SECTION 1 – THE IDENTIFICATION OF THE HAZARDOUS CHEMICAL AND OF SUPPLIER

CAS NO
1310 – 73 – 2

PRODUCT NAME
CAUSTIC SODA (25% - 49% Liquid)

PROPER SHIPPING NAME
SODIUM HYDROXIDE SOLUTION

PRODUCT USE
Metal finishing, Industrial cleaner, Chemical Processing, Petroleum Industry, Effluent Water Treatment. pH control agent.

MANUFACTURER
MALAY-SINO CHEMICAL INDUSTRIES SDN. BHD.
Lot 4406, Kawasan Perindustrian Teluk Kalong,
24000 Kemaman, Terengganu, Malaysia.
Telephone: (609) 8633529/30
Fax: (609) 8633531
Email: sds@malay-sino.com.my
Toll Free No: 1800-88-0732

SECTION 2 – HAZARD IDENTIFICATION

ICOP Classification
Skin corrosion category 1A
Serious eye damage category 1

EMERGENCY OVERVIEW
Signal Word: DANGEROUS

DETERMINED BY USING ICOP CRITERIA
HAZARD STATEMENT
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
PRECAUTIONARY STATEMENTS

Prevention

<table>
<thead>
<tr>
<th>Code</th>
<th>Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>P260</td>
<td>Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.</td>
</tr>
<tr>
<td>P264</td>
<td>Wash hand thoroughly after handling.</td>
</tr>
<tr>
<td>P280</td>
<td>Wear protective gloves/ protective clothing/ eye protection/ face protection.</td>
</tr>
</tbody>
</table>

Response

<table>
<thead>
<tr>
<th>Code</th>
<th>Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>P301+P330+P331</td>
<td>IF SWALLOWED: Rinse mouth. DO NOT induce vomiting.</td>
</tr>
<tr>
<td>P303+P361+P353</td>
<td>IF ON SKIN (or hair): Remove / take off immediately all contaminated clothing. Rinse skin with water/shower.</td>
</tr>
<tr>
<td>P304+P340</td>
<td>IF INHALED: Remove victim to fresh air and keep.</td>
</tr>
<tr>
<td>P305+P351+P338</td>
<td>IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</td>
</tr>
<tr>
<td>P310</td>
<td>Immediately call a POISON CENTER or doctor / physician.</td>
</tr>
<tr>
<td>P321</td>
<td>Specific treatment.</td>
</tr>
<tr>
<td>P363</td>
<td>Wash contaminated clothing before reuse.</td>
</tr>
</tbody>
</table>

Storage

<table>
<thead>
<tr>
<th>Code</th>
<th>Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>P405</td>
<td>Store locked up.</td>
</tr>
</tbody>
</table>

Disposal

<table>
<thead>
<tr>
<th>Code</th>
<th>Phrase</th>
</tr>
</thead>
<tbody>
<tr>
<td>P501</td>
<td>Dispose of contents/ container to according appropriate schedule waste.</td>
</tr>
</tbody>
</table>

SECTION 3 – THE COMPOSITION AND INFORMATION OF THE INGREDIENTS OF HAZARDOUS CHEMICAL

<table>
<thead>
<tr>
<th>NAME</th>
<th>CAS RN</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Hydroxide</td>
<td>1310-73-2</td>
<td>25% - 50%</td>
</tr>
<tr>
<td>Water</td>
<td>7732-18-5</td>
<td>Remaining</td>
</tr>
</tbody>
</table>

SECTION 4 – FIRST AID MEASURES

SWALLOWED

- DO NOT delay.
- For advice, contact a Poisons Information Centre or a doctor at once.
- Urgent hospital treatment is likely to be needed.
If swallowed do NOT induce vomiting.
If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
Observe the patient carefully.
Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
Transport to hospital or doctor without delay.

EYE
- DO NOT delay.
  If this product comes in contact with the eyes:
  - Immediately hold eyelids apart and flush the eye continuously with running water.
  - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
  - Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
  - Transport to hospital or doctor without delay.
  - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN
- DO NOT delay.
  If skin or hair contact occurs:
  - Immediately flush body and clothes with large amounts of water, using safety shower if available.
  - Quickly remove all contaminated clothing, including footwear.
  - Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
  - Transport to hospital or doctor without delay.

