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

1.1 Product identifiers

Product name: Methyllithium solution

Product Number: 197343

Brand: Aldrich

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)**

- Flammable liquids (Category 2), H225
- Pyrophoric liquids (Category 1), H250
- Chemicals which, in contact with water, emit flammable gases (Category 1), H260
- Acute toxicity, Oral (Category 4), H302
- Skin corrosion (Category 1B), H314
- Serious eye damage (Category 1), H318
- Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

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

Aldrich - 197343
Hazard statement(s)
H225  Highly flammable liquid and vapor.
H250  Catches fire spontaneously if exposed to air.
H260  In contact with water releases flammable gases which may ignite spontaneously.
H302  Harmful if swallowed.
H314  Causes severe skin burns and eye damage.
H336  May cause drowsiness or dizziness.

Precautionary statement(s)
P210  Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P222  Do not allow contact with air.
P223  Do not allow contact with water.
P231 + P232 Handle under inert gas. Protect from moisture.
P233  Keep container tightly closed.
P240  Ground/bond container and receiving equipment.
P241  Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242  Use only non-sparking tools.
P243  Take precautionary measures against static discharge.
P261  Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264  Wash skin thoroughly after handling.
P270  Do not eat, drink or smoke when using this product.
P271  Use only outdoors or in a well-ventilated area.
P280  Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P302 + P334 IF ON SKIN: Immerse in cool water/ wrap in wet bandages.
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.
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.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405  Store locked up.
P422  Store contents under inert gas.
P501  Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS
May form explosive peroxides.
Repeated exposure may cause skin dryness or cracking.

Aldrich - 197343
SECTION 3: Composition/information on ingredients

3.2 Mixtures

Synonyms:
- Lithium methanide
- MeLi

Formula: CH₃Li
Molecular weight: 21.98 g/mol

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl ether</td>
<td>Flam. Liq. 1; Acute Tox. 4; STOT SE 3; H224, H302, H336</td>
<td>&gt;= 20 %: STOT SE 3, H336;</td>
</tr>
<tr>
<td>CAS-No.</td>
<td>60-29-7</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>200-467-2</td>
<td></td>
</tr>
<tr>
<td>Index-No.</td>
<td>603-022-00-4</td>
<td></td>
</tr>
<tr>
<td>Registration number</td>
<td>01-2119535785-29-XXXX</td>
<td></td>
</tr>
</tbody>
</table>

methyl lithium

<table>
<thead>
<tr>
<th>Component</th>
<th>Pyr. Liq. 1; Water-react 1; Skin Corr. 1B; Eye Dam. 1; H250, H260, H314, H318</th>
<th>&gt;= 5 - &lt; 10 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS-No.</td>
<td>917-54-4</td>
<td></td>
</tr>
<tr>
<td>EC-No.</td>
<td>213-026-4</td>
<td></td>
</tr>
</tbody>
</table>

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

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
After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation). Call a physician immediately. 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
SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
Water Foam

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Lithium oxides
Carbon oxides
Lithium oxides
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
May not get in touch with: Water
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

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
Remove container from danger zone and cool with water. 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: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. 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 with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

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. Avoid generation of vapours/aerosols. Keep workplace dry. Do not allow product to come into contact with water.
**Advice on protection against fire and explosion**
Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

**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. Never allow product to get in contact with water during storage.

**Storage stability**
Recommended storage temperature
2 - 8 °C
Test for peroxide formation periodically and before distillation.

**Storage class**
Storage class (TRGS 510): 4.2: Pyrophoric and self-heating hazardous materials

**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**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diethyl ether</td>
<td>60-29-7</td>
<td>TWA</td>
<td>400 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>500 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA</td>
<td>400 ppm 1,200 mg/m³</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>STEL</td>
<td>500 ppm 1,500 mg/m³</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PEL</td>
<td>400 ppm 1,200 mg/m³</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
</tr>
</tbody>
</table>

**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
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.

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 30 min
Material tested: Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
required when vapours/aerosols 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

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Appearance</td>
<td>Form: liquid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Odor</td>
<td>No data available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Odor Threshold</td>
<td>No data available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) pH</td>
<td>No data available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Melting point/freezing point</td>
<td>No data available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) Initial boiling point and boiling range</td>
<td>No data available</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g) Flash point</td>
<td>-17 °C (1 °F) - closed cup</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
h) Evaporation rate  No data available  
  
i) Flammability (solid, gas)  No data available  
  
j) Upper/lower flammability or explosive limits  No data available  
  
k) Vapor pressure  No data available  
  l) Vapor density  No data available  
  
m) Density  0.732 g/mL at 25 °C (77 °F)  
  Relative density  No data available  
  
n) Water solubility  No data available  
  
o) Partition coefficient: n-octanol/water  No data available  
  
p) Autoignition temperature  No data available  
  
q) Decomposition temperature  No data available  
  
r) Viscosity  No data available  
  s) Explosive properties  Not classified as explosive.  
  t) Oxidizing properties  none  

