1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Red-Al® sodium bis(2-methoxyethoxy)aluminum hydride solution
Product Number: 196193
Brand: Aldrich
Supplier: Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103 USA
Telephone: +1 800-325-5832
Fax: +1 800-325-5052
Emergency Phone # (For both supplier and manufacturer): (314) 776-6555
Preparation Information: Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Flammable liquid, Water Reactive, Toxic by ingestion, Toxic by skin absorption, Corrosive, Target Organ Effect, Teratogen, Reproductive hazard

Target Organs
Bladder, Liver, Kidney, Brain.

GHS Classification
Flammable liquids (Category 2)
Substances, which in contact with water, emit flammable gases (Category 1)
Acute toxicity, Oral (Category 3)
Acute toxicity, Inhalation (Category 5)
Acute toxicity, Dermal (Category 3)
Skin irritation (Category 2)
Serious eye damage (Category 1)
Reproductive toxicity (Category 2)
Specific target organ toxicity - single exposure (Category 2)
Specific target organ toxicity - single exposure (Category 3)
Aspiration hazard (Category 1)
Acute aquatic toxicity (Category 2)

GHS Label elements, including precautionary statements

Pictogram

Signal word
Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H260 In contact with water releases flammable gases which may ignite spontaneously.
H301 + H311 Toxic if swallowed or in contact with skin.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H333 May be harmful if inhaled.
H336 May cause drowsiness or dizziness.
H361 Suspected of damaging fertility or the unborn child.
H371 May cause damage to organs.
H401 Toxic to aquatic life.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232 Handle under inert gas. Protect from moisture.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P280 Wear protective gloves/ eye protection/ face protection.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTER or doctor/ physician if you feel unwell.
P331 Do NOT induce vomiting.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P422 Store contents under inert gas.

HMIS Classification
Health hazard: 3
Chronic Health Hazard: *
Flammability: 3
Physical hazards: 2

NFPA Rating
Health hazard: 3
Fire: 3
Reactivity Hazard: 2
Special hazard.: W

Potential Health Effects
Inhalation May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. Vapours may cause drowsiness and dizziness.

Skin Toxic if absorbed through skin. Causes skin burns.

Eyes Causes eye burns.

Ingestion Toxic if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Synonyms</th>
<th>Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red-Al®, Sodium bis(2-methoxyethoxy) aluminum hydride solution SBAH Sodium dihydrido-bis(2-methoxyethoxy)aluminate Sodium bis(2-methoxyethoxy)aluminum dihydride</td>
<td>C₆H₁₆AlNaO₄</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>22722-98-1</td>
<td>245-178-2</td>
<td>-</td>
<td>&gt;= 65 - &lt;= 70 %</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>203-625-9</td>
<td>601-021-00-3</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES
General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Conditions of flammability
Flammable in the presence of a source of ignition when the temperature is above the flash point. May burn in presence of air, or emit a flammable gas in the presence of water or water vapour. Keep away from heat/sparks/open flame/hot surface. No smoking. Keep away from heat/sparks/open flame/hot surface/air/water. No smoking.

Suitable extinguishing media
Dry powder

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Hydrogen gas, Carbon oxides, Aluminum oxide, Sodium oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Use explosion-proof equipment. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Never allow product to get in contact with water during storage.

8. EXPOSURE CONTROLS/PERSOAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
</table>

Aldrich - 196193
<table>
<thead>
<tr>
<th>Compound</th>
<th>CAS Number</th>
<th>TWA</th>
<th>STEL</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>100 ppm, 375 mg/m³</td>
<td>150 ppm, 560 mg/m³</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>200 ppm</td>
<td></td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Remarks Z37.12-1967</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CEIL 300 ppm</td>
<td></td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Peak 500 ppm</td>
<td></td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z2</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Z37.12-1967</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA 20 ppm</td>
<td></td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Visual impairment Female reproductive Pregnancy loss 2010Adoption Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen: Agents which cause concern that they could be carcinogenic for humans but which cannot be assessed conclusively because of a lack of data. In vitro or animal studies do not provide indications of carcinogenicity which are sufficient to classify the agent into one of the other categories.</td>
</tr>
<tr>
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<td></td>
<td>TWA 100 ppm, 375 mg/m³</td>
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<td></td>
<td>ST 150 ppm, 560 mg/m³</td>
</tr>
</tbody>
</table>

