Remove contaminated clothing and shoes immediately.
- ☐ Wash the affected area with large amount of water using soap or mild detergent for 15~20 minutes at least until it is evident that there is no chemical substances left.
- ☐ If you get a skin burn, wrap the affected area loose with a sterilized gauze.
- ☐ Take medical treatment right away.

When inhaled

- ☐ Immediately remove the patient where the air is fresh.
- ☐ If the patient stop breathing, try artificial respiration.
- ☐ Keep the patient warm and comfortable.
- ☐ Take medical treatment right away.



When swallowed

- ☐ Do not vomit
- ☐ If a patient is unconscious or not able to swallow, do not give anything to eat and lay the head to one side.
- ☐ Have the person drink large amount of water or milk right away.
- ☐ In case a patient vomits, keep the head lower than the his hips for preventing him from stopping breathing.
- ☐ Take medical treatment right away.

Warnings of a doctor

- ☐ Antidote : No antidote is available
- ☐ In case of inhalation, oxygen supply must be considered / In case of a swallow, endoscopy of the esophagus must be considered.
- ☐ Avoid washing out the stomach / The patient must be functionally cured according to symptoms.

5. How to handle on explosion + fire

Flash point	Spontaneous ignition point	Explosion(combustion) lowest limit	Explosion(combustion) upper limit	Ignition Level
N/A	N/A	N/A	N/A	N/A

The classification and regulations according to the Fire Fighting Act

- ☐ N/A(No regulation)

Extinguishant

- ☐ Powder extinguishant, carbon dioxide, water, general foam
- ☐ Use minute water sprinkle, fog or regular foam in case of a big fire

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#### Fire-extinguishing method & equipment

- ☐ If possible, remove a container from fire area
- ☐ After a fire was out, make cool the side of the container exposed to flames by watering it for a long time.
- ☐ Keep away from the tank as far as possible
- ☐ Use appropriate fire-extinguishing chemicals
- ☐ Use large amount of water in mist type (Do not spray water directly on the material)
- ☐ Extinguish fire from a distance if possible

#### Hazardous substance from combustion

#### Prohibited extinguishant

- ☐ Pyrolysis product may contain fume of ☐ N/A hazardous corrosive potassium oxide.

#### Fire & Explosion Risk

- ☐ Fire risk is negligible even if it is exposed to heat or a flame.

#### 6. How to deal with leak

##### To protect the human body

- ☐ Do not touch the leakage unless equipped with a protective gear.
- ☐ Stop (or minimize) leak if you can without being exposed to a danger.
- ☐ Forbid unauthorized entry.
- ☐ Isolate a danger area
- ☐ Confine the leakage (small spills - sweep up with a broom)
- ☐ Collect the leakage as much as possible (Vacuum up or use a shovel)
- ☐ Neutralize the remaining leakage with a weak acid.
- ☐ Isolate the container from contaminated area, mark and remove it to safe area.
- ☐ Wear protective equipment and clothing
- ☐ Comply with the regulations of the Other Hazardous Chemicals Control Act.

##### To protect environment

- ☐ Large spill - Report spills to the related administrative body and neighborhood through emergency call as regulated.
- ☐ Keep waste water from flowing into waterway, drain or underground.



### Purification or Removal

#### ● Soil spill

- ▷ If possible, collect it
- ▷ Neutralize the residue with a weak acid (Hydrochloric acid, sulfuric acid, phosphoric acid, nitric acid, etc.)
- ▷ Comply with preferentially the regulations of the Soil Environment Preservation Act.

#### ● Spill in the air

- ▷ Attention should be paid so as not to raise the dust.