INHALED
- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital or doctor without delay.

NOTES TO PHYSICIAN
- For acute or short-term repeated exposures to highly alkaline materials:
  - Respiratory stress is uncommon but present occasionally because of soft tissue edema.
Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.

Oxygen is given as indicated.

The presence of shock suggests perforation and mandates an intravenous line and fluid administration.

Damage due to alkaline corrosives occurs by liquefaction necrosis whereby the saponification of fats and solubilisation of proteins allow deep penetration into the tissue.

Alkalis continue to cause damage after exposure.

**INGESTION:**

- Milk and water are the preferred diluents.
  - No more than 2 glasses of water should be given to an adult.

- Neutralizing agents should never be given since exothermic heat reaction may compound injury.

- Catharsis and emesis are absolutely contra-indicated.

- Activated charcoal does not absorb alkali.

- Gastric lavage should not be used.

Supportive care involves the following:

- Withhold oral feedings initially.

- If endoscopy confirms transmucosal injury starts steroids only within the first 48 hours.

- Carefully evaluate the amount of tissue necrosis before assessing the need for surgical intervention.

- Patients should be instructed to seek medical attention whenever they develop difficulty in swallowing (dysphagia).

**SKIN AND EYE:**

- Injury should be irrigated for 20-30 minutes.
  - Eye injuries require saline. [Ellenhorn & Barceloux: Medical Toxicology]

---

**SECTION 5 – FIRE FIGHTING MEASURES**

**EXTINGUISHING MEDIA**

- Water spray or fog.
- Foam.
- Dry chemical powder.
- Carbon dioxide.

**FIRE FIGHTING**

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
Do not approach containers suspected to be hot.
Cool fire exposed containers with water spray from a protected location.
If safe to do so, remove containers from path of fire.
Equipment should be thoroughly decontaminated after use.
When any large container (including road and rail tankers) is involved in a fire, consider evacuation by 800 metres in all directions.

**FIRE/EXPLOSION HAZARD**
- Non combustible liquid.
  - Not considered to be a significant fire risk.
    - Heating may cause expansion or decomposition leading to violent rupture of containers.
    - Other combustion products include: caustic compounds.

**FIRE INCOMPATIBILITY**
- Avoid reaction with, acids, ammonium salts, strong oxidizers, organic materials/compounds.
- Reacts with aluminium/zinc producing flammable, explosive hydrogen gas.

### SECTION 6 – ACCIDENTAL RELEASE MEASURES

**MINOR SPILLS**
- NOT touch the spill material. Slippery when spilt.
- Clean up all spills immediately.
- Control personal contact with the substance, by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite. Place spilled material in clean, dry, sealable, labeled container.

**MAJOR SPILLS**
- DO NOT touch the spill material. Slippery when spilt.
- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labeled containers fro recycling.
- Neutralize/decontaminate residue (see Section 13 for specific agent).
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.
PROTECTIVE ACTIONS FOR SPILL

1. PROTECTIVE ACTION ZONE is defined as the area in which people are at risk of harmful exposure. This zone assumes that random changes in wind direction confines the vapour plume to an area within 30 degrees on either side of the predominant wind direction, resulting in a crosswind protective action distance equal to the down wind protective action distance.

2. PROTECTIVE ACTIONS should be initiated to the extent possible, beginning with those closest to the spill and working away from the site in the downwind direction. Within the protective action zone a level of vapour concentration may exist resulting in nearly all unprotected persons becoming incapacitated and unable to take protective action and/or incurring serious or irreversible health effects.

3. INITIAL ISOLATION ZONE is determined as an area, including upwind of the incident, within which a high probability of localized wind reversal may expose nearly all persons without appropriate protection to life-threatening concentrations of the material.

4. SMALL SPILLS involve a leaking package of 200 litres (55 US gallons) or less, such as a drum (jerrican or box with inner containers). Larger packages leaking less than 200 litres and compressed gas leaking from a small cylinder are also considered “small spills”.

5. LARGE SPILLS involve many small leaking packages or a leaking package of greater than 200 litres, such as a cargo tank, portable tank or a “one-tonne” compressed gas cylinder.