**Personal protective equipment**

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Hand protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove’s outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Eye protection**
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin and body protection**
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Hygiene measures**
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. **PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance**
- Form: liquid
- Colour: light yellow
Safety data

pH: no data available
Melting point/freezing point: no data available
Boiling point: 110 °C (230 °F)
Flash point: 4 °C (39 °F) - closed cup
Ignition temperature: no data available
Autoignition temperature: no data available
Lower explosion limit: 1.27 % (V)
Upper explosion limit: 7 % (V)
Vapour pressure: 28 hPa (21 mmHg) at 20 °C (68 °F)
Density: 1.036 g/mL at 25 °C (77 °F)
Water solubility: no data available
Partition coefficient: n-octanol/water: no data available
Relative vapour density: no data available
Odour: no data available
Odour Threshold: no data available
Evaporation rate: no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Vapours may form explosive mixture with air.
Reacts violently with water.

Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight. Exposure to moisture.

Materials to avoid
Water, Oxidizing agents, Combustible material

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Hydrogen gas, Carbon oxides, Aluminum oxide, Sodium oxides
Reacts with water to form: - Hydrogen gas

Thermal decomposition
205 °C

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - > 50 mg/kg
no data available

Inhalation LC50
no data available
Dermal LD50
LD50 Dermal - rabbit - > 200 mg/kg
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
Skin - rabbit - Severe skin irritation

Serious eye damage/eye irritation
Eyes: no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity
IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Toluene)
NTP: No component 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 identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

Teratogenicity
no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation May be harmful if inhaled. Material is extremely destructive to the tissue of the mucous membranes and upper respiratory tract. Vapours may cause drowsiness and dizziness.
Ingestion Toxic if swallowed. Aspiration hazard if swallowed - can enter lungs and cause damage.
Skin Toxic if absorbed through skin. Causes skin burns.
Eyes Causes eye burns.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: Not available
12. ECOLOGICAL INFORMATION

Toxicity
no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3399  Class: 4.3 (3)  Packing group: I
Proper shipping name: Organometallic substance, liquid, water-reactive, flammable (Sodium dihydridobis(2-methoxyethanolato)aluminate(1-))
Reportable Quantity (RQ): 2857 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 3399  Class: 4.3 (3)  Packing group: I  EMS-No: F-G, S-N
Proper shipping name: ORGANOMETALLIC SUBSTANCE, LIQUID, WATER-REACTIVE, FLAMMABLE (Sodium dihydridobis(2-methoxyethanolato)aluminate(1-))
Marine pollutant: No

IATA
UN number: 3399  Class: 4.3 (3)  Packing group: I
Proper shipping name: Organometallic substance, liquid, water-reactive, flammable (Sodium dihydridobis(2-methoxyethanolato)aluminate(1-))

15. REGULATORY INFORMATION

OSHA Hazards
Flammable liquid, Water Reactive, Toxic by ingestion, Toxic by skin absorption, Corrosive, Target Organ Effect, Teratogen, Reproductive hazard

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
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<td>108-88-3</td>
<td>2007-07-01</td>
</tr>
</tbody>
</table>
SARA 311/312 Hazards
Fire Hazard, Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
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Pennsylvania Right To Know Components

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<td>2007-07-01</td>
</tr>
<tr>
<td>Sodium dihydridobis(2-methoxyethanolato)aluminate(1-)</td>
<td>22722-98-1</td>
<td>2007-07-01</td>
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New Jersey Right To Know Components

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California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

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<tbody>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>2009-02-01</td>
</tr>
</tbody>
</table>

16. OTHER INFORMATION

Further Information
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