

**MATERIAL SAFETY DATA SHEET**

**CAUSTIC SODA, ANHYDROUS**

**1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION**

Brenntag Canada Inc.  
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WHMIS#: 00040026  
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Website: <http://www.brenntag.ca>

**EMERGENCY TELEPHONE NUMBERS (FOR EMERGENCIES INVOLVING CHEMICAL SPILLS OR RELEASE)**

Toronto, ON (416) 226-6117  
Edmonton, AB (780) 424-1754

Montreal, QC (514) 861-1211  
Calgary, AB (403) 263-8660

Winnipeg, MB (204) 943-8827  
Vancouver, BC (604) 685-5036

**PRODUCT IDENTIFICATION**

Product Name: Caustic Soda, Anhydrous.  
Chemical Name: Sodium Hydroxide.  
Synonyms: Lye; Soda Lye; Caustic Soda Beads; Caustic Soda Flake; Caustic Soda Rayon; Caustic Soda Diaphragm; Caustic Soda Pels; Caustic Soda SP Pearls; Caustic Soda GER Pearls; Caustic Soda Micropearls.  
Chemical Family: Alkali. Hydroxide.  
Molecular Formula: NaOH.  
Product Use: Cleaner. Metal treatment. Water treatment. pH control of water. Neutralizing agent in the petroleum industry. Electrolyte Solution. Laboratory reagent. Pulp and paper industry. Chemical intermediate.

**WHMIS Classification / Symbol:**

E: Corrosive



READ THE ENTIRE MSDS FOR THE COMPLETE HAZARD EVALUATION OF THIS PRODUCT.

**2. COMPOSITION, INFORMATION ON INGREDIENTS (Not Intended As Specifications)**

<i>Ingredient</i>	<i>CAS#</i>	<i>ACGIH TLV</i>	<i>% Concentration</i>
Sodium Hydroxide	1310-73-2	---	95 - 99
Sodium Chloride	7647-14-5	---	0 - 2
Sodium Carbonate	497-19-8	---	0 - 2

**3. HAZARDS IDENTIFICATION**

**EMERGENCY OVERVIEW:** Corrosive! Harmful if inhaled, absorbed through skin, or swallowed. Prolonged or repeated exposure may cause discoloration and erosion of teeth. Causes delayed lung injury. Causes severe skin and eye burns. Dust is extremely irritating to respiratory tract. See "Other Health Effects" Section. Can decompose at high temperatures forming toxic gases. Reacts with water. Contents may develop pressure on prolonged exposure to heat.

**POTENTIAL HEALTH EFFECTS**

Inhalation:	Corrosive! Product may cause severe irritation of the nose, throat and respiratory tract. Repeated and/or prolonged exposures may cause productive cough, running nose, bronchopneumonia, pulmonary oedema (fluid build-up in lungs), and reduction of pulmonary function. Excessive contact with powder may cause drying of mucous membranes of nose and throat due to absorption of moisture and oils. Brief contact with the dust causes irritation. Greater exposure causes severe burns. In the presence of moisture (perspiration, humidity, tears), the dust dissolves to form a corrosive solution which may cause burns. (3)
Skin Contact:	Corrosive! Burns (chemical) can occur if not promptly removed. Toxic effects may be delayed.
Skin Absorption:	Corrosive! Skin absorption is a secondary concern to the continual destruction of tissue while the product is in contact with the skin. Burns (chemical) can occur if not promptly removed.
Eye Contact:	Extremely corrosive! This product causes corneal scarring and clouding. Glaucoma, cataracts and permanent blindness may occur. Prolonged and repeated exposure may cause visual disturbances.
Ingestion:	Corrosive! This product causes severe burning and pain in the mouth, throat and abdomen. Vomiting, diarrhea and perforation of the esophagus and stomach lining may occur. May cause nausea and vomiting.
Other Health Effects:	Corrosive effects on the skin and eyes may be delayed, and damage may occur without the sensation or onset of pain. Strict adherence to first aid measures following any exposure is essential.  Dusts are extremely corrosive to the entire respiratory tract. Breathing dusts can destroy mucous membranes and cause severe pneumonitis. Brief contact with eyes causes severe pain and eye damage. Skin contact can cause irritation and ulceration, especially under the finger nails (and other confined spaces such as under rings or watch bands). (3)  Corrosive to all body tissues with which it comes in contact. The effect of local dermal exposure may consist of multiple areas of superficial destruction of the skin or of primary irritant dermatitis. Similarly, inhalation of dust, spray or mist may result in varying degrees of irritation or damage to the respiratory tract tissues and an increased susceptibility to respiratory illness. These effects occur only when the TLV is exceeded. (3)