7. IERG information is derived from CANUTEC – Transport Canada.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)
The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing life-threatening health effects is: sodium hydroxide 50 mg/m³

irreversible or other serious effects or symptoms which could impair an individual’s ability to take protective action is: sodium hydroxide 5 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is: sodium hydroxide 0.5 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs
Very Toxic (T+)  >= 0.1 %  Toxic (T)  >= 3.0 %

R50  >= 0.25 %  Corrosive  >= 5.0 %
R51  >= 2.5 %
Else  >= 10 %

where percentage is percentage of ingredient found in the mixture

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 – HANDLING AND STORAGE

PROCEDURE FOR HANDLING
- Avoid generating and breathing mist.
- DO NOT allow clothing wet with material to stay in contact with skin.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- WARNING: To avoid violent reaction, ALWAYS add material to water and NEVER water to material.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately. Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storage and handling recommendations contained within this MSDS.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

SUITABLE CONTAINER
- DO NOT use aluminium, galvanized or tin-plated containers. Plastic carboy or Plastic container Plastic drum.
  Mild steel can.
- Check that containers are clearly labelled.
Packaging as recommended by manufacturer.

**STORAGE INCOMPATIBILITY**
- Avoid storage with acids, ammonium salts, strong oxidisers / organic compounds.

**STORAGE REQUIREMENTS**
- DO NOT use aluminium, galvanised or tin-plated containers.
- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storage and handling recommendations contained within this MSDS.

---

**SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS**

| +: May be stored together |
| O: May be stored together with specific precautions |
| X: Must not be stored together |

---

**SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION**

**EXPOSURE CONTROLS**

<table>
<thead>
<tr>
<th>Source Material</th>
<th>Ceiling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use and Standard Of Exposure Of Chemical Hazardous To Health (OSHA Act 1994) Permissible Exposure Limits of Toxic Substances</td>
<td>Caustic Soda 25%</td>
</tr>
</tbody>
</table>

**EMERGENCY EXPOSURE LIMITS**

<table>
<thead>
<tr>
<th>Material (ppm)</th>
<th>Revised IDLH Value (mg/m³)</th>
<th>Revised IDLH Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Hydroxide 1824</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>
MATERIAL DATA
CAUSTIC SODA 25%:
- None assigned. Refer to individual constituents.

SODIUM HYDROXIDE:
- for sodium hydroxide
  The TLV-C is recommended based on concentrations that produce noticeable but not excessive, ocular and upper respiratory tract irritation.

WATER:
- No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION

EYE
- Full face shield.
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent].

HANDS/ FEET
- Barrier cream and
- Wear chemical protective gloves, e.g. PVC.
- Wear safety gumboots, e.g. Rubber.

OTHER
- Overalls
- PVC Apron
- PVC protective suit may be required if exposure severe.
• Eyewash unit.
• Ensure there is ready access to a safety shower.

GLOVE SELECTION INDEX

- Glove selection is based on a modified presentation of the: "Forsberg Clothing Performance Index".
  The effect(s) of the following substance(s) are taken into account in the computer-generated selection: water, sodium hydroxide.

- Protective Material CPI*.

<table>
<thead>
<tr>
<th>Material</th>
<th>CPI</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUTYL</td>
<td>A</td>
</tr>
<tr>
<td>NEOPRENE</td>
<td>A</td>
</tr>
<tr>
<td>NATURAL RUBBER</td>
<td>B</td>
</tr>
<tr>
<td>VITON</td>
<td>C</td>
</tr>
</tbody>
</table>

A: Best Selection  
B: Satisfactory; may degrade after 4 hours continuous immersion  
C: Poor to Dangerous Choice for other than short term immersion  

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. —

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

RESPIRATOR


ENGINEERING CONTROLS

- Use in a well-ventilated area.
  Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

- The basic types of engineering controls are:
  Process controls which involve changing the way a job activity or process is done to reduce the risk.

  Enclosure and/or isolation of emission source which keeps a selected hazard "physically"
away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure.

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas.

### SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

**APPEARANCE**
Clear slightly hazy water-white strongly alkaline corrosive liquid. Miscible with water. Exothermic reaction on dilution with water.