#### ● Underwater spill: Neutralize the material with a weak acid.

## 7. Handling & Storage

### Handling

- In case making the diluted solution of potassium hydroxide, be sure to put potassium hydroxide into water (Absolutely do not put water into potassium hydroxide)
- Avoid bodily contact and persons handling Potassium Carbonate must always wear protective goggles, protective suit and protective gloves.
- When handling or working with Potassium Carbonate, wear protective goggles, protective suit, protective gloves (rubber, neoprene, or PVC), protective apron, Positive Pressure Self-Contained Breathing Apparatus to avoid short term contact with and repeated long term exposure to the chemical and work under hoods for better ventilation.
- Upon being contacted with this material, it destroys the cell of the skin, so absolutely do not work with bare hands.
- Remove contact lenses before starting any work.
- Do not smoke or have food while working.
- When manufacturing liquid, always you must slowly put the material into the surface of the liquid to be mixed. (Start with tepid water of 27~36°C).
- In case the concentration of potassium hydroxide becomes a certain degree, or put it into a liquid too fast, or put it into a hot or a cold liquid, a phenomenon of boiling up may occur.
- The container must be collected in accordance with the process required by the supplier and the regulation of the Road Traffic Act and the Hazardous Chemical Control Act.
- There must be no remaining potassium hydroxide in the packing containers before they are collected and destroyed in accordance with the regulations of the Waste Control Act.

### Storage

- ☐ Users should follow all the related regulations of the Industrial Safety & Health Act, the Hazardous Chemical Control Act and the Clean Water Environment Preservation Act.
- ☐ Containers should stand physical damage. Make them airtight and store in a dry, well-ventilated, cool and dark place to prevent the chemical from coming into contact with moisture and carbon dioxide in the air.
- ☐ Storing and transporting with food stuff, feed and medicine is prohibited. Use Local exhaust system, if necessary.
- ☐ Keep it in the dry place where it can be protected from moisture and water (A material highly hygroscopic)
- ☐ Keep away from an acid, metal, explosive inorganic peroxides, and a material which easily tends to ignite.
- ☐ Isolate it the materials that must not be kept with it.
- ☒ Do not put this product into storage together with Volatile Organic Compounds.  
if may be caused by "discoloration"

## 8. Exposure prevention & Personal Protection Equipment

### Engineering Management

- ☐ N/A

### Protection of respiratory organ

- ☐ Wear protective respirator, if used frequently, or standard for exposure exceeds.
- ☐ Respiration protection is classified from the minimum density to the maximum density, so consider characteristics before use.
  - ▷ Full face dustproof mask
  - ▷ Air-Purifying Respirator (Full face, Particulate filter)
  - ▷ Electronic Pan Respirator (Full face, High Efficiency Particulate filter)
- ☐ In case of imminent danger with life or health or unknown concentration.
  - ▷ All Self-contained full face respirator which is operated with positive pressure (SCBA).
  - ▷ Supplied Air Respirators (Full Face AIR LINE Mask)

### Eye protection

- ☐ Wear Safety Glasses (goggle type) to protect from hazardous dust or scatterer (Putting one over another would help.)
- ☐ Safety showers and eyewash fountains should be conveniently located, readily accessible to personnel in work places.



#### Hand protection

- ☐ Wear appropriate Chemical resistant gloves

#### Body protection

- ☐ Wear appropriate chemical resistant clothing

#### Hygienic caution

- ☐ To follow the allowable regulations, install Local Ventilation System and check if it fits into Exposure Standard

#### Exposure Standard

- ☐ The Industrial Safety & Health Act : TWA(C2 mg/m<sup>3</sup>) / STEL( - )
- ☐ Others
  - ▷ 2 mg/m<sup>3</sup> OSHA ceiling
  - ▷ 2 mg/m<sup>3</sup> ACGIH ceiling
  - ▷ 2 mg/m<sup>3</sup> NIOSH recommended ceiling

### 9. Physical & Chemical Properties

- |  |  |
|--|--|
| <input type="radio"/> Physical condition : Solid               | <input type="radio"/> Boiling point : 1320°C (@ 101 KPa)                   |
| <input type="radio"/> Shape : Transparent through opaque shape | <input type="radio"/> Melting point : 380°C                                |
| <input type="radio"/> Odor : Odorless                          | <input type="radio"/> Viscosity : N/A                                      |
| <input type="radio"/> Mol. Wt. : 56.11                         | <input type="radio"/> pH : 12.0 (0.01 M solution)                          |
| <input type="radio"/> Molecular formula : KOH                  | <input type="radio"/> Volatility : No                                      |
| <input type="radio"/> Vapor density : N/A                      | <input type="radio"/> Intoxication Limit : No                              |
| <input type="radio"/> Density : Unknown                        | <input type="radio"/> Solubility : Soluble(110g/100 ml @ 25°C)             |
| <input type="radio"/> Evaporation rate : N/A                   | <input type="radio"/> Solvent solubility : Soluble in alcohol and glycerin |