## 4. FIRST AID MEASURES

### FIRST AID PROCEDURES

General Guidelines:	Prompt removal of the material and obtaining medical attention are essential for all contact. Remove all contaminated clothing and immediately wash the exposed areas with copious amounts of water. Continue the flushing during transportation to the emergency department. Corrosive effects may be delayed (up to 72 hours), and damage may occur without the sensation or onset of pain. Contact local poison control centre for further guidance.
Inhalation:	Move victim to fresh air. Give artificial respiration ONLY if breathing has stopped. Give cardiopulmonary resuscitation (CPR) if there is no breathing AND no pulse. Oxygen administration may be beneficial in this situation but should only be administered by personnel trained in its use. Obtain medical attention IMMEDIATELY.
Skin Contact:	Prompt removal of the material from the skin is essential for all concentrations, whether as a solid, or a concentrated or dilute solution. (3) Prompt removal of the material from the skin is essential. Remove all contaminated clothing and immediately wash the exposed areas with copious amounts of soap and water for a minimum of 30 minutes or up to 60 minutes for critical body areas. Immerse the exposed part immediately in ice water to relieve pain and to prevent swelling and blistering. Place cold packs, ice or wet cloths on the burned area if immersion is not possible. Cover the exposed part with a clean, preferably sterile, lint-free dressing. Obtain medical attention IMMEDIATELY and monitor breathing and treat for shock for severe exposure.
Eye Contact:	Immediately flush eyes with running water for a minimum of 30 minutes, preferably up to 60 minutes. Hold eyelids open during flushing. If irritation persists, repeat flushing. Do not transport victim until the recommended flushing period is completed unless flushing can be continued during transport.
Ingestion:	Do not attempt to give anything by mouth to an unconscious person. If victim is alert and not convulsing, rinse mouth out and give 1/2 to 1 glass of water to dilute material. DO NOT induce vomiting. If spontaneous vomiting occurs, have victim lean forward with head down to avoid breathing in of vomitus, rinse mouth and administer more water. Obtain medical attention IMMEDIATELY. DO NOT give acidic agents (e.g., citrus juices or vinegar) to "neutralize" the alkali. This action may cause an exothermic reaction and burn the esophagus.

Note to Physicians: This product contains materials that may cause severe pneumonitis if aspirated. If ingestion has occurred less than 2 hours earlier, carry out careful gastric lavage; use endotracheal cuff if available, to prevent aspiration. Observe patient for respiratory difficulty from aspiration pneumonitis. Give artificial resuscitation and appropriate chemotherapy if respiration is depressed.

Mucosal injury following ingestion of this corrosive material may contraindicate the induction of vomiting in the treatment of possible intoxication. Similarly, if gastric lavage is performed, intubation should be done with great care. If oral burns are present or a corrosive ingestion is suspected by the patient's history, perform esophagoscopy as soon as possible. Scope should not be passed beyond the first burn because of the risk of perforation. Medical conditions that may be aggravated by exposure to this product include diseases of the skin, eyes or respiratory tract