**PHYSICAL PROPERTIES**
Liquid.
Mixes with water.
Corrosive.
Alkaline.

<table>
<thead>
<tr>
<th>State applicable</th>
<th>Liquid</th>
<th>Molecular Weight</th>
<th>Not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melting Range (°C)</td>
<td>- 18</td>
<td>Viscosity</td>
<td>Not</td>
</tr>
<tr>
<td>Boiling Range (°C)</td>
<td>112</td>
<td>Solubility in water (g/L)</td>
<td>Miscible</td>
</tr>
<tr>
<td>Flash Point (°C)</td>
<td>Non Flammable</td>
<td>pH (1 % Solution)</td>
<td>12.7</td>
</tr>
<tr>
<td>Decomposition Temp (°C)</td>
<td>Not Available</td>
<td>pH (as supplied)</td>
<td>12 – 14</td>
</tr>
<tr>
<td>Autoignition Temp (°C)</td>
<td>Not Applicable</td>
<td>Vapour Pressure (kPa)</td>
<td>13 mmHg @ 60°C(50%)</td>
</tr>
<tr>
<td>Upper Explosive Limit (%)</td>
<td>Not Applicable</td>
<td>Specific Gravity (water=1)</td>
<td>1.27 @20°C</td>
</tr>
<tr>
<td>Lower Explosive Limit (%)</td>
<td>Not Applicable</td>
<td>Relative Vapour Density (air=1)</td>
<td>Not available</td>
</tr>
<tr>
<td>Volatile Component (% vol)</td>
<td>Not Available (by wt)</td>
<td>Evaporation Rate</td>
<td>Very Slow</td>
</tr>
</tbody>
</table>
SECTION 10 – STABILITY AND REACTIVITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of water.
- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

For incompatible materials - refer to Section 7 - Handling and Storage.

SECTION 11 – TOXICOLOGICAL INFORMATION

Health hazard summary table:

<table>
<thead>
<tr>
<th>Health Effect</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Skin corrosion/irritation</td>
<td>Skin Corr. 1 A</td>
</tr>
<tr>
<td>Serious eye damage/irritation</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Respiratory or skin sensitization</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Germ cell mutagenicity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>Not applicable</td>
</tr>
<tr>
<td>STOT- single exposure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>STOT- repeated exposure</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Aspiration hazard</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

- Considered an unlikely route of entry in commercial/industrial environments

EYE

- The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

SKIN

- Bare unprotected skin should not be exposed to this material.
- The material may accentuate any pre-existing dermatitis condition.
- The material may cause skin irritation after prolonged or repeated exposure and may
produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling the epidermis. Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis.

**INHALED**
- Not normally a hazard due to non-volatile nature of product.
- The material may produce respiratory tract irritation. Symptoms of pulmonary irritation may include coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and a burning sensation. Unlike most organs, the lung can respond to a chemical insult or a chemical agent, by first removing or neutralising the irritant and then repairing the damage (inflammation of the lungs may be a consequence).

The repair process (which initially developed to protect mammalian lungs from foreign matter and antigens) may, however, cause further damage to the lungs (fibrosis for example) when activated by hazardous chemicals. Often, this results in an impairment of gas exchange, the primary function of the lungs. Therefore prolonged exposure to respiratory irritants may cause sustained breathing difficulties.

**CHRONIC HEALTH EFFECTS**
- Principal routes of exposure are usually by skin contact with the material, eye contact with the material and accidental ingestion.
  - A prompt response to all contact is imperative to minimize damage. Reaction to contact with broken skin is prompt and intense. Reaction to contact with intact skin apart from initial soapy feeling may be delayed, but unless removed quickly will result in burns, which may proceed to deep ulceration with scarring.

**TOXICITY AND IRRITATION**

**CAUSTIC SODA 25%:**
- Not available. Refer to individual constituents.

**SODIUM HYDROXIDE:**
- Unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

**TOXICITY**

<table>
<thead>
<tr>
<th>Substance</th>
<th>Route</th>
<th>Concentration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin (rabbit)</td>
<td>500 mg/24h</td>
<td>SEVERE</td>
<td></td>
</tr>
<tr>
<td>Eye (rabbit)</td>
<td>0.05 mg/24h</td>
<td>SEVERE</td>
<td></td>
</tr>
<tr>
<td>Eye (rabbit)</td>
<td>1 mg/24h</td>
<td>SEVERE</td>
<td></td>
</tr>
<tr>
<td>Eye (rabbit)</td>
<td>1 mg/30s rinsed</td>
<td>SEVERE</td>
<td></td>
</tr>
</tbody>
</table>
The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular edema of the spongy layer (spongiosis) and intracellular edema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.

