Section 1 - Product and Company Information

Product Name: Sodium Hydroxide, SigmaUltra, minimum 98%
Product Number: 8045
Brand: Sigma Chemical
Company: Sigma-Aldrich
Street Address: 3500 Spruce Street
City, State, Zip, Country: SAINT LOUIS, MO 63133 US
Technical Phone: 314 771 5765
Fax: 800 325 0502
Emergency Phone: 414 273 3880 Ext. 5998

Section 2 - Composition/Information on Ingredient

Substance Name: Sodium Hydroxide
CAS #: 1310-73-2
SARA 313: No
EC No: 215-165-5
Annex I Index Number: 011-005-00-6

Formula: NaOH
Synonyms: Caustic soda, Hydroxyde de sodium (French), Lehre-roth devil's eye, Natriumhydroxid (German), Natriumhydroxyde (Dutch), Sodio hve, Sodio/laurotio di (Italian), Sodium hydrate, Sodium hydroxide (ACGIH/OSHA), Sodium(hydroxyde de) (French), White caustic

Section 3 - Hazards Identification

Emergency Overview: Corrosive. Causes severe burns. Exothermic in contact with water.
HMIS Rating: Health: 3 Flammability: 0 Reactivity: 2 Special Hazard(s): Water reactive
NFPA Rating: Health: 3 Flammability: 0 Reactivity: 2 Special Hazard(s): Water reactive

For additional information on toxicity, please refer to Section 1.

Section 4 - First Aid Measures

Oral Exposure: If swallowed, wash out mouth with water provided person is conscious. Call a physician immediately. Do not induce vomiting.
Inhalation Exposure: If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.
Dermal Exposure: In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

Section 5 - Fire Fighting Measures

Explosion Data: Sensitivity to Mechanical Impact: Contact with aluminum, tin and zinc liberates hydrogen gas. Contact with nitromethane and other similar nitro compounds causes formation of shock-sensitive salts.
Autoignition Temp: N/A
Extinguishing Media: Suitable: Use extinguishing media appropriate to surrounding fire conditions. Unsuitable: Do not use water.
Firefighting: Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Eject toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

Procedure to be Followed in Case of Leak or Spill: Evacuate area.
Procedure(s) of Personal Precaution(s): Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.
Methods for Cleaning Up: Sweep up, place in a bag and hold for waste disposal. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

Handling: User Exposure: Do not breathe dust. Do not get in eyes, on skin, or clothing. Avoid prolonged or repeated exposure.
Storage: Suitable: Keep tightly closed. Store in a cool dry place.
Incompatible Materials: Do not allow contact with water.

Section 8 - Exposure Controls / PPE

Engineering Controls: Safety shower and eyewash. Use only in a chemical fume hood.

Sigma Chemical - 8045 Sigma-Aldrich Corporation Page 2 www.sigma-aldrich.com
Eye
Chemical safety goggles.

General Hygiene Measures
Wash contaminated clothing before reuse. Discard contaminated shoes. Wash thoroughly after handling.

Exposure Limits

<table>
<thead>
<tr>
<th>Country</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poland</td>
<td>NDS</td>
<td>0.5 mg/m³</td>
</tr>
<tr>
<td>USA</td>
<td>PEL</td>
<td>2 mg/m³</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSCh</td>
<td>1 mg/m³</td>
</tr>
<tr>
<td>USA</td>
<td>TLV</td>
<td>2 mg/m³</td>
</tr>
<tr>
<td>Poland</td>
<td>NDSP</td>
<td></td>
</tr>
</tbody>
</table>

Exposure Limits, RTECS

<table>
<thead>
<tr>
<th>Country</th>
<th>Source</th>
<th>Type</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>ACGIH</td>
<td>Ceiling concentration</td>
<td>2 mg/m³</td>
</tr>
<tr>
<td>USA</td>
<td>MSHA Standard</td>
<td>Ceiling concentration</td>
<td>2 mg/m³</td>
</tr>
<tr>
<td>USA</td>
<td>OSHA</td>
<td>Ceiling concentration</td>
<td>8H TWA 2</td>
</tr>
<tr>
<td>New Zealand</td>
<td>OEL</td>
<td></td>
<td>MG/M³</td>
</tr>
<tr>
<td>USA</td>
<td>NICHC</td>
<td>Ceiling concentration</td>
<td>2 mg/m³/15M</td>
</tr>
</tbody>
</table>

Section 9 - Physical/Chemical Properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Physical State</th>
<th>Color</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molecular Weight</td>
<td>40 AMU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>13 - 14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SVP/K Range</td>
<td>1,390 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP/MP Range</td>
<td>318 °C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freezing Point</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>&lt; 16 mmHg</td>
<td>20 °C</td>
<td></td>
</tr>
<tr>
<td>Vapor Density</td>
<td>&gt; 1 g/l</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturated Vapor Conc.</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMD Density</td>
<td>2.13 g/m³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bulk Density</td>
<td>2.13 g/l</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color Threshold</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volatiles</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VOC Content</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Content</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solvent Content</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partition Coefficient</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decomposition Temp.</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash Point °F</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flash Point °C</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explosion Limits</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flammability</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autoignition Temp</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Solubility
N/A
N/A = not available

Section 10 - Stability and Reactivity

Stability
Stable.

Conditions of Instability
Absorbs carbon dioxide from air. Never add water to this material, always add this material to water.

Conditions to Avoid
Do not allow water to enter container because of violent reaction.
Matters to Avoid
Strong oxidizing agents, Strong acids, Organic materials.

Hazardous Decomposition Products
Sodium/iodine oxides.

Hazardous Polymerization
Will not occur.

Section 11 - Toxicological Information

Route of Exposure
Skin Contact
Causes burns.

Skin Absorption
May be harmful if absorbed through the skin.

Eye Contact
Causes burns.

Inhalation
Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion
May be harmful if swallowed.

Signs and Symptoms of Exposure
Inhalation may result in spasms, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.

Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS Number: WE4900200

Toxicity Data
Intrapetitoneal - Mouse: 40 MG/KG (LD50)

Irritation Data
Skin - Rabbit: 500 mg 24 HR
Remarks: Severe irritation effect

Eyes - Rabbit: 0.50 mg 24 HR
Remarks: Severe irritation effect

Eyes - Monkey: 1 % 24H
Remarks: Severe irritation effect

Skin - Rabbit: 500 mg 24H
Remarks: Severe irritation effect
Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

Appropriate Method of Disposal of Substance or Preparation
Contact a licensed professional waste disposal service to dispose of this material. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: Sodium hydroxide, solid
UN# : 1823
Class: II
Packing Group: Packing Group II
Hazard Label: Corrosive
PIH: Not PIH

IATA
Proper Shipping Name: Sodium hydroxide, solid
IATA UN Number: 1823
Hazard Class: II
Packing Group: II

Section 15 - Regulatory Information

EU Directives Classification
Symbol of Danger: C
Indication of Danger: Corrosive.
Risk Statements: R35
Causes severe burns.
Safety Statements: S26 37/38 45
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US Classification and Label Text
Indication of Danger: Corrosive.
Risk Statements: Causes severe burns.

Section 16 - Other Information

Disclaimer
For R&D use only. Not for drug, household or other uses.

Warranty
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropreate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2002 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.