## 5. FIRE-FIGHTING MEASURES

Flashpoint (°C)	Autolgnition Temperature (°C)	Flammability Limits in Air (%):	
		LEL	UEL
Non-combustible (does not burn).	Not available.	Not available.	Not available.
Flammability Class (WHMIS):			
Hazardous Combustion Products:	Thermal decomposition products are toxic and may include oxides of sodium.		
Unusual Fire or Explosion Hazards:	Avoid direct contact of this product with water as this can cause a violent exothermic reaction. Spilled material may cause floors and contact surfaces to become slippery. Reacts with most metals to produce hydrogen gas which could make an explosive mixture with air.		
Sensitivity to Mechanical Impact:	Not expected to be sensitive to mechanical impact.		
Rate of Burning:	Not available.		
Explosive Power:	Not available.		
Sensitivity to Static Discharge:	Not expected to be sensitive to static discharge.		
EXTINGUISHING MEDIA			
Fire Extinguishing Media:	Do not use water. Foam. Carbon Dioxide. Dry Chemical. Use media appropriate for surrounding fire and/or materials.		
FIRE FIGHTING INSTRUCTIONS			
Instructions to the Fire Fighters:	Avoid direct contact of this product with water as this can cause a violent exothermic reaction. Remove containers from fire zone whenever possible.		
Fire Fighting Protective Equipment:	Use self-contained breathing apparatus and protective clothing.		

## 6. ACCIDENTAL RELEASE MEASURES

Information in this section is for responding to spills, leaks or releases in order to prevent or minimize the adverse effects on persons, property and the environment. There may be specific reporting requirements associated with spills, leaks or releases, which change from region to region.

Containment and Clean-Up Procedures: See Section 13, "Deactivating Chemicals". In all cases of leak or spill contact vendor at Emergency Number shown on the front page of this MSDS.

Minimize air borne spreading of dust. Wear respirator, protective clothing and gloves. Avoid dry sweeping. Do not use compressed air to clean surfaces. Vacuuming is preferred. Return all material possible to container for proper disposal. Any recovered product can be used for the usual purpose, depending on the extent and kind of contamination. Where a package (drum or bag) is damaged and / or leaking, repair it, or place it into an over-pack drum immediately so as to avoid or minimize material loss and contamination of surrounding environment. Replace damaged containers immediately to avoid loss of material and contamination of surrounding atmosphere. Collect product for recovery or disposal. For release to land, or storm water runoff, contain discharge by constructing dykes or applying inert absorbent; for release to water, utilize damming and/or water diversion to minimize the spread of contamination. Ventilate enclosed spaces. Notify applicable government authority if release is reportable or could adversely affect the environment.

## 7. HANDLING AND STORAGE

### HANDLING

- Handling Practices:** Use normal "good" industrial hygiene and housekeeping practices. Clean up immediately to eliminate slipping hazard. Avoid moisture contamination. When diluting, add this material/product to water in small amounts to avoid spattering. Never add water to this material/product. The water should be lukewarm. Never start with hot or cold water. Minimize air borne spreading of dust.
- Ventilation Requirements:** See Section 8, "Engineering Controls".
- Other Precautions:** Potentially deadly carbon monoxide gas can form in enclosed areas or enclosed tanks when alkaline products contact food or beverage products that contain sugars. (3) Do not enter such areas until they have been well ventilated and carbon monoxide and oxygen levels have been determined to be safe. (3)
- Use only with adequate ventilation and avoid breathing dusts or fumes. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Wash contaminated clothing thoroughly before re-use.
- Do not store near oxidizing material or polymerization catalysts. Hazardous carbon monoxide can form upon contact with food and beverage products in enclosed spaces and can cause death.
- Clean all containers of residues before adding the product. This will avoid potential violent reaction with unknown residues. (3)

### STORAGE

- Storage Temperature (°C):** See below.
- Ventilation Requirements:** May be fatal if inhaled or absorbed through skin.
- Storage Requirements:** Store in a cool, dry and well-ventilated area. Keep away from heat, sparks and flames. Keep containers closed. Avoid moisture contamination. Prolonged storage may result in lumping or caking. Protect from direct sunlight. Protect against physical damage.
- Hazardous carbon monoxide can form upon contact with food and beverage products in enclosed spaces and can cause death.
- Special Materials to be Used for Packaging or Containers:** Materials of construction for storing the product include: nickel. Hydrogen gas may be produced on prolonged contact with metals such as aluminum, tin, lead and zinc. Equipment for storage, handling or transportation should NOT be made of: aluminum and its alloys, copper and its alloys, zinc and its alloys, lead, tin, bronze, brass and Magnesium. Attacks some types of rubber, plastics and coatings.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Recommendations listed in this section indicate the type of equipment, which will provide protection against overexposure to this product. Conditions of use, adequacy of engineering or other control measures, and actual exposures will dictate the need for specific protective devices at your workplace.

### ENGINEERING CONTROLS

- Engineering Controls:** Local exhaust ventilation required. Ventilation should be corrosion proof. Make up air should be supplied to balance air that is removed by local or general exhaust ventilation. Ventilate low lying areas such as sumps or pits where dense dust may collect.
- For personnel entry into confined spaces (i.e. bulk storage tanks) a proper procedure must be followed. It must include consideration of, among other things, ventilation, testing of tank atmosphere, provision and maintenance of SCBA, and emergency rescue.

### PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Eye Protection:** Safety glasses with side shields are recommended to prevent eye contact. Use full face-shield and chemical safety goggles when there is potential for contact. Contact lenses should not be worn when working with this material.
- Skin Protection:** Gloves and protective clothing made from butyl rubber, neoprene, natural rubber, nitrile rubber or PVC should be impervious under conditions of use. Discard contaminated gloves. Prior to use, user should confirm impermeability.
- Do not use gloves or protective clothing made from polyvinyl alcohol (PVA). Exposed skin areas should be protected as appropriate whenever the potential for skin contact exists (consider long sleeves, gloves, aprons, etc.).

**Respiratory Protection:** No specific guidelines available. A NIOSH/MSHA-approved air-purifying respirator equipped with N95 dust, mist, fume cartridges for concentrations up to 10 mg/m3. A NIOSH/MSHA-approved self-contained breathing apparatus if concentrations are higher or unknown.

Immediately Dangerous to Life and Health (IDLH) value: 10 mg/m3. The purpose of establishing an IDLH value is to ensure that the worker can escape from a given contaminated environment in the event of failure of the most protective respiratory equipment. In the event of failure of respiratory protective equipment, every effort should be made to exit immediately. (4)

**Other Personal Protective Equipment:** The use of coveralls is recommended. Wear an impermeable apron and boots. Locate safety shower and eyewash station close to chemical handling area. Take all precautions to avoid personal contact.

**EXPOSURE GUIDELINES**

SUBSTANCE	ACGIH TLV (STEL)	OSHA PEL		NIOSH REL	
		(TWA)	(STEL)	(TWA)	(STEL)
Sodium Hydroxide	2 mg/m3 (Ceiling)	2 mg/m3	---	---	2 mg/m3 (Ceiling)

**9. PHYSICAL AND CHEMICAL PROPERTIES (Not intended as Specifications)**

**Physical State:** Solid.

**Appearance:** Odourless, white granular solid.

**Odour:** Odourless.

**Odour Threshold (ppm):** Not available.

**Boiling Range (°C):** 1 390.

**Melting/Freezing Point (°C):** 310 - 320.

**Vapour Pressure (mm Hg at 20° C):** 1.5

**Vapour Density (Air = 1.0):** Not available.

**Relative Density (g/cc):** 2.13

**Bulk Density:** Not available.

**Viscosity:** Not applicable.

**Evaporation Rate (Butyl Acetate = 1.0):** Not applicable.

**Solubility:** Soluble in water.

**% Volatile by Volume:** Not applicable.

**pH:** 14 (5% solution).

**Coefficient of Water/Oil Distribution:** 0.

**Volatile Organic Compounds (VOC):** Not applicable.

**10. STABILITY AND REACTIVITY**

**CHEMICAL STABILITY**

**Under Normal Conditions:** Stable.

**Under Fire Conditions:** Not normally a fire hazard. Incombustible.

**Hazardous Polymerization:** Will not occur.

**Conditions to Avoid:** Avoid moisture contamination. Avoid direct contact of this product with water as this can cause a violent exothermic reaction. Keep tightly closed to protect quality. Clean up immediately to eliminate slipping hazard. Minimize air borne spreading of dust.

**Materials to Avoid:** Halogenated compounds. Violently reactive with: Organic materials. Combustibles. Water, metals, strong acids, organic halogen compounds and organic nitric compounds. May react violently with metals such as sodium, potassium and barium, particularly if they are finely divided. In contact with small quantities of water, heat is given off. Reacts violently with potassium chlorate. Metallic fines and powders. May react with organohalogen compounds to form spontaneously combustible compounds. May react explosively with nitro- and chloro-organic compounds, glycols and organic peroxides. Attacks some types of rubber, plastics and coatings.

Reacts with most metals to produce hydrogen gas which could make an explosive mixture with air. aluminum and its alloys. zinc and its alloys. copper and its alloys. brass. bronze. lead. Chromium. Magnesium. tin. Alkali metals. Potentially deadly carbon monoxide gas can form in enclosed areas or enclosed tanks when alkaline products contact food or beverage products that contain sugars. (3)  
Violently polymerizes acetaldehyde, acrolein, and acrylonitrile.

**Decomposition or Combustion Products:** Thermal decomposition products are toxic and may include oxides of sodium.

## 11. TOXICOLOGICAL INFORMATION

### TOXICOLOGICAL DATA:

SUBSTANCE	LD50 (Oral, Rat)	LD50 (Dermal, Rabbit)	LC50 (Inhalation, Rat, 4h)
Sodium Hydroxide	---	1350 mg/kg (3)	---
Sodium Chloride	3000 mg/kg (1)	> 10000 mg/kg (1)	> 21000 mg/m3 (1)
Sodium Carbonate	4,090 mg/kg (1)	---	---

**Carcinogenicity Data:** The ingredient(s) of this product is (are) not classed as carcinogenic by ACGIH, IARC, OSHA or NTP. See "Other Health Effects" Section.

**Reproductive Data:** No adverse reproductive effects are anticipated.

**Mutagenicity Data:** No adverse mutagenic effects are anticipated.

**Teratogenicity Data:** No adverse teratogenic effects are anticipated.

**Respiratory / Skin Sensitization Data:** None known.

**Synergistic Materials:** None known.

**Other Studies Relevant to Material:** Many publications in the scientific literature confirm the severely irritating properties of acute and short-term exposure to Sodium Hydroxide in humans and animals and discuss toxic effects (such as death, eye damage or changes in lung morphology), which are probably related to the corrosive properties of this compound. (3)

Inhalation of unmeasured concentrations 30 minutes per day for 2.5 months resulted in lung damage in rats. A rodent drinking water study at 1% (duration unknown) was reported to result in "nervous symptoms" and growth retardation. Growth was unaffected in this same study at 0.5%, but no conceptions occurred. (3)

No tumors were seen in any longer term animal studies. Sodium Hydroxide produced no genetic changes in standard tests using bacterial cells. No significant increases in mortality in relation to duration or intensity of exposures were reported in an epidemiologic study of a small group of workers exposed to caustic dusts for 30 years or more. (3)

Massive ingestion of Sodium Hydroxide has been implicated as causing esophageal cancer. Squamous cells carcinomas of the esophagus occurred approximately 12-42 years later in individuals who survived accidental childhood ingestion and are likely due to the tissue destruction and possible scarring of the esophagus rather than a direct effect of Sodium Hydroxide. (3)

## 12. ECOLOGICAL INFORMATION

**Ecotoxicity:** Toxicity is primarily associated with pH. This product is toxic to Aquatic Life.

Sodium Hydroxide:  
LC50 (24-hr) = 25 ppm (Brook trout). (3)  
LC50 (48-hr) = 33 - 100 ppm (Shrimp). (3)  
LC50 (48-hr) = 220 - 1000 ppm (Cockle). (3)

**Environmental Fate:** This material is not expected to bioaccumulate. (3) Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

Sodium Hydroxide has no biological oxygen demand. (3) There is limited information available on the environmental fate and effects of Sodium Hydroxide. Laboratory toxicity data indicate that Sodium Hydroxide is moderately toxic to aquatic and terrestrial organisms. The primary mode of action is due to the corrosive nature of this chemical and its tendency to increase pH in poorly buffered environments. Aquatic organisms become increasingly stressed as pH exceeds 9, with many aquatic species being intolerant of pH levels in excess of 10. Increased pH due to the introduction of Sodium Hydroxide into aquatic environments may lead to the precipitation of essential micronutrients. Exposed terrestrial species would be subject to skin irritation and burns due to the corrosive nature of this material. Due caution should be exercised to prevent the accidental release of this material to aquatic or terrestrial environments. (3)

### 13. DISPOSAL CONSIDERATIONS

**Deactivating Chemicals:** Neutralize carefully with weak acid to a pH of 6 to 9. Neutralization is expected to be exothermic. Effervescence may result. Confirm pH using pH paper.

**Waste Disposal Methods:** This information applies to the material as manufactured. Reevaluation of the product may be required by the user at the time of disposal since the product uses, transformations, mixtures and processes may influence waste classification. Dispose of waste material at an approved (hazardous) waste treatment/disposal facility in accordance with applicable local, provincial and federal regulations. Do not dispose of waste with normal garbage, or to sewer systems.

**Safe Handling of Residues:** See "Waste Disposal Methods".

**Disposal of Packaging:** Empty containers retain product residue and can be dangerous. Do not dispose of package until thoroughly washed out. Treat package in the same manner as the product.

### 14. TRANSPORTATION INFORMATION

#### CANADIAN TDG ACT SHIPPING DESCRIPTION:

SODIUM HYDROXIDE, SOLID, Class 8, UN1823, PG II.  
Label(s): Corrosives. Placard: Corrosives.  
ERAP Index: ----. Exemptions: None known.

#### US DOT CLASSIFICATION (49CFR 172.101, 172.102):

SODIUM HYDROXIDE, SOLID, Class 8, UN1823, PG II.  
Label(s): Corrosive. Placard: Corrosive.  
CERCLA-RQ: 1 000 lb/454 kg. Exemptions: None known.

### 15. REGULATORY INFORMATION

#### CANADA

CEPA - NSNR: All constituents of this product are included on the DSL.  
CEPA - NPRI: Not included.  
Controlled Products Regulations Classification (WHMIS):  
E: Corrosive

#### USA

Environmental Protection Act: All constituents of this product are included on the TSCA inventory.  
OSHA HCS (29CFR 1910.1200): Corrosive.  
NFPA: 3 Health, 0 Fire, 2 Reactivity (3)  
HMIS: 3 Health, 0 Fire, 2 Reactivity (3)

#### INTERNATIONAL

Sodium Hydroxide is found on the following inventories: EINECS (European Inventory of Existing Commercial Chemical Substances), ACOIN (Australia), MITI (Japan) and Korea.

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## 16. OTHER INFORMATION

### REFERENCES

1. RTECS-Registry of Toxic Effects of Chemical Substances, Canadian Centre for Occupational Health and Safety RTECS database.
2. Clayton, G.D. and Clayton, F.E., Eds., Patty's Industrial Hygiene and Toxicology, 3rd ed., Vol. IIA,B,C, John Wiley and Sons, New York, 1981.
3. Supplier's Material Safety Data Sheet(s)
4. CHEMINFO, through "CCINFODisc", Canadian Centre for Occupational Health and Safety, Hamilton, Ontario, Canada.
5. Guide to Occupational Exposure Values, 2005, American Conference of Governmental Industrial Hygienists, Cincinnati, 2005.
6. Regulatory Affairs Group, Brenntag Canada Inc.
7. The British Columbia Drug and Poison Information Centre, Poison Managements Manual, Canadian Pharmaceutical Association, Ottawa, 1981.
8. U.S. Dept. of Health and Human Services, NIOSH Pocket Guide to Chemical Hazards, National Institute for Occupational Safety and Health, Washington, D.C., 1990.

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The information contained herein is offered only as a guide to the handling of this specific material and has been prepared in good faith by technically knowledgeable personnel. It is not intended to be all-inclusive and the manner and conditions of use and handling may involve other and additional considerations. No warranty of any kind is given or implied and Brenntag Canada Inc. will not be liable for any damages, losses, injuries or consequential damages which may result from the use of or reliance on any information contained herein. This Material Safety Data Sheet is valid for three years.

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To obtain revised copies of this or other Material Safety Data Sheets, contact your nearest Brenntag Canada Regional office.

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