9.2 Other safety information  
No data available  

---  

SECTION 10: Stability and reactivity  

10.1 Reactivity  
Formation of peroxides possible.  
Vapors may form explosive mixture with air.  

10.2 Chemical stability  
Sensitive to air.  

10.3 Possibility of hazardous reactions  
No data available  

10.4 Conditions to avoid  
Exposure to air.  
Warming.  
Moisture.  

10.5 Incompatible materials  
Oxygen, Oxidizing agents, acids, Alcohols, Reacts violently with water.  

10.6 Hazardous decomposition products  
Reacts with water to form: - Reacts with water to liberate flammable and/or explosive gas. Peroxides  
In the event of fire: see section 5
SECTION 11: Toxicological information

11.1 Information on toxicological effects

**Mixture**

**Acute toxicity**
Oral: No data available
Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:; damage of respiratory tract
Dermal: No data available

**Skin corrosion/irritation**
Mixture causes burns.
Repeated exposure with the mixture may cause skin dryness or cracking.

**Serious eye damage/eye irritation**
Mixture causes serious eye damage. Risk of blindness!

**Respiratory or skin sensitization**
No data available

**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**
No data available

**Specific target organ toxicity - single exposure**
Mixture may cause drowsiness or dizziness.

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

**Aspiration hazard**
No data available

11.2 Additional Information

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, 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.

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Liver - Ingestion may provoke the following symptoms:; Irregularities - Based on Human Evidence
Components

Diethyl ether

**Acute toxicity**
LD50 Oral - Rat - 1,211 mg/kg
Remarks: (RTECS)
Symptoms: Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.
LC50 Inhalation - Mouse - 4 h - 97.5 mg/l - vapor
Remarks: (RTECS)
Symptoms: mucosal irritations
LD50 Dermal - Rabbit - male - > 20,000 mg/kg
(OECD Test Guideline 402)
Remarks: (ECHA)
No data available

**Skin corrosion/irritation**
Skin - Rabbit
Result: No skin irritation - 4 h
(OECD Test Guideline 404)
Dermatitis

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

**Respiratory or skin sensitization**
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)

**Germ cell mutagenicity**
Test Type: Micronucleus test
Test system: Human lymphocytes
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: Mouse lymphoma test
Result: negative
Method: OECD Test Guideline 474
Species: Mouse - male and female
Result: negative

**Carcinogenicity**
No data available

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
May cause drowsiness or dizziness. - Central nervous system
Acute oral toxicity - Risk of aspiration upon vomiting., Aspiration may cause pulmonary edema and pneumonitis.
Acute inhalation toxicity - mucosal irritations
Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

methyl lithium

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

SECTION 12: Ecological information

12.1 Toxicity
Mixture
No data available

12.2 Persistence and degradability
No data available

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
No data available

Components

Diethyl ether
Toxicity to fish
LC50 - Leuciscus idus (Golden orfe) - 2,840 mg/l - 48 h
Remarks: (ECOTOX Database)

Toxicity to daphnia and other aquatic invertebrates
EC50 - Daphnia magna (Water flea) - 1,380 mg/l - 48 h
Remarks: (IUCLID)

Toxicity to algae
static test ErC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h
(OECD Test Guideline 201)

Toxicity to bacteria
static test EC50 - activated sludge - 21,000 mg/l - 3 h
(OECD Test Guideline 209)
static test NOEC - activated sludge - 42 mg/l - 3 h
(OECD Test Guideline 209)

methyllithium
No data available

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: 3394  Class: 4.2 (4.3)  Packing group: I
Proper shipping name: Organometallic substance, liquid, pyrophoric, water-reactive (methyllithium, Diethyl ether)
Reportable Quantity (RQ): 105 lbs
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 3394  Class: 4.2 (4.3)  Packing group: I  EMS-No: F-G, S-M
Proper shipping name: ORGANOMETALLIC SUBSTANCE, LIQUID, PYROPHORIC, WATER-REACTIVE (methyllithium, Diethyl ether)
IATA
UN number: 3394   Class: 4.2 (4.3)
Proper shipping name: Organometallic substance, liquid, pyrophoric, water-reactive
(methyllithium, Diethyl ether)
IATA Passenger: Not permitted for transport
IATA Cargo: 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
Fire Hazard, Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Reportable Quantity  F003 lbs

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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Version: 6.5    Revision Date: 10/25/2021    Print Date: 08/05/2023