### 10. Stability and Reactivity

#### Chemical Stability

- ☐ Actively reacts to water

#### Conditions & Substance to avoid

- ☐ Conditions to avoid
  - ▷ It burns but does not easily ignite
  - ▷ Flammable and poisonous gas may be accumulated in a tank or a hopper car.
- ☐ Substance to avoid
  - ▷ Nitric acid: Actively reacts
  - ▶ Acid : Actively reacts
  - ▷ Acrolein : Active polymerization reaction

- ▶ Alcohol : Melts generating heat
- ▶ Aluminum : Corrodes when moisture exists
- ▷ Ammonium salt : Generates ammonia gas
- ▷ Benzoyl chloride + Sodium azide : Active exothermic reaction
- ▷ Para-bis(1,2-Dibromoethyl)benzene : exothermic reaction
- ▷ Bromoform : Active exothermic reaction
- ▷ Bromoform + Cyclic polyethylene oxide : Explosive reaction
- ▷ Calcium carbide + Chlorine : Forms explosive acetylene dichloride
- ▷ Chlorine dioxide : Blows up when in contact with this
- ▷ Chlorine + hydrogen peroxide : Generates red fluorescent light
- ▷ Chloroform + methanol : Active exothermic reaction
- ▷ 1,2-Dichloroethylene : Forms explosive and flammable acetylene chloride
- ▷ Cyclopentadiene : Forms exothermic resin
- ▷ Geranium : Candescent reaction
- ▶ Glass : This is slowly damaged
- ▷ Halogenated hydrocarbon : Active reaction
- ▷ nitride : Firing reaction
- ▷ Lead : Corrodes when moisture exists
- ▷ Anhydrous mallein : Exothermic or explosive resolution
- ▶ Metal : Corrodes with generation of flammable hydrogen gas
- ▷ N-Methyl-N-Nitrosourea + Methylene chloride : Explosive reaction
- ▷ Trichloro nitric acid : Explosive reaction
- ▷ Alkane nitrate : Forms explosive salt
- ▷ Nitro benzene + Methanol : Active exothermic reaction
- ▷ Nitro ethane : Forms explosive salt
- ▷ Ortho-Nitro phenol : Actively reacts
- ▷ Nitro propane : Forms explosive salt
- ▷ N-Nitrosomethylurea + N-Butylether : Forms explosive compounds
- ▷ Phosphorous : Forms flammable monochloride(일염화물)
- ▷ Peroxi potassium disulphate : Firing reaction
- ▷ Potassium peroxodisulphate + water : Exothermic reaction
- ▶ Sugar : Generates carbon monoxide at the temperature above 84℃
- ▷ Tetrachloroethane : Generates flammable chloroethylene
- ▷ 2,2,3,3-Propane tetrafluoride : Exothermic reaction
- ▷ Tetrahydrofuran : Explosive reaction
- ▷ Thorium dioxide : Candescent reaction when this is heated



- ▶ Tin : Corrodes when moisture exists
- ▷ Trichloroethylene : Generates dichloroethylene when this is heated
- ▷ 2,4,6-Toluene trinitrate + Methanol : Forms an explosive
- ▶ Zinc : Corrodes when moisture exists

#### Hazardous substance produced when decomposed

- ☐ On thermal decomposition, poisonous corrosive potassium oxide may be produced.

#### Polymerization

- ☐ There has not a report of risk polymerization at normal temperature and pressure.

### 11. Information on Toxicity

#### Irritation

- ☐ 50/mg 24 hours The skin - a man : serious(STANDARD DRAIZE TEST)
- ☐ 50/mg 24 hours The skin - a rabbit : serious(STANDARD DRAIZE TEST)
- ☐ 50/mg 24 hours The skin - GUINEA PIG : serious(STANDARD DRAIZE TEST)
- ☐ 1/mg 24 hours rinsing the eyes - a rabbit : ordinary stimulus(RINSED DRAIZE TEST)

#### Toxicity

- ☒ Acute poisonous character : 273 mg/kg(LD50, RAT)

#### Others

- ☐ Carcinogenesis : No regulation in the Industrial Safety & Health Act
- ☒ Local impact : corrosive agent - inhalation, the skin, the eyes, a swallow
- ☐ Degree of acute toxicity : If swallowed, it is poisonous
- ☐ Mutagenic data : Usable
- ☐ Case that exposure can increase hazard level : Eye disease, cutaneous disorder and allergy

### 12. Effect on Environment

#### Aquatic & ecological Toxicity

- ☐ BLUEGILL(Fresh water, fatal) : 56PPM/24hr
- ☐ MINNOW(Fresh water, fatal) : 28.6PPM/24hr
- ☐ TROUT(Fresh, fatal) : 50PPM/24hr
- ☐ Even if very low concentration of this material is contained in the water, it is harmful to aquatic organisms.

#### Soil movability

- ☐ N/A

Residual property &  
Resolvability

☐ N/A

Possibility of accumulation in  
a living body

☐ N/A

### 13. Caution on Disposal

Restrictions under the laws related to environment preservation

- ☐ When disposing of hydroxide, comply with the regulations of the Hazardous Chemical Control Act, the Water Quality Environment Preservation Act and the Soil Environment Preservation Act.
- ☐ When disposing of a packing container, make sure that potassium hydroxide does not remain in the container and comply with the regulations of the laws related environment such as the Waste Control Act.

How to dispose

- Dilute with large amount of water before neutralizing. Large amount of heat are emitted while diluting or neutralizing, so be careful.
- Neutralize with a weak acid (Hydrochloric acid, Sulfuric acid, etc.)

Caution on disposal

- Do not bury it in the ground.
- Prevent spills from spreading to outside and follow the relevant law.

### 14. Information for Transportation

Classification & control according to Dangerous Article  
Shipping & Storage Rules of the Vessel Safety Act

- U.S. DOT shipping name and ID number(49 CFR 172.101)
  - ▷ Potassium hydroxide(UN 1813) – SOLID

Caution on transportation

- ☐ Comply with the relevant regulations of the Hazardous Chemical Control Act.

Classification & control by other countries

- UN Hazard Level Classification : 8
- ☐ UN Packing Category: II
- ☐ U.S. DOT Hazard Classification(40 CFR 172.101) : Corrosive substance
- ☐ U.S. DOT Indication Standard(49 CFR 172.101) : Corrosive
- ☐ U.S. DOT Packing Standard(49 CFR 173.119)



- ▷ Exception : 49 CFR 173. 154
- ▷ Small packing : 49 CFR 173.202
- ▷ Large packing : 49 CFR 173.242
- U.S. DOT shipping name and ID number(49 CFR 172.101) .
  - ▷ Potassium hydroxide(UN 1813) – SOLID
- U.S. DOT Hazard Level Classification(49 CFR 172.101) : 8 – Corrosive substance
- U.S. DOT Limit(49CFR 172.101) : Airplane or train for a passenger → 1L / Airplane only for cargos → 30L

## 15. Control Laws

### National Law

- Industrial Safety & Health Act : Allowable concentration
- Hazardous Chemical Control Act : Poisonous substance
- Fire Firing Act : No regulation.

### Other Foreign Law

- USA Regulation
  - ▷ TSCA Product List Status: Regulated
  - ▷ CERCLA 103 Regulation (40CFR 302.4) : Regulated
  - ▷ SARA 302 Regulation (40CFR 355.30) : No regulation
  - ▷ SARA 304 Regulation (40CFR 355.40) : No regulation
  - ▷ SARA 313 Regulation (40CFR 372.65) : No regulation
  - ▷ OSHA Regulation(29CFR 1910.119): No regulation
  - ▷ CALIFORNIA Proposal 65 : No regulation
  - ▷ SARA Hazard Category : Article 311/312 of SARA (40 CFR 370.21)
    - Acute : Regulated
    - Chronic : No regulation
    - Fire : Regulated
    - Reactivity : Regulated
    - Sudden Discharge : No regulation

## 16. Others

- This material is prepared by Unid Co., Ltd. Incheon Factory, Safe Environment Team on the basis of Material Safety Data Sheet of Korea Occupational Safety & Health Agency, CHLORINE INSTITUTE PAMPHLET #87 #88, Poisonous materials of Ministry of Environment, CAUSTIC POTASH HAND BOOK, the Industrial Safety & Health Act, the Waste Control Act, the Hazardous Chemical Control Act, and the Clean Water & Environment Act.