SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name: Sodium borohydride

Product Number: 452882
Brand: Aldrich
CAS-No.: 16940-66-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses: Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone: +1 314 771-5765
Fax: +1 800 325-5052

1.4 Emergency telephone

Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

- Chemicals which, in contact with water, emit flammable gases (Category 1), H260
- Acute toxicity, Oral (Category 3), H301
- Skin corrosion (Category 1B), H314
- Serious eye damage (Category 1), H318
- Reproductive toxicity (Category 1B), H360

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word: Danger
The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Hazard statement(s)
H260 In contact with water releases flammable gases which may ignite spontaneously.
H301 Toxic if swallowed.
H314 Causes severe skin burns and eye damage.
H360 May damage fertility or the unborn child.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P223 Do not allow contact with water.
P231 + P232 Handle under inert gas. Protect from moisture.
P260 Do not breathe dust.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes.
P310 Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P335 + P334 Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P363 Wash contaminated clothing before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P402 + P404 Store in a dry place. Store in a closed container.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS
Reacts violently with water.

SECTION 3: Composition/information on ingredients

3.1 Substances
Synonyms: Sodium tetrahydridoborate
VenPure®

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
</table>

Aldrich - 452882
**SECTION 4: First aid measures**

### 4.1 Description of first-aid measures

**General advice**
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

**If inhaled**
After inhalation: fresh air. Call in physician.

**In case of skin contact**
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.

**In case of eye contact**
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

**If swallowed**
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Do not attempt to neutralise.

### 4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.

### 4.3 Indication of any immediate medical attention and special treatment needed

No data available

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**SECTION 5: Firefighting measures**

### 5.1 Extinguishing media

**Suitable extinguishing media**
Sand Dry powder Cement

**Unsuitable extinguishing media**
Water Carbon dioxide (CO2) Foam
5.2 **Special hazards arising from the substance or mixture**  
Borane/boron oxides  
Sodium oxides  
Not combustible.  
May not get in touch with: Water  
Ambient fire may liberate hazardous vapours.

5.3 **Advice for firefighters**  
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 **Further information**  
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

**SECTION 6: Accidental release measures**

6.1 **Personal precautions, protective equipment and emergency procedures**  
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact.  
Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.  
For personal protection see section 8.

6.2 **Environmental precautions**  
Do not let product enter drains. Risk of explosion.

6.3 **Methods and materials for containment and cleaning up**  
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area.  
Avoid generation of dusts.

6.4 **Reference to other sections**  
For disposal see section 13.

**SECTION 7: Handling and storage**

7.1 **Precautions for safe handling**  
**Advice on safe handling**  
Work under hood. Do not inhale substance/mixture. Keep workplace dry. Do not allow product to come into contact with water.  
**Hygiene measures**  
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.  
For precautions see section 2.2.

7.2 **Conditions for safe storage, including any incompatibilities**  
**Storage conditions**  
Tightly closed. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.  
Never allow product to get in contact with water during storage.  
Air and moisture sensitive. Store under inert gas.

**Storage class**
Storage class (TRGS 510): 4.3: Hazardous materials, which set free flammable gases upon contact with water

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested: KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Appearance</td>
<td>Form: solid</td>
</tr>
<tr>
<td></td>
<td>Color: white</td>
</tr>
<tr>
<td>b) Odor</td>
<td>odorless</td>
</tr>
<tr>
<td>c) Odor Threshold</td>
<td>Not applicable</td>
</tr>
<tr>
<td>d) pH</td>
<td>No data available</td>
</tr>
<tr>
<td>e) Melting point/freezing point</td>
<td>Melting point/range: &gt; 300 °C (&gt; 572 °F) - dec.</td>
</tr>
<tr>
<td>f) Initial boiling point and boiling range</td>
<td>&gt; 400 °C &gt; 752 °F at ca.1,013 hPa - OECD Test Guideline 103</td>
</tr>
<tr>
<td>g) Flash point</td>
<td>()Not applicable</td>
</tr>
<tr>
<td>h) Evaporation rate</td>
<td>No data available</td>
</tr>
<tr>
<td>i) Flammability (solid, gas)</td>
<td>No data available</td>
</tr>
<tr>
<td>j) Upper/lower flammability or explosive limits</td>
<td>Lower explosion limit: 3.02 %(V)</td>
</tr>
<tr>
<td>k) Vapor pressure</td>
<td>&lt; 1 hPa at 25 °C (77 °F) - OECD Test Guideline 104</td>
</tr>
<tr>
<td>l) Vapor density</td>
<td>1.3</td>
</tr>
<tr>
<td>m) Density</td>
<td>1.07 g/cm3 at 20 °C (68 °F)</td>
</tr>
<tr>
<td></td>
<td>Relative density No data available</td>
</tr>
<tr>
<td>n) Water solubility</td>
<td>Decomposes in contact with water., Risk of violent reaction.</td>
</tr>
<tr>
<td>o) Partition coefficient: n-octanol/water</td>
<td>- Not applicable for inorganic substances</td>
</tr>
<tr>
<td>p) Autoignition temperature</td>
<td>&gt; 400 °C (&gt; 752 °F) at 1,013 hPa - Relative self-ignition temperature for solids</td>
</tr>
<tr>
<td>q) Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>r) Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>s) Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>t) Oxidizing properties</td>
<td>none</td>
</tr>
</tbody>
</table>