WATER:
- No significant acute toxicological data identified in literature search.

SKIN
Sodium hydroxide  GESAMP/ EHS Composite List  D1: skin (3)
- GESAMP Hazard Profiles  irritation/ corrosion

SODIUM HYDROXIDE:
- Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. Environmental processes (such as oxidation and the presence of acids or bases) may transform insoluble metals to more soluble ionic forms. Microbiological processes may also transform insoluble metals to more soluble forms. Such ionic species may bind to dissolved ligands or sorb to solid particles in aquatic or aqueous media. A significant proportion of dissolved/ sorbed metals will end up in sediments through the settling of suspended particles. The remaining metal ions can then be taken up by aquatic organisms.

When released to dry soil most metals will exhibit limited mobility and remain in the upper layer; some will leach locally into ground water and/ or surface water ecosystems when soaked by rain or melt ice. Environmental processes may also be important in changing solubilities.

Even though many metals show few toxic effects at physiological pHs, transformation may introduce new or magnified effects.

A metal ion is considered infinitely persistent because it cannot degrade further.

The current state of science does not allow for an unambiguous interpretation of various measures of bioaccumulation.
The counter-ion may also create health and environmental concerns once isolated from the metal. Under normal physiological conditions the counter-ion may be essentially insoluble and may not be bioavailable. Environmental processes may enhance bioavailability.

Prevent, by any means available, spillage from entering drains or water courses. DO NOT discharge into sewer or waterways.

Ecotoxicity:
Fish LC50 (96h): 43mg/l

<table>
<thead>
<tr>
<th>Ecotoxicity</th>
<th>Persistence: Water/ Soil</th>
<th>Persistence: Air</th>
<th>Bioaccumulation</th>
<th>Mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium Hydroxide</td>
<td>LOW</td>
<td>No Data Available</td>
<td>LOW</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

SECTION 13 – DISPOSAL INFORMATION

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult State Land Waste Management Authority for disposal.
- Treat and neutralise with dilute acid at an effluent treatment plant.
- Recycle containers, otherwise dispose of in an authorised landfill.

SECTION 14 – TRANSPORTATION INFORMATION

Labels Required: CORROSIVE
Land Transport UNDG:
Class or division: 8
UN No: 1824
Shipping Name: SODIUM HYDROXIDE SOLUTION
Subsidiary risk: None
UN packing group: II

Air Transport IATA:
ICAO/ IATA Class: 8
UN/ ID Number: 1824
Special provisions: A3A803
Shipping Name: SODIUM HYDROXIDE SOLUTION
ICAO/ IATA Subrisk: None
Packing Group: II
Maritime Transport IMDG:
IMDG Class: 8  IMDG Subrisk: None
UN Number: 1824  Packing Group: II
EMS Number: F – A, S – B  Special Provisions: None
Limited Quantities: 1 L
Shipping Name: SODIUM HYDROXIDE SOLUTION

SECTION 15 – REGULATORY INFORMATION; AND

REGULATIONS
Occupational Safety & Health (Classification, Labeling, and Safety Data Sheet of Hazardous Chemical) Regulation 2013.

The Industry Code of Practice on Chemical Classification and Hazard Communication 2013 (ICOP CCHC).

Classified as Poison in Part II in the First Schedule of Poison Act 1952.

Regulations for ingredients
Sodium hydroxide (CAS: 1310-73-2, 12200-64-5) is found on the following regulatory lists;

Water (CAS: 7732-18-5) is found on the following regulatory lists;

SECTION 16 – OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS
Ingredient Name  CAS
sodium hydroxide  1310-73-2, 12200-64-5
EXPOSURE STANDARD FOR MIXTURES

- "Worst Case" computer-aided prediction of spray/ mist or fume/ dust components and concentration:

- Composite Exposure Standard for Mixture (TWA) :100 mg/m³.

- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the MSCI Classification committee using available literature references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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