9.2 Other safety information

<table>
<thead>
<tr>
<th>Property</th>
<th>Value/Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative vapor density</td>
<td>1.3</td>
</tr>
</tbody>
</table>
SECTION 10: Stability and reactivity

10.1 Reactivity
Reacts violently with water.

10.2 Chemical stability
Sensitive to moisture

10.3 Possibility of hazardous reactions
Risk of explosion with:
Water
Alcohols
(generation of hydrogen)
Copper
Nickel
in finely distributed form.
aluminium chloride
metallic salts
phenol
Strong oxidizing agents
polymerisable substances
hydrogen peroxide
Powdered metals
acids
Risk of ignition or formation of inflammable gases or vapours with:
carbon/soot
Exothermic reaction with:
phosphoric acid
conc. sulfuric acid
Dimethylformamide

10.4 Conditions to avoid
Moisture.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 162 mg/kg
(Calculation method)
LD50 Oral - Rat - female - 56.57 mg/kg
(OECD Test Guideline 425)
Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of
perforation of the esophagus and the stomach.
LC50 Inhalation - Rat - male - 4 h - > 1.3 mg/l - dust/mist

Remarks: (highest concentration to be prepared)
(ECHA)
Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract
Acute toxicity estimate Dermal - 230 mg/kg
(Calculation method)
LD50 Dermal - Rabbit - male - 4,000 - 8,000 mg/kg
Remarks: (External MSDS)

**Skin corrosion/irritation**
Skin - Rabbit
(OECD Test Guideline 404)
Remarks: (Test in mixture)

**Serious eye damage/eye irritation**
Causes serious eye damage. Risk of corneal clouding.

**Respiratory or skin sensitization**
Sensitisation test: - Guinea pig
Result: negative
Remarks: (External MSDS)

**Germ cell mutagenicity**
No data available

**Carcinogenicity**
IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA’s list of regulated carcinogens.

**Reproductive toxicity**
May damage the unborn child.
May damage fertility.

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

### 11.2 Additional Information

**RTECS:** ED3325000
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonia, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Decomposition of the substance with tissue moisture.

After absorption:

CNS disorders
Headache

Other information

The following applies to boron compounds in general: resorption is followed by nausea and vomiting, agitation, spasms, CNS disorders, cardiovascular disorders.

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish

LC50 - Danio rerio (zebra fish) - > 100 mg/l - 96 h

Remarks: (External MSDS)

Toxicity to bacteria

12.2 Persistence and degradability

The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Forms toxic mixtures in water, dilution measures notwithstanding. Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.
SECTION 14: Transport information

**DOT (US)**
UN number: 1426  Class: 4.3  Packing group: I
Proper shipping name: Sodium borohydride
Reportable Quantity (RQ):
  Poison Inhalation Hazard: No

**IMDG**
UN number: 1426  Class: 4.3  Packing group: I  EMS-No: F-G, S-O
Proper shipping name: SODIUM BOROHYDRIDE

**IATA**
UN number: 1426  Class: 4.3  Packing group: I
Proper shipping name: Sodium borohydride
IATA Passenger: Not permitted for transport

SECTION 15: Regulatory information

**SARA 302 Components**
This material does not contain any components with a section 302 EHS TPQ.

**SARA 313 Components**
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards**
Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**
No components are subject to the Massachusetts Right to Know Act.

SECTION 16: Other information

**Further information**
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